# Duck Trapping Success and Mortality Using Four Trap Designs

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## ABSTRACT

A total of 760 ducks were trapped during the spring and autumn in northwestern Wisconsin during 1982-1990 using four types of traps: swim-in bait traps, swim-in bait traps with decoys, floating bait traps, and decoy traps. Most of the ducks were captured in the spring with Mallard the most numerous species followed by Blue-winged Teal and Wood Duck. Trapping mortality averaged 4.5% with mink and raccoon responsible for most known causes of death.

## METHODS

Capturing, marking, and releasing waterfowl for subsequent recovery and observation provides information on movement, philopatry, recruitment, survival, and habitat use. We trapped ducks from 1982-1990 in northwestern Wisconsin as part of an effort to evaluate experimental management techniques for increasing waterfowl production (Evrard and Lillie 1987). In this paper, we report the capture effectiveness and mortality associated with four duck trap designs,

***Study Area*** - The study area was located in the prairie pothole region of northwestern Wisconsin. The 1,300-km$^2$ area in north-central St. Croix and south-central Polk counties has been described by Evrard (1996). Most of the area was used for agricultural crops and pasture, but about 11% of the area was wooded and 13% wetlands. Approximately 2,800 ha of this area was in federal and state Waterfowl Production Areas managed during the study by the Wisconsin Department of Natural Resources.

***Trap Locations*** - Each spring 1982-1990, we placed bait and decoy duck traps in wetlands observed to be used by relatively large numbers of Mallard *(Anas platvrhynchos)* and Blue-winged Teal *(A.discors)* breeding pairs. Trapping began in late April and ended in late May when females were nesting. Bait trapping resumed in August and September, 1983-1987 and 1990, in a reduced effort after ducklings and molting adult ducks gained flight. Trap densities were not different between years. The experimental design of the study was admittedly weak in that all four trap types were not placed in the same location in the same wetland at the same time.

***Four types of traps were used in this study*** - **Swim-in bait traps** (Hunt and Dahlka 1953) were made of a single 15-m long section of 2.5 x 5-cm mesh welded wire, 1.2 m high. The welded wire, in a lily pad configuration and supported by three steel fence posts, was placed in water <1 m in depth in wetlands adjacent to the shoreline. Trap fencing was bent to form funnel entrances oriented perpendicular to the shoreline. A short section of 2.5-cm. mesh woven wire was attached to the funnel entrance and adjusted to provide the narrow width (approximately 8 cm) of the funnel entrance. The top of the trap was fitted with 5 x 5-cm mesh nylon netting with one side temporarily fastened to permit retrieval of captured ducks using a dip net. Traps and funnel entrance were baited with cracked and whole shelled corn grain. We tried wheat and oat grain but found these grains mostly floated and were blown from the traps by the wind. Bait was also scattered in front of the trap. Trap locations were baited prior to placement of the traps and bait traps without tops were baited prior to initiation of trapping.

**Swim-in bait traps with decoys** were created by attaching a cage containing a live decoy duck to the inside rear wire of the baited lily-pad trap (see

previous paragraph). The cage was constructed so the decoy duck had a dry loafing and feeding area, but yet had access to water. In 1982, game-farm female Mallards and game-farm Blue-winged Teal, male and female, decoy ducks were used. Blue-winged Teal decoy survival was poor in the cages, so only female Mallard decoys were used in 1983 and subsequent years.

**Floating bait traps** were constructed by placing a 2.5 x 5-cm welded wire funnel trap mounted on a 60 x 122 cm plywood panel underlain with styrofoam floatation. The floating bait trap was placed in deeper water (>1 m) than the swim-in bait traps and was held in place by a wire attached to a cement block anchor. Cracked and whole shelled corn grain was placed on the plywood base of the funnel and trap and on the wetland bottom surrounding the trap. Ducks had to leave the water and walk on the relatively dry plywood base through the funnel into the trap.

**Decoy traps**, circular, 140-cm diameter, 60-cm high, 2.5 x 5-cm welded wire mesh traps (Anderson et al. 1980), were supported by three steel fence posts and placed in wetland locations similar to lily-pad traps. Each trap contained a central decoy duck cage and three surrounding capture compartments. Each capture compartment had a 48-cm wide door attached to a treadle that was activated when a duck swam into the compartment in an effort to reach the decoy duck. Female game-farm Mallards were used for decoy ducks.

Traps were checked twice daily, in early morning and late afternoon. Bait traps were baited daily. Decoy ducks were checked and fed daily. Captured waterfowl were immediately banded, marked, and released near the trap sites. Capture rates are reported as number of birds caught per trap-day.

## RESULTS AND DISCUSSION

***Overall trapping success*** - A total of 760 ducks were trapped during spring and autumn, 1982-1990. Mean number captured per season was 64.9 ducks per spring (range 32 - 97, n = 9) and 29.7 ducks per autumn (range 19 - 48, n = 6). Capture rate averaged 0.40 in spring and 0.39 in autumn.

Mallards comprised 60% of all captures followed by Blue-winged Teal (19%), Wood Ducks *(Aix sponsa)* (18%), and other species (3%; mostly Ring-necked Ducks *(Aythya collaris).*

Most (n = 582) waterfowl were trapped in the spring. Mallards comprised 67% of the spring-trapped ducks followed by Blue-winged Teal (23%), Wood Ducks (6%), and other species (4%). Ducks were not captured in proportion to their availability in spring. Breeding waterfowl counts in the same wetlands indicated Blue-winged Teal were most numerous comprising 42% of indicated breeding pairs, followed by Mallard with 28%; Wood Duck, 12%; and other species, 18%. No fall censuses were made.

In the autumn, Wood Ducks comprised 57% of the captures, followed by Mallards with 38%, Blue-winged Teal with 4%, and other species 1%. Since systematic waterfowl counts were not made in autumn, comparisons cannot be made between species composition of ducks trapped versus ducks available in the population.

All ducks trapped in the spring were adults (AHY or After Hatching Year); in autumn, only 2% of Mallards, 25% of Blue-winged Teal, and 48% of Wood Ducks trapped were AHY, the balance being young of the year.

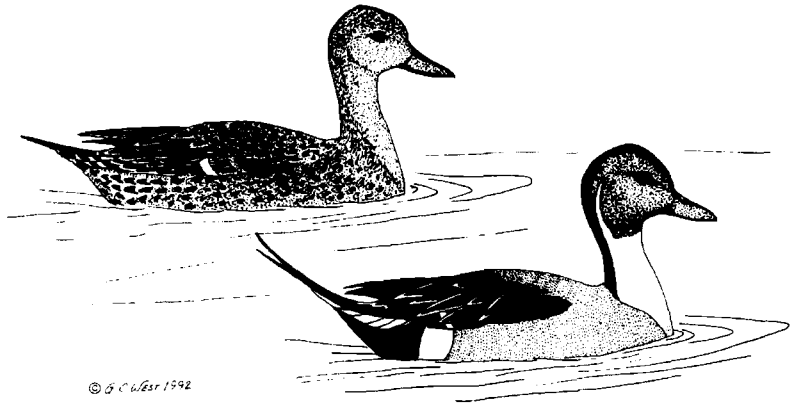
***Trapping success by trap type/season*** - In the spring, decoy traps and bait traps with decoys were more successful in capturing waterfowl than swim-in bait traps (Table 1). Floating bait traps as used in this study were largely unsuccessful in capturing waterfowl.

Mallard trapping rates in decoy traps were 0.40 for males and 0.05 for females. These rates are similar to capture rates of 0.32 for male and 0.09 for female Mallards captured in decoy traps in the spring in North Dakota by Sharp and Lokemoen (1987) even though there are more wetland basins (7.4 basins/km$^2$ vs. 3.9 basins/km$^2$ and more Mallard breeding pairs (4.8 pairs/km$^2$ vs. 0. 6 pairs/km$^2$) in North Dakota compared to this Wisconsin area.

As would be expected, since only female decoys were used, more male Mallards than females were

**Table 1. Ducks captured per trap-day, 1982-1990, St. Croix and Polk Co., Wisconsin. Other includes Ring-necked Duck, American Black Duck *(Anas rubripes)*, Gadwall *(A. strepera)*, Green-winged Teal *(A. crecca)*, and Bufflehead *(Bucephala albeola)*. Trap-days determined by multiplying number of traps by number of days traps open.**

| Design | Trap Days | Mallard | | Blue-winged Teal | | Wood Duck | | Other | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | M | F | M | F | M | F | | |
| **SPRING** | | | | | | | | | |
| Bait | 251 | 0.02 | 0.01 | 0.14 | 0.05 | 0.01 | 0.01 | 0.04 | **0.27** |
| Bail with decoy | 575 | 0.20 | 0.02 | 0.11 | 0.03 | 0.05 | 0.01 | 0.02 | **0.44** |
| Floating bait | 53 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | **0.02** |
| Decoy | 565 | 0.40 | 0.05 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | **0.46** |
| Spring subtotal | 1444 | 0.24 | 0.03 | 0.07 | 0.02 | 0.02 | 0.01 | 0.02 | **0.40** |
| **FALL** | | | | | | | | | |
| Bait | 292 | 0.09 | 0.12 | 0.01 | 0.01 | 0.17 | 0.16 | 0.02 | **0.58** |
| Floating Bait | 199 | 0.02 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | **0.03** |
| Fall subtotal | 471 | 0.07 | 0.07 | 0.01 | 0.01 | 0.10 | 0.10 | 0.01 | **0.36** |
| **Total** | **1951** | **0.20** | **0.04** | **0.06** | **0.02** | **0.04** | **0.03** | **0.01** | **0.39** |



captured in decoy traps (7.7:1) and in bait traps with female decoys (9.8:1). Sharp and Lokemoen (1987) also reported a preponderance of male Mallards captured in decoy traps (3.0:1, N = 565), but not as extreme as found in this study.

Although we did not make specific sex ratio counts in our study, Bellrose et al. (1961), summarizing a wide range of studies over time, reported only a slight preponderance (51.1%) of male Mallards in the spring in breeding marshes.

In the spring, swim-in bait traps with and without decoys were the most successful trap designs in capturing Blue-winged Teal, primarily adult males (Table 1). Combined rates were 0.12 for males and 0.04 for females. Bait trapping success of both sexes was higher for Blue-winged Teal in spring (0.15) than in autumn (0.02). The converse was true for Mallards and Wood Ducks with bait trapping success higher in autumn (0.34) than in spring (0.20). In autumn, bait traps were effective in trapping nearly equal numbers of adult and juvenile, male and female Wood Ducks (Table 1).

We can only speculate about the seasonal changes in trapping effectiveness for the three duck species. These changes could be due to changes in food needs and availability and/or breeding territorial imperatives. Census data were not available for comparisons.

***Trapping mortality*** - Trapping mortality records were not kept in 1982 but were during1983 - 1990. Of 661 ducks captured in all traps for which mortality records existed, 30 (4.5%) died or were killed while in traps. Mortality rates for Mallards (5.1%), Blue-winged Teal (3.9%), and Wood Ducks (4.4%) were not significantly different ($X^2 = 0.388$, df = 2, $P = 0.82$), thus species-specific mortality was in the same proportions as were birds captured. Mallards (n = 19) made up most of the mortality, followed by Blue-winged Teal (n =6), and Wood Ducks (n = 5). Known causes of death for 21 ducks were, in descending order: 9 - mink ( *Mustela vision)*; 6 - raccoon *(Procyon lotor)*; 5 - trap related injuries and accidents; and 1 - snapping turtle *(Chelydra serpentina)*. The cause of death for the other nine ducks was unknown.

Spring trapping mortality for decoy traps was 3.6% and 4.4% for bait traps. Trapping mortality for bait traps in the autumn was 6.2%. Most (77%) of the total trapping mortality occurred in bait traps.

We suspected the open funnel design made bait traps easier to penetrate by aquatic predators than the decoy trap. In 1984 and 1985, spring duck mortality at bait traps was 12.5% and 14.3% respectively. In an effort to reduce the mortality in 1985, a wire box trap was attached to the outside wall of three swim-in bait traps to capture and remove problem raccoons that learned to enter and leave the traps after killing a duck. As the raccoon moved along the trap wall searching for an opening into the trap, it entered the box trap and was captured. No bait was used in the box traps. The box traps were open for a total of 18 trap nights, capturing six raccoons—three adults, and three young-of-the-year. The duck mortality in bait traps would have been undoubtedly higher without removal of the problem raccoons. Spring duck mortality never exceeded 4.7% at bait traps in the remaining years of the study. The box traps, however, were ineffective in capturing problem mink since the wire mesh size was too large for animals the size of mink,

The welded wire of the decoy traps and decoy cages was torn open by large raccoons in some years. The worst year was 1989, when three of the 12 ducks captured in decoy traps were killed by raccoons.

Sharp and Lokemoen (1987) reported extremely low mortality (<1%) associated with decoy traps used to capture Mallards in North Dakota. Anderson et al. (1980) also reported <1% mortality among Canvasbacks *(Aythya valisineria)*. Redheads *(A. americana)*, and Lesser Scaup *(A. affinis)* captured in decoy traps with most losses attributed to drowning. The higher trap mortality in our study may have been due to high predator densities. Substantial losses of Wood Ducks to predators have occurred in swim-in traps in central Wisconsin (Bacon 1983).

One problem that occurred with swim-in bait traps, while not associated with duck mortality, was the consumption of corn bait by white suckers *(Catostomus commersoni)* in some wetlands.

The fish fed upon the corn bait spread on the wetland bottom and followed the bait trail through the funnel into the trap where they could not escape. This reduced the effectiveness of the traps to ducks due to the lack of bait. The presence of suckers and other fish in the bait traps, including golden shiners *(Notemigonus crysoleucas)* may have also increased the attractiveness of the bait traps to predators.

## CONCLUSIONS

Traps with female game-farm Mallard decoys in the spring were more successful in capturing adult male than adult female Mallards. Swim-in bait traps in the autumn captured more Mallards than in the spring. The same bait traps in the spring, by contrast, were more successful in capturing Blue-winged Teal, primarily adult males, than in the autumn. Autumn bait trapping was twice as effective as spring trapping in capturing nearly equal numbers of juvenile and adult Wood Ducks of both sexes. Swim-in bait traps may be ineffective if used in wetlands containing large numbers of white suckers and other fish species that feed on trap bait. Floating bait traps as used in this study were ineffective in both spring and fall and are not recommended. The 4% trapping mortality was higher than reported in two other studies involving swim-in decoy and bait traps. Approximately 75% of the mortality was due to predation. This mortality can be reduced by using box traps for predators attached to the outside of the duck traps.

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