

Aspen



Aspen patch in the Great Basin (Peavine Peak, Washoe County).
Photo by John Boone.

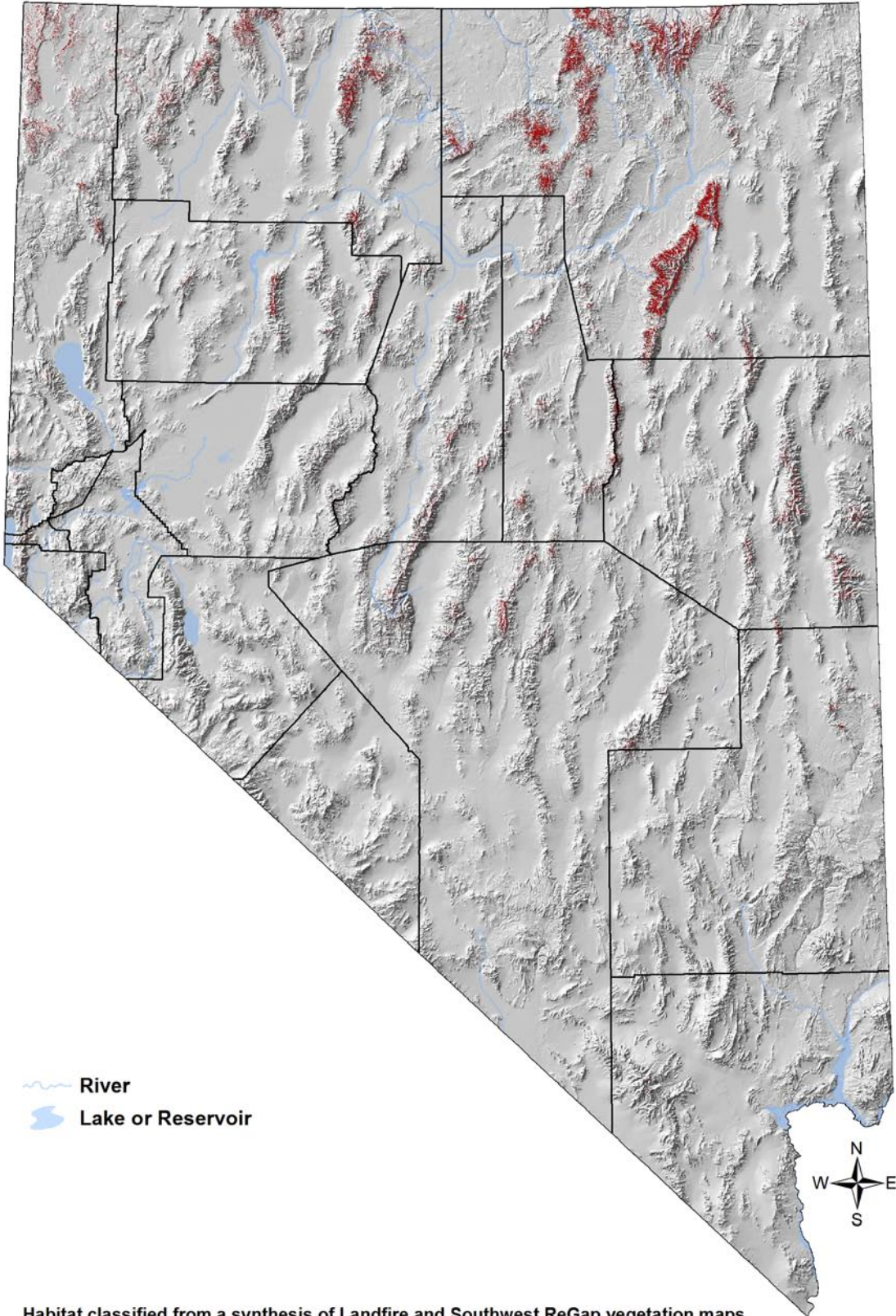
Key Bird-Habitat Attributes

Stand Structure	Aspen of various age classes, with understory of mesic shrubs, grasses, and flowering forbs Canopy closure ~ 30 – 40% ideal Understory cover > 50% ideal Large standing snags > 30 cm [12 in] dbh
Ideal Scale for Conservation Action	Whole stand
Plant Species Composition	Aspen, wild rose, currant, and other mesic species, flowering forbs and native graminoids
Understory	Intact graminoid and flowering forb understory important Understory cover > 50% ideal
Mosaic	Juxtaposed or interspersed Montane Riparian and Montane Shrubland habitat beneficial (except where bordered by Coniferous Forest)
Presence of Cliffs > 30 m [100 ft] Tall	Presence of tall cliffs increases value to birds

Conservation Profile

Estimated Cover in Nevada	274,000 ha [677,200 ac] 1% of state
Landownership Breakdown	USFS = 51% BLM = 31% Private = 14% Other = 4%
Priority Bird Species	Sooty Grouse Dusky Grouse Mountain Quail Northern Goshawk Flammulated Owl Calliope Hummingbird Rufous Hummingbird Lewis's Woodpecker Williamson's Sapsucker Green-tailed Towhee (Greater Sage-Grouse)
Indicator Species	Dusky Flycatcher Orange-crowned Warbler MacGillivray's Warbler Red-naped Sapsucker
Most Important Conservation Concerns	Livestock and wild horse grazing Conifer encroachment Changes in fire regimes Motorized and non- motorized recreation Climate change (change in precipitation and temperature) Plant pathogens Insect outbreaks Invasive weeds Mining
Recovery Time	30 years
Regions of Greatest Conservation Interest	Elko, Humboldt, Washoe, White Pine, Lander, Eureka, and northern Nye counties
Important Bird Areas	Bilk Creek-Montana Mountains Carson Range Great Basin National Park Jarbidge Mountains Northern Snake Range Ruby Mountains Sheldon NWR Spring Mountains Toiyabe Range

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

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Overview

Quaking aspen (*Populus tremuloides*) is the most widely distributed native tree in North America (Rogers et al. 2007), but it covers only about one percent of Nevada's landscape. These limited patches of aspen rank among Nevada's most important wildlife habitats (Flack 1976, Dobkin et al. 1995), and also among the most threatened. From our observations during Nevada Bird Count surveys, the majority of Nevada's aspen stands are small, and they are most often associated with an obvious water source, such as alpine snowpockets, montane riparian systems, montane springs, and ephemeral snowmelt drainages. The majority of scientific literature about aspen comes from studies of larger, "upland" stands that are common in the Rocky Mountain states (e.g., Flack 1976). In Nevada, however, large non-riparian stands are mostly restricted to areas with higher-than-average precipitation, such as the Ruby Mountains. Therefore, more study is needed of small stands of aspen in more arid settings, especially in the central Great Basin.

Aspen woodlands invariably draw the attention of hikers, campers, riders, and passing sightseers, and they are also sought out by grazing animals for forage and shade. Aspen stands are likewise a magnet for birds for several reasons. They are associated with relatively moist, rich soils, and are therefore more productive than uplands (Rogers et al. 2007). Aspen also stand out in their propensity to become infected with heartrot fungi (primarily *Phellinus tremulae*) while still alive, with up to 20% of trees infected by 100 years of age (Hart and Hart 2001). This makes them ideal for the construction of nest cavities by birds. The heartwood is easily excavated while the sapwood remains intact, allowing a tree to be used for years, if not decades, before it finally dies (Hart and Hart 2001). Because a dead aspen usually falls within a few years, more cavities can typically be found in live aspens than in dead ones. The cavities created by woodpeckers also benefit many secondary cavity nesters, such as House Wrens, swallows, chickadees, bluebirds, and small owls (Dobkin et al. 1995).

Aspen is unusual in that it is a clonal species, with short-lived (generally < 150 years) genetically identical trees arising from the parental root system (Rogers et al. 2007). Most aspen reproduction in the American West is vegetative, with suckers arising from nodes on the roots. Sexual reproduction via seed is extremely rare in this region, and the modern climate is believed to be mostly unsuitable for seeds to germinate and establish. Romme et al. (2001) argued, however, that while vegetative reproduction is effective for maintaining aspen in a stable climate, occasional seedling establishment is necessary for aspen to adapt to changing environmental conditions and to colonize new patches. While some stands remain stable over long periods (Mueggler 1985), most stands occasionally require a stand-replacing disturbance, such as fire, in order to persist over the long term. When the overstory trees are killed in a healthy stand, growth suppressants produced in the leaves no longer reach the roots, and new stems resprout profusely throughout the clone (Schier et al. 1985).

Aspen stands typically have high bird abundance and richness, and thus it is critical for avian conservation to protect as many existing aspen stands as possible (Griffis-Kyle and Beier 2003). Figure Hab-3-1 illustrates an idealized aspen stand in a typical Nevada setting with the habitat elements required by Priority bird species.

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Main Concerns and Challenges

The following top conservation concerns were identified for aspen in our planning sessions:

- Persistent overgrazing by domestic livestock and feral horses
- Conifer encroachment (primarily in western Nevada)
- Changes in fire regimes
- Motorized and non-motorized recreation
- Change in precipitation and snowmelt resulting from climate change
- Change in temperature resulting from climate change
- Plant pathogens
- Insect outbreaks
- Invasive weeds
- Mining (where habitat conversion occurs)

Most researchers and forest managers have concluded that a large proportion of the aspen stands across Nevada and much of the west are in decline (Brown et al. 2006). In many regions, it is easy to locate sites of stands that are now extirpated, or in imminent danger of extirpation, due to lack of vegetative regeneration. Causes of decline vary by region, but commonly-attributed factors include sustained overgrazing (which we define to include over-browsing in the context of Aspen habitat), reduced fire return intervals, invasion of aspen stands by conifers, climate change effects, plant disease, and heavy recreational use. These factors can conspire to prevent or discourage vegetative recruitment and, when sustained for long periods of time, lead to stand senescence and eventual death. Additionally, they often result in degradation or destruction of the understory layer. Threats may be compounded, for example, when fire removes the overstory trees and overgrazing eliminates the post-fire regeneration (Mueggler 1985, Schier et al. 1985). Large-scale mortality of aspen also has been increasing in recent years in a phenomenon known as “Aspen Dieback” (or Sudden Aspen Decline). This not only causes stem die-off, but also kills much or all of the root systems of aspen clones. Stand maturation, drought, elevation, aspect, and secondary agents, such as cankers, bark beetles, borers, all appear to play a role (Worrall et al. 2008), but the phenomenon is still poorly understood.

In western Nevada, conifer invasion is perhaps the most immediate threat to persistence of aspen stands, but in many other parts of Nevada, sustained grazing that discourages the establishment of young trees has emerged as a leading concern (Kay 2001). Low elevation aspen stands are particularly vulnerable because of their accessibility. When overgrazing continues over many years or decades, aspen clones eventually become physiologically exhausted, lose their ability to produce new growth, and die out. Aspen stands at risk for this outcome have a distinctive appearance – they consist exclusively of older trees with relatively little understory vegetation. In fact, degraded aspen woodlands have become so prevalent in Nevada that they are assumed by many to represent the normal condition. However, if successful stem regeneration is allowed to occur occasionally (by providing occasional rest periods from grazing pressure), young aspen stems should become well enough established to rejuvenate the stand.

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Not to Scale

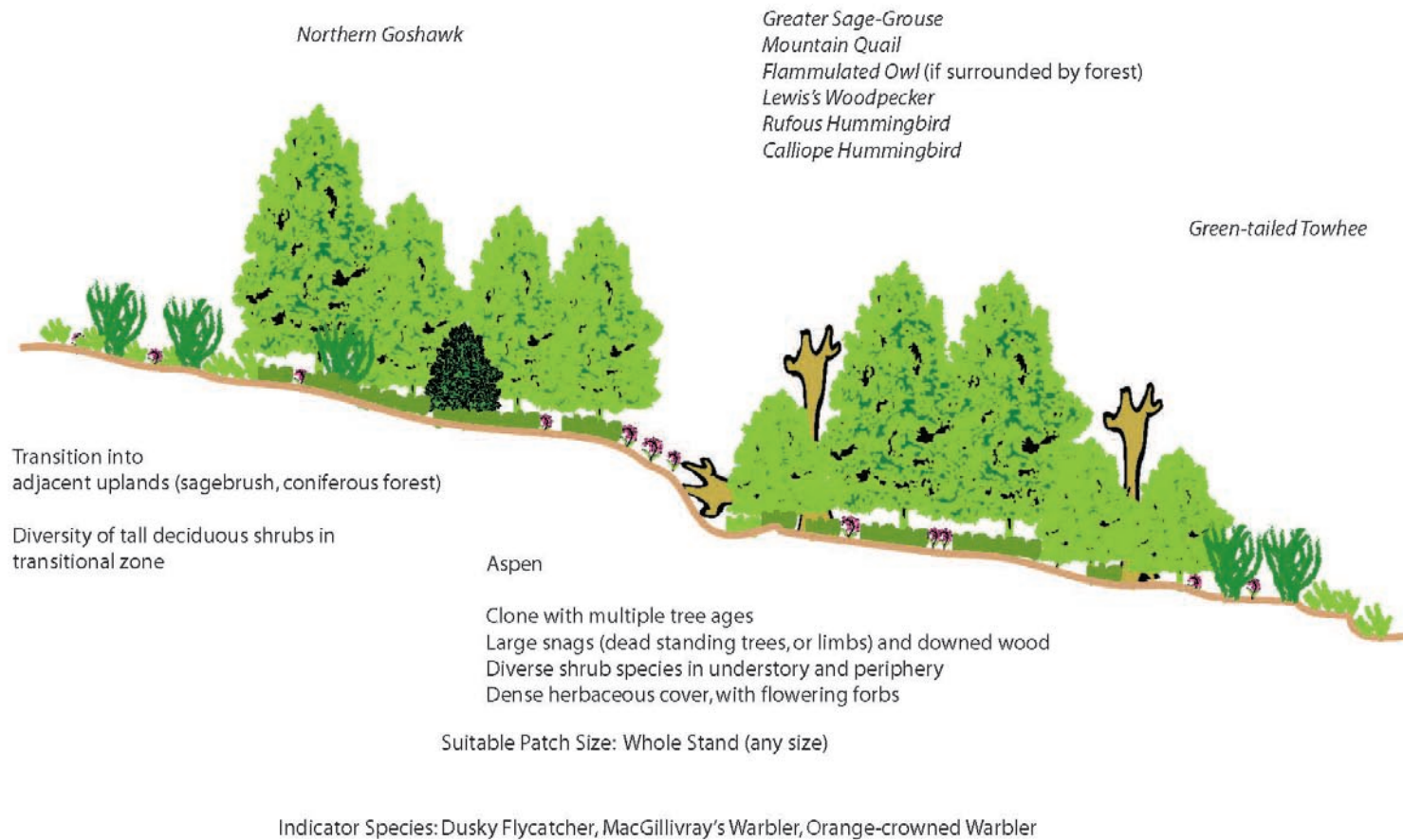


Figure Hab-3-1: Idealized aspen woodland landscape to maximize the number of aspen associated priority bird species.

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Conservation Strategies

Habitat Strategies

- **Manage at the scale of a whole aspen stand** if possible
- A **diversity of age and size classes, active recruitment of root sprouts, preservation of snags, and intact forb understory** are keys habitat values for all Priority species (see parameters above in Key Bird–Habitat Attributes table). Any land uses that chronically reduce aspen recruitment and native understory vegetation inside the stand and in adjacent areas should be minimized
- **Stand replacement by fire** may be used as a management tool to encourage aspen regeneration; however, sites where large individual trees or snags provide nesting opportunities for Priority species (Northern Goshawk, Lewis’s Woodpecker) may need to be excluded from such treatments
- **Restoration efforts**, especially livestock exclosures, grazing rest periods, or conifer thinning, can be effective in allowing heavily impacted stands to recover
- **Recreational uses** should be actively managed in areas that are popular. Alternate shade structures, trail planning to avoid aspen recruitment and understory patches, and discouragement of wood carvings are priorities

Research, Planning, and Monitoring Strategies

- The **Nevada Aspen Working Group** (<http://www.aspensite.org/Nevada.html>) should continue to conduct inventories and research, publicize aspen conservation values, and raise funds for protection and restoration. Aspen stands have, to date, not been fully inventoried in the state, particularly stands that are too small to be reflected in remote sensing maps. The lack of a **comprehensive aspen inventory** prevents us from monitoring losses and implementing adaptive management in light of climate change effects.
- A **Western Aspen Alliance** is being developed between The Forest Service Rocky Mountain Research Station and Utah State University to address aspen issues that occur in the west (<http://www.western-aspen-alliance.org/>)
- Continue **long-term monitoring of landbirds** in Nevada aspen stands through the Nevada Bird Count.

Public Outreach Strategies

- Distribution of **public education materials**, such as the “Aspen: Oasis in the Desert” poster of the **Nevada Aspen Working Group**, should be pursued to promote appreciation of, and prevention of unintentional damage to, Nevada’s aspen. Additional materials may be prepared for popular trail heads to encourage recreationists to practice low-impact use of aspen stands
- **Workshops** for land managers and private landowners, such as those held by the **Nevada Aspen Working Group**, should continue in order to educate people about the unique values of, and threats to, aspen stands
- **Outreach to landowners and land managers** through the IBA program and partner agencies should continue to be pursued to assist with specific conservation actions in high-priority aspen areas.