

Pinyon-Juniper



Pinyon-Juniper habitat on the east slope of Wheeler Peak, White Pine County.
Photo by Elisabeth Ammon.

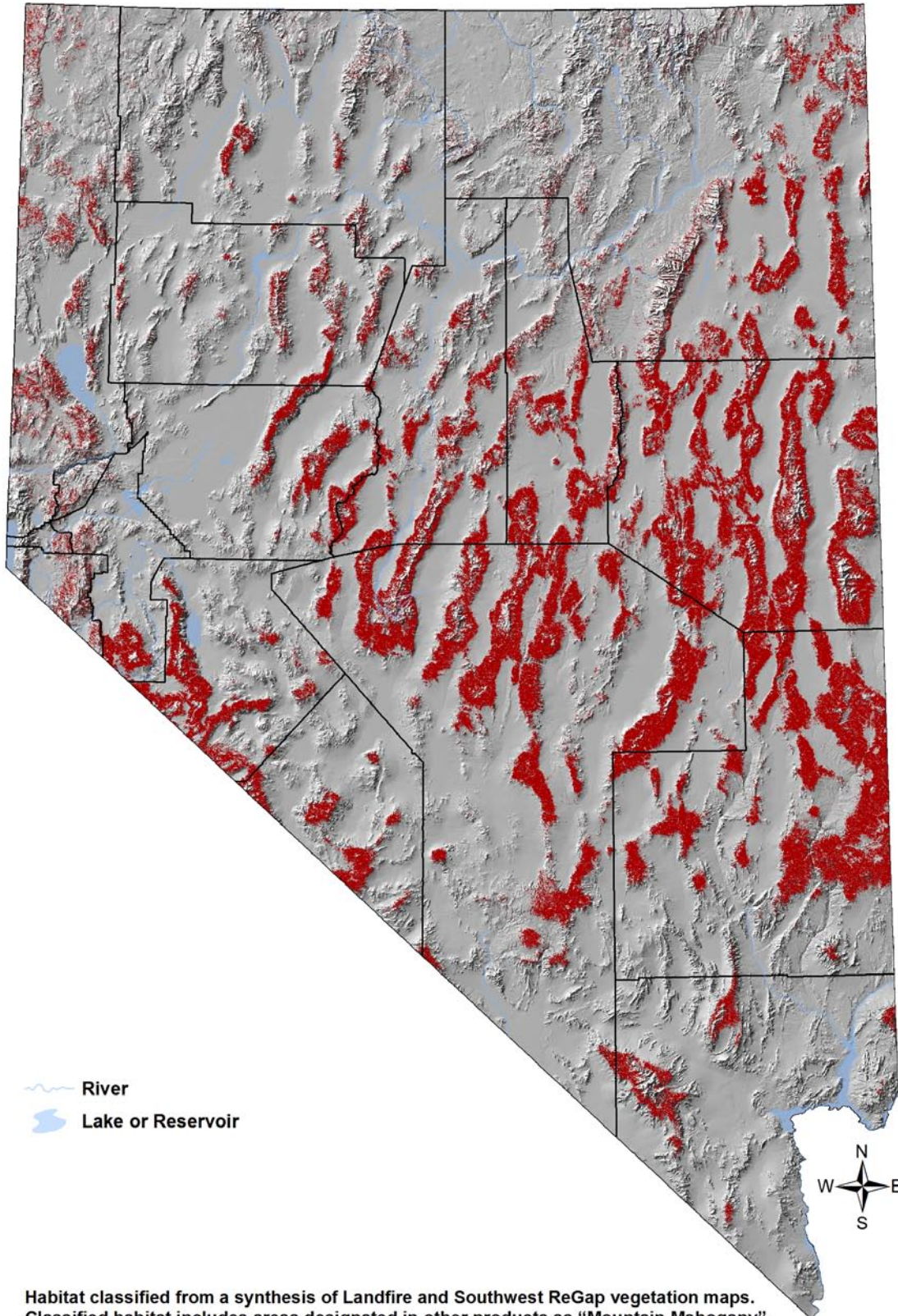
Key Bird-Habitat Attributes

Stand Structure	Multi-aged stands with shrub understory (parkland setting), frequent shrubby openings, and occasional dense-canopy stands
Ideal Scale for Conservation Action	1,400 ha [3,500 ac] or more
Plant Species Composition	Mixed stands of pinyon pine, juniper spp., mountain mahogany (where these can grow), with multiple species of shrubs (often sagebrush) as understory; forbs and flowering shrubs beneficial
Plant Condition	Pine nut and juniper berry crops important to birds; old trees provide snags for cavities; localized insect outbreaks pose little threat, but may create problems if widespread
Distance to Riparian/Spring Habitats	Proximity of water-dependent habitat increases value to birds
Presence of Cliffs > 30 m [100 ft] Tall	Presence of tall cliffs increases value to birds
Other Features	Abandoned mine shafts increases value to birds; may be gated

Conservation Profile

Estimated Cover in Nevada	3,695,000 ha [9,130,000 acres] 13% of state
Landownership Breakdown	BLM = 64% USFS = 26% Private = 5% Other = 5%
Priority Bird Species	Ferruginous Hawk Common Poorwill Gray Flycatcher Gray Vireo Pinyon Jay Virginia's Warbler Green-tailed Towhee Black-chinned Sparrow (Northern Goshawk) (Golden Eagle) (White-throated Swift)
Indicator Species	Juniper Titmouse Black-throated Gray Warbler
Most Important Conservation Concerns	Changes in fire intensity / frequency Insect outbreaks Livestock grazing Climate change (changes in precipitation) Urban, suburban, and industrial development Motorized recreation Invasive weeds
Recovery Time	75 years
Regions of Greatest Conservation Interest	White Pine, Lincoln, Lander, Clark, and northern Nye counties
Important Bird Areas (Mclvor 2005)	Carson Range D.E.M. Bird and Wildlife Sanctuary Goshute Mountains Great Basin National Park Jarbidge Mountains Monitor Valley Mount Grant Northern Snake Range Ruby Mountains Spring Mountains Toiyabe Range Wellington-Pine Grove Hills

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Habitat classified from a synthesis of Landfire and Southwest ReGap vegetation maps. Classified habitat includes areas designated in other products as "Mountain Mahogany". Small patches of habitat may not be visible on this map, and some areas may be misclassified.

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Overview

Pinyon pine and juniper woodlands currently cover 12% of Nevada, approximately 3.5 million ha [9.1 million ac], accounting for an estimated 15% of their range-wide distribution (Mitchell and Roberts 1999). Nevada contains several juniper species, but Utah juniper (*Juniperus osteosperma*) is predominant. Of the two species of pinyon pines found within the Great Basin, only the single-leaf pinyon (*Pinus monophylla*) is known to occur in Nevada (Charlet 1996). Over the past 150 years, pinyon-juniper woodlands throughout the West and in Nevada have expanded into other habitat types and increased in density (Miller et al. 1995, Bauer and Weisberg 2009). The reasons for this range expansion and stand infill are speculated to include altered fire regimes, grazing, natural range expansion, recovery from past impacts, and a changing climate (Romme et al. 2009). Regardless of underlying mechanisms, which are undoubtedly complex, the changes in pinyon-juniper woodlands cause two main concerns to the wildlife manager: 1) the conversion of other high-priority habitat types (e.g., sagebrush) into woodlands, and 2) impacts of increasingly dense stand conditions on pinyon-juniper associated wildlife species, and its possible role in increasing the risk of large-scale destructive fires.

Ironically, despite the increased amount of Pinyon-Juniper habitat on the landscape, species such as Pinyon Jay, Western Scrub-Jay, and Mountain Chickadee are undergoing steep and significant population declines in the pinyon-juniper biome (Sauer et al. 2008). As non-migratory seed-eaters, these species represent a suite of birds that rely almost exclusively on pinyon-juniper woodlands. Therefore, significant bird conservation concerns exist not only for habitat types that are being encroached upon by pinyon-juniper, but for Pinyon-Juniper habitat itself.

From a bird conservation perspective, the ideal pinyon-juniper woodland has a mostly open canopy with a significant shrub understory (Fig. Hab-16-1). Based on Nevada Bird Count data, the Priority bird species associated with pinyon-juniper woodland are more abundant in these types of stands than in predominantly closed-canopy stands. Small groves of high-density trees interspersed in the woodland landscape are tolerated, and may in fact be beneficial for some species or for a subset of life history requirements. More generally, trees of diverse ages should be present within large pinyon-juniper landscapes, with at least some mature, seed-bearing trees (Gillihan 2006). The preferred open canopy structure is most often observed in two situations; 1) old-growth stands on rocky ridges and ravines, and 2) early-mid successional woodland stages that typify the pinyon-juniper “expansion” zones.

Currently, pinyon-juniper management typically focuses on removal of trees in so-called Phase I and II stands, which equate to the early and mid-successional encroachment sites that appear to be most valuable to birds (Miller et al. 2008). The goal of these treatments is often to reclaim sagebrush habitat, but the result of these treatments is often the removal of perhaps the most biologically valuable part of the pinyon-juniper woodland. Phase III stands (late-successional stands with high canopy closure), which are bird-poor and which have the potential to carry fire over long distances, are rarely targeted for tree removal projects because they are less accessible and are not perceived to be a threat to sagebrush. It is our recommendation that the processes that promote woodland infill, the ecology of pinyon-juniper expansion, and the inter-relationship of these factors with fire regimes and fire risk need to be carefully evaluated in order to determine the most beneficial management actions within the pinyon-juniper / sagebrush interface zone.

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Minimally, pinyon-juniper projects seeking to reclaim sagebrush habitat should try to avoid creating sharp habitat edges between reclaimed shrubland and dense, closed-canopy woodland

Main Concerns and Challenges

The following top seven conservation concerns were identified in our planning sessions for Pinyon-Juniper habitat in Nevada:

- Changes in fire regimes and intensity
- Insect outbreaks
- Livestock, wild horse and burro grazing
- Change in precipitation and snowmelt related to climate change
- Urban, suburban, and industrial development
- Motorized recreation
- Invasive weeds

In the near term, the main challenge associated with managing pinyon-juniper woodlands is that there are different perceptions within the resource management community about the nature of current pinyon-juniper dynamics, different interpretations of desirable condition, and different priorities regarding the most pressing issues to address. Pinyon-Juniper woodland distribution is inherently unstable, given the evolution of dispersal mechanisms (seed caching by birds and rodents) that result in variable local colonization events. The differing opinions about how to best intercede in this system to facilitate beneficial wildlife outcomes and manage fire risk reflect the complexity of the interrelated mechanisms that determine woodland distribution and structure.

Interestingly, research on past and current fire regimes shows mixed results, and the notion that low-intensity, frequent fires maintained pinyon-juniper woodlands historically is not necessarily supported (Baker and Shinneman 2004). Instead, fires in pinyon-juniper woodlands were likely severe, with long average return intervals of > 400 years (Baker and Shinneman 2004, Bauer and Weisberg 2009). Therefore, fire exclusion, which is often cited as a factor in pinyon-juniper expansion, likely occurred primarily in adjacent shrublands rather than in woodlands (Bauer and Weisberg 2009).

Most of the other conservation concerns tend to be fairly localized in scope and modest in severity. The impacts of climate change, in contrast, are difficult to predict and could be systemic. Growth of pinyon pines decreases with decreased winter/spring precipitation and increased June temperatures, and their regeneration may be threatened by increasingly long droughts (Barger et al. 2009). Prolonged droughts are also considered a significant contributor to insect outbreaks that can kill large stands of trees (Breshears et al. 2005).

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Not To Scale

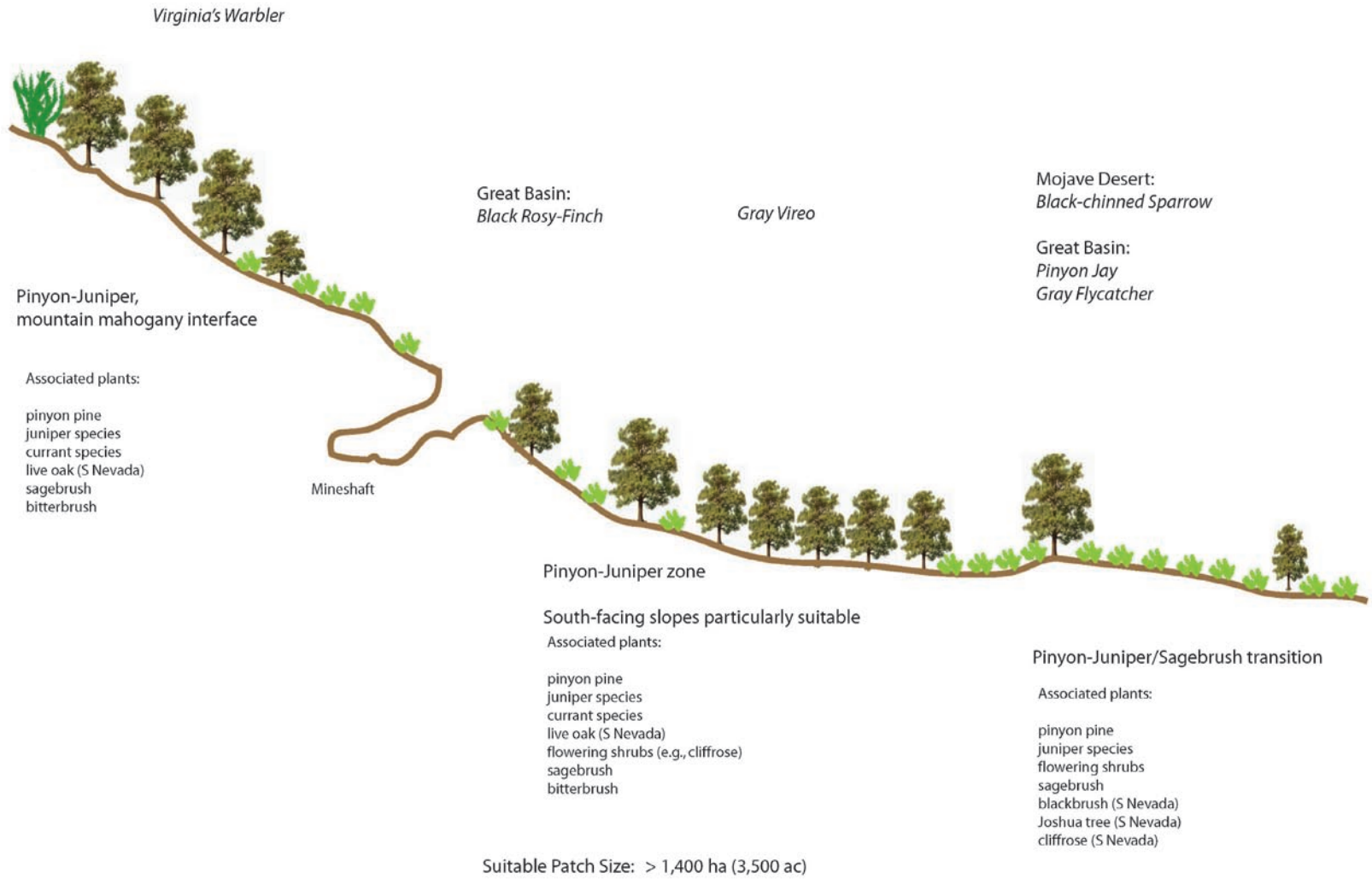


Figure Hab-16-1: Idealized pinyon-juniper woodland landscape to maximize the number of pinyon-juniper associated Priority bird species.

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Conservation Strategies

Habitat Strategies

- **Manage at landscape scale** (> 1,400 ha [3,500 ac]) with the goal of maintaining predominantly **open woodlands with xeric shrub understory**, including flowering shrubs and forbs, and a variety of tree ages, including cone-bearing trees. Multiple overstory species (pinyon pine, juniper spp., mountain mahogany), and **high plant species richness** in the understory, where environmental conditions exist to support them, are particularly desirable for Priority bird species
- Proximity to **water** (riparian areas, 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
- When implementing pinyon-juniper control measures, creation of sharp woodland edges should be avoided. Instead, **feathering of the woodland / shrubland edge preferred**, with the goal of creating a varied transition zones is recommended. Treatments that generate patchiness within dense extensive stands would likely benefit most Priority species
- Maintain **grazing and OHV use** at levels that do not permanently impact the shrub and forb understory or cause soils to be unnaturally exposed
- 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 whenever possible
- In the **southern regions** of Nevada (primarily Clark, Lincoln, and Nye counties), protect old-growth stands on **rocky ridges and ravines**, and at the **interface with Joshua Tree woodlands** from impacts to habitat integrity in order to preserve Gray Vireo and Black-chinned Sparrow strongholds.

Research, Planning, and Monitoring Strategies

- Encourage **experimental treatments** of mid-elevation pinyon-juniper that is overgrown to determine whether open woodlands with sufficient shrub understory can be restored in the interior of woodlands, away from the pinyon-sagebrush edge
- **Monitor effects of pinyon-juniper treatments** for effectiveness and bird responses, and monitor habitat variables important to Priority species
- Continue **long-term monitoring of landbirds** statewide through the Nevada Bird Count

Public Outreach Strategies

- **Promote public appreciation** of healthy pinyon-juniper woodlands, their bird community, aesthetics of trees, sustainable pine nut harvest, importance of native understory vegetation, and threats from off-road vehicle recreation and weed invasion.