

Sagebrush



Sagebrush habitat in Duck Creek Valley, White Pine County. Photo by Elisabeth Ammon.

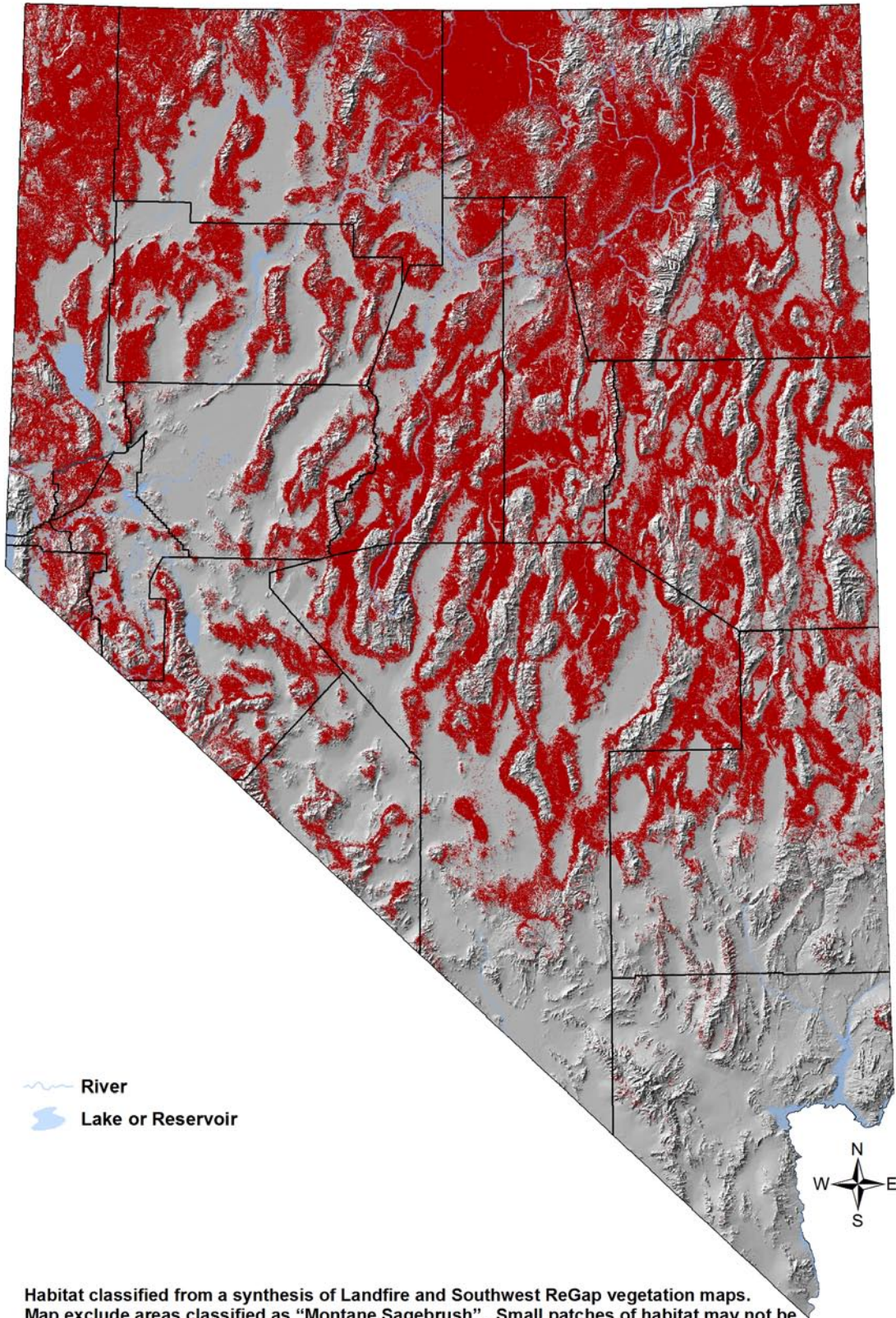
Key Bird-Habitat Attributes

Plant Composition	In sagesteppe (northern NV), about a 1:1 ratio of sagebrush and herbaceous vegetation (mostly perennial bunchgrasses and forbs); in sagebrush shrublands (central and eastern NV), multiple size classes of sagebrush with lesser component of herbaceous understory including forbs
Ideal Scale for Conservation Action	200 ha [500 ac] or larger to accommodate different patch types and avoid fragmentation
Vegetation Structure	Taller sagebrush (~ 1 m [3.3 feet]) are the most valuable, but large landscapes should contain different shrub canopy heights; understory and bare ground preferences vary among Priority species, so maintaining landscape diversity is important
Plant Species	Multiple shrub and forb species increase habitat value for birds
Distance to Water	Water-associated habitats (riparian, marsh, open water, springs) within 1000 m [3,300 ft] increase habitat value
Other Features	Mammal burrows, mineshafts, cliffs, and ephemeral washes add significant value for some priority species

Conservation Profile

Estimated Cover in Nevada	10,450,000 ha [25,800,000 ac] 37% of state
Landownership Breakdown	BLM = 76% Private = 13% USFS = 5% Other = 6%
Priority Bird Species	Greater Sage-Grouse Swainson's Hawk Ferruginous Hawk Golden Eagle Prairie Falcon Burrowing Owl Common Poorwill Gray Flycatcher Sage Thrasher Brewer's Sparrow Sage Sparrow (Sharp-tailed Grouse) (Short-eared Owl) (Pinyon Jay) (Black Rosy-Finch)
Indicator Species	None needed
Most Important Conservation Concerns	Increased fire frequency or intensity Invasive weeds Livestock, wild horse and burro grazing Energy development Conifer encroachment Climate change (change in precipitation and temperature) Urban, suburban, and industrial development Motorized recreation Mining
Habitat Recovery Time	25-100 years
Regions of Greatest Conservation Interest	Northern, northeastern, eastern, and central Nevada
Important Bird Areas	Bilk Creek – Montana Mountains Goshute Mountains Great Basin National Park High Rock Resource Area Jarbidge Mountains Monitor Valley North Ruby Valley Northern Snake Range Ruby Mountains Sheldon NWR Toiyabe Range Washoe Valley Wellington – Pine Grove Hills

Sagebrush



Habitat classified from a synthesis of Landfire and Southwest ReGap vegetation maps. Map exclude areas classified as "Montane Sagebrush". Small patches of habitat may not be visible on this map, and some areas may be misclassified.

Sagebrush

Overview

Of all habitat types in this plan, sagebrush covers the largest portion of Nevada. It occurs primarily in the mid-to-low elevations of the Great Basin portion of the state and in smaller patches at high elevations in the Mojave portion. In this plan, we include only lowland sagebrush communities (< 1,800 m [5,900 ft]) within the Sagebrush habitat type, whereas montane sagebrush is included within the Montane Shrub habitat type. In northern and northwestern Nevada, sagebrush steppe (“sagesteppe”) is characterized by a significant understory of grasses and forbs. In eastern and central Nevada, “Great Basin sagebrush” is often denser and taller, but has relatively little herbaceous understory.

Despite being so widespread, sagebrush shrublands have been degraded to the point that many sagebrush bird species are clearly declining (Rich et al. 2005). The combined effects of altered fire regimes, grazing, and invasive weeds, particularly cheatgrass (*Bromus tectorum*), have stressed large areas beyond their ability to naturally recover (Knick et al. 2003). The vast scale of the problem requires that habitat restoration efforts be carefully planned to address synergistic threats (e.g., Forbis et al. 2006).

Lowland sagebrush canopy cover is typically 6-20% (Davies et al. 2006), with many sagebrush birds preferring the upper end of this range. Tall, dense sagebrush is required by several priority species, but more open, low-growing shrubs or grassy areas are used by others. Understory requirements likewise vary by species, although in general, presence of an understory layer is beneficial both to birds and to increased resilience against invasive weeds (Anderson and Inouye 2001). Most plants that are characteristic of Sagebrush habitats are not well-adapted to continuous grazing pressure (Mack and Thompson 1982), but grazing can be sustainable as long as herbaceous understories are preserved. Studies of grazing effects on sagebrush birds have shown mixed results (Page et al. 1978, Saab et al. 1995).

The role of fire in Nevada’s shrublands, both historically and in a modern context, is complex and deserving of continued study (Donovan et al. 2002). Fire is thought to have been relatively common historically in sagesteppe landscapes, but was apparently far less frequent in Great Basin sagebrush, probably due to the relative lack of fine fuels (Paige and Ritter 1999). Fire is thought to have played some role in shaping the sagebrush / pinyon-juniper interface zone. However, sagebrush is readily killed by fire, and most ecotypes do not resprout from roots and can only regenerate from seed. This suggests that, in general, sagebrush is not well-adapted to fire (BLM 2002). Recovery times for sagebrush stands can be 25 to 100 years or more, and there is little evidence that fire was historically more frequent than in modern times; in fact the opposite could be true. Therefore, fire suppression likely has had little effect in most lowland sagebrush areas (Baker 2006).

In the modern era, the appearance of invasive weeds, sustained grazing by domestic livestock and wild horses, and direct human impacts on fire frequency and intensity have fundamentally altered fire regimes in Great Basin shrublands. Given these new realities, it is imperative to determine how to best manage fire to protect key wildlife habitat in the short-term, while still ensuring long-term habitat viability (BLM 2002).

Sagebrush

Main Concerns and Challenges

The following top conservation concerns were identified in our planning sessions for Sagebrush habitat in Nevada:

- Increased fire frequency or intensity
- Invasive weeds
- Overgrazing by livestock, wild horses and burros
- Energy development
- Conifer encroachment
- Change in precipitation and snowmelt related to climate change
- Change in temperature related to climate change
- Urban, suburban, and industrial development
- Motorized recreation
- Mining

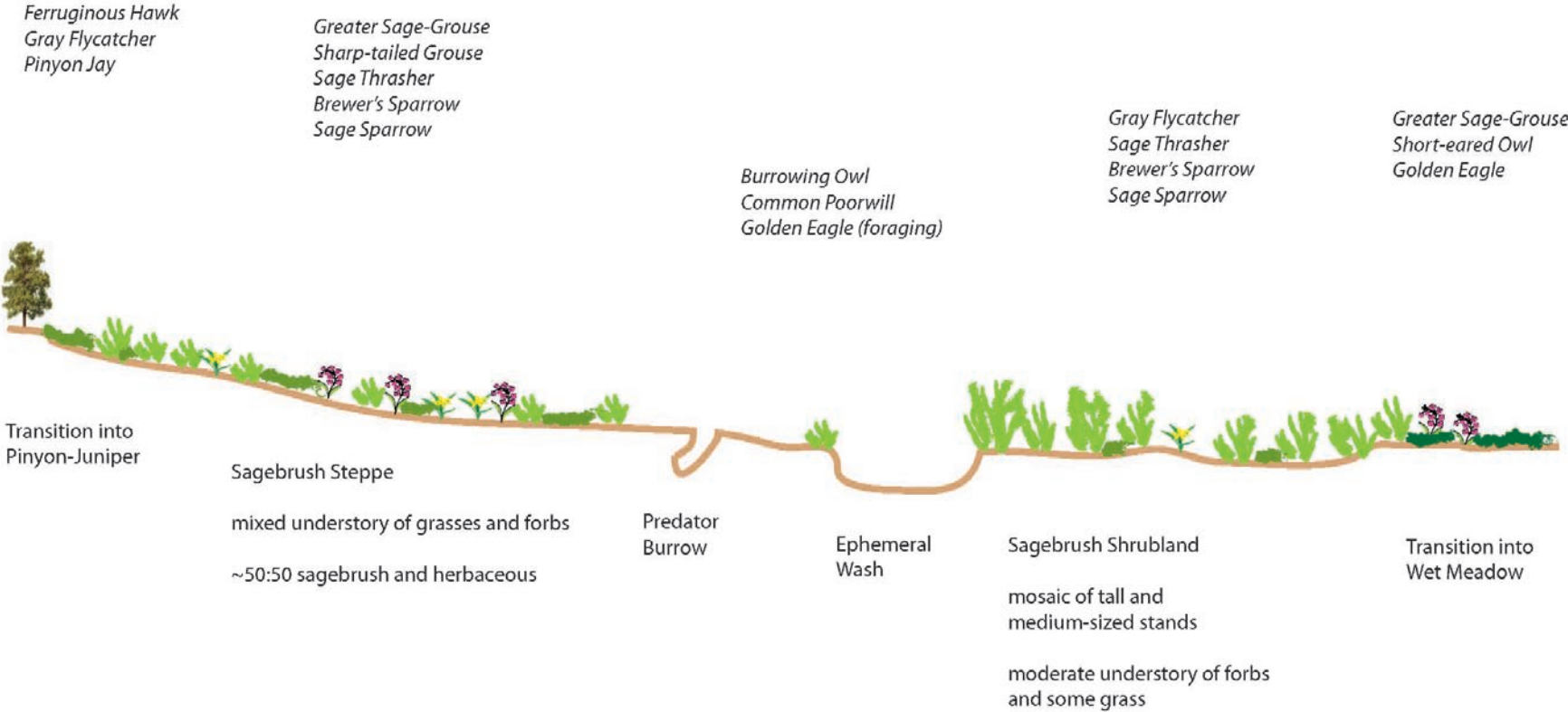
The variety of threats to sagebrush ecosystems have been well reviewed (Paige and Ritter 1999, Dobkin and Sauder 2004, Suring 2005, Chambers et al. 2008, Miller et al. 2011). The most serious threats to lowland sagebrush in Nevada involve the interrelated problems of invasive grasses, increased fire frequency, sustained grazing, and climate change (Knapp 1996, Hunt and Stiver 2000, Neilson et al. 2005, Baker 2006, Chambers et al. 2007, Bradley 2010). Almost one million acres in Nevada, mostly consisting of sagebrush, have been invaded by cheatgrass, and over six million acres of sagebrush have burned since 1999 (23% of total sagebrush cover; NDOW *pers. comm.*). Cheatgrass invasion across this vast landscape, especially in northern Nevada, has increased fire frequency to the point that native shrubsteppe plants cannot re-establish naturally in many places (Whisenant 1990). Therefore, to maintain and restore habitat for sagebrush-dependent species, fire suppression has been recommended for areas where there is a threat of cheatgrass invasion (WAFWA 2009). Fire is likely to be detrimental if intact sagebrush ecosystems have not had time to fully recover from previous disturbances, or if it destroys native understory plants beyond recovery (Baker 2006). For these cases, fire prevention and green-stripping are likely needed as stop-gap measures (Pellant 1994).

Livestock grazing is the most widespread land use on sagebrush ecosystems throughout the Great Basin (Knick et al. 2003), and should be carefully managed to prevent further loss of native herbaceous understories. Sustained heavy grazing by livestock and wild horses can be detrimental when it chronically removes understory vegetation and seedlings, and affects soil integrity (Young 1994, Saab et al. 1995). Additionally, it may compound the problems discussed above by helping to facilitate cheatgrass invasion. Pinyon-juniper expansion into sagebrush is also considered a problem statewide (Suring et al. 2005, Miller et al. 2008), though we believe this concern deserves additional study as discussed in the Pinyon-Juniper habitat account (p. Hab-16-1).

Several sagebrush Priority species are more likely to occur in large patches of sagebrush than in small ones (Knick and Rotenberry 2002), and others are vulnerable to landscape fragmentation (e.g., Greater Sage-Grouse; Knick and Rotenberry 2002). For this reason, the scale at which we recommend managing sagebrush is fairly large, but even larger landscapes that include high-

Sagebrush

Not To Scale



Suitable Patch Size: > 200 ha (440 acres)

Figure Hab-17-1: Idealized sagebrush landscape to maximize the number of sagebrush associated Priority bird species.

Sagebrush

elevation and mesic habitats are required to maintain some species, especially Greater Sage-Grouse. Details on sage-grouse requirements should be based on more specific recommendations provided by the Nevada Sage-Grouse Conservation Team (2004). Habitat conversion and fragmentation from agriculture and development is a concern in many western states (Vander Haegen 2007, Leu et al. 2008), but in Nevada fragmentation of high-quality sagebrush more often occurs as a result of fire or habitat degradation. Similarly, habitat conversion from urban, industrial and energy development can be locally a significant concern (Torregrosa and Devoe 2008, Walston et al. 2009), particularly where high-priority conservation areas such as sage-grouse leks are concerned. Intensive OHV recreational uses can impact sagebrush birds through destruction of herbaceous understory, fragmentation of the landscape, increased fire danger, and introduction of invasive weeds (Barton and Holmes 2007, Ouren et al. 2007).

Climate change is of concern because it may further accelerate the spread of invasive weeds, and establish conditions where fires become more likely. Bradley (2010) predicted that climate change is most likely to negatively impact sagebrush ecosystems in southern Nevada first.



Sagebrush habitat in North Spring Valley,
White Pine County. Photo by John Boone.

Sagebrush

Conservation Strategies

Habitat Strategies

- **Manage at a landscape scale of 200 ha [500 ac]** or larger, if possible. The sagebrush landscape should be allowed to vary in size classes, shrub densities, and amount of understory at a natural scale, depending on soil conditions and fire history. Fragmentation through habitat conversion should be avoided to the extent possible. Because adjacent habitats, especially **mesic areas**, are beneficial to Priority species, impacts should largely be avoided in areas within 1,000 m [3,300 ft] of these features
- Where **Greater Sage-Grouse** occur, species-specific conservation strategies (Spp-8-1) should be implemented at the recommended spatial scales. The majority of these strategies favor other sagebrush-associated species, as well.
- **Native grass and forb understories** should be protected wherever possible. Grazing impacts can be decreased by focusing it on the plants' dormant season and by protecting current season's growth through the nesting season. Manage for at least 50% of annual vegetative growth to remain (Paige and Ritter 1999)
- **Fire prevention and green-stripping** may be a necessary stop-gap measure in areas of critical importance to sage-grouse (e.g., Montana, Bilk Creek, Santa Rosa ranges), but interagency **fire response planning** is needed to ensure long-term maintenance of high-quality sagebrush
- Proximity to **water** (riparian areas, desert springs, wet meadows), presence of **cliffs** > 30 m [100 ft] tall, or **abandoned mines** (which may be gated) raise the priority level of a site for bird conservation. Cliffs and abandoned mines should be surveyed for cliff-nesting Priority species and Black Rosy-Finches in proposed development projects site (see also Hab-4-1)
- The majority of priority bird species nest between **May 1 and July 15**, and some of them are particularly sensitive to nest disturbance. This is the time period when disturbances should be avoided to the extent possible

Research, Planning, and Monitoring Strategies

- Interagency planning of fire management, livestock management, and cheatgrass prevention efforts may be expanded into a **climate-change effects response network** emphasizing increased drought effects (Chambers et al. 2008, 2009)
- **Monitor effects of pinyon-juniper treatments** for effectiveness, and monitor habitat variables important to Priority species, as well as bird responses
- Study **effects of OHV use** on Priority landbirds and habitat integrity
- Continue **long-term monitoring of landbirds** statewide through the Nevada Bird Count
- Monitor status of **invasive weeds** to assess threat level locally and statewide.

Sagebrush

Conservation Strategies - continued

Public Outreach Strategies

- Increase public outreach that emphasizes the **fragility and beauty of intact sagebrush** expanses, with emphasis on responsible off-highway-vehicle use, fire prevention, control of invasive plants, and appreciation of sagebrush birds. Help debunk the notion that sagebrush are “weeds.”
- Increase **outreach to land managers** by holding workshops on sagebrush birds and their habitat needs, providing “best management practices” tools (e.g. *Birds in a Sagebrush Sea*; *Pocket Guide to Sagebrush Birds*: <http://www.sagestep.org/pubs/birdguide.html>), and helping review project plans.



Sagebrush habitat in Duck Creek Valley,
White Pine County. Photo by John Boone.