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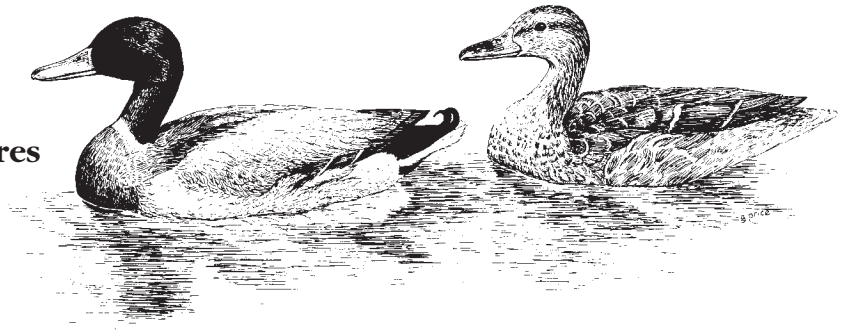


## Waterfowl Use of Nesting Structures in Northwest Wisconsin

by James O. Evrard

In some years and in some areas of Wisconsin, nesting success of mallards (*Anas platyrhynchos*) and other ducks falls below the level needed to maintain breeding populations (Gatti 1987). Artificial nesting structures can increase nesting success by reducing nest losses to predators, weather, and in the case of Canada geese, desertion resulting from disturbances caused by competition for nesting territories. In this study we tested the effectiveness of artificial nesting structures for increasing waterfowl production by installing and monitoring 50 nesting structures in 11 Waterfowl Production Areas (WPAs) in St. Croix and southern Polk Counties during 1985-92. We used 4 types of structures: tubs and hay bales intended to attract Canada geese and wire and fiberglass baskets designed to attract mallards.

### Methods

The criteria used to select WPA wetlands for placement of structures included prior use by nesting Canada geese and mallards, structure sites secure from ice damage, available brood habitat, and minimal human disturbance.

During the winter of 1984-85, 16 goose nesting tubs were placed in 12 WPA wetlands. Tubs were made from 1/3 of a 55-gallon steel barrel with wood landing platforms attached to opposite sides at the top (Ohio Dep. Nat. Resour.). The bottom of the tub was heavy wire screen or steel with holes cut to permit water to drain from the nesting material. Tubs were bolted to 2 galvanized pipes (1.5 inches in diameter) driven through the ice into the wetland bottom at a height of 4-6 feet above the ice surface. Five to 10 inches of nesting material (hay or dead emergent vegetation) were placed in the tubs. Cost per tub installed was $41.[1] In 1986, one tub was lost to shifting ice.

In February of 1988, 5 large round hay bales were placed in each of 2 WPA wetlands. Bales were tipped on end, baling twine was replaced with wire, and bales were placed on the ice in locations at least 100 feet from shore and over at least 18 inches of water. Areas of dense emergent vegetation were avoided. Costs per bale installed were $34, compared with costs of $4-6 for similar bales installed

[1] All costs for this study include materials, labor, and transportation, as do all comparable costs cited from other studies unless otherwise noted.

in North and South Dakota wetlands and $35 per bale installed in Montana (Johnson et al. 1994).

During the same winter, 12 wire and 12 fiberglass baskets—30 inches in diameter and 12 inches deep (Bishop and Barratt 1970)—were placed in 8 WPA wetlands. The number of baskets varied from 2 to 4 per wetland. Half of the baskets had wire tops woven with vegetation and half had fiberglass screen tops. Hay was placed into the baskets for nesting material, with a deep nest bowl with a wired straw "collar" as recommended by Ball et al. (1989). Baskets were mounted 3-4 feet above water level on single 2-inch diameter aluminum pipes driven through the ice in open-water sites or along the edge of emergent vegetation. Sites were chosen to minimize basket-tipping during spring ice breakup; however, during this study, several baskets were tipped into wetlands by spring ice action, and several others were destroyed by prescribed burning. Costs per basket installed were $27. Costs for comparable baskets, exclusive of labor, installed in North and South Dakota and Montana were $33 (Johnson et al. 1994).

Tubs and baskets were checked each winter for use the previous spring; nesting materials were added and repairs made if needed. Winter maintenance costs in 1989 were $10.50 per structure annually. Bales were checked during every breeding season for use. In 1990 and 1991, all structures were checked immediately after the nesting season in addition to the annual winter maintenance checks. Nest use and success was determined by the presence of eggs, egg shells, egg membranes, feathers, and down in the nest. In 1992, all basket covers were removed because uncovered baskets were being used 3 times more often than covered baskets.

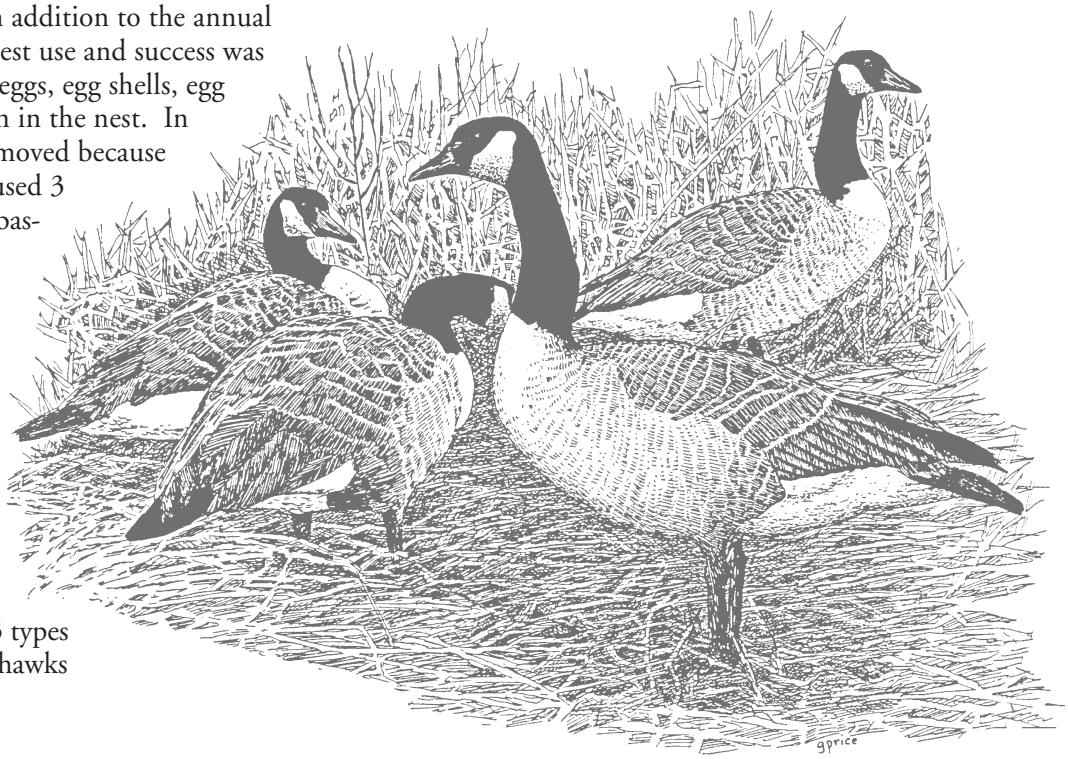
## Results

Declining wetland water levels during a drought complicated this study. Structures placed in open water areas were found in dense emergent vegetation or on dry land in later years, conditions that restricted their use by waterfowl. Another complicating factor was the use of all 3 types of structures by raptors such as hawks and great horned owls (*Bubo virginianus*) for feeding sites and, perhaps, hunting perches.

**Tub Use.** No tubs were used in 1985, the first year they were available (Table 1). In each subsequent year, at least 1 tub was used by geese, but geese used no more than 1 tub on 1 wetland in any 1 year, despite up to 4 tubs being available in some wetlands up to 164 acres in size. Lack of nesting material may have been the cause of nonuse in some cases. Although geese used tubs at a low annual mean rate (x = 8%), nest success was high (90%). This compared favorably with 82% nest success reported for elevated barrels in Iowa (Nigus and Dinsmore 1980). In 1989, a mallard nested in a tub on 1 wetland where 1 other mallard nest was found in a nesting basket. Mallards nested in tubs on 4 wetlands in 1992. Mallard nest success in the 5 tubs used was also high (80%).

**Hay Bale Use.** None of the 10 available bales were used in 1988. In 1989, a bale was used by a mallard in a unsuccessful late nesting attempt. Three bales deteriorated and disappeared during the winter of 1989-90 and 6 more disappeared during the winter of 1990-91. Decomposition of the bales was hastened by the burrowing activities of muskrats. Bales installed in wetlands in North and South Dakota and Montana also had an average life span of only 2 or 3 years (Johnson et al. 1994).

**Basket Use.** None of the 24 available baskets were used in 1988, the first year they were available. Use increased



in each subsequent year, with a high of 56% use by mallards in 1992. In 1991, mallards used all available nest baskets in the single wetland where baskets had been used in 1989 and 1990. In 1992, mallards used 7 of the 8 usable nesting baskets in the wetland where baskets were first used by mallards in 1989, and baskets in 3 additional wetlands were used. Open baskets erected over open water, especially wire baskets with a deep nest bowl and straw collar, were used most often by mallards. Covered baskets and baskets in dense emergent vegetation were not preferred. Mallard nest success in adjacent uplands varied yearly from 16-19% during 1988-90 (Evrard unpubl. data), while nest success for baskets was much higher (80%). This success rate compares with 70% success in baskets in North and South Dakota and Montana reported by Johnson et al. (1994).

## Conclusions and Management Recommendations

Nesting tubs proved to be durable and were used successfully by geese and mallards. Tubs are recommended over hay bales, which had little waterfowl use and a comparatively short life. The acceptance of nest baskets—especially open wire baskets—by mallards in areas where alternate upland grassy nesting cover was available is significant in that nest success was higher in structures than in grassy cover.

Structures should be placed in open water locations where damage from ice can be minimized. Any structure not used for several years should be moved to an area where use is established and increasing. Annual use and maintenance checks are essential to repair damage and add nesting material. If an annual maintenance check cannot be made, nesting structures should not be erected.

Many factors should be considered when deciding the feasibility of nest structure programs. Are they really needed? Will potential benefits outweigh costs? Is predation increased due to the creation of raptor feeding and hunting perches? Factors such as aesthetics or boating activity should also be considered. Instant success cannot be expected. It may be several years before structures are used, and use will increase slowly as hens return to structures they nested successfully the previous year and their offspring return to nest in the structures in which they hatched.

Nesting structure programs also have great potential on private lands. In this setting, such programs could not only increase waterfowl nesting success but also enhance landowner awareness of the value of wetland for waterfowl production while providing opportunities for citizens groups to participate hands-on in wildlife conservation.

**Table 1.** *Number of nest structures used by Canada geese and mallards, 1985-92.*

| | 1985 | | 1986 | | 1987 | | 1988 | | 1989 | | 1990 | | 1991 | | 1992 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Structure/User Type** | **No.** | **(%)** | **No.** | **(%)** | **No.** | **(%)** | **No.** | **(%)** | **No.** | **(%)** | **No.** | **(%)** | **No.** | **(%)** | **No.** | **(%)** |
| **Tubs available** | 16 | | 15 | | 15 | | 15 | | 15 | | 15 | | 15 | | 14 | |
| Geese | 0 | (0) | 1 | (7) | 1 | (7) | 1 | (7) | 2 | (13) | 2 | (13) | 2 | (13) | 1 | (7) |
| Mallards | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 1 | (7) | 0 | (0) | 0 | (0) | 4 | (29) |
| **Bales available** | 0 | | 0 | | 0 | | 10 | | 10 | | 7 | | 1 | | 0 | |
| Mallards | – | – | – | – | – | – | 0 | (0) | 1 | (10) | 0 | (0) | 0 | (0) | – | – |
| **Baskets available** | 0 | | 0 | | 0 | | 24 | | 24 | | 22 | | 18 | | 18 | |
| Geese | – | – | – | – | – | – | 0 | (0) | 0 | (0) | 0 | (0) | 1 | (17) | 0 | (0) |
| Mallards | – | – | – | – | – | – | 0 | (0) | 1 | (4) | 3 | (14) | 4 | (22) | 10 | (56) |
| **All structures available** | 16 | | 15 | | 15 | | 49 | | 49 | | 45 | | 34 | | 32 | |
| Geese | 0 | (0) | 1 | (7) | 1 | (7) | 1 | (2) | 2 | (4) | 2 | (4) | 3 | (9) | 1 | (3) |
| Mallards | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 3 | (6) | 3 | (7) | 4 | (12) | 14 | (44) |
| **Total** | 0 | (0) | 1 | (7) | 1 | (7) | 1 | (2) | 5 | (10) | 5 | (11) | 7 | (21) | 15 | (47) |

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## About the Author


James O. Evrard is a Project Leader for the Wildlife Research Section of the Bureau of Research. Address: Department of Natural Resources, Box 367, Grantsburg, WI 54840. Phone: (715) 463-2693


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