Lowland Riparian

Conservation Profile

Estimated Cover in Arizona

- 365,427.36 ac
- 0.50% of state

Land Ownership Breakdown

- 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

- 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

- 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

- Northern Beardless-Tyrannulet, Gila Woodpecker, Gilded Flicker, Abert’s Towhee, Purple (Desert) Martin, Thick-billed Kingbird, Rose-throated Becard

Key Habitat Characteristics Profile

Elevational Range

- 80 - 4,000 feet

Vegetation Structure

- Multi-aged, multi-layered stands of deciduous trees and shrubs, as well as emergent and wet meadow grasses and forbs

Plant Species Composition

- Fremont cottonwood, sycamore, Goodding and other willow species, alder, cypress, walnut; sometimes invaded by salt cedar or Russian olive

Important Microhabitats

- 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

Upper San Pedro River, photo by Bureau of Land Management
Lowland Riparian

Low Elevation Riparian (<4000 ft.)

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
Habitat Importance

Many bird species depend on lowland riparian areas and their associated resources. In addition to the species that specialize on this habitat type for nesting, the majority of migratory landbirds depend on riparian resources as migration stopover habitat. Riparian birds vary in their resource 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 salt cedar/willow wetlands and backwaters (Song Sparrow). All of these species and other landbird migrants also require a diversity of invertebrates generated by riparian and wetland vegetation and aquatic habitats. Riparian habitats are in their nature linear and therefore large patches of riparian and wetland vegetation are usually only afforded by large sections of rivers that have not been encroached upon or impounded. While such areas are of critical importance to many birds, smaller systems are also important to maintain connectivity among habitat patches and to provide migration stopover habitat for countless birds with smaller area requirements.

Distribution in Arizona

The largest river systems in Arizona include the Lower Colorado, San Pedro, Salt, Gila, and Bill Williams rivers. These rivers are widely distributed across the state, and their lowland riparian habitats are found at low elevations (<4,000 ft), where the floodplains become wide and meanders large.

Habitat Description

Lowland riparian gallery forests were historically dominated by Fremont cottonwood and Goodding willow, with sycamore strongly influencing the higher elevations of this habitat zone. Many riparian areas of the southwest have been invaded by exotic salt cedar 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 such 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 several 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.

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<th>Most Important Conservation Concerns</th>
<th>Details</th>
<th>Threat Level</th>
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| Residential and Commercial Development:  
  - Housing and urban areas             | Increased urban/suburban development                 | High         |
| Agriculture and Aquaculture:         | Encroachment of agriculture  
  - Annual and perennial nontimber crops  
  - Livestock farming and ranching      | Poorly timed and heavy livestock grazing             | High         |
| Energy Production and Mining:        | Quarrying for sand and gravel                       | Medium       |
| Natural System Modifications:        | Fire  
  - Fire and fire suppression            | Surface water  
  - Dams and water management/use       | Diversion/Impoundment  
  - Ground water pumping                 | Ground water pumping  
                                   | Water quality                           | High         |
| Invasive and Problematic Species:    | Invasive salt cedar and other non-natives            | High         |
| Climate Change:                      | Droughts and increasing temperature  
  - Ecosystem encroachment               | Reduced snow pack                            | High         |
  - Changes in precipitation and hydrological regimes (droughts) |

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 (droughts), 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 reading 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, land 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 of floodplains for new agricultural areas.
2. Enforce existing planning regarding grazing management in riparian zones on federally managed lands and encourage adoption of enhanced protections 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 such operations are expected.
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Recommended Actions:

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

Natural System Modifications:

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

One 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 that were used for agricultural and urban development. New water diversions should be carefully examined for additional impacts to existing occupied avian habitats 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 salt cedar communities have effectively eliminated the dominant native cottonwoods and willows along vast stretches of low elevation riparian reaches. Salt cedar is highly flammable and fire adapted, readily resprouting after a burn, while cottonwood essentially does not resprout and willow only to a small extent. Salt cedar communities burn repeatedly on a multi-decadal time scale. With each successive burn the native riparian tree community is reduced in proportion, with salt cedar eventually forming a monoculture.

Recommended Actions:

1. Discourage new diversions, particularly in high quality bird habitats.
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 on the extremely wide array of 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 thresholds that prevent losses of these cover types.
5. Develop fire management protocols for areas of mixed salt cedar/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 salt cedar, but herbaceous species, such as common reed and reed canary grass, can also become a problem for riparian habitat quality. Although several riparian-obligate species have apparently somewhat adapted to the use of salt cedar, many of them 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 salt cedar inhabit our low elevation riparian and aquatic habitats. Examples include Bermuda grass, Johnson grass, Vitex, castor bean, creeping water primrose (*Ludwigia* sp.), and many others. It is unknown what effects that many of these have on these ecosystems, but their sheer prevalence argues that they must result in impacts if only from competition for space and resources. Genetic pollution from the inadvertent planting and subsequent pollen dispersal of non-native varieties of plants, particularly mesquites is likely leading to undocumented impact to our low elevation riparian communities. It is easy to see inappropriate source materials being incorporated into riparian restoration sites, and the prevalence of Chilean mesquite, etc. into landscape plantings seems to similarly risk genetic impact.

**Recommended Actions:**

1. Work with State Dept. of Agriculture to enhance list 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, etc. regarding appropriate plant pallets to minimize these risks.
3. Determine the extent and severity of invasive weeds in all major riparian areas of the state. Focus primarily on those that can dominate a vegetation layer, such as saltcedar and common reed.

**Climate Change:**
- Ecosystem encroachment
- Changes in precipitation and hydrological regimes (droughts)

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, not necessarily with the goal of completely eradicating weeds, but rather to maintain a diversity of vegetation layers and plant species.
8. Refrain from treating invasive weeds during the main breeding season of riparian birds (mid-March — June).
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References and Literature Cited


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Recommended Citation