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James K. Ringelman  
*Colorado Division of Wildlife*

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## 13.1.2 Life History Traits and Management of the Gadwall

James K. Ringelman  
Colorado Division of Wildlife  
317 West Prospect Road  
Fort Collins, CO 80526

The gadwall is widely distributed throughout the western two-thirds of North America. Although its primary breeding habitat is in the drought-prone and degraded waterfowl habitats of the northern Great Plains, its continental population has remained relatively stable while those of most other dabbling ducks have declined. Some unique life history traits may in part be responsible for the resilience of gadwall populations. These unique attributes, which are important for gadwall management, are the subject of this leaflet. Readers interested in general references on gadwall biology and natural history are referred to Bellrose (1980) or Palmer (1976).

### Distribution

Gadwall breeding populations reach their highest densities in the mixed-grass prairies of the northern Great Plains and the intermountain valleys of the western United States (Fig. 1). The parklands and shortgrass prairies contain relatively fewer breeding birds. Some portions of the Pacific, Atlantic, and Alaskan coasts also have important breeding populations.

The primary migration corridor for gadwalls originates in the prairies and extends through the low plains region of the United States, including Nebraska, Kansas, eastern Colorado, Oklahoma, Texas, Louisiana, and into Mexico. Secondary mi-



### Species Profile—Gadwall

**Scientific name:** *Anas strepera*

**Weight in pounds (grams):**

Adults—male 2.1 (953), female 1.8 (835)

Immatures—male 1.9 (858), female 1.7 (776)

**Age at first breeding:** 1 or 2 years

**Clutch size:** 10, range 5 to 13

**Incubation period:** 25 days

**Age at fledging:** 48–52 days

**Nest sites:** Tall, dense herbaceous vegetation or small shrubs within 1,000 feet of water, often near the site used the previous year

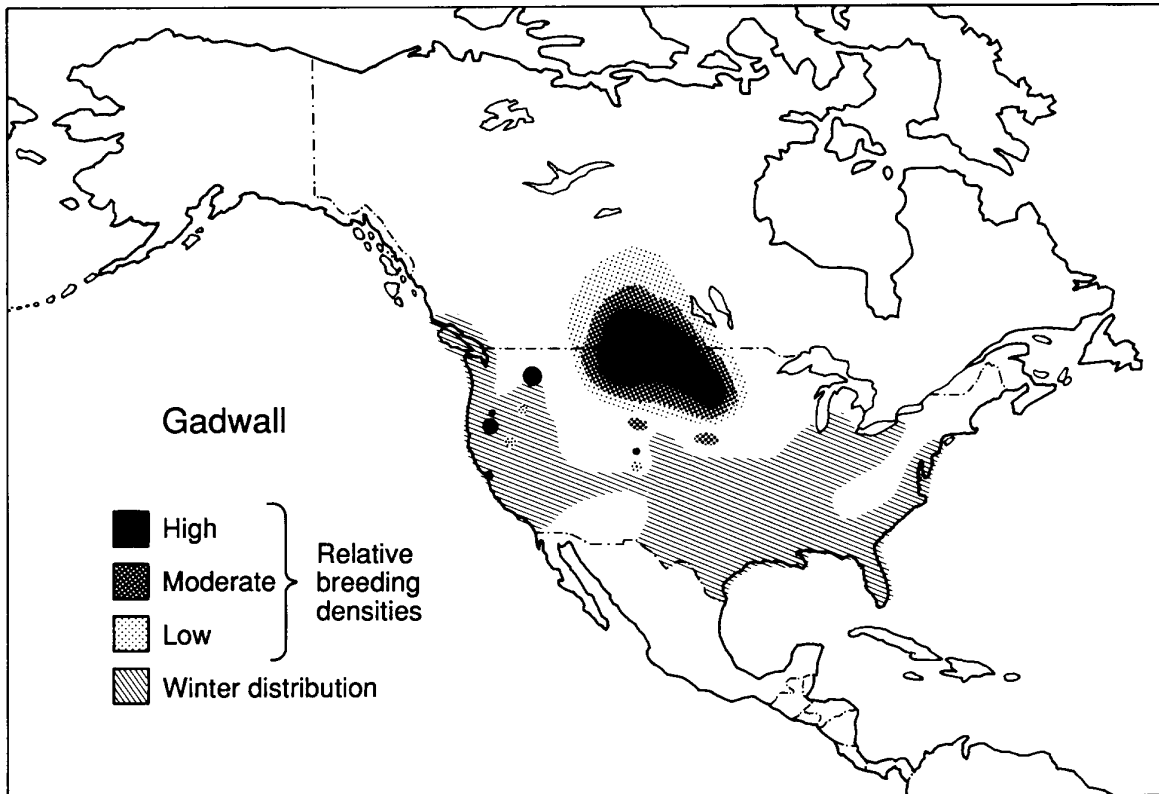
**Food habits:** Herbivorous, except during spring when some aquatic invertebrates are consumed

gration routes link the prairies with the Pacific Northwest, northern and central California, and northern Utah. From Utah, birds migrate to wintering areas in central and southern California and Mexico. Gadwall also migrate along diagonal routes from the Great Plains to the central and southern Atlantic coast.

Major wintering areas include coastal areas of Louisiana and Texas, south along the east coast of Mexico to the Yucatan Peninsula; the central and southern Atlantic coast; the Central Valley of California; and much of the west coast of Mexico.

### Population Status and Harvest

Despite drought and widespread waterfowl habitat destruction in the 1970's and 1980's, the size of the gadwall population in North America has re-



**Fig. 1.** Distribution of breeding and wintering gadwalls in North America.

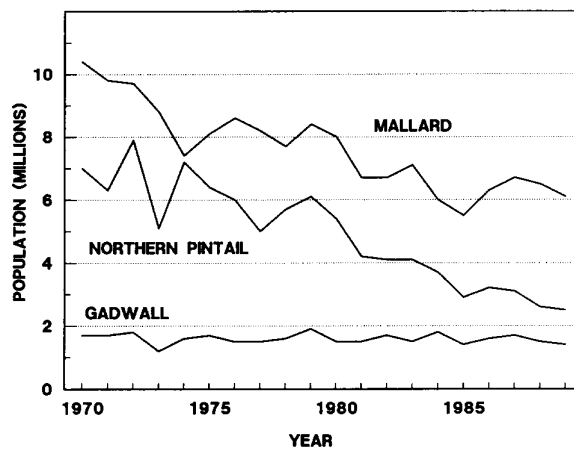
mained relatively stable compared with populations of mallards and northern pintails (Fig. 2). Breeding gadwall are increasing in the Great Basin region, the intermountain valleys of the Rocky Mountains, and in the Pacific Flyway. The reproductive success of gadwall may be enhanced because of the tendency of this species to use semipermanent wetlands, home to traditional nesting sites where hens were previously successful, and to concentrate in secure nesting locations such as islands. The gadwall is also a lightly-harvested species; gadwall make up 4.2% of the continental population of breeding ducks but compose only 2.5% of the duck harvest.

### Spring Migration and Breeding

Gadwalls depart wintering areas by March or early April (Fig. 3). They are among the last birds to arrive on the nesting grounds, and yearlings usually arrive later than older birds. Three to four weeks pass before most birds begin laying, during which time females acquire the fat and protein reserves needed for egg production. Compared to other dabbling ducks, a high percentage of yearling gadwalls do not attempt to nest. Birds older than

one year initiate nests first, often in mid-May. Most female gadwall that nest successfully return to areas used the previous year. When drought occurs on their prairie breeding grounds, many gadwalls migrate north into central and northern Canada.

Shortly after arrival on the nesting grounds, pairs establish territories on seasonal and semipermanent wetlands. Gadwall also tend to use open



**Fig. 2.** Continental breeding population of gadwalls (1970–89) compared with breeding populations of mallards and northern pintails.

brackish or alkaline waters. Since semipermanent ponds are less susceptible to annual drought events than are ephemeral and temporary wetlands, the gadwall's preference for deepwater habitats may be beneficial during drought.

Aquatic invertebrates make up about half of the gadwall's diet during spring and summer (Table 1), and up to 72% during egg laying. Gadwalls consume the green portions of aquatic plants almost exclusively during the non-nesting season (Table 1). Most plants and animals consumed by gadwalls are adapted to semipermanent or permanent wetlands, so drawdowns of managed impoundments should be infrequent (6–8 years) in wetlands managed for this species. A small percentage of ponds in a wetland community should be drawn down during a single season, so that several "familiar" wetlands remain within the home range of gadwall pairs.

Nests are usually located in dry upland sites under clumps of shrubs or in herbaceous vegetation. Although nests average 1,000 feet (300 m) from water, sites up to 1.2 miles (1.9 km) away may be used. Nests in the valleys of the intermountain West are commonly found in baltic rush, nettle, and under small shrubs. In the northern Great Plains, fields of seeded native grasses usually receive the greatest use, followed by introduced grasses and unplowed, native prairie. Shrubs such as western snowberry and Woods rose also provide attractive nesting cover. Growing grainfields receive little use, and gadwalls avoid stubble and summer fallow areas.

Areas of dense vegetation, such as a grass-legume mixture, provide beneficial nesting cover for gadwalls. Residual cover from the previous year's growing season, although not as important for the late-nesting gadwalls as it is for other early-nesting

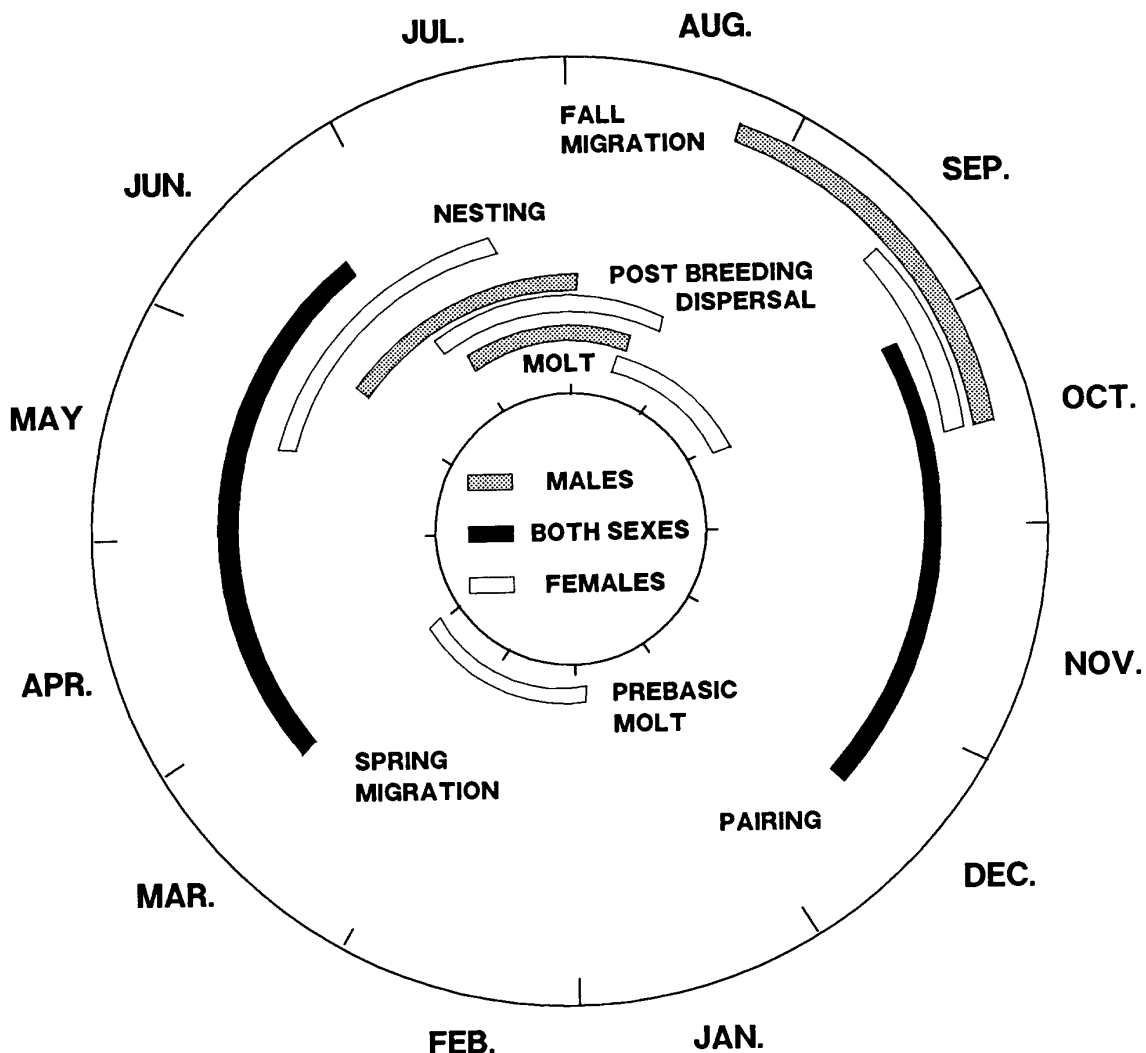


Fig. 3. The chronology of important life history events in the annual cycle of the gadwall.

Table 1. *Seasonal food habits of adult gadwall. Within seasons, the list of food items is arranged in order of importance in the diet. Vegetative foods refer to green portions of plants unless otherwise noted.*

Season, food type, and % volume in diet	Common name	Habitat and location
<b>Spring and summer</b>		
Plant foods (54%)	Filamentous algae Widgeongrass Muskgrass Sago pondweed Elodea	Brackish, subsaline, and saline wetlands of North Dakota.
Animal foods (46%)	Fairy shrimp Seed shrimp Water fleas Midges Beetle larvae	
<b>Fall and winter</b>		
Plant foods (95%)	Filamentous algae Dwarf spikerush Widgeongrass Spiked watermilfoil Baby pondweed	Fresh, intermediate, and brackish marshes in Louisiana
Animal foods (5%)	Seed shrimp	
Plant foods (91%)	Fragrant flatsedge Redroot sedge Widgeongrass	Fresh and brackish tidal impoundments in South Carolina
Animal foods	none listed	

ducks, nonetheless affords important cover in many nesting habitats. Residual cover can become lodged and matted over several years, so burning or mechanical manipulations are sometimes needed to rejuvenate nesting areas.

Gadwalls often use islands as nesting sites because the water barrier reduces nest losses from mammalian predators. The high nest success typical of islands, coupled with the homing tendencies of gadwalls, contribute to nesting densities as high as 200 nests/acre (493 nests/ha). Suitable nesting islands should be 0.2–1.2 acres (0.1–0.5 ha) in size, elongated in shape, and separated from the mainland by at least 500 feet (150 m) of water that remains 3 feet (0.9 m) deep during the nesting season. Although islands can be incorporated into the initial impoundment designs or constructed when a wetland has been dewatered, the construction cost is high even when amortized over the expected life of the island. Additionally, vegetation can be difficult to establish on newly constructed islands. A more cost-effective approach is to cut-off an existing peninsula from the mainland, thereby saving most of the cost of earth moving and vegetation establishment. As valuable as nesting islands can be, managers must provide a diversity of wetlands for

pairs and broods to complement the secure nesting habitat afforded by islands.

Brood-rearing hens will move ducklings up to 1.2 miles (1.9 km) to brood habitat. Gadwall ducklings initially consume equal amounts of plant and animal foods, but consumption of animal food peaks at 2 weeks of age as vegetative matter begins to dominate their diet (Table 2). The average brood size at time of fledging (50 days old) is 6.2 ducklings per brood.

## Post-breeding Dispersal

After hens have incubated for about 2 weeks, males abandon their breeding territories and concentrate on large permanent or semipermanent wetlands near the nesting area. Males, which are flightless for 25–28 days beginning in mid-July, form molting rafts of several hundred to thousands of individuals. These birds often occupy open water areas that contain beds of submersed aquatic vegetation, their primary food (Table 1). Unlike mallards and other secretive species that seek heavy vegetative cover when flightless, gadwalls often associate with American wigeons and diving ducks and loaf on the bare shorelines of islands or main-

Table 2. Food habits of gadwall ducklings. The list of food items is arranged in order of importance in the diet. Vegetative foods refer to green portions of plants unless otherwise noted.

Food type and % dry weight in diet	Common name	Habitat and location
Plant foods (90%)	Baby pondweed	Freshwater prairie wetlands in southern Alberta
	Filamentous algae	
	Slough grass seeds	
	Duckweed	
	Muskgrass	
	Coontail	
Animal foods (10%)	Beetle larvae	
	Midges	
	Water fleas	

land stretches that are free from human disturbance. Female gadwalls molt 20–40 days after the males, usually singly or in small flocks. However, moderate- to large-sized wetlands of a permanent or semipermanent nature, expanses of open water with submersed vegetation, and open shorelines secure from human disturbance are important characteristics of molting habitat for both sexes.

## Fall Migration

Most gadwalls begin their fall migration in early September, and none remain on northern breeding grounds by late October. However, because of their late breeding and molt chronology, some females remain flightless into late September and early October. These birds, which are probably hens that successfully completed second nests after their first clutch was destroyed, may be subject to hunting before they fully regain flight capabilities. Since opening of the hunting season typically occurs as early as possible (the first week in October) in the northern Great Plains and intermountain basins of the West, some local populations of late-molting female gadwalls may be subject to high hunting mortality during early fall.

Because gadwall consume a diet composed almost exclusively of green, submersed aquatic vegetation during fall (Table 1), traditional wetland management techniques such as moist-soil impoundments, which encourage the production of seed producing annuals, are not as attractive to gadwalls as they are to most other dabbling ducks. Cereal grains and row crops so highly sought by mallards, pintails, and green-winged teal also receive little use by gadwalls, but flooded ricefields are used by gadwalls in the Central Valley of California. Wetland management to benefit gadwall

should be directed at maintaining large wetlands with stable water levels suitable for the growth of submersed aquatic vegetation. Although it is most desirable to promote the growth of native vegetation present in a wetland, managers can establish stands of submersed vegetation by seeding or transplanting tubers and whole plants. Wildlife plant nurseries sell seeds and tubers for this purpose. Extreme water level fluctuations or poor water quality may inhibit the growth of submersed vegetation. Stabilization of water levels through control structures or augmentation of water flows during dry periods may be necessary. Removal of rough fishes, which increase water turbidity and degrade water quality, often dramatically improves stands of submersed vegetation.

## Winter

Gadwalls reach their highest winter densities on the fresh, intermediate, and brackish marshes of the Louisiana coast. There, as elsewhere, their diet is composed almost entirely of vegetative foods (Table 1) obtained in water 6–26 inches (15–66 cm) deep. Plant foods consumed by gadwalls are lower in protein and energy and higher in fiber than the seeds and animal foods eaten by other ducks. Because gadwalls rely on low-quality foods, they feed throughout the day and night. Their strategy for nutrient acquisition is therefore more similar to that of geese than to other ducks; they consume large quantities of food to meet nutritional and energetic demands. Unlike geese, however, gadwalls do not have the capacity to store food obtained during intermittent feeding bouts. Wintering gadwalls may be susceptible to nutritional deficiencies if continual disturbance alters their feeding regimes.

## Suggested Reading

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## Appendix. Common and Scientific Names of Plants and Animals Named in Text.

### Plants

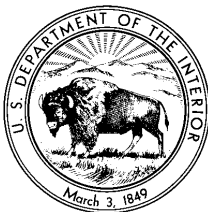
Slough grass	<i>Beckmannia syzigachne</i>
Coontail	<i>Ceratophyllum</i> spp.
Muskgrass	<i>Chara</i> spp.
Filamentous algae	Chlorophyceae
Fragrant flatsedge	<i>Cyperus odoratus</i>
Dwarf spikerush	<i>Eleocharis parvula</i>
Baltic rush	<i>Juncus balticus</i>
Redroot sedge	<i>Lachnanthes caroliniana</i>
Common duckweed	<i>Lemna minor</i>
Spiked watermilfoil	<i>Myriophyllum spicatum</i>
Sago pondweed	<i>Potamogeton pectinatus</i>
Baby pondweed	<i>Potamogeton pusillus</i>
Woods rose	<i>Rosa woodsii</i>
Widgeongrass	<i>Ruppia maritima</i>
Western snowberry	<i>Symphoricarpos occidentalis</i>
Stinging nettle	<i>Urtica dioica</i>

### Birds

Northern pintail	<i>Anas acuta</i>
American wigeon	<i>Anas americana</i>
Green-winged teal	<i>Anas crecca</i>
Mallard	<i>Anas platyrhynchos</i>
Gadwall	<i>Anas strepera</i>

### Invertebrates

Fairy shrimp	Anostraca
Midges	Chironomidae
Water fleas	Cladocera
Beetles	Coleoptera
Seed shrimp	Ostracoda



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