

Lowland Riparian Woodlands



Upper San Pedro River, photo by ©Bureau of Land Management

Key Habitat Characteristics Profile

Elevational Range ²
80 – 4,000 feet
Vegetation Structure ³
Multi-aged, multi-layered stands of deciduous trees and shrubs, as well as emergent and wet meadow grasses and forbs
Plant Species Composition ³
Fremont cottonwood, sycamore, Goodding's and other willow species, alder, cypress, walnut; sometimes invaded by salt cedar or Russian olive
Important Microhabitats ⁶
Large snags or senescent trees (DBH ≥ 12") for cavity nesters, emergent wetlands, riparian shrub thickets (ideally native species), plants and aquatic habitats with high insect productivity
Fire Regime
Natural fire regimes unknown, but likely mostly low-intensity and local fires; invasive species make it more flammable than historically and lead to high-intensity fires
NRCS Major Land Resource Areas
30 - Mohave Desert 31 - Lower Colorado Desert 40 - Sonoran Basin & Range 41 - SE AZ Basin & Range

Conservation Profile

Estimated Cover in Arizona ²	
365,427.36 ac 0.50% of state	
Land Ownership Breakdown ²	
Federal	29.89%
Private	22.56%
Tribal	26.73%
State	10.56%
Other	0.26%
Most Important Conservation Concerns	
Urban/rural development Unsustainable agricultural practices Mining and quarrying Water management/use (groundwater) Non-native invasive plants Climate change (drought, temperature extremes, fire)	
Habitat Recovery Time	
10 – 50 years	
Vulnerability to Climate Change ^{1,5,7,8}	
Vulnerability	High
Effects	Loss of snowpack runoff, higher competition with other water uses
Response	Loss of native riparian vegetation and perennial streams.

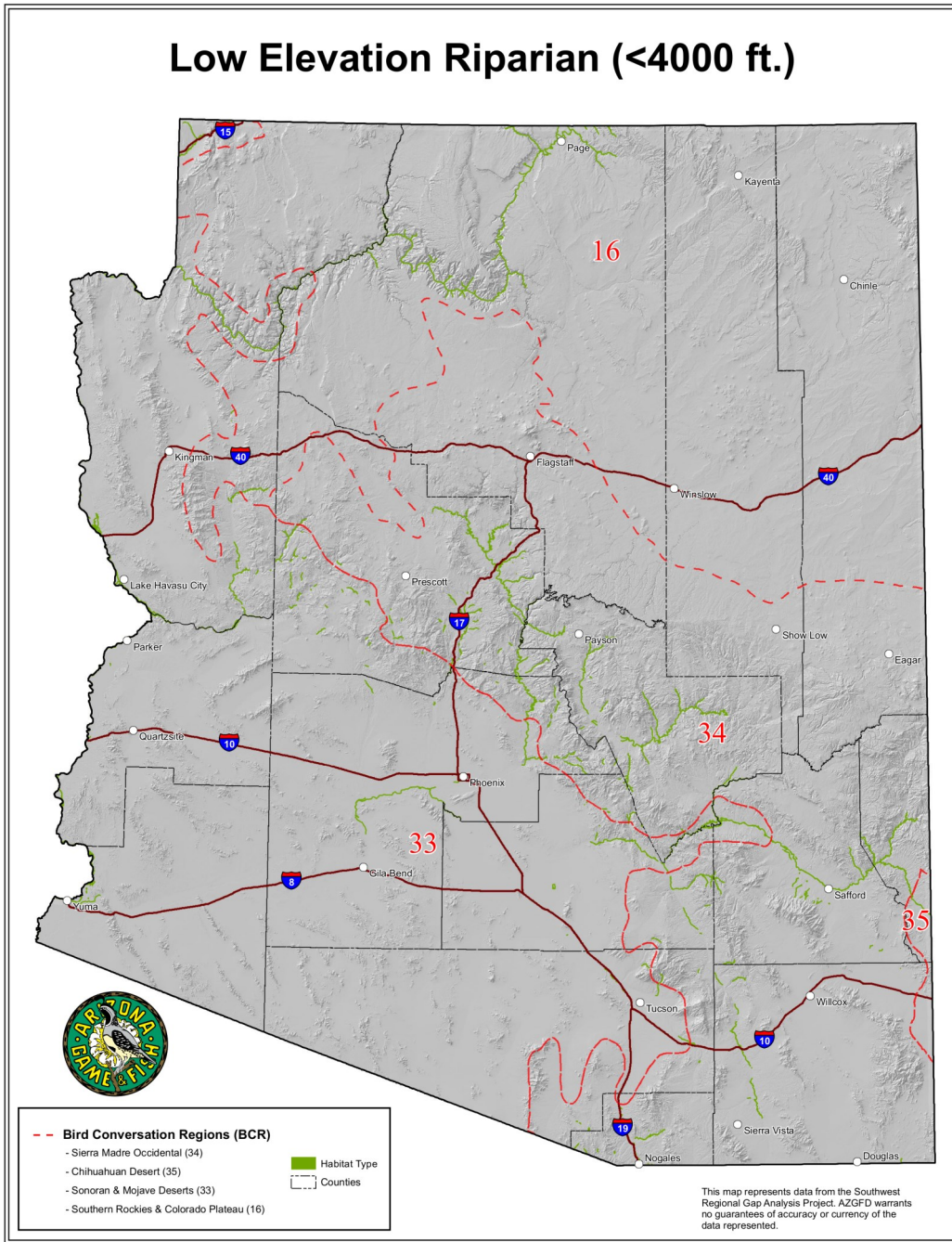
Bird Relationships Profile

Representative Bird Species with Accounts
Brown-crested Flycatcher Elf Owl Lucy's Warbler Song Sparrow Yellow-billed Cuckoo
Other Associated Breeding Bird Species ⁴
White-winged Dove, Mourning Dove, Western Screech Owl, Bald Eagle, Gray Hawk, Black-chinned Hummingbird, Ladder-backed Woodpecker, Vermilion Flycatcher, Ash-throated Flycatcher, Willow Flycatcher, Bell's Vireo, Verdin, Bewick's Wren, Crissal Thrasher, Phainopepla, Common Yellowthroat, Yellow Warbler, Yellow-breasted Chat, Summer Tanager, Blue Grosbeak, Hooded Oriole
AZ Stewardship Responsibility ²
Northern Beardless-Tyrannulet, Gila Woodpecker, Gilded Flicker, Abert's Towhee, Purple (Desert) Martin, Thick-billed Kingbird, Rose-throated Becard

HABITAT ACCOUNT ● Lowland Riparian Woodlands



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Habitat Codes Included in Lowland Riparian

Arizona Breeding Bird Atlas

- WAR, WRS, WSD, WIR (below 4,000 feet)

USGS Southwestern ReGAP

- North American Warm Desert Riparian Mesquite Bosque
- North American Warm Desert Riparian Woodland and Shrubland
- North American Warm Desert Lower Montane Riparian Woodland and Shrubland (below 4,000 feet)
- Invasive Southwest Riparian Woodland and Shrubland



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General Information

Habitat Importance

Many bird species depend on lowland riparian areas and adjacent habitats. In addition to the species that nest in lowland riparian habitat, the majority of migratory landbirds depend on riparian resources as migration stopover habitat. Riparian birds vary in their requirements, ranging from large multi-aged stands of gallery forest (Common Black Hawk, Elf Owl, and Yellow-billed Cuckoo) to tree cavities in snags (Elf Owl and Brown-crested Flycatcher) to mesquite bosques (Lucy's Warbler) and saltcedar/willow wetlands and backwaters (Song Sparrow). All of these and other landbirds also require a diversity of invertebrates found in riparian and wetland vegetation and aquatic habitats. Riparian habitats are by nature linear and therefore large patches of riparian and wetland vegetation are usually only afforded by sections of rivers that have not been encroached upon or impounded. While large stretches of lowland riparian habitat are of critical importance to many birds, smaller systems are also important to maintain connectivity among habitat patches and provide migration stopover spots for birds with smaller area requirements.

Distribution in Arizona

Lowland riparian areas are widely distributed across the state. The largest river systems in Arizona include the Lower Colorado, San Pedro, Salt, Gila, Verde, and Bill Williams rivers, all of which include lowland riparian habitats at low elevations (< 4,000 ft), where the floodplains become wide and meanders are large. In an arid system like Arizona, smaller rivers, creeks, and ciénegas are also important examples of this habitat type.

Habitat Description

Lowland riparian gallery forests were historically dominated by Fremont cottonwood and Goodding's willow, with sycamore strongly influencing the higher elevations of this habitat zone. Many lowland riparian areas of the southwest have been invaded by exotic saltcedar and Russian olive, which can dominate the woodland layer. Critical components of functioning riparian areas include water table connectivity between the river and the floodplain, horizontal and vertical patchiness that includes multiple seral stages of woodland vegetation, emergent wetlands, and high plant diversity, including alder, walnut, and cypress. Areas with herbaceous understory are also important for several bird species that nest and forage in these microhabitats. The transitional zone between strictly riparian vegetation and dry uplands is often dominated by the somewhat drought-tolerant mesquite, which provides important habitat for multiple bird species.



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Conservation Concerns and Management Actions

Threats Assessment

This table is organized by Salafsky et al.'s (2008) standard lexicon for threats classifications. Threat level is based on expert opinion of Arizona avian biologists and reviewers. We considered the full lexicon but include only medium and high threats in this account.

Threat	Details	Threat Level
Residential and Commercial Development: <ul style="list-style-type: none"> Housing and urban areas 	<ul style="list-style-type: none"> Increased urban/suburban development 	High
Agriculture: <ul style="list-style-type: none"> Annual and perennial nontimber crops Livestock farming and ranching 	<ul style="list-style-type: none"> Encroachment of agriculture Poorly timed and heavy livestock grazing 	High
Energy Production and Mining: <ul style="list-style-type: none"> Mining and quarrying 	<ul style="list-style-type: none"> Quarrying for sand and gravel 	Medium
Natural System Modifications: <ul style="list-style-type: none"> Fire and fire suppression Dams and water management/use 	<ul style="list-style-type: none"> Fire Surface water Diversion/Impoundment Ground water pumping Water quality 	High
Invasive and Problematic Species: <ul style="list-style-type: none"> Invasive non-native plants 	<ul style="list-style-type: none"> Invasive salt cedar and other non-natives 	High
Climate Change: <ul style="list-style-type: none"> Ecosystem encroachment Changes in precipitation and hydrological regimes (droughts) 	<ul style="list-style-type: none"> Droughts and increasing temperature Reduced snow pack 	High

In the following section, we provide more detail about threats, including recommended management actions. Threats with similar recommended actions are grouped.

Based on the habitat needs of the five representative bird species reviewed to create this account, the primary conservation concerns include surface water diversions and impoundments, climate change (drought), invasive plants, groundwater pumping, and urban/rural development. Most of these conservation concerns are clearly related to consumptive water uses that increasingly compete with conservation needs due to an increasing human population and changing climate. We recommend [Bringing Birds Home: A Guide to Enhancing Rivers, Streams and Desert Washes for Birds and Other Wildlife](#).



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Residential and Commercial Development:

- Housing and urban areas
- Commercial and industrial areas

Conversion of floodplains to agricultural and urban landscapes is one of the sources of complete loss of riparian habitat, as it is rarely reversible. In addition to the permanent habitat loss, these developments also lead to increased pressure on already scarce water resources.

Recommended Actions:

1. Promote a “no net loss” policy for riparian areas and mesquite bosques in county and city plans.
2. Discourage the use of natural floodplain vegetation for livestock grazing; protect sensitive riparian vegetation from grazing and soil compacting.
3. Pursue an open space strategy focused on riparian areas which both protects them from development and furthers public support for their protection.

Agriculture and Aquaculture:

- Annual and perennial non-timber crops
- Livestock farming and ranching

Encroachment of agriculture into floodplains has reduced the extent of lowland riparian habitat in many areas. Most of these losses occurred many decades ago, and losses today are primarily when lands that were taken out of production by flooding are reclaimed to agriculture or pasturage. Cattle grazing within riparian areas still impacts riparian vegetation recruitment by removing young trees and shrubs, compacting soils, and trampling banks.

Recommended Actions:

1. Work with private landowners to minimize clearing floodplains for new agricultural areas.
2. Apply existing grazing management planning for riparian zones on federally-managed lands; encourage adoption of enhanced protection in planning documents.

Energy Production and Mining:

- Mining and quarrying

Quarrying for sand and gravel has impacted many areas along low elevation floodplains. This has resulted in the extensive loss of riparian habitats, especially in areas close to human communities. With anticipated economic growth, more quarrying operations are expected.

Recommended Actions:

1. Limit new sand and gravel operations to areas that have no well-developed low elevation riparian habitat.
2. Require restoration of sand and gravel extraction sites with a mix of water elements, diverse and complex habitat edges, and native riparian plantings.



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Natural System Modifications:

- Fire and fire suppression
- Dams and water management/use

Some of the most important factors in net losses of streams and riparian gallery forests over the last century have been surface water diversions and associated infrastructure for agricultural and urban development. New water diversions should be carefully examined for impacts to bird habitat and to potential future habitat restoration areas. Regulation of dams and other diversion structures should be optimized for water releases to benefit riparian recruitment and prevention of habitat loss as a result of droughts.

Large fires in saltcedar communities have effectively eliminated the dominant native cottonwoods and willows along vast stretches of low elevation riparian reaches. Saltcedar is highly flammable and fire adapted, readily resprouting after a burn, while cottonwood essentially does not resprout and willow does so only to a small extent. Saltcedar communities burn repeatedly on a multi-decadal time scale. With each successive burn the native riparian tree community is reduced, with saltcedar eventually forming a monoculture.

Recommended Actions:

1. Discourage new diversions, particularly in high quality bird areas.
2. Examine existing dams and other infrastructure for possibilities of releasing flows in an environmentally beneficial pattern, encouraging recruitment of new riparian vegetation and preventing losses during dry periods.
3. Develop public outreach campaigns that educate communities about the broad ecological and aesthetic values of riparian areas.
4. Monitor effects of groundwater pumping, both dispersed and centrally managed operations, on riparian woodlands and wetlands; identify and promote the establishment of pumping thresholds that prevent losses of these cover types.
5. Develop fire management protocols for areas of mixed saltcedar/native riparian plant communities designed to include dispersed firebreaks and fire protection zones around major stands of natives.

Invasive and Problematic:

- Invasive non-native/alien species

Invasive plants in riparian areas include saltcedar, but herbaceous species, such as common reed and reed canary grass, can also negatively impact riparian habitat quality. Although several riparian-obligate bird species have apparently somewhat adapted to the use of saltcedar, many cannot, including those that require large cavities and a diverse insect population for breeding, such as Elf Owl, Brown-crested Flycatcher, and Common Black-Hawk. Therefore, a large and partially senescent tree component and functional aquatic habitats in wetlands and streams are critical for these species.

Many invasive non-native species besides saltcedar inhabit Arizona's low elevation riparian and aquatic habitats, including Bermuda grass, Johnson grass, *Vitex*, castor bean, and creeping water primrose (*Ludwigia* sp.) It is unknown what effects that many of these have on these ecosystems, but their sheer prevalence suggests that at a minimum they likely compete with native species for space and resources. Genetic pollution from the planting and subsequent pollen dispersal of non-native varieties of plants, particularly mesquites, may have negative impacts on Arizona's low elevation riparian communities. The prevalence of inappropriate source materials being incorporated into riparian restoration sites, including species like Chilean mesquite, may pose a risk.



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Recommended Actions:

1. Work with state department of agriculture to enhance lists of prohibited plants to include more of those known to spread into riparian habitats (e.g. *Vitex*, castor bean, umbrella palm, feather plant, *Salvinia*, etc.)
2. Develop and provide educational materials to land managers, nurseries, landscapers, pond culturists, and others about appropriate plants to minimize these risks.
3. Determine the extent and severity of invasive weeds in all major riparian areas of the state; focus on those that can dominate a vegetation layer, such as saltcedar and common reed.

Climate Change:

- Ecosystem encroachment
- Changes in precipitation and hydrological regimes (drought)

Prolonged droughts are expected to affect lowland riparian areas primarily by increasing the pressure from competing water uses, but also by reducing snowpacks that provide the majority of river flows in Arizona. Additional water development structures and aggressive use of upstream water rights are expected to impact river flows and therefore the entire ecosystem that depends on them.

Recommended Actions:

1. Identify important habitat areas for Yellow-billed Cuckoos and other riparian obligate birds in Arizona.
2. Determine opportunities for restoring riparian wetlands and woodlands in large river reaches.
3. Evaluate the risk of dewatering from prolonged droughts for river reaches that provide important bird habitat or that are slated for future restoration projects.
4. Determine land uses in areas that compound the habitat-degrading effects of prolonged droughts.
5. Participate in watershed partnerships and collaboratives and share avian riparian requirements and restoration strategies with partners.
6. Maintain or restore continuous associations of mesic shrub vegetation; this vegetation structure is associated with overall avian abundance, species richness, riparian-associate bird species abundance, and landscape-level biological diversity (Sanders and Edge 1998).
7. Determine strategies for maintaining required habitat elements for all priority birds to maintain a diversity of vegetation layers and plant species, even if they are not all native.
8. Refrain from treating invasive weeds during the main breeding season of riparian birds (mid-March — June).



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