WATERFOWL MANAGEMENT IN GEORGIA

PREFACE & ACKNOWLEDGMENTS

Wildlife biologists serving on the Georgia Department of Natural Resources' Waterfowl Committee prepared the information found here. It is intended to serve as a source of general information for those with a casual interest in waterfowl. It also serves as a more detailed guide for landowners and managers who want to improve the waterfowl habitat on their property. The committee hopes this information will serve to benefit the waterfowl resource in Georgia and help to ensure its well-being for generations to come.

Land management assistance is available from Wildlife Resources Division biologists. For additional help, contact the nearest Game Management Section office.

Game Management Offices

Region I Armuchee (706) 295-6041
Region II Gainesville (770) 535-5700
Region III Thomson (706) 595-4222
Region III Thomson (Augusta) (706) 667-4672
Region IV Fort Valley (478) 825-6354
Region V Albany (229) 430-4254
Region VI Fitzgerald (229) 426-5267
Region VII Brunswick (912) 262-3173
* Headquarters (770) 918-6416

We would like to express our appreciation to Carroll Allen and Dan Forster of the Georgia Department of Natural Resources for providing editorial comments.

AUTHORS:

Greg Balkcom, Senior Wildlife Biologist

Ted Touchstone, Wildlife Biologist

Kent Kammermeyer, Senior Wildlife Biologist

Vic Vansant, Regional Wildlife Supervisor

Carmen Martin, Wildlife Biologist

Mike Van Brackle, Wildlife Biologist

George Steele, Wildlife Biologist

John Bowers, Senior Wildlife Biologist

The Department of Natural Resources is an equal opportunity employer and offers all persons the opportunity to compete and participate in areas of employment regardless of race, color, religion, national origin, handicap, or other non-merit factors.

BREEDING AND WINTERING AREAS

Georgia's abundant waterfowl resources include both year-round residents as well as wintering migrants. However, the vast majority of Georgia's waterfowl are migrants from the northeastern United States, the upper midwest, central Canada, and other northern areas. These ducks spend the spring and summer in traditional northern breeding areas, and then migrate to southern latitudes during the fall and winter. The ducks then return to the breeding areas the following spring to repeat this annual cycle.

BREEDING AREAS

Most of North America's waterfowl breed in the "Prairie Pothole" region of the upper midwestern United States and southern Canada or in the Boreal Forest region of middle and upper Canada. A few species breed even farther north in the Arctic tundra. The "Prairie Pothole" is the name given to the geographic region of the upper midwest that contains numerous small, isolated, wetlands interspersed with grasslands and agricultural fields. This region provides nesting habitat for millions of ducks each spring and summer. These same ducks fly south each winter to escape harsh weather and take advantage of the available food supply in warmer, southern climates.

WINTERING AREAS

On a broad scale, there are four major wintering areas for North America's waterfowl: the Chesapeake Bay and Atlantic Coast, the Mississippi River Alluvial Valley and Delta, the Gulf Coast of Texas and Louisiana, and the Pacific Coast and California's Central Valley. These wintering areas are extremely valuable to migrating waterfowl. They provide abundant food needed by ducks to maintain body weight over the winter so that they will be in good physical condition for the northern migration back to the breeding grounds. Ducks also begin the courtship process and often select mates while still on the wintering grounds.

FLYWAYS

The term "Flyway" is commonly used in two different ways. The term can be used to describe a group of states and provinces that work together administratively to manage their waterfowl resources, or it can be used as a biological term describing the flight path of ducks between breeding areas and wintering areas. There are four major biological flyways in the United States: Atlantic, Mississippi, Central, and Pacific. These migration routes have been determined using several factors, including band returns, direct observations, and radar images.

The states that are included in each of the biological flyways work together to determine hunting regulations. Administratively, Georgia is in the Atlantic Flyway, which also includes the states of Connecticut, Delaware, Florida, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, and West

Virginia as well as the Canadian provinces of New Brunswick, Newfoundland, Nova Scotia, Ontario, Prince Edward Island, and Quebec. Puerto Rico and the Virgin Islands also are included in this flyway.

SETTING HUNTING REGULATIONS

Various types of data are collected by state agencies and the U.S. Fish and Wildlife Service before hunting regulations are established. Biologists conduct aerial surveys of available wetlands across the breeding area during the late spring, and then resurvey those same areas later in the summer to estimate duck numbers and remaining wetlands. These data are used to calculate the "Fall Flight Index," an index to the number of ducks that will fly south for the winter. Band return data are used to estimate harvest levels and survival rates. The new Harvest Information Program (HIP) questionnaire is also used to estimate harvest, hunter numbers, and hunter activity. Wings collected from hunter-harvested ducks are used to estimate the proportion of the harvest that is composed of males, females, adults, and juveniles.

The individual states then meet collectively as Flyways and combine all of this information into a recommendation to the U.S. Fish and Wildlife Service for the upcoming hunting season. The U.S. Fish and Wildlife Service then combines the biological recommendations with public comment and opinion to set hunting regulations for the fall hunting season. This process is repeated annually to ensure that hunting regulations remain flexible to adjust for annual fluctuations in waterfowl population levels.

CONSERVATION EFFORTS FOR WATERFOWL

Because waterfowl depend on wetland habitats, and wetlands are rapidly declining, many conservation agencies and organizations are working to protect our wetlands and waterfowl. Federal agencies include the U.S. Fish and Wildlife Service and the U.S. Geological Survey. State agencies like the Georgia Department of Natural Resources, Wildlife Resources Division are working cooperatively with these federal agencies and with private conservation groups such as Ducks Unlimited, The Nature Conservancy, Waterfowl USA, and the Georgia Waterfowl Association to protect and enhance our wetland and waterfowl resources.

In Georgia, the Ducks Unlimited M.A.R.S.H. Program (Matching Aid to Restore State's Habitats) has been a great success. The M.A.R.S.H. Program is a conservation program that creates, restores, or enhances wetland habitats. Under this program, Ducks Unlimited and the Georgia Department of Natural Resources, Wildlife Resources Division each pay for half of the costs associated with development of wetland projects. Between 1985 and 1999, Georgia completed 25 M.A.R.S.H. Projects encompassing 15,102 acres of wetland wildlife habitat. In 2000, four new projects are scheduled for completion. These areas provide habitat for migrating and wintering waterfowl, as well as aquatic invertebrates, numerous amphibians and reptiles, wading birds, shorebirds, certain species of neotropical migratory birds, and mammals such as the beaver, round-tailed muskrat, and otter.

In addition to these conservation groups and programs, there are national laws that affect wetlands and laws that encourage landowners to manage their property for wildlife. Section 404 of the Clean Water Act requires permits from the U. S. Army Corps of Engineers before any dredging or filling

activities can take place in wetlands. Another important law that affects wetlands and waterfowl is the 1996 Food Securities Act, also known as the Farm Bill. Private landowners control 74% of the wetlands in the U.S., and this piece of legislation is designed to encourage landowners to protect those wetlands. Landowners who qualify can enroll in programs such as the Conservation Reserve Program (CRP), the Wetland Reserve Program (WRP), or the Wildlife Habitat Incentives Program (WHIP). These programs help offset the cost of creating or enhancing wildlife habitat on private property. If you are interested in the conservation programs offered under the Farm Bill, contact your local county office of the USDA Natural Resources Conservation Service (NRCS) or the Farm Services Agency (FSA).

Another important conservation effort is the North American Waterfowl Management Plan (NAWMP). This is an overall plan to conserve waterfowl resources across North America. The NAWMP contains population goals for all major waterfowl species, and lists various conservation methods to achieve those goals. Partnerships between private conservation groups and various state and federal agencies are the key ingredient to making the NAWMP successful. Conservation groups, agencies, and legislators are all working together to ensure a strong future for our waterfowl resources.

IMPORTANT WATERFOWL SPECIES IN GEORGIA

In his classic book, "Ducks, Geese, and Swans of North America," Frank C. Bellrose describes 55 different species of waterfowl. In Georgia, only a few of these species are seen in any great numbers. Most of the common species of ducks can be divided into two distinct groups, dabbling ducks and diving ducks. Georgia's most common members of each group are described below, including life history information from Bellrose's book. Learning to identify the different species of ducks can be accomplished through the use of field guides that can be purchased at most bookstores.

DABBLING OR PUDDLE DUCKS

These ducks are recognized by several common traits. They prefer shallow water and dabble or tip up to feed. Their legs are set near the middle of their body, and they are able to walk comfortably on land. When taking flight, they leap almost vertically from the water. They have a patch of bright colors, called a speculum, on each wing.

WOOD DUCK

The wood duck is the most common duck in Georgia. It makes up nearly 50% of all ducks harvested by Georgia hunters, and it is the only duck that breeds in significant numbers in our state.

Breeding Areas - Eastern half of the U.S., from Maine to Florida, and west to Texas.

Breeding Habitat - Forested wetlands, beaver ponds, river bottoms. Wood ducks nest in tree cavities or artificial nest boxes.

Average Clutch Size - 12

Incubation - 30 days

Average Nest Success - 40%

Adult Survival - 45-50%

Wintering Areas - Southeastern U.S.

Food Habits - The prime food item in the fall is acorns. Other important food items include smartweed, wild millet, duckweed, and panic grass.

The wood duck was abundant in the forested wetlands of North America during the pre-colonial period. But as the human population grew, man's activities began to have an enormous impact on the wildlife populations around them. Loss of bottomland hardwoods and unregulated market hunting caused wood duck populations to decline drastically, nearly to the point of extinction by the early 1900's.

Protection by laws such as the Migratory Bird Treaty Act of 1918 and the Migratory Bird Hunting Stamp Act of 1934 (the Duck Stamp Act) along with the development of the first artificial wood duck nest box in 1937 have helped wood duck populations to soar once again.

Today, the wood duck is the most common duck in Georgia, and it is the number one bird in the bag for Georgia's waterfowl hunters. In 1997, Georgia's hunters harvested over 52,000 wood ducks (43% of the total duck harvest). In contrast, in 1961 (the first year of available USFWS harvest data) only 4,100 wood ducks were harvested in Georgia (20% of the total duck harvest).

Currently, the Georgia Department of Natural Resources operates 90 Wildlife Management Areas across the state. On these areas, almost 2000 wood duck nest boxes are maintained annually. Other agencies (U.S. Forest Service, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers) maintain over 500 wood duck nest boxes on their properties. Many private landowners also erect and maintain wood duck nest boxes.

The wood duck, like all other waterfowl species, relies heavily on man's conservation efforts for its continued survival. With the continuing loss of mature, bottomland hardwoods, the naturally-occurring cavities that wood ducks use for nesting remain scarce. By providing artificial nesting cavities, conservationists can help enhance local wood duck populations.

MALLARD DUCK

The mallard duck is another common dabbling duck found in Georgia. The mallard makes up 13% of our duck harvest.

Breeding Areas - The northern one-third of the U.S, extending northwest across Canada to Alaska. Breeding mallards seen in Georgia are feral, i.e. escaped or released from captivity, there are no truly wild mallards breeding in Georgia.

Breeding Habitat - Prairie parklands, open grassy areas with isolated, small wetlands.

Average Clutch Size - 9 eggs

Incubation - 28 days

Average Nest Success - 35-40%

Adult Survival - 45-50%

Wintering Areas - Mississippi River delta between Cape Girardeau, Mo., and the Gulf of Mexico

Food Habits - Seeds of bulrushes, pondweeds, wild millet, sedges, smartweeds, acorns, and crops such as corn, sorghum, rice, and soybeans

OTHER IMPORTANT DABBLERS

Besides the wood duck and the mallard, there are several other species of dabbling ducks found in Georgia during the fall and winter. Green and blue-winged teal are some of the smallest members of the waterfowl family. Blue-winged teal are early migrants, and often pass through Georgia as early as September. Together, these species account for about 7% of Georgia's annual duck harvest. Other dabblers found in Georgia include American wigeon, northern shoveler, mottled duck, gadwall, and northern pintail. None of these species individually account for more than 3% of Georgia's duck harvest.

DIVING DUCKS

These ducks differ from dabbling ducks in several ways. They prefer deeper, more open water. They dive to feed, often to depths of several feet. Their legs are set farther back on their body, which allows them to swim better under water, but makes them appear awkward when trying to walk on land. When taking flight, they run across the surface of the water prior to becoming airborne, and their wing patches are usually white or gray.

RING-NECKED DUCK

The ring-necked duck is the most common diving duck in Georgia (Figure 5, inside front cover). It makes up 18% of the duck harvest in Georgia.

Breeding Areas - Closed boreal forest of Alberta, Saskatchewan, and Manitoba.

Breeding Habitat - Marshes at least partially surrounded by wooded vegetation.

Average Clutch Size - 9 eggs

Incubation - 26 days

Average Nest Success - 67%

Adult Survival - 45-50%

Wintering Areas - Eastern half of the U.S., from New Jersey southward

Food Habits - Water shield, pondweeds, sedges, smartweeds, coontail, duckweed, snails, clams, and fly larvae

CANVASBACK

The canvasback was known as the "King of the Ducks" during the market hunting days of the late 1800's and early 1900's around the Chesapeake Bay, where it was preferred because of its large size and excellent table fare. Today, the canvasback still carries a high reputation with waterfowl hunters (Figure 6, inside front cover). In Georgia, the canvasback makes up just under 5% of our annual duck harvest.

Breeding Areas - Prairie parklands of Saskatchewan, Alberta, and Manitoba.

Breeding Habitat - Small, shallow, intermittent ponds.

Average Clutch Size - 9 eggs

Incubation - 25 days

Average Nest Success - 45%

Adult Survival - 50-55%

Wintering Areas - In the Atlantic Flyway, primarily on the Chesapeake Bay

Food Habits - Wild celery, widgeongrass, eelgrass, pondweeds, clams, and mollusks.

LESSER SCAUP

In addition to the ring-necked duck and the canvasback, the lesser scaup is another important diving duck for Georgia hunters (Figure 7, inside back cover). Lesser scaup make up nearly 4% of Georgia's duck harvest.

Breeding Areas - Across Canada, from the Great Lakes to Alaska.

Breeding Habitat - River deltas and open boreal forest

Average Clutch Size - 9 eggs

Incubation - 25 days

Average Nest Success - 45%

Adult Survival - 45-50 %

Wintering Areas - In the Atlantic Flyway, mainly in Florida

Food Habits - Snails, clams, aquatic insects, smartweeds, bulrushes, pondweeds and widgeongrass

Other Important Divers And Sea Ducks

In addition to the ring-necked duck, canvasback, and lesser scaup, there are several other species of diving ducks that are found in Georgia during the winter. Redheads are seen on Lake Seminole during their migration to the Gulf of Mexico. Hooded mergansers can be found in the same forested wetlands as wood ducks. The small bufflehead occasionally is found on some of the larger reservoirs as they migrate through Georgia. In addition, ruddy ducks can be important species in some areas.

Another group of ducks is called the sea ducks, and this group includes species such as the eiders, scoters, oldsquaw, and harlequin. Very few seas ducks are harvested in Georgia, but they can periodically be seen in the waters of the Atlantic Ocean off the coast.

IMPORTANT GOOSE SPECIES IN GEORGIA

There are two species of geese found in Georgia. The most common is the resident Canada goose, and the other species is the migratory snow goose. Snow geese are relative newcomers to Georgia. As their population has greatly increased over the past several years, their wintering area has expanded to include Georgia.

CANADA GOOSE

The Canada goose has become a common resident of Georgia. Practically all of the Canada geese seen in Georgia are resident birds, they are not migratory. These birds spend all year in our state, even though they may use different habitats during the summer and the winter.

Breeding Area - Resident Canada geese breed across the state of Georgia.

Breeding Habitat - Ranges from isolated ponds and wetlands to major reservoirs.

Average Clutch Size - 5 eggs

Incubation - 26 days

Average Nest Success - 70%

Adult Survival - 80%

Wintering Areas - Various habitats across the state

Food Habits - Clovers, grasses, and cultivated grains.

Historically, migratory Canada geese passed through Georgia on their way to an important wintering area, St. Marks National Wildlife Refuge in Florida. Over time, the migratory population of Canada geese began to decline, and fewer and fewer geese passed through Georgia. Today, there are virtually no migratory Canada geese present in Georgia during the winter.

In 1975, the Georgia Department of Natural Resources began a program to re-establish Canada geese in Georgia. During the restocking period of the late 1970's and early 1980's, thousands of wild Canada geese were released on reservoirs and farm ponds across the state. Canada geese quickly adapted to the available habitats in Georgia, and our resident goose population began to grow and expand into new areas.

Currently, Georgia's Canada goose population is estimated at approximately 45,000 birds. Some of our resident geese have adapted so well to life in urban and suburban areas that they cause problems in certain situations. Geese often use habitats such as golf courses, beaches, lawns, housing developments around major impoundments, and man-made ponds in subdivisions and apartment complexes. Goose-human interactions occur often in these settings. In situations where geese are causing problems, the Georgia Department of Natural Resources, Wildlife Resources

Division, has trained personnel who can provide technical guidance and assistance to solve these problems.

SNOW GOOSE

There are two different species of snow geese, the lesser snow goose and the greater snow goose. The lesser snow goose is the species found in our state, and it is a relative newcomer to Georgia. The population of mid-continent lesser snow geese has increased greatly during the last several years, and more and more lesser snow geese are now wintering in Georgia. Lesser snow geese come in two distinct color phases, a white phase (called the snow goose), and a dark phase (called the blue goose). Though they may look different, they are both the same species, lesser snow goose.

Breeding Area - Hudson Bay in Canada.

Breeding Habitat - Grassy tundra areas near large bodies of water.

Average Clutch Size - 5 eggs

Incubation - 23 days

Average Nest Success - 85-90%

Adult Survival - 70-75%

Wintering Areas - Primarily agricultural areas of Arkansas, Louisiana, and Texas

Food Habits - Roots of bulrushes, cordgrass, cattails, and agricultural crops

WATERFOWL HABITATS IN GEORGIA

Georgia is blessed with a great diversity of wetland habitats. In his 1978 book, "The Natural Environments of Georgia," Charles H. Wharton divided Georgia's wetlands into 39 different types ranging from mountain springs to salt marsh and beach. A much simpler breakdown of wetland types is presented by the Georgia Nongame and Natural Heritage Section in their publication entitled "State of Georgia Landcover Statistics by County." This breakdown can be simplified to include 5 different wetland types: 1) major reservoirs, 2) farm ponds, 3) beaver ponds and forested wetland, 4) coastal marshes, and 5) managed impoundments.

RESERVOIRS

Reservoirs in the southern Atlantic Flyway serve as important resting areas for migrating waterfowl. Most reservoirs are too deep to produce enough food to hold ducks over the winter, but they do provide resting areas and refuges from nearby hunting pressure. There are many large reservoirs in Georgia that are owned and operated by the Georgia Power Company or the U.S. Army Corps of Engineers. Some of these reservoirs have well-developed shorelines and heavy boat traffic, and are of little value to migrating waterfowl. However, some of our reservoirs do provide benefits for waterfowl.

The large reservoir projects along the Georgia-South Carolina border including Hartwell, Russell, and Clark Hill provide stopover areas for ducks migrating to coastal areas of Georgia and South Carolina. Along the Chattahoochee River basin in southwestern Georgia, Lakes Walter F. George and Seminole provide resting and feeding areas for waterfowl migrating to the Gulf Coast of Florida. Submergent and emergent vegetation proliferate in the relatively shallow waters of Lake Seminole, providing an ample supply of food for the waterfowl that use the lake. Lake Seminole contains Georgia's largest inland concentration of wintering waterfowl, primarily ring-necked ducks, canvasbacks, and scaup.

FARM PONDS

Farm ponds are designed for fish, not for ducks. Most farm ponds are too deep for waterfowl use and are built with steep sides to reduce the growth of aquatic vegetation. Most good duck foods are considered to be weeds by the average fishermen.

Farm ponds may occasionally provide resting habitat for migrating ducks, but they do not provide enough food to hold ducks over the winter. If the pond is bordered by grass, Canada geese may be attracted to the pond and will feed on the nearby grasses. The landowner must decide whether to manage for ducks or for fish, because a good pond for fishing is usually not a good pond for ducks.

BEAVER PONDS AND FORESTED WETLANDS

Beaver ponds are found all over Georgia and contain various types of wetland habitats. Beaver pond habitat includes emergent herbaceous vegetation such as cattails, needle rush, or bulrush and a few interspersed woody plants such as willows, alder, or button bush. Forested wetlands include areas dominated by large woody vegetation, and includes habitats such as river swamps, cypress ponds, and tupelo gum ponds.

During the breeding season, these wetlands provide excellent nesting sites and brood-rearing habitat for resident wood ducks. During the fall and winter, these inland freshwater wetlands are used extensively by migrating and wintering wood ducks, mallards, and teal. Available foods include acorns from oak trees, seeds of naturally occurring vegetation, and numerous types of aquatic invertebrates. Beaver ponds and forested wetlands also provide roosting sites, loafing areas, and refuge from disturbance. Because of their importance to wood ducks, these types of interior freshwater wetlands are some of the most popular areas for Georgia's waterfowl hunters.

COASTAL MARSHES

The tidal marshes around Georgia's ''Golden Isles'' can be classified in one of two categories: brackish or salt. Brackish marsh includes low-salinity emergent wetlands dominated by black needlerush or giant cordgrass. These wetlands are transitional areas between freshwater marsh or forested wetland and salt marsh. The vast majority of Georgia's coastal wetlands are defined as salt marsh and include extensive areas dominated by smooth cordgrass.

Coastal wetlands, because of the influence of the tides, are extremely rich in nutrients and can provide important wintering areas for a variety of waterfowl species. Coastal bays and sounds are important areas for migrating scaup, mergansers, and scoters.

MANAGED IMPOUNDMENTS

Managed waterfowl impoundments can provide the best possible habitat for migrating and wintering waterfowl. The key to a successful waterfowl impoundment is the ability to control the water level. This includes being able to drain and reflood the impoundment at any time. A dependable water supply is a must. If you can control the water, then you can influence the vegetation in the impoundment. By manipulating factors such as water depth, timing of flooding, duration of flooding, and timing of drawdown, you can provide the proper conditions for growing a variety of food plants that are highly preferred by ducks. Normally, impoundments are flooded in October or early November and are drained in the late winter or early spring. If wood duck production is an important objective, the impoundment may remain flooded until June to provide sufficient brood-rearing habitat for the ducklings. The impoundment manager also can control other factors such as cover and hunting pressure.

Managed impoundments on the Savannah National Wildlife Refuge on the Georgia-South Carolina border are extremely important wintering areas for waterfowl migrating down the Savannah River system, and managed coastal impoundments along the Altamaha river just south of Darien provide migrating and wintering habitat for American green-winged teal, blue-winged teal, wood ducks, northern pintails, gadwall, northern shovelers, mallards, mottled ducks, black ducks, American wigeon, ring-necked ducks, and lesser scaup.

Waterfowl impoundments come in many forms, they may be flooded moist soil areas with native vegetation, flooded fields of agricultural crops, or flooded hardwoods (known as green tree reservoirs). Management techniques for waterfowl impoundments will be discussed on the following pages.

MANAGEMENT TECHNIQUES FOR WATERFOWL

Like all species of wildlife, waterfowl need the basic necessities for life: food, water, cover, and space. By manipulating the amount and type of each of these resources, waterfowl habitat can be greatly improved. The management techniques discussed below can be used to increase the amount of desirable foods, provide the correct amount and type of cover, control water depth and timing of flooding, and create the space and refuge needed by waterfowl.

NOTE: Always check with local offices of the U.S.D.A. Natural Resource Conservation Service and/or the U.S. Army Corps of Engineers before modifying any wetland area. There are strict federal laws concerning wetlands that must not be violated.

MANAGING FOOD RESOURCES

Providing food for waterfowl can be accomplished in one of two ways, through moist soil management to encourage the growth of desirable, native food plants or by cultivating agricultural crops such as corn or millets. In some cases, a combination of native foods and cultivated crops can be used to attract and hold waterfowl.

MOIST SOIL MANAGEMENT

Moist soil management is a management technique that stimulates the growth of beneficial native plants by controlling the water level in an impoundment or a beaver pond. If you can control the depth, duration, and timing of flooding, you can practice moist soil management. Water levels can be controlled with the use of a flashboard riser. Removing boards will allow water to drain from the impoundment, and replacing boards will keep water in the impoundment. A dependable source of water is absolutely necessary. Streamflow can be used to fill the impoundment, or a pump can be used to pull water from a nearby source, or gravity can be used to pull water from an upstream holding pond into the impoundment. Do not rely solely on rainfall and runoff to fill the pond, or the impoundment will remain empty in some years due to lack of rainfall.

Managed impoundments should be drained gradually (over a period of 2-4 weeks) around May or June, and the soil should be kept moist through the growing season. This will stimulate the germination and growth of selected wetland plants that are preferred by waterfowl, including wild millets, smartweeds, sedges, and other aquatic plants. By draining the impoundment gradually, a greater variety of wetland plants will germinate and grow, whereas a rapid drawdown will result in a very similar stand of vegetation across the impoundment. Once the seeds are mature in the fall, the impoundment can be mowed, disked, or burned before it is reflooded. This practice is legal as long as you are managing native vegetation. Mowing, disking, and burning reduce the amount of vegetative cover in the impoundment and provide open water areas for ducks to use. These techniques also help prevent perennial pest plants from becoming established, and they stimulate the preferred, early successional plant species such as wild millets and smartweeds. The impoundment should be reflooded gradually beginning in early October, and the impoundment should be full by early November, when many of the migrants begin to arrive. Ideally, water depths in managed impoundments should range from 2-4 inches up to 18 inches. These depths provide ideal foraging areas for wintering waterfowl. After waterfowl season, the water level in the impoundment can be reduced to attract migrating shorebirds, and then drained slowly in May or June, when the annual management process starts over.

In a beaver pond situation, food resources can be increased through the use of a Clemson beaver pond leveler (Adobe Acrobat Reader required). This device should be inserted into the beaver dam in early June to drain the beaver pond. Exposing the bottom or sides of the pond to air and sunlight will result in the germination of a tremendous variety of wetland plants that will attract a variety of waterfowl in the fall. In the fall, the manager must simply close the drain and allow the pond to refill. Beaver pond managers must realize that without a dependable water supply, there is a chance that the beaver pond will not be flooded prior to duck season.

Moist soil management is inexpensive because there is no seed or fertilizer to buy and no farm equipment is needed unless the manager chooses to manipulate the vegetation prior to flooding. There is normally a great diversity of plants that grow in moist soil areas, and because these plants have evolved in wet areas, their seeds are durable and won't rot after the impoundment is flooded. Because there are so many different species of plants, there is usually a very consistent seed crop every year. Native plants provide a balanced diet, including all essential nutrients. Impoundments that are managed for native vegetation usually have more aquatic invertebrates, more amphibians, more reptiles, and more mammals than impoundments that are managed in other ways.

PLANTING AGRICULTURAL CROPS

Impoundment managers also have the option of planting agricultural crops as a means of increasing the food supply for waterfowl. Just like moist soil management, the impoundment manager must have complete control of the water level. The manager must be able to drain the impoundment completely, keep the water off during the growing season, and reflood the impoundment from a dependable water source in the fall.

There are many different crops that can be planted for waterfowl. The management scheme is very similar for most agricultural crops. The impoundment is drained in March or April, and allowed to dry completely. The impoundment must be dry enough to support a farm tractor. Once the seedbed is prepared, the crop is planted at the proper seeding rate and fertilizer and lime are added according to soil test specifications. Planting dates will vary depending on the selected crop. Once the seed has matured, the impoundment is reflooded in early November in preparation for the arrival of migrating ducks.

Agricultural crops can also be used in beaver ponds if the water level can be controlled. A quick, late drawdown in July followed by hand sowing of Japanese millet on the exposed mudflats can provide a large amount of palatable seed for waterfowl. Once the seed is mature, allow the beaver pond to reflood as described in the section above.

Before choosing to plant agricultural crops for waterfowl, there are several factors to consider. Small grains do not provide a nutritionally complete diet for waterfowl, while native plants provide essential nutrients and a greater diversity of food. Planting has many additional costs, including seed, fertilizer, lime, equipment, and the risk of a crop failure in some years. However, some plantings are highly palatable and productive and may do an excellent job of attracting and holding waterfowl.

NOTE: There are strict baiting laws that must be followed when planting agricultural crops for waterfowl management. See Georgia's current migratory bird baiting regulation. If further assistance or clarification is needed, contact your local Georgia Department of Natural Resources, Wildlife Resources Division office for assistance.

GREEN TREE RESERVOIRS

A green tree reservoir is another type of impoundment that can be managed for waterfowl. A dike is used to hold water in an impoundment that is built around a stand of mature, mast producing trees, especially water oaks, willow oaks, southern cherrybark oaks, and others.

A water control structure such as a flashboard riser is used to hold water in the fall and winter, and the boards are removed to drain the area during the spring and summer. The impoundment should be flooded only after the leaves on the trees have changed color in the fall, which normally happens about late October or November. Once the leaves change color, the trees have gone dormant for the winter, and they will not be damaged by flooding. The impoundment should be flooded to a depth of no more than 18 inches. The primary food source in a green tree reservoir is acorns, and the waterfowl that benefit the most include mallards, wood ducks, and black ducks.

In the spring, drain the impoundment when the buds on the trees begin to swell, which normally happens in late February or early March. If the impoundment remains flooded too long in the

spring, the trees could be killed. Flooding a green tree reservoir every year will slowly weaken the trees, and some eventually will die. Flooding the impoundment every other year is one way to extend the life of the trees. Another option is to flood the impoundment for three years in a row, and then let it remain dry for two years in a row. This rotation will allow use of the impoundment 3 out of every 5 years.

MANAGING AVAILABLE COVER

Cover can be loosely defined as a place to hide, but ducks need different types of cover at different times of the year. During the spring, hens need nesting cover. Once the ducklings hatch, they need brood-rearing cover that will protect them until they are able to fly, usually at about 7 weeks of age. Ducks also need loafing cover, which is simply a safe place to sit and relax.

NESTING COVER

Hens need a safe place to build their nest because a hen on an exposed nest is more prone to attract predators, which may destroy the eggs, kill the hen, or both. The only species of waterfowl that nests in significant numbers in Georgia is the wood duck. Wood duck hens normally nest in tree cavities that have been hollowed out by some other species, usually woodpeckers. In many areas, the mature hardwood trees that would normally provide nesting cavities for wood duck hens have been cut down, and there are not enough suitable natural cavities available.

In areas where natural cavities are lacking, nest boxes can be built and erected to create the necessary nesting cover for wood duck hens. These boxes not only provide additional cavities for the wood ducks, but they are also much safer than a natural cavity when a predator guard has been properly installed. Predator guards are necessary to prevent nest predators like raccoons and rat snakes from entering the box, killing the hen, and destroying the nest. Nest boxes also must be maintained annually to keep them productive. Unhatched eggs, old nesting material, and wasp nests have to be removed, and fresh shavings need to be added along with some sort of insect repellent. Wood duck nest boxes must be put up in or near available brood-rearing habitat in order to successfully increase local wood duck populations.

Too many wood duck boxes in one area may lead to a problem known as "dump nesting." In cases where the boxes are too close together, several hens may lay eggs in the same box, yet none of the hens incubate the eggs. Dump nests may contain as many as 25-30 eggs that never develop or hatch. To avoid the problem of "dump nesting," only put up about one box per acre of suitable habitat when beginning a nest box program. Check and maintain the boxes annually, and only add more boxes when the existing boxes are all being used.

BROOD-REARING HABITAT

To successfully raise a brood of young ducklings, the hen wood duck needs the proper type of cover to protect them. Good brood-rearing habitat contains a mixture of approximately 30% shrubs, 25% open water, 5% trees, and 40% emergent vegetation. The emergent vegetation and overhead shrub cover provide places for the ducklings to hide from predators. The emergent vegetation also provides places for the ducklings to hunt for animal foods including aquatic insects, spiders, and

other invertebrates. These animal foods are part of a high protein diet that ducklings need for proper growth and development.

To be beneficial, brood-rearing habitat should be in close proximity to the nesting cover and/or nest boxes that are available to wood ducks. Brood-rearing areas should be shallow, and have a dependable water source so that the area will stay flooded until the ducklings are able to fly.

LOAFING COVER

Loafing cover is another requirement of wintering waterfowl. Loafing cover is simply a safe place to sit and rest. Muskrat mounds, beaver lodges, stumps, floating logs, and tussocks of vegetation are all examples of loafing areas. Some species prefer large areas of open water to sit and loaf. Ducks often feed heavily in the morning or afternoon hours, and then loaf and preen during the middle of the day. Ducks often seek isolated spots out of the water to preen and rest, and loafing areas provide these havens.

MANAGING DISTURBANCE

In addition to food, water, and cover, ducks also need space. Managers can provide all of the other necessities of life, but if ducks are constantly harassed by man's activities, i.e. if they don't have the space that they need, the ducks won't stay very long.

Reducing Disturbance and Providing Refuge Areas

Limiting access to the impoundment is the best way to limit disturbances. If the manager has the capability to "close the gates" to the wetland areas that are managed for waterfowl, that is the best way to provide a quiet environment for waterfowl. If ducks are consistently flushed, they will eventually move to another area. Other options include leaving a border of vegetation around the impoundment if it is near a road, house, or other source of disturbance. If the impoundment is hunted, do not hunt too often. The manager may have to learn by experience how often the impoundment can be hunted without driving ducks away. Many public impoundments in Georgia are only hunted once per week. Morning hunting is generally believed to be less disruptive and less likely to move ducks than evening hunting, or "roost shooting" (which is illegal after sunset). In addition to reducing disturbance to the ducks on the impoundment, providing a refuge also is very important. The refuge can take two forms: a space refuge or a time refuge. A space refuge is a physical portion of the area that is not hunted. A time refuge is a limit on the days or hours when hunting is allowed. Either of these techniques provide waterfowl with a safe place to feed and loaf when hunting season is open.

SUMMARY

By providing the essentials of life: food, cover, water, and space, land managers can enhance local wood duck populations and attract migratory waterfowl to their property. Hopefully this management guide has provided the information necessary to begin a waterfowl management program. If landowners or managers have additional questions about waterfowl management, the

Georgia Department of Natural Resources, Wildlife Resources Division, has trained personnel to answer their questions and assist with the development of a waterfowl management plan. Simply call the nearest Game Management Office to seek assistance.

REFERENCES

Arner, Dale H. and Gary R. Hepp. 1989. Beaver pond wetlands: a southern perspective. Pages 117-128 in: Smith, L. M., R. L. Pederson, and R. M. Kaminski. Habitat management for migrating and wintering waterfowl in North America. Texas Tech University Press. 560 pp.

Bellrose, F. C. 1976. Ducks, geese, and swans of North America. Third Ed. Stackpole Books. Harrisburg, Pa. 540 pp.

Georgia Nongame and Natural Heritage Section. 1996. State of Georgia Landcover Statistics by County. Georgia Department of Natural Resources, Wildlife Resources Division, Georgia Natural Heritage Program. Project Report 26. 57 pp.

Huffstatler, H. and D. Stewart. 1993. Waterfowl habitat management handbook for the lower Mississippi River valley. Coop. Ext. Service, Miss. State Univ. Publication 1864. 19 pp.

Jackson, J. L. 1980. Bring ducks to your land: managing wetlands for waterfowl in the southeast. Coop. Ext. Service, Univ. of Georgia. 15pp.

Johnson, F. A. and F. Montalbano III. 1989. Southern reservoirs and lakes. Pages 93 - 116 in: Smith, L. M., R. L. Pederson, and R. M. Kaminski. Habitat management for migrating and wintering waterfowl in North America. Texas Tech University Press. 560 pp.

Neely, W. W. and V. E. Davison. 1966. Wild ducks on farmland in the south. U.S.D.A. Farmer's Bulletin 2218. 14 pp.

Wharton, Charles H. 1978. The Natural Environments of Georgia. Georgia Department of Natural Resources, Environmental Protection Division, Georgia Geologic Survey. Bulletin 114. 227 pp.

Williams, R. K., R. D. Perry, M. D. Prevost, and S. E. Adair, Ph.D. 1998. Management of south Atlantic coastal wetlands for waterfowl and other wildlife. Atlantic Coast Joint Venture of the North American Waterfowl Management Plan and Ducks Unlimited. 29 pp.

SELECTED NATIVE PLANTS TO ENCOURAGE FOR WILDLIFE

Freshwater Emergents - plants that extend above the surface of the water.

Common Name	**Scientific Name**
Asiatic Dayflower	Aneilema kiesak
Spikerush	Eleocharis spp.
Bulrush	Scirpus spp.
Wild Millet	Echinochloa spp.
Fall Panicum	Panicum spp.
Smartweed	Polyganum spp.
Flatsedge	Cyperus spp.
Redroot	Lachnanthes spp.
Arrow Arum	Peltandra spp.
Giant Foxtail	Setaria magna

FRESHWATER PAD PLANTS - PLANTS THAT ONLY REACH THE WATER'S SURFACE.

Watershield	Brasenia schreberi
White Waterlily	Nymphaea odorata

FRESHWATER SUBMERGENTS - PLANTS THAT GROW COMPLETELY BELOW THE WATER'S SURFACE

Pondweed	Potamogeton spp. and Najas spp.
Muskgrass	Chara spp.

BRACKISH WATER - PLANTS THAT GROW IN WATER WITH A RELATIVELY LOW SALT CONTENT.

Widgeongrass	Ruppia maritima
Saltmarsh Bulrush	Scirpus robustus
Dwarf Spikerush	Eleocharis spp.

BIBLIOGRAPHY OF SELECTED WETLAND PLANT IDENTIFICATION BOOKS:

Aulbach-Smith, C.A. and de Kozlowski, S. J. 1990. Aquatic and wetland plants of South Carolina. South carolina Aquatic Plant Management Council and South Carolina Water Resources Commission. 123 pp.

Lewis, G.W. and J. F. Miller. 1984. Identification and control of weeds in southern ponds. UGA Cooperative Extension Service. 26pp.

Tiner, R. W. 1993. Field guide to the coastal wetland plants of the southeastern United States. The University of Massachusetts Press. 328 pp.

Duncan, W. H. and M. B. Duncan. 1987. The Smithsonian guide to seaside plants of the Gulf and Atlantic coasts from Louisiana to Massachusetts, exclusive of peninsular Florida. Smithsonian Institution Press. 409

SELECTED AGRICULTURAL CROPS TO PLANT FOR WATERFOWL

Crop	Seeding Rate	Planting Method	Fertilization Rate	Plant Date	Days to Maturity
Japanese Millet	25 lbs/ac	Broadcast	500 lbs of 10-10-10	July	75
Browntop Millet	25 lbs/ac	Broadcast	500 lbs of 10-10-10	June	60
Dove Proso Millet	20 lbs/ac	Broadcast	500 lbs of 10-10-10	May-June	75
Rice	100 lbs/ac	Broadcast	100 lbs of 34-0-0	April-June	100
Corn	7 lbs/ac	Drilled (Rows)	750 lbs of 10-10-10	April-May	100
Egyptian Wheat	30 lbs/ac	Broadcast	500 lbs of 10-10-10	May-July	100
Grain Sorghum	7 lbs/ac	Drilled (Rows)	750 lbs of 10-10-10	May-June	100

SPECIFICATIONS FOR WOOD DUCK BOX CONSTRUCTION

MATERIALS

Rough cut cypress boards 1" thick are preferred, but cedar, yellow pine, or exterior plywood are acceptable substitutes. DO NOT use treated lumber.

Weather resistant latch on the side flap that opens for maintenance

Zinc coated 1 ½" inch wood screws

Â½" wire mesh, 4 ½" wide, from bottom of box to front hole, on inside of box, to allow ducklings to climb up and escape

See figure

Sides (10" wide)

One side with pivoting flap

Flap beveled for opening 8 ½" above the bottom

Flap beveled at top

Pivot screws 16" above the bottom

Use countersunk wood screws

Bottom

Recessed at least 1/4" with five holes at least 3/8" diameter for drainage

Top (12" wide)

Overhang front by 1 ½"

Use countersunk wood screws

Bevel back cut to match back board

Front (12" wide)

Opening cut 3" high by 4" wide

Opening 4" from top of front board

Use countersunk wood screws

Bevel top cut to match top board

Back (12" wide)

Leave 2" above and below for mounting to post with lag bolts

Use countersunk wood screws

Predator Guard

Use 29 gauge aluminum flashing or galvanized metal, 36" wide

See figure for specifications on inverted cone design

Post

Pressure treated 4" by 4" wooden post, various lengths depending on water depth

GUIDELINES FOR MOUNTING WOOD DUCK NEST BOXES

1. Boxes should not be hidden. Boxes should be placed so that there is a 40'' flight line in front of the box that is free from obstructions such as tree limbs or bushes.
2. If using a wooden post, sharpen the post so that it can be driven down into the mud. Drill a hole for the lag bolts used to mount the box. Drive the post into the ground, slip the predator guard over the post, mount the box onto the post, add wood shavings to a depth of 4" in the bottom of the box, then nail the predator guard in place.
3. Position the box as nearly vertical as possible, with a very slight tilt forward. The tilt will enable ducklings to climb out more easily.
4. Boxes should be placed at the rate of 1 per acre in suitable brood-rearing habitat.
5. Boxes should be placed so that the bottom of the box is at least 4 feet above the high water mark.
6. Do not place more than one box per post, as this may increase the possibility of "dump nesting."
7. When attaching the box to the post, use 3" to 5" lag bolts instead of nails. Bolts make it easier to remove boxes in the future for replacement or repair as necessary.
8. No box should be mounted without a predator guard.
9. Wasps can be kept out of the boxes using a small piece of no-pest strip stapled or tacked inside the box.
10. Flat-type predator guards can be used, and should measure 40" by 40". These can be mounted very easily on the bottom of the box.