

# Aspen



Typical aspen woodland setting in the Great Basin portion of Nevada (Peavine Peak, Washoe County). Photo by John Boone.

## Key Bird-Habitat Attributes

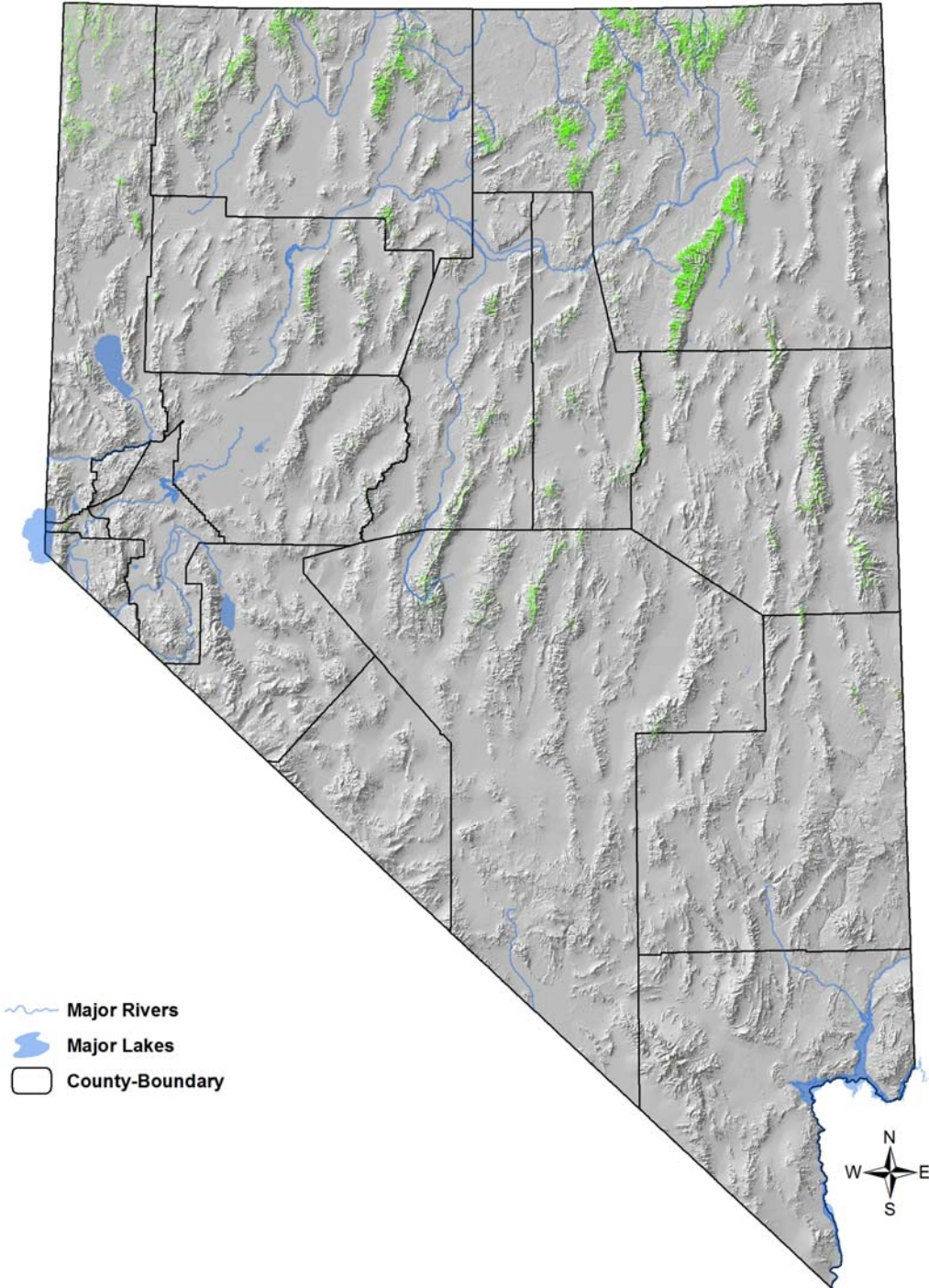
Stand Structure	Aspen at various age classes and shrubs of mesic species, with grass and flowering forb understory, transition into montane shrublands with additional deciduous shrub species
Ideal Scale for Conservation Action	Whole stand
Plant Species Composition	Aspen, wild rose, currant, and other mesic species, flowering forbs and native graminoids as understory
Understory	Intact stands of graminoid and forb understory important to some species, particularly the flowering forbs
Distance to Riparian/Spring Habitats	Proximity of other water-dependent habitats increases value to birds
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	Northern Goshawk Greater Sage-Grouse Mountain Quail Lewis's Woodpecker Calliope Hummingbird Rufous Hummingbird Green-tailed Towhee (White-throated Swift) (Prairie Falcon) (Golden Eagle)
Indicator Species	Cooper's Hawk MacGillivray's Warbler Orange-crowned Warbler
Past Impacts	Livestock Plant Pathogens Encroachment by other Habitat Types
Most Important Threats	Climate Change Livestock Plant Pathogens Recreation (especially OHV-based) Encroachment by other Habitat Types
Recovery Time	30 years
Regions of Greatest Conservation Interest	Elko, Humboldt, Washoe, White Pine, Lander, Eureka, and Nye counties
Important Bird Areas	Ruby Mountains, Great Basin National Park, Northern Snake Range, Carson Range, Spring Mountains, Toiyabe Range, Monitor Valley

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Quaking aspen (*Populus tremuloides*) is the most widely distributed native tree in North America (Hollenbeck 2006, Rogers et al 2006), but aspen occupies only about one percent of Nevada's landscape. These patches of aspen are among Nevada's most ecologically and esthetically valuable, and also among the most threatened. Aspen woodlands are sought out by domestic livestock for foraging and shelter, and they invariably draw the attention of hikers, campers, riders, and passing sightseers. Aspen woodlands are also biologically unusual. Aspen is a clonal species, with short-lived (generally < 150 years), genetically identical trees arising from the parental root system (Jones and DeByle 1985, 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. (2005) argued, while vegetative reproduction is effective for maintaining aspen in a stable climate, at least 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, growth suppressants (e.g., auxin) produced in the leaves can no longer reach the roots, and hormonal growth promoters (e.g., cytokinins) in the roots result in new aspen stems (Schier et al. 1985).

Most researchers and forest managers have concluded that a large proportion of the aspen stands across Nevada and the west are in decline (Brown et al. 2006). In many regions of Nevada, 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 reduced fire return intervals, invasion of aspen stands by conifers, climate change, disease, sustained herbivory, and heavy recreational use. These factors prevent or discourage vegetative recruitment and, when sustained for long periods of time, lead to stand senescence and eventual death. Threats can be compounded, for example, when fire removes the overstory trees and excessive herbivory eliminates the post-fire regeneration (Mueggler 1985, Schier et al. 1985). Large-scale mortality of aspen has also been increasing in recent years in a phenomenon known as "Aspen Dieback", the causes of which are still unknown. Where it occurs, it not only causes stem die-off, but also kills much or all of the root systems of sometimes ancient aspen clones. Stand maturation, drought, elevation, aspect, and secondary agents, such as cankers, bark beetles, borers, appear to play a role (Worrall et al. 2008), but the phenomenon is still very poorly understood.

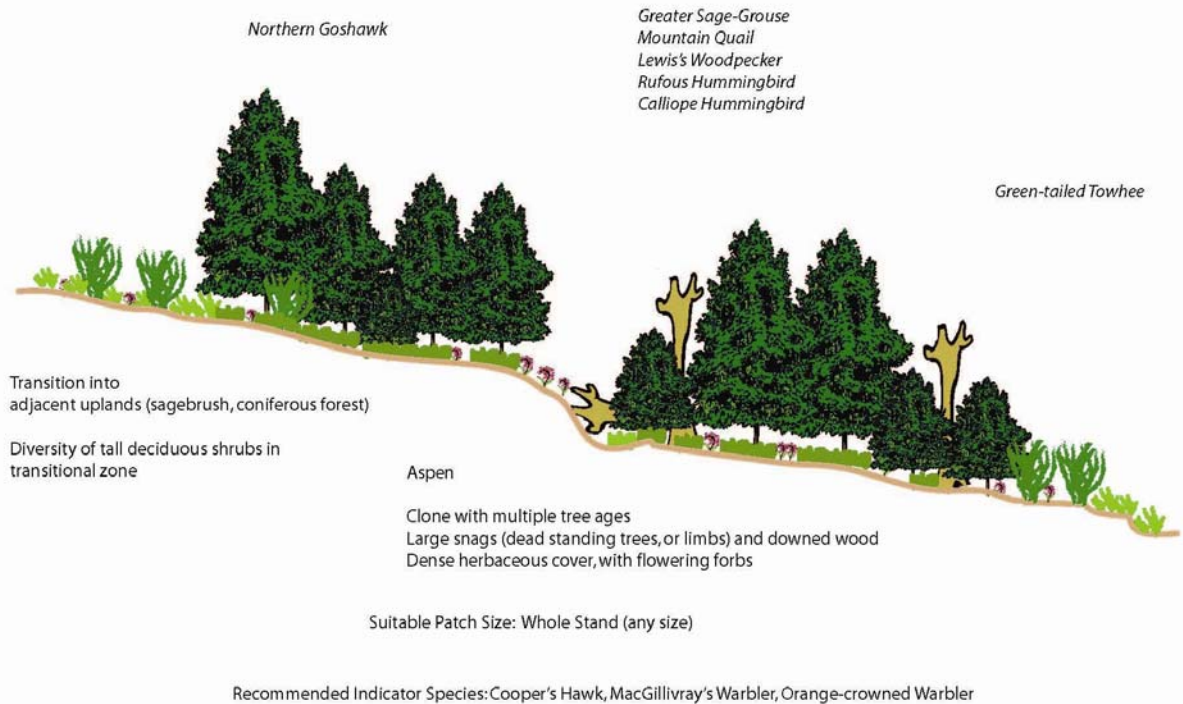
In many parts of Nevada, sustained herbivory that discourages the establishment of young trees has emerged as a leading cause of past aspen declines (Kay 2001). In far western Nevada and in other high-elevation aspen, conifer invasion is also an important management issue. Low-elevation aspen stands are particularly attractive to domestic and feral livestock across much of this arid state because of their abundance of high-quality forage, proximity to water, and opportunities for shelter. Ungulates selectively browse younger, more palatable aspen stems and understory vegetation, and often spend long periods of time in the stands. When intense grazing pressure continues over many years or decades, aspen clones eventually become physiologically exhausted and may lose their ability to produce new growth. Aspen stands in this condition have

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a distinctive appearance – they consist of older trees with relatively little understory vegetation. In fact, degraded aspen woodlands have become so prevalent in many of Nevada’s mountain ranges that they are assumed by many to represent the normal condition. If this condition persists, the affected stands may eventually be lost without chances of recovery. If successful stem regeneration is allowed to occur occasionally, young aspen may become well enough established for the stand to hold up to other threats for a period of time.

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*Not to Scale*



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## Conservation Strategies

### Habitat Strategies

1. Manage at the scale of a whole aspen stand, if at all possible. In large stands, sections may be designated for conservation, particularly if they have habitat features that benefit birds (see below).
2. Various aspen age and size classes, and active recruitment of root sprouts, are key for sustaining aspen clones. Any land uses that impact the recruitment process should be minimized.
3. Stand replacement by fire is natural if it occurs at the natural intervals; however, excessive use of fire to encourage recruitment may be a problem where large individual trees or snags provide nesting opportunities for priority species (Northern Goshawk, Lewis's Woodpecker).
4. A species-rich understory of forbs and graminoids is important for maintaining several priority species (Greater Sage-Grouse, Calliope Hummingbird, Rufous Hummingbird), and a diversity of shrubs at the margins and in openings in the stand is important to these and others (e.g., Green-tailed Towhee). Therefore, any land uses that impact the understory excessively should be minimized.
5. Recreational use should be 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.

### Public Outreach

1. Distribution of public education materials, such as the "Aspen: Oasis in the Desert" poster of the Nevada Aspen 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 discourage recreationists from wood carvings and destruction of the fragile understory.
2. Workshops for land managers and private landowners, such as those held by the Nevada Aspen Group, should continue to educate of the unique values of, and threats to, aspen as bird habitat.

### Research, Planning, and Monitoring

1. The Nevada Aspen Group should continue in its efforts to raise the profile, conduct inventories and research, raise funds for protection and restoration, of aspen in Nevada.
2. A comprehensive, statewide inventory of the often-small clones of aspen in Nevada has not yet been conducted. A high priority should be to document the location, size, and stand condition of all aspen stands in Nevada, including the small ones that may be in danger of extirpation due to climate change and other threats.