

# THE PLIGHT OF WOOD DUCKS IN THE CAROLINAS

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There are few success stories in the annals of American wildlife conservation to match that of the Wood Duck (*Aix sponsa*). From near extinction in the early years of the twentieth century as a result of earlier habitat destruction and unrestricted shooting, the American population of Wood Ducks steadily increased so that a period of inviolate protection starting in 1918 was ended by an open hunting season starting in 1941. Under federal regulations Wood Ducks have continued to be hunted in some states within their range each year since 1941, and they have actually become important game birds in several states, particularly in the Carolinas.

Materialistic as we humans are, it just might be possible that Wood Ducks were brought back from near extinction only because they held possibilities as game birds, for most help they receive comes left-handedly from hunters. However, lest the hunters should take an unearned bow it must be recalled that, with little or no artificial help, Pileated Woodpeckers (*Dryocopus pileatus*) also returned at about the same time to reoccupy remnants of their earlier breeding habitats deserted with the clearing of the primeval forest. Clearly, help would have been to no avail if Wood Ducks had not been adaptable enough to accept the help along with its accompaniments of civilization, and the success of Wood Ducks was most importantly a result of their adaptability.

## NEST BOX CONSTRUCTION AND PLACEMENT

Wood Ducks are adaptable only within certain limits, and there are some features of their habitat requirements which they refuse to compromise. For example, they must have elevated cavities for nesting. Tree cavities furnish their natural nesting places, but with clearing of the forest suitable cavities became greatly reduced in numbers; thus the need for artificial nesting facilities was developed. A wooden box 24 inches high with a floor 10 inches square is suitable for their use. There is an entrance hole 4 inches in diameter with its bottom about 16 inches above the floor of the box. A ladder of hardware cloth is attached to the inside of the front of the box for use of the ducklings in escaping from the box, and the roof is made removable to permit periodic inspections of the contents of the box. About 4 inches of sawdust is placed on the floor of the box for nesting material. Only down from her breast is added by the female (Figure 1).

The boxes are mounted on trees near rivers or lakes or on posts extending above the high water level of ponds (Figure 2). When nest cavities are scarce, Wood Ducks nest at surprisingly great distances from water, but many ducklings are then lost in their movement to water. In Iowa, Leopold (1951) reported 61 of 189 Wood Duck ducklings lost in moving about one city block from their nests to water. The boxes should be firmly attached to their supports, but tree-mounted boxes should be attached in such a way that the bolts or nails can be removed from the trees when use of the boxes is discontinued, and the removal of the nails or bolts should be effected at that time. This is desirable for preventing possible damage to equipment when the trees are later harvested and processed.

Because female Wood Ducks return in successive years to cavities where they have successfully nested and because the young females tend to return to nest at or near their hatching places, a person once successful in attracting Wood Ducks to boxes has an improved probability for having nesting birds in subsequent years after the first. However, mortality is particularly high during the first year of the birds' lives, and it is necessary to have about 34 ducklings to leave the nests to assure that one young female will be alive to return to the locality the next year. The probability of an adult female returning a second year is much higher than for the newly hatched young, or about one



Figure 1. A female Wood Duck incubates her eggs.

in three. The birds form pairs when on their wintering grounds, and the males follow their mates to their hatching or earlier nesting sites; thus males do not return to their hatching or earlier nesting sites unless they happen to pair with females from the same nesting localities.

Wood Ducks readily nest near human dwellings, and when a dwelling is located reasonably near the necessary water, these ducks can be induced to nest within easy view of a window. However, Wood Ducks nesting near such dwellings provide little entertainment to humans because the birds remain outside but near the boxes so little of the time that they are seldom seen there. I have known of several pairs of Wood Ducks nesting immediately beside human dwellings where the presence of the birds was unknown until the ducklings were seen leaving their nests. However, by assiduous watching, males can be seen near the boxes in the early morning when they accompany their mates on cavity explorations, and the view of a wild male Wood Duck just outside one's window provides an experience always to be treasured.

Obviously it is most satisfying to attract Wood Ducks near our own homes, but for various reasons many of us cannot feasibly achieve this goal; nevertheless we need not be entirely deprived of experiences with nesting Wood Ducks, for we can find new and satisfying experiences in observing the nesting activities of these birds merely by mounting boxes on shores of accessible rivers. Permission to erect the boxes can ordinarily be readily obtained from landowners having appropriate habitat on their properties. Sections of rivers where the gradient is low are most satisfactory for later brood rearing and hence also for erection of the boxes.

River habitats appear to offer the best possibilities for helping Wood Ducks in the Carolinas. In Ohio, as many as two broods of ducklings per mile were found on 10-mile sections of the Scioto River; whereas, in float trips over 25 miles of the Tar, Neuse, and Pasquotank Rivers in North Carolina, only six broods were found, or about one brood per 4 miles of travel. Nest boxes were used immediately after they were placed on the Tar River, suggesting that the low number of breeding Wood Ducks on these North Carolina rivers probably results from a shortage of suitable nesting cavities. This shortage can be overcome by provision of nest boxes.



Figure 2. A small Ohio pond favored by Wood Duck broods and containing a properly placed nest box.

Wood Ducks normally soon use boxes properly placed for their use, as was demonstrated by J. R. Hester at his pond near Wendell, N. C. Three nest boxes were erected in 1954, and one box was occupied the first year. In the second year, all of the five boxes which had been erected were used by Wood Ducks (Hester, 1955). At Hester's Pond in 1961, there were 27 successful nests producing 372 ducklings (Hardister, 1963).

Eastern Bluebirds (*Sialia sialis*) seem to have captured most of the concerns of naturalists and bird clubs establishing nest box trails, and erection of nest boxes for Wood Ducks has been somewhat neglected, except by state agencies and hunting groups. True, a bit of additional equipment is needed on a Wood Duck nest box trail in the form of a small boat and a ladder, but work on rivers with nesting Wood Ducks offers additional attractions not available in following bluebird nest box trails on motor highways.

The state fish and game agencies in several northern states have erected relatively large numbers of nest boxes for Wood Ducks, particularly those in Massachusetts, Vermont, Illinois, and Ohio. During the period from 1949 to 1953, approximately 3,500 Wood Duck nest boxes were erected by employees of the Massachusetts Division of Fisheries and Game (Grice and Rogers, 1965). The fish and game agencies in the southern states have been somewhat less active in erecting nest boxes for Wood Ducks; however, in 1971 the South Carolina Wildlife Resources Department initiated a Wood Duck nest box program in their state, erecting 200 boxes. In North Carolina the Wildlife Resources Department is maintaining only about 100 boxes.

#### COMPETITORS AND PREDATORS

In some areas use of Wood Duck boxes by Starlings (*Sturnus vulgaris*) presents a formidable problem, the Starlings even building their nests over growing clutches of eggs of Wood Ducks. The Wood Ducks lay their eggs in the early morning and leave the nest

unattended during the time between daily egg layings, thus giving the Starlings opportunities to usurp the nesting cavities even when the clutch of eggs is being laid. Nests are abandoned by the female Wood Duck after Starlings have built their nests on top of her eggs. However, after her clutch of eggs is complete and incubation has started, the female Wood Duck is able to discourage entry of the box by Starlings merely by giving a hissing sound when the Starlings alight on the box. Starlings usually present little of a problem in competition for use of nest boxes placed on rivers remote from human dwellings.

Other species of birds than Starlings sometimes compete with Wood Ducks for use of nest boxes, particularly Screech Owls (*Otus asio*). To solve the problem of such competition it is sometimes best to use enough boxes to meet the needs of both the competitors and the Wood Ducks, depending on the desirability of the other birds.

Competition for use of the boxes by Raccoons (*Procyon lotor*) is sometimes a problem, too, particularly when the boxes are mounted on trees. When only a few boxes are being used, this problem can be minimized by keeping the entrances of the boxes closed during the season when they are not being used by ducks, or from about early July until early March.

Raccoons sometimes pose serious problems in connection with Wood Duck nest box programs by eating the eggs or incubating ducks. In a study in Massachusetts, McLaughlin and Grice (1952) reported that 26 of 30 nests were destroyed by Raccoons. A decline in use of the boxes sometimes occurs with passage of time, presumably as a result of disturbance from Raccoons. Boxes have been developed having various degrees of effectiveness for protecting Wood Duck nests from Raccoons (see Webster and Uhler, 1964). Increase in numbers of nesting Wood Ducks can be expected with passing of time if plenty of boxes are always available to the ducks and if predation on the incubating ducks or their eggs does not become excessive. If predation becomes excessive it is sometimes best to move the boxes to new locations.

Fox Squirrels (*Sciurus niger*) also destroy many Wood Duck eggs, Bellrose (1955) in Illinois reporting 419 of 820 clutches destroyed by Fox Squirrels. Seemingly, Gray Squirrels (*S. carolinensis*) do not destroy Wood Duck eggs (Stewart, 1957).

Snakes are also important predators of Wood Duck eggs in some areas. In Alabama, Florida, Georgia, and Louisiana the Gray Rat Snake (*Elaphe obsoleta*) was reported to be the chief predator of eggs in Wood Duck nests (Stewart, 1957). In Illinois, Bellrose (1955) found that Bull Snakes (*Pituophis sayi*) were responsible for 10 percent of the egg predation at Wood Duck nests. There has been little research on methods of preventing destruction of Wood Duck eggs by snakes.

#### WHAT MAKES PONDS SUITABLE FOR WOOD DUCKS?

Emergent vegetation for a place to rear their broods is a second habitat requirement which Wood Ducks refuse to compromise. There is often a shortage of brood rearing habitat in the necessary close association with suitable nesting cavities; then some water with emergent vegetation is desirable. Hardister (1963) reported that broods from 27 boxes on woods-surrounded Hester's Pond left the 6-acre pond soon after hatching and moved, presumably to Tarpley's Millpond about 1.5 miles away. On the other hand, I knew of a pond at the Olentangy Wildlife Experiment Station in Ohio containing 0.6 of an acre, two-thirds of which was covered with emergent vegetation, where five broods gathered in each of the two years, 1955 and 1956 (Figure 2). Several other ponds at the Olentangy Station also contained brood concentrations on less than 2 acres of water. In each case, the open water that was present was little used by the broods. In river habitats Wood Duck broods were often found to remain in areas with little or no emergent vegetation, but the broods then remained mostly near densely vegetated shores or islands.

Shallow water with emergent vegetation is desirable for optimum brood rearing habitat, but there should be a minimum of shallow water lacking emergent vegetation and having a growth of filamentous algae. The ducklings often dive when they are

surprised feeding on the surface of water away from emergent vegetation, and in the presence of submerged filamentous algae they become entangled in the algae and drown. I knew of one brood in central Ohio that was thus quickly reduced from 11 to 6 ducklings, and it would have been further reduced except for my rescuing 5 of the ducklings found entangled in the algae (Stewart, 1966).

With many farm and fish ponds now scattered over the breeding range of the Wood Duck, there may seem to be an abundance of habitat suitable for Wood Ducks, the ponds only needing to have nest boxes added. In a publication of the U. S. Department of Agriculture, Neely and Davison (1971) noted, "Some fishponds have suitable places for Wood Duck nesting boxes . . . The pond and its edges usually provide enough green plants, insects, and other summer food for the broods without any special management." Unfortunately a properly built fishpond lacks the shallow water and emergent vegetation so desirable for Wood Duck brood habitat. Fishermen do not want emergent vegetation on their ponds, but Wood Duck broods need places to hide.

Multiple use of ponds is ordinarily desirable, but production of Bullfrogs (*Rana catesbeiana*) is one use that should not be combined with production of Wood Ducks, although a Wood Duck pond is also suitable for Bullfrogs. At a pond at the Olentangy Wildlife Experiment Station in Ohio where I had just noted the mysterious disappearance of one duckling from a brood of five, I quickly captured two Bullfrogs after releasing onto the pond two ducklings with fish lines attached to their legs (Stewart, 1967). Largemouth Bass (*Micropterus salmoides*) probably capture and eat Wood Duck ducklings also, but I have no information on the extent of such predation. Research is needed on this matter.

As a combination developed by nature, Beavers (*Castor canadensis*) and Wood Ducks are particularly satisfactory together, a Beaver pond providing ideal habitat for Wood Duck broods. In Alabama, Speak (1956) found at least five broods of Wood Ducks on a Beaver pond of 25 acres. But Beavers are not welcomed by many landowners because they cut trees and flood land that could be otherwise used; thus this natural method of producing Wood Duck habitat was displaced with the coming of modern materialism, and it holds little or no prospect of a return in a meaningful manner unless perchance the apparel styles of humans might change to demand beaver fur.

The provision of ponds suitable for Wood Ducks in rearing their broods may prove to be a particularly stubborn problem in the Carolinas because malaria-bearing mosquitoes also breed in shallow water with emergent vegetation. The laws of North Carolina forbid construction of a pond as large as one-fourth acre containing emergent vegetation during the brood season of Wood Ducks. In South Carolina the size of such a pond must be less than one-tenth acre. I once found a brood of newly hatched Wood Ducks beside a water hole less than a foot in diameter, but they remained there only during their first day or two out of the nest. It is doubtful if large numbers of Wood Duck broods would remain until their flying age on ponds of less than one-fourth acre, but research is needed on this question. New research is sorely needed also on methods for controlling mosquito larvae so that ponds can be built suitable for use by Wood Ducks. Certainly, no one wants to propagate malaria-bearing mosquitoes as part of the cost of helping Wood Ducks.

To hold Wood Ducks in an area after they attain flight capability is still more difficult than holding them until that time. Then there should be logs, treetops, or vegetation-free islands available to the ducks over or near the water in somewhat secluded areas for daytime loafing places (Figure 3). It is desirable but not essential for the ponds to be near or in woodland. I knew of one brood of Wood Ducks in Ohio that remained several weeks after attaining flight capability on a pond about 100 feet from a human dwelling although there were only scattered trees nearby, but the pond contained an abundance of emergent vegetation and was surrounded with undisturbed plant growth. Holding the birds at this age depends on having the best habitat within a distance of some 8 to 10 miles. The birds normally cannot be held in an area throughout the day merely by providing food.



Figure 3. A woodland pond used as a loafing place by Wood Ducks.

#### ARTIFICIAL FEEDING

The ducklings eat whole shelled corn already when they are about 3 weeks of age, and artificial feeding can be started at this time. The corn can be placed on bare soil near the shore of the pond or river or on a wooden raft floating among emergent vegetation. The mother duck leading the brood normally does not feed with her brood but flies elsewhere to feed in the morning and evening. Feeding stations used by the broods are usually abandoned when the young attain flight capability and join the adults at their feeding sites. Likewise, feeding sites used by the adults may be abandoned when dispersal occurs about one month before southward migration starts in early November. Attracting Wood Ducks to winter feeding stations is best accomplished as a major goal on wildlife refuges, as the wintering ducks feed in flocks that do not readily change their feeding places. On the Savannah National Wildlife Refuge in southeastern South Carolina I once attempted to trap some Wood Ducks by placing shelled corn at their daytime loafing place, but the ducks actually spent the day sitting on the corn and left in the evening to fly to their regular feeding place without eating any of it. Artificial winter feeding or feeding during the hunting season is a special problem also because hunters may find the feeding stations and be tempted to shoot the "baited" birds illegally.

#### MANAGEMENT

When an open hunting season prevails, hunting is undoubtedly the chief cause of mortality of Wood Ducks after the birds have reached the flying age, and as many as 68 percent of a population may be killed and crippled by hunters in one year (Stewart, 1957). Approximately one-half million Wood Ducks may be bagged in a hunting season in the eastern half of the United States. As many as 29,290 have been bagged in one year in North Carolina (Donnelly, pers. com.).

Management of duck populations in the southeastern United States is aimed at harvest rather than production (see Neely and Davison, 1971), but with most ducks occurring in this area only during the fall and winter and with most people everywhere

being more anxious to be on the receiving rather than the giving end, this emphasis on harvest is understandable. However, a major opportunity is being lost and a responsibility being neglected in the general failure to promote production of Wood Ducks in the southland. With the Wood Duck being the only wild duck breeding naturally throughout the southeastern United States, this species presents the only available opportunity for residents of this area to work directly with production of wild ducks.

The destiny of Wood Ducks is strongly set by hunters whose license fees furnish operating funds for state wildlife agencies and for waterfowl habitat restoration projects. Our agencies are doing the job they are paid to do, but wildlife protection is becoming increasingly complex as the Carolinas attract new industries and cities grow rapidly. Funds and personnel are needed to combat harmful pollution of wildlife habitat, to prevent unwise drainage projects proposed by private enterprise and government agencies such as the Soil Conservation Service and the Army Corps of Engineers, and to assist farmers and enlightened developers in using their land in harmony with nature. There is a growing urgency for reduction in depletive use of wildfowl and other natural resources, and there are increasing numbers of people who can enjoy Wood Ducks without killing them; however, it will do no good to spare ducks from the gun if they cannot find adequate nesting sites and unpolluted wintering grounds. Perhaps the time has come for all citizens to support wildlife protection through general taxes thus relieving state and federal agencies of any sense of special obligation to hunters in establishing wildlife management policies and hunting regulations.

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## OBITUARY

### DORIS CALLAN HAUSER

Doris Callan Hauser of Fayetteville, N. C., one of the state's outstanding amateur ornithologists, died 30 March 1972 at the age of 57. She was the wife of the Rev. Roscoe C. Hauser Jr. Her enthusiasm, close observation, keen intellect, and ability to explain in layman's terms did much to interest others in bird study. Mrs. Hauser's papers in *Chat* and other journals brought her into communication with ornithologists throughout the United States, in Europe, Japan, Thailand, Australia, and other countries. Her papers published outside the Carolinas include the following articles.

#### *The Auk*

- Vol. 76, July 1959, Reverse mounting in Red-bellied Woodpeckers.
- Vol. 77, July 1960, A record of *Pipilo erythrophthalmus articus* in North Carolina.
- Vol. 83, January 1966, Hummingbird survives through December in North Carolina.

#### *The Wilson Bulletin*

- Vol. 69, March 1957, Some observations on sun-bathing in birds.
- Vol. 71, December 1959, Notes on pairing and nest-building of mismatched vireos.

#### *Journal of Mammalogy*

- Vol. 45, March 1964, Anting by Gray Squirrels.

At the time of her death Mrs. Hauser was preparing for publication a paper tentatively titled "Anting in Wild Birds," which details observations of olfactory perception by birds dressing their plumage with a species of ant that has a pungent aroma.—MRS. NEILL A. CURRIE JR.