Wetlands

Bill Williams National Wildlife Refuge, photo by Genevieve Johnson/BOR

Key Habitat Characteristics Profile

Elevational Range[1]

80 – 9,400 feet

Vegetation Structure[2]

1:1 or 1:2 ratio of open water to emergent vegetation cover ideal for most species. Water depth sufficiently varied to allow for diversity of emergent and submerged plant species.[5] Mix of young and old vegetation. New marsh preferred by Ridgway's Rail. Variable heights and densities of emergent plants ideal

Plant Species Composition[2]

Lowland: submergent and emergent plants such as duckweeds, cattail, rushes, and sedges, as well as sago and leafy pondweeds, water milfoils, holly-leafed naiad, common pondmat, and bladderwort; also sacaton grass[1]

Upland: beaked sedge, hardstem bulrush, northern mannagrass, and common spikerush; submergent plants include common bladderwort, variableleaf pondweed, shortspike watermilfoil, water buttercup, and water smartweed[1]

Important Microhabitats[7]

Shallows of < 4" water with little fluctuation in water level

Fire Regime[3]

Fire can be beneficial when outside the breeding season (spring – early summer) as emergent plants tend to choke the wetland over time; natural fire intervals unknown

NRCS Major Land Resource Areas

38 - Mogollon Transition

39 - AZ & NM Basin & Range Mountains

40 - Sonoran Basin & Range

Conservation Profile

Estimated Cover in Arizona[1]

7,510.86 ac
.01% of state

Land Ownership Breakdown[1]

Federal	54.92%
Private	32.09%
Tribal	2.08%
State	10.88%
Other	0.03%

Most Important Conservation Concerns

Livestock farming/ranching
Agriculture
Fire suppression
Water management/use
Non-native invasive plants
Climate change (drought)

Habitat Recovery Time[5]

2 – 5 years under ideal conditions

Vulnerability to Climate Change

Vulnerability	High to moderate (due to water management in some wetlands)
Effects	Loss of small wetlands important to metapopulations
Response	Loss of wetlands dependent bird populations

Bird Relationships Profile

Representative Bird Species with Accounts

Black Rail (Lowland)
Virginia Rail
Least Bittern (Lowland)
Marsh Wren

Other Associated Breeding Bird Species[4,6]

Gadwall, Redhead, Green-winged Teal, Cinnamon Teal, Osprey, Black-crowned Night-Heron, Snowy Egret, Pied-billed Grebe, Ridgway's Rail, Sora, American Bittern, Common Gallinule, American Coot, Common Yellowthroat, Song Sparrow, Red-winged Blackbird, Yellow-headed Blackbird

AZ Stewardship Responsibility[1]

None

Last Update: October 2023

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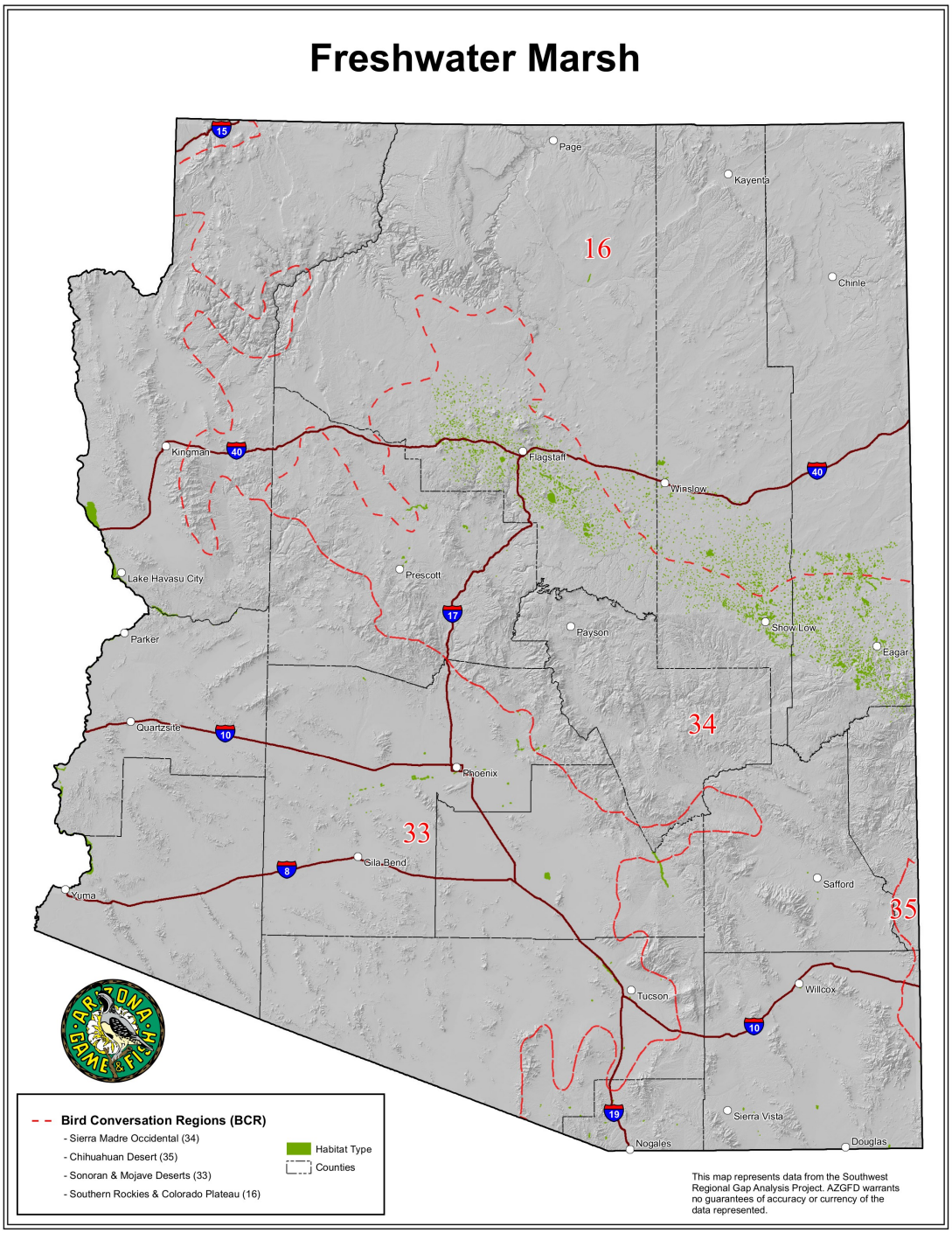

Habitat Codes Included in Wetlands

Arizona Breeding Bird Atlas

- WMC, WRS

USGS Southwestern ReGAP

- North American Arid West Emergent Marsh
- Rocky Mountain Alpine-Montane Wet Meadow

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General Information

Habitat Importance

Freshwater wetlands are a critical habitat type in the dry state of Arizona because they support a diversity of birds that directly depend on them, including Black and Virginia rails, Least Bittern, and Marsh Wren. They also play a role in supporting upland species that need shelter, food, and water provided by wetlands. Not only are the state's larger wetland complexes important for supporting the strongholds of wetland-obligate species, but the smaller patches (< 100 ac) may play an important role in maintaining corridors and metapopulations of bird species that have to cross large swaths of unhospitable desert to find tolerable conditions for both breeding and migration stop-over habitat. Marshes are frequently or continually inundated, with water depths up to 2 yards. Water levels may be stable, or may fluctuate 1 yard or more over the course of the growing season.

Distribution in Arizona

The Arizona Partners In Flight Plan (Latta et al. 1999) divides the major wetland areas of Arizona into four regions, (1) the White Mountains, (2) the San Francisco Plateau, which includes the Mogollon Rim and the Colorado Plateau, (3) the Mexican Highlands and Chihuahuan Desert, and (4) the lower Colorado River area in the Sonoran and Mojave deserts. The latter two feature primarily lowland freshwater marshes, while the first two represent high elevation wetlands. The lowland areas are more likely to have large wetland complexes that are reasonably interconnected, such as near the Colorado River drainage and other major rivers. High-elevation, or upland, freshwater marshes likely play an important role for connecting birds to suitable migratory pathways and to other large wetland complexes.

Habitat Description

Lowland freshwater wetlands often have a ratio 1:1 to 1:2 ratio of emergent cover to open water, with variable water depths that accommodate both a diversity of submerged and emergent plant species and a diversity of benthic and aquatic invertebrates. One of the critical suitability criteria for this habitat type is the relative stability of the water table, particularly during the times of year when freshwater marsh bird species use the area. All of the wetland-obligate species build their nest very close to the water's edge and depend on food sources that are gathered from very shallow (< 4") water depths. Therefore, fluctuating water levels in wetlands during nesting are detrimental to the safety of nests and to the birds' ability to forage.

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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.

Most Important Conservation Concerns	Details	Threat Level
Agriculture: • Annual and perennial nontimber crops • Livestock farming and ranching	• Some crop and livestock practices	Medium/High
Natural System Modifications: • Fire and fire suppression • Dams and water management/use	• Lack of fire in marsh habitats • Dams and water management/use	Medium
Invasive and Other Species: • Invasive non-native/alien species • Problematic native species	• Invasive native and nonnative plants	Medium
Climate Change: • Ecosystem encroachment • Changes in precipitation and hydrological regimes (droughts)	• Drying of wetlands and rivers	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 four representative bird species reviewed to create this account, the most important conservation concerns for freshwater wetland habitat include surface water diversions, habitat degradation, groundwater pumping, invasive weeds, and climate change.

Agriculture

- Livestock farming and ranching

Habitat degradation in wetlands results from a variety of sources. Livestock grazing can be either detrimental or beneficial to habitat values of wetlands for birds, depending on its intensity and timing in relation to growing seasons of plants and breeding seasons of birds. Wetlands are considered degraded both when they are denuded of emergent vegetation and when they are choked with it. Historically, marshes were likely maintained by dynamic processes, such as flood-scouring, fire, and other stochastic events. Because water levels in many wetland complexes are now stabilized through water management infrastructure, successional processes progressively choke the wetland with vegetation, and open water areas are not maintained through these natural processes.

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Recommended Actions:

1. Develop and support policies for no net loss of wetlands.
2. Promote conservation easements and protection/enhancement measures for functional wetlands.
3. Determine the roles of water management (inflow and outflow controls), fire, and grazing in beneficial management practices for maintaining a marsh that features a diversity of emergent and submerged plant species and a variety of water depths.
4. Include a plan for maintaining significant areas of shallow (< 4") water depths to provide foraging habitat for most freshwater marsh birds.
5. Maintain current suitable habitat and hydrology at appropriate locations within Imperial National Wildlife Refuge and at Mittry Lake, especially for Black Rail and Ridgway's Rail (Latta et al. 1999).
6. Create additional suitable habitat near currently Black Rail occupied areas, which should include common threesquare and California bulrush plantings, and ensure stable water levels during the nesting season; identify possible restoration sites at Cibola and Imperial National Wildlife Refuges (Latta et al. 1999).
7. Preserve or restore wetlands for Least Bitterns, particularly large (> 25 ac) wetlands with dense growth of robust, emergent vegetation (Gibbs et al. 1992).
8. Explore options for artificial wetland creation that result in fairly large, permanent wetlands with a diverse and dense emergent vegetation zone; areas along the lower Colorado River and in a connecting corridor to the middle Gila River are of particular interest for restoring bird metapopulation connectivity.
9. Undertake new wetland restoration efforts close to currently occupied sites to maximize the likelihood of colonization by priority bird species.
10. Explore habitat enhancement options for wastewater and sewage pond installations that allow for dense emergent vegetation along pond edges.
11. Restore recently-drained (< 30 years ago) wetlands to promote rapid regeneration of wetland vegetation (Zimmerman et al. 2002).
12. Where cattail control is necessary, stagger treatments in order to maintain various stages of regeneration and growth (Zimmerman et al. 2002).
13. Continue to coordinate with the Lower Colorado River Multispecies Conservation Plan to meet their goal of creating 512 acres of marsh habitat.
14. Continue to work with BLM and USFWS to use controlled burns to improve marsh habitat and to protect habitat from wildfire.

Natural System Modifications:

- Dams and water management/use

While dams and other diversions are undoubtedly a cause of natural wetland loss and ecosystem modification, they are also now a major source of maintaining wetlands throughout the desert southwest. Because dams are maintained for municipal and agricultural purposes, their water management is usually not designed for optimal habitat value for birds. Therefore, the goal for this conservation issue is to identify measures that optimize the bird-habitat value of managed wetland systems within the framework of other water needs.

Groundwater pumping is a conservation issue for remaining natural wetlands that are not managed through surface water diversions or impoundments, such as river backwaters, oxbow wetlands, desert springs, and terminal marshes. Groundwater pumping can lower water tables.

Recommended Actions:

1. Minimize fluctuations in water level in wetlands managed for Black and Virginia rails, Least Bittern, and Marsh Wren, especially during the March – July nesting period (Flores and Eddleman 1995).
2. For delineation of Black Rail habitat, include not only vegetation cover but also water depths within wetlands, access to upland vegetation, and overhead coverage by emergent vegetation (Flores and Eddleman 1995).
3. Create structures for and receive permission to maintain or manipulate water levels to enhance existing and potential nesting habitat (Flores and Eddleman 1995).
4. Acquire and retain water rights and include Black Rails as a management priority in protected wetlands (Flores and Eddleman 1995).
5. Create additional wetland management areas in existing croplands adjacent to rivers or near water sources.
6. Avoid dredging in existing or potential Black Rail habitat (Latta et al. 1999).
7. Discourage efforts to line canals where seepage has already created Black Rail habitat (Latta et al. 1999).
8. Focus on Cibola National Wildlife Refuge for possible habitat creation efforts (Latta et al. 1999).
9. Include retention of shallow-water habitats in wetland management planning (Latta et al. 1999).
10. Review existing unsuitable wetlands, reservoirs, and river backwaters for opportunities to create additional habitat for wetland priority birds; grading shorelines to create shallows and mudflats is usually less costly than creation of new wetlands.
11. Develop local hydrological management plans that consider wetlands.

Invasive and Problematic Species:

- Invasive non-native/alien species

Invasive species can cause decreased habitat quality for birds that prefer native emergent vegetation. Of particular concern for freshwater wetlands are invasions by *Phragmites*, reed canary grass, and sometimes native cattail. Weed control is therefore a management need for all wetlands for quality bird habitat.

Recommended Actions:

1. Limit extent and level of disturbance that promotes invasion and spread of invasive plants, which often occurs after native vegetation is removed.
2. Develop a systematic weed management plan that focuses on species that are of little or no value to priority wetland birds.

Climate Change:

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

Long-term warming trends, coupled with a projected decrease in precipitation, will result in an even drier climate in southwestern North America (Seager and Vecchi 2010). While some of the short-term effects of a drier climate may be mitigated by water management, a long-term outlook predicts less and less water available for non-consumptive uses such as maintenance of freshwater wetlands for wildlife values.

Recommended Actions:

1. Develop a geographically explicit plan for maintaining a network of wetland complexes across the region. Prioritize according to connectivity with other wetlands, wetland complex size, and habitat condition.
2. Develop public support for such a plan by emphasizing that it serves to support a network of migration stop-over sites and metapopulations of wetland-obligate bird species

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