NRCS Natural Resources Conservation Service
Wildlife Habitat Management Institute

WILDLIFE HABITAT COUNCIL℠

Wading Birds

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General information

Wading birds are most commonly associated with wetlands, streams, and other aquatic habitats. Most wading birds possess long legs and toes, and long and sometimes curved bills – adaptations enabling them to live and feed in shallow-water habitats. This leaflet addresses birds in the orders Ciconiformes (herons and their allies) and Gruiformes (cranes and their allies). Common wading birds of the United States are represented in table 1.

Wading birds rely heavily on wetland habitats including inland and coastal emergent marshes and wooded swamps. Throughout the history of the United States wetlands have been converted for agriculture, residential, commercial, and other land uses. More than half of the country's original wetland acreage has been converted to other land uses in the last two centuries. California leads the United States in wetland acres drained followed by Ohio, each having lost more than 90 percent of their original wetland acreage. Many adjacent native grassland and forest habitats have also undergone significant land use changes. As a result, many species of wading birds that depend on these habitats have suffered significant population reductions, with some populations still in decline. Protecting and properly managing existing wetland communities can help maintain and enhance populations of wading birds and other wildlife species that live in similar habitats.

This leaflet is designed as an introduction to the habitat requirements of wading birds and to assist landowners and managers in developing comprehensive wading bird management plans. The success of any management plan depends on targeting specific needs of the species of interest and analyzing designated habitat areas to ensure all required habitat elements are provided. Practical habitat management activities that can be conducted on private lands to attract wading birds and help maintain existing populations are included. This leaflet encourages involving fish and wildlife professionals to identify and address additional management goals.

Great blue heron (Ardea hedodias)

Range

The ranges of various wading bird species in the United States differ greatly. Some non-migratory species have relatively restrictive ranges, whereas some migratory species have extensive ranges. Migratory waders common to the United States can possess ranges encompassing nearly the entire country.

Habitat requirements

General

Although there are similarities among many species' habitat requirements, management to meet the needs of one species may not benefit other species. It is beyond the scope of this leaflet to identify detailed habitat requirements for individual wading birds in separate regions, but generalizations for groups of wading birds and broad concepts for managing their habitats are presented.

Wading birds are naturally adapted to wetlands, streams, and other aquatic ecosystems in North America. Habitats used by wading birds are diverse - ranging from aquatic complexes to dry upland meadows, pastures, and crop fields (table 2). Inland freshwater ponds, lakes, streams, wetlands with emergent aquatic vegetation, coastal marshes, riparian and wooded wetlands and bogs, mangroves, and estuaries are the most common sites used for feeding and nesting. The cattle egret, a member of the heron family, relies almost totally on pasture and upland grassland habitats. However, the snowy egret seeks nest sites among mangroves and salt marshes. Upland forest communities and small clusters of trees and shrubs near wetland habitats provide nesting and roosting sites for some wading birds. Trees and shrubs are particularly important as nest sites for herons, egrets, and other colonial nesters.

Food

Fish, aquatic and terrestrial invertebrates, amphibians, reptiles, and crustaceans are common foods consumed by wading birds. Diets also include wetland plant seeds, small mammals such as voles, shrews, and pocket gophers, and occasionally other birds. Most waders are opportunistic feeders, capturing food items using bills adapted to probe mud and animal burrows; spear fish, frogs, and other small animals; or to strain aquatic invertebrates and other edible material from the water. Many waders feed standing in or perching over shallow water less than 12 inches deep. Most wading birds are migratory and occupy a variety of habitats ranging from coastal and freshwater shoreline habitats, grassland and scrub communities, and agricultural fields and pastures. Thus food items consumed vary among species, seasons, regions, and habitats.

Colonial and solitary nesting

Some wading bird species nest in colonies while others are solitary nesters. Improving foraging efficiency is the primary advantage of colonial nesting. Young birds of a nesting colony learn from older birds experienced in finding feeding grounds. For herons, foraging success improves with age. Adult great blue herons are twice as successful at locating feeding sites as juveniles. Protection from predators is a secondary benefit of colonial nesting. Individuals or nesting pairs within the colony protect or expose eggs and young to predation, depending on behaviors characteristic to the species. In a "selfish colony," typically comprised of several hundred nesting pairs, protects the eggs and young of the dominant birds nesting in the center of the colony are protected while eggs and young of inexperienced pairs are left more subject to predation. The colonial behavior known as mobbing (where several birds attack as a group) also acts as a defense against predators.

American bittern (Botaurus lentiginosus)

Cover – colonial nesting

Colonial nesting sites hold a few pairs to thousands of pairs of nesting birds. Heronries contain single or mixed species. Ibises, egrets, and herons often nest together in clumps of woody vegetation close to fresh or salt water swamps and marshes, lakes or other bodies of water. Ibises nest in shrubs or low trees, sometimes over water. Egrets choose nesting sites in trees 5 to 40 feet off the ground. Herons nest in shrubs or trees up to 80 feet tall. Great blue herons usually take nesting sites in the tops of the tallest trees in large heronries of mixed species. Nesting cover for members of the order Ciconiiformes varies by region, but ranges from conifer and mixed hardwood forests, to shrubs, mangroves, bulrushes, and rock ledges. Colonial nesting sites can be noisy (especially after young hatch) and have an unpleasant odor. Ground cover under the heronry or rookery is usually splattered with fecal material and feathers.

Cover – solitary nesting

Most solitary nesters are secretive marsh birds of the order Gruiformes (rails and bitterns). Primary social units include the mated pair and brood. These wad-

Table 1 Common wading birds in the United States

Order	Family	Species representatives
Ciconiiformes	Ardeidae	herons, bitterns, egrets
	Ciconiidae	wood stork
	Threskiornithidae	ibis, spoonbill
Gruiformes	Aramidae	limpkin
	Gruidae	cranes
	Rallidae	rails, coot, moorhen
Phoenicopteriformes	Phoenicopteridae	greater flamingo

Table 2 Habitat characteristics of common wading birds in the United States

Species	Habitat		Preference [1]		Nesting habits [2]
	Emergent marsh	Open water	Herbaceous uplands	Trees & shrubs	
American bittern	F, N	F	F		S
least bittern	F, N	F			S
great blue heron	F	F		N	C
great egret	F	F		N	C, S
snowy egret	F	F		N	C
little blue heron	F		F	N	C
cattle egret			F	N	C
green heron	F, N	F		N	S, C
black-crowned night heron	F, N	F		N	C
yellow-crowned night heron	F	F		N	C
white ibis	F, N	F		N	C
white-faced ibis	F			N	C
wood stork		F		N	C
yellow rail	F, N		F		S
black rail	F, N				S
clapper rail	F, N				S
king rail	F, N		N		S
Virginia rail	F, N				S
sora	F, N				S
purple gallinule	F, N				S
common moorhen	F, N	F	F		S, C
American coot	N	F	F		S
sandhill crane	N		F, N		S

[1] F = Feeding, N = Nesting
[2] C = Colonial, S = Solitary

ing birds prefer fresh or salt water marshes, swamps, and wet meadows, and depend on several kinds of emergent vegetation for cover and nest materials. The nests of rails and bitterns are hard to find because they are on the ground and canopied with vegetation. The natural camouflage of grasses and perennial plants in nesting areas and the elusive nature of these webless marsh birds makes estimating populations difficult.

Common wading bird food items

Fishes

- gizzard shad, herring, minnows, dace, shiners, carp, chubs, killifishes, suckers, pickerel, sticklebacks, catfishes, small eels, other small fishes

Aquatic insects

- water boatman, back swimmers, water scorpions, giant water bugs, diving beetles, dragonfly nymphs, caddisflies, mayfly nymphs, pillbugs, mosquito larvae, larvae of: flies, midges, crane flies, soldier flies, dance flies, snipe flies, horseflies, brine flies, flower flies, water beetles

Crustaceans and other aquatic invertebrates

- crayfish, snails, worms, mollusks, amphipods, blue crabs, fiddler crabs, hippa crabs, eggs of horseshoe crabs, shrimp, squid, clams, mussels, leeches

Reptiles and amphibians

- lizards, garter snakes, queen snakes, water snakes, and adults and tadpoles of frogs, toads, and salamanders

Terrestrial invertebrates

- grasshoppers, crickets, beetles, caterpillars, cutworms, earthworms, bloodworms, slugs, spiders, ants

Plants (roots, shoots, tubers, and seeds)

- grasses, sedges, cultivated and wild rice, wild berries, wheat, corn, sorghum, bulrushes, pondweeds, wigeon grass, smartweeds

Birds and mammals

- small birds, mice, voles, lemmings, small rats, shrews, ground squirrels, pocket gophers

Black-crowned night heron (Nycticorax nycticorax)

Sandhill cranes are also solitary nesters and establish nesting territories on prairie potholes, freshwater marshes, open mountain meadows, mixed conifer and hardwood forests, or lowland tundra areas. These wading birds need adequate emergent vegetation to build their nests, 4 to 5 feet in diameter, on mounds above water. Agricultural lands provide the bulk of their food on migration routes, so crop fields interspersed with wetlands create preferred habitat.

Cover – winter

Winter habitat requirements differ little from those of summer months. Combinations of inland freshwater and coastal aquatic systems with grassland, agricultural, and upland habitats are used by wading birds throughout winter months. In the southern United States and California's Central Valley, flooded crop fields (rice) provide extra nutrition to year-round residents and wintering waders.

Water

Foods consumed by wading birds provide an adequate amount of water.

Interspersion of habitat types

Interspersion of aquatic ecosystems and non-aquatic habitats helps maximize habitat quality for many wading bird species. However, many area-sensitive obligate wading species require large, unbroken blocks of aquatic complexes with little or no interspersion of other habitats. For this reason, it is important to consider landowner objectives, local landscape features, and future goals for species of concern when preparing management plans for wading birds.

Wading bird habitat management

Fashion trends in the early 1800s and 1900s nearly led herons, egrets, and others to extinction. The breed-

ing plumage of these wading birds was sought after for decorating hats and dresses. Plumes in good condition from live birds were more highly valued than those found on the ground in heronries and rookeries. In response to the millinery trade and rapidly decreasing populations, the American Ornithologist's Union proposed the Model Law in 1884 drafted "for the protection of North American Birds and their eggs, against wanton and indiscriminate destruction." The Model Law was not a successful solution, but it promoted public awareness and helped jumpstart conservation legislation in North America.

Today, wetland habitat loss and degradation are primarily responsible for declining populations of wading birds. The effects of pesticides and herbicides on wading birds and their food sources also contribute to the decline.

The various species and groups of wading birds require a variety of habitat conditions (table 3). For example, nesting success of rails is directly related to water depth and distance to open water, and they prefer a certain degree of salinity and moderate level of vegetation structure. Habitat management plans designed for rails should focus on maintaining natural structure and function of tidal marshes. Management actions could include maintaining or restoring altered tidal flow. Periodic prescribed burning has been used to reduce overgrown grasses, allowing rails to move freely through vegetative cover.

Sandhill cranes require adequate wetland habitat for pair formation and foraging. The suppression of fire in the southern breeding ranges has increased brush and litter and allowed open lands to convert to pine forests. The accumulation of litter and succession of open lands to forest has reduced food availability and suitable nesting cover for sandhill cranes. Prescribed burning in Florida's Okefenokee Swamp and in Jackson Hole, Wyoming, has been shown to benefit sandhill crane populations. These fires also reduce invading vegetation on sedge meadows and increase earthworm activity, an important food item for juvenile sandhill cranes.

Table 3 General wading bird habitat requirements

Habitat component	Habitat requirements
Food	Fish – gizzard shad, herring, minnows, dace, shiners, carp, and others
	Aquatic invertebrates – midges, mosquito larvae, caddis flies, and others
	Crustaceans and other aquatic invertebrates – crayfish, snails, mollusks, crabs, and others
	Reptiles and amphibians – lizards, snakes, adult and tadpoles of frogs, toads, and salamanders
	Terrestrial invertebrates – spiders, crickets, beetles, caterpillars and others
	Plants – grasses, sedges, rice, wild berries, roots and tubers of aquatic plants, wheat, corn, sorghum, seeds of bulrushes, pondweeds, wigeon grass, and smartweeds
	Birds and mammals – small shore and wading birds and small mammals
Cover – colonial nesting	On the ground in dry uplands or swampy prairies, or along pond or lakeshores; in shrubs or low trees, conifer and mixed hardwood forests, mangroves, or rock ledges; all nesting cover should be in close proximity to water – fresh or salt water swamps and marshes, lakes, rivers, streams, ponds, and coastal tidal marshes
Cover – solitary nesting	Perennial vegetation (bulrushes, cordgrass, etc.) in fresh or salt water marshes and swamps, mudflats, wet meadows, or open prairie adjacent to crop fields
Winter cover	A wetland complex of inland fresh and salt water areas and coastal aquatic systems adjacent to grassland or agricultural areas
Water	Daily foraging activities and the types of foods eaten provide daily water needs
Interspersion	Some wading bird species prefer interspersion of various types of aquatic ecosystems and a mixture of aquatic and non-aquatic habitats
Minimum habitat size	Size of nesting and feeding habitat can vary considerably between different species of wading birds

Conducting appropriate grassland and prairie management practices such as prescribed burning, managed grazing, and rotational mowing can help increase nesting and brood-rearing cover for some species of wading birds. Other waders benefit from wetland management by seasonal water drawdown, planting of native wetland vegetation, and various practices of forest management such as prescribed burning and stand thinning.

Minimum habitat area

The amount of habitat required for nesting and feeding varies among wading bird species. Great blue herons will travel up to 18 miles to find food, but typically forage within three miles of suitable nesting habitat. Some species, like the sora, require little cover and nest in small patches of marsh vegetation. Distribution and interspersion of food and cover resources greatly affect the suitability of wading bird habitat. For colonial and solitary nesters, the proximity of suitable nesting habitat to foraging habitat is usually the main factor affecting wading bird use of the area.

Limiting factors

Based on the above habitat requirement descriptions, use table 4 to rate availability and quality of wading bird habitat in a defined planning area. Habitat communities and components that are absent or rated low are probably limiting habitat quality.

Management prescriptions

Management treatments should address habitat components that are determined as limiting wading bird habitat potential. For planning purposes, select from possible action items listed in table 5 to improve the quality or availability of each limiting habitat component. NRCS Conservation Practices (table 6) and various programs (table 7) may provide financial or technical assistance to carry out specific management practices and are listed where applicable.

Green heron (Butorides virescens)

Available assistance

Corporate and private landowners interested in improving wading bird habitat can work with the Wildlife Habitat Council and NRCS, and encourage interested employees to volunteer. Schools and community groups in conjunction with Federal, state, and non-profit organizations also produce successful habitat projects. Environmental education programs offered by state agencies, universities and non-profit groups heighten public awareness of wading bird habitat and conservation issues. Table 7 provides general information on a variety of assistance programs available through public and private institutions.

Table 4 Limiting factors for habitat components

Habitat Component	Availability/Quality			
	High	**Medium**	**Low**	**Absent**
Food				
Cover – colonial nesting				
Cover – solitary nesting				
Winter cover (may not apply to areas in which wading birds do not winter)				
Interspersion of habitat components				

Table 5 Management options, conservation practices, and assistance programs

Habitat component	Management options for increasing quality or availability	Conservation practices and assistance programs
Food	Protect and restore coastal and freshwater wetlands, marshes, lakes and ponds from siltation and non-point source pollution by fencing livestock and providing bank stabilization through aquatic and bank vegetation plantings	390, 643, 657, WRP, WHIP, EQIP, PFW, CRP
	Restore natural hydrology and vegetation to the previously degraded wetlands	
	Reduce herbicide use on grasslands, especially near water, where application results in reduction of invertebrates (either terrestrial, marine, or freshwater) used for food	
Cover – colonial nesting	Protect large forested tracts that support large colonies of colonial nesting birds	391
Cover – solitary nesting	Encourage native vegetation in grassland meadows and prairies, and conduct appropriate grassland management practices such as prescribed burning, managed grazing, and rotational mowing	327, 338, 528A, 645 WHIP, EQIP, PFW
	Restore natural hydrology and vegetation to the previously degraded wetlands	
	Reduce herbicide use when application results in loss of nesting, loafing, brood-rearing, or winter cover	
Winter cover	Protect and restore coastal and freshwater wetlands, marshes, lakes and ponds from siltation and non-point source pollution via fencing of livestock	390, 643, 657 WHIP EQIP, PFW, CRP, WRP
	Restore natural hydrology and vegetation to the previously degraded wetlands	
Interspersion and minimum habitat size	Combine above prescriptions to increase interspersion of habitat components and amount of suitable habitat.	

Table 6 NRCS conservation practices that may apply to wading bird management

Code	Conservation practice
327	Conservation cover
338	Prescribed burning
390	Riparian herbaceous cover
391	Riparian forest buffer
528A	Prescribed grazing
643	Restoration of declining habitats
645	Upland wildlife management
657	Wetland restoration

Table 7 Financial and technical assistance available to landowners to develop habitat

Program	Land eligibility	Type of assistance	Contact
Conservation Reserve Program (CRP)	Highly erodible land, wetland and certain other lands with cropping history Streamside areas in pasture land	50% cost-share for establishing permanent cover and conservation practices, and annual rental payments for land enrolled in 10- to 15-year contracts. Additional financial incentives available for some practices	NRCS or FSA state or local office
Environmental Quality Incentives Program (EQIP)	Cropland, range, grazing land and other agricultural land in need of treatment	Up to 75% cost-share for conservation practices in accordance with 5- to 10-year agreements. Incentive payments for certain management practices	NRCS state or local office
North American Waterbird Conservation Plan	Corporate, private, or public lands, or individuals and organizations	Provides technical expertise and implementation plan to meet regional and national waterbird conservation goals	Local office of the U.S. Fish and Wildlife Service
Partners for Fish and Wildlife Program (PFW)	Most degraded fish and/ or wildlife habitat	Up to 100% financial and technical assistance to restore wildlife habitat under minimum 10-year cooperative agreements	Local office of the U.S. Fish and Wildlife Service
Waterways for Wildlife	Private land	Technical and program development assistance to coalesce habitat efforts of corporations and private landowners to meet common watershed level goals	Wildlife Habitat Council
Wetlands Reserve Program (WRP)	Previously degraded wetland and adjacent upland buffer, with limited amount of natural wetland, and existing or restorable riparian areas	75% cost-share for wetland restoration under 10-year contracts and 30-year easements, and 100% cost-share on restoration under permanent easements. Payments for purchase of 30-year or permanent conservation easements	NRCS State or local office
Wildlife Habitat Incentives Program (WHIP)	High-priority fish and wildlife habitats	Up to 75% cost-share for conservation practices under 5- to 10-year agreements.	NRCS state or local office
Wildlife at Work	Corporate lands	Technical assistance on developing habitat projects into programs that allow companies to involve employees and the community	Wildlife Habitat Council
State fish and wildlife agencies and private groups may have assistance programs or other useful tools in your area.			State or local contacts

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In cooperation with partners, the mission of the Wildlife Habitat Management Institute is to develop and disseminate scientifically based technical materials that will assist NRCS field staffs and others to promote conservation stewardship of fish and wildlife, and deliver sound habitat management principles and practices to America's land users.

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The mission of the Wildlife Habitat Council is to increase the amount of quality wildlife habitat on corporate, private, and public land. WHC engages corporations, public agencies, and private, nonprofit organizations on a voluntary basis as one team for the recovery, development, and preservation of wildlife habitat worldwide.

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