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TECHNIQUES FOR TRAPPING, AGING, AND BANDING WINTERING CANVASBACKS

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Methods used to capture and handle waterfowl (Anatidae) during banding operations vary widely, and problems or successes in trapping technique, trap design, special equipment, and procedures often go unshared among banders. In addition, banders generally depend on a combination of cloacal and dimorphic body and wing plumage characteristics to efficiently and accurately age and sex live, hand-held birds. Whereas basic sex and age criteria have been developed for waterfowl by using cloacal (Hochbaum 1942) and wing plumage characteristics (Carney 1964), evaluation of these techniques during large scale banding operations, for specific species and for specific times of the year, have largely gone unreported.

This paper details traps, other equipment, and procedures used to capture and band Canvasbacks (*Aythya valisineria*) and describes and evaluates techniques used to age Canvasbacks, particulary Carney's (1964) wing plumage methodology, during a large scale winter banding program on Chesapeake Bay. This program was designed to estimate sex- and age-specific survival rates for Canvasbacks (cf. Nichols and Haramis 1980) and further to investigate physiological characteristics of wintering birds. During winters 1978–1982, this program accounted for the capture of over 17,000 Canvasbacks and produced 13,451 new bandings. These bandings included 4225 immature and 9226 adult birds.

TRAP DESIGN AND FABRICATION

Two traps were used during this study: a funnel trap and a barrier trap (Fig. 1). The funnel trap has long been used by State and Federal banding personnel in the Chesapeake Bay region and is believed to have been developed by Bay banders as an offshoot of early experiments with diving duck traps in Michigan (Hunt and Dahlka 1953) and New York (Schierbaum and Talmage 1954, Schierbaum et al. 1959). The barrier trap was developed during this study.

Both traps were constructed from 1.8 m (6 ft), 5 × 10 cm (2 × 4 in) mesh, 12-½ gauge welded wire. Five 1.8 m square pieces were hog-ringed together to form a cube-shaped trap (Fig. 1). No bottom was required on these traps when they were used on sandy substrates. The door of each trap was hinged with hog rings along its lower edge and was made wide enough so when opened it covered the entrance and prevented ducks from escaping.

The funnel trap has a 60 × 30 cm (2 × 1 ft) entrance that was fitted with 20 cm (8 in) baffles forming an inward facing funnel (Fig. 1). The barrier trap was designed with a larger 150 × 30 cm (5 × 1 ft) entrance to work more effectively with trap-wary birds. A simple barrier of wire together with an inclined deflector formed a vertical opening through

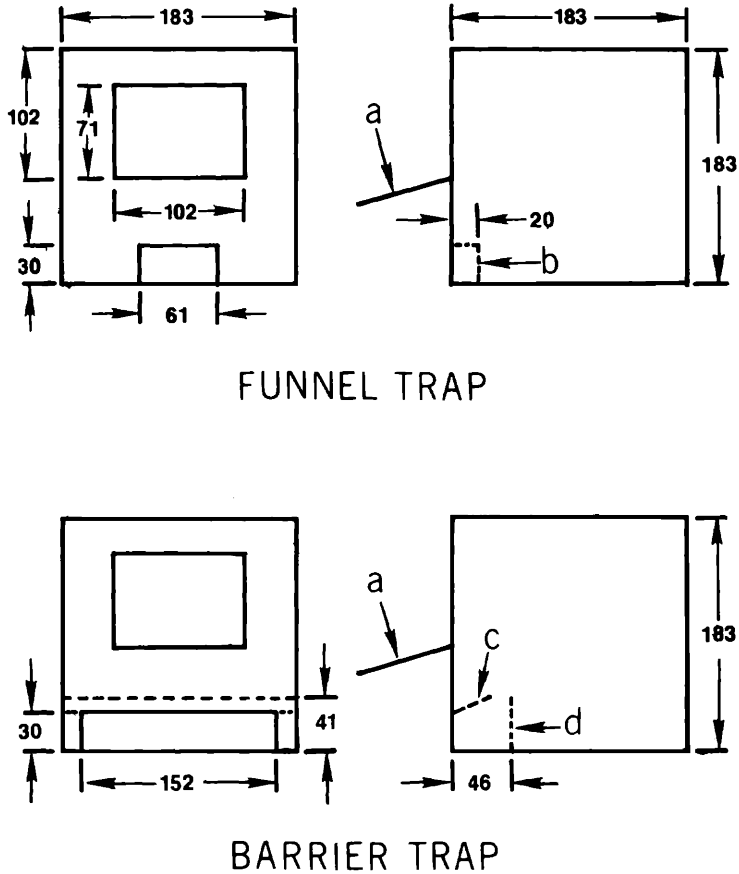

FIGURE 1. Front (left) and side views of 2 diving duck trap designs used on the Chesapeake Bay (dimensions in cm). Door (a) is shown only in the side view and measures 81 × 122 cm (32 × 48 in) in the funnel trap and 81 × 183 cm (32 × 72 in) in the barrier trap. Also shown are funnel (b), deflector (c), and barrier (d). A simple wire brace (not shown) connected barrier and deflector at the middle of the trap to provide an evenly-spaced entrance.

which the ducks would pass. The barrier and deflector were held evenly spaced by a 20 cm (8 in) wire brace at the center of the trap. Both traps were easily dismantled by first removing the entrance structure and then the hog rings from 3 sides of the top. The traps were then folded flat for easy handling and transport.

TRAPPING METHODS

Trap sites were selected adjacent to areas frequented daily by large numbers of Canvasbacks. Sites were chosen along sheltered shorelines, preferably with firm, shallow sloping, sandy bottoms. These sites were pre-baited (see below) for a short period until the ducks used the bait well. Closed traps were often set in place a few days before trapping to condition the birds to their presence. This preliminary procedure often helped to maximize the catch for the first few days of trapping.

Traps were set with the entrance facing shore to capitalize on the diving duck's natural response to escape toward open water. Thus, trapped birds would search the back side of a trap for escape and would seldom locate the entrance. Traps were set in water 46 to 76 cm (1.5 to 2.5 ft) deep. In tidal areas, a 20 × 30 cm (8 × 12 in) opening was cut in each of the upper corners of the back side of each trap to allow trapped birds ready escape during abnormally high water. Water depth greater than 1 m (3.5 ft) precluded removal of birds from traps by personnel wearing chest waders. During such high water, traps were serviced by boat or the birds were released by rolling the traps over.

In general, the number of birds present and their response to the bait determined the number of traps used. Consideration was given to the maximum catch potential of 50 Canvasbacks per trap and ample personnel and holding facilities insured proper handling and care of the birds.

Most grains were readily accepted by ducks, but whole corn (*Zea mays*) was most visible and stayed in place on the bottom better than smaller grains. Bait was placed squarely within the entrance of the funnel trap to assist in guiding birds into the trap. Bait was placed along the barrier in the barrier trap and placement was less critical.

When under winter stress, i.e. subfreezing temperatures with surface ice, Canvasbacks often fed at any time of the day; however, birds normally fed at dawn and dusk. Because Canvasbacks had a well-synchronized morning flight, traps were set before the birds arrived at the trap site (Fig. 2). On clear days the flight began about 45 min before sunrise and lasted for 20 to 30 min; on overcast days the flight was delayed and was less synchronous. After feeding at dusk, the birds moved to open water and usually did not return near shore until the next morning. Because Canvasbacks are known to return to near-shore trap sites to feed on bright moonlit nights (M. C. Perry, pers. comm.), traps were left overnight with the doors in the open position to block the entrances. Traps could have been set for the morning trapping at dark the previous day, but changeable weather and the scattering of bait with tidal and wave action made this a less productive method. In subfreezing temperature, traps were removed from the water overnight and watched during daytime trapping to prevent ice buildup. When flow ice was present, traps were watched closely, particularly at changing tides, to prevent damage to traps and birds.

HANDLING AND HOLDING

Ducks were removed from traps with custom fabricated dip nets that had stout 51 cm (20 in) diameter hoops and 2.4 m (8 ft) wooden handles.

FIGURE 2. Upper—About 200 Canvasbacks captured in 1 hour in welded-wire traps baited before dawn. The traps are in 81 cm (32 in) of water; note slush ice on the water's surface. Lower—Ducks were dip-netted from traps and placed in specially modified poultry crates brought to the trap in a flat-bottomed boat.

The net was 51 cm (20 in) deep and made of 1.3 cm (0.5 in) mesh knotted nylon. Larger mesh sizes were unsatisfactory because the legs, bills, and wings of ducks became entangled in the netting and greatly increased removal time.

A crew of 3 was most efficient in handling the birds; one person netted the ducks, a second removed them from the net, and a third operated the doors on specially modified holding crates that were brought to the trap site in a flat-bottomed boat (Fig. 2). By this technique, banded ducks and sexes could be sorted as birds were being removed from the traps. No further handling of the birds was required until they were dry and ready to be banded and released.

The holding crates were standard 60 × 91 × 30 cm (2 × 3 × 1 ft) poultry crates of dowel and plywood construction. Burlap was tacked around the sides of the crates and a loose burlap bag was used to partially cover the top of each crate to provide seclusion and thereby reduce stress on the birds. The crates were also fitted with a false bottom of 1.3 cm (.5 in) mesh hardware cloth to aid in keeping birds clean and dry.

When taken from the traps, the ducks were wet and tired from diving. Canvasbacks remained calm in the modified poultry crates and 3 to 6 h was ample time for them to dry and pass much of the ingested bait. The hardware cloth bottom allowed water and feces to drop away, permitting the birds to dry unsoiled. Clean, dry birds were pleasant to handle and could be accurately aged and measured. Birds banded and released immediately after capture were often too wet and tired to fly and may have been vulnerable to exposure and predation. Clean, dry birds flew readily and suffered no visible adverse effects upon release.

Only 12 to 15 Canvasbacks were held in these crates at any one time. We also captured many Lesser Scaup (*A. affinis*) and found that whereas many more of these birds could be held in a crate, they were less able to withstand crowding. We emphasize that birds should always be given ample space in which to remain cool and well-ventilated until banded and released.

MORTALITY

Because Canvasbacks often entered traps soon after they were baited, we established a policy of nearly constant surveillance of trap sites. This allowed us to empty traps promptly and respond immediately to changes in weather, disturbance, or other factors that may have jeopardized trapped birds. We believe this policy, which eliminated any major mortality, was primarily responsible for the low 5-year trap mortality total of 49 birds (.3% of total captures).

Mortalities were so infrequent that they appeared accidental. Most losses occurred when birds became exhausted from diving and subsequently drowned during the removal process. Removing birds from the traps rapidly was thus important to reducing stress and possible mortality. Losses generally increased during periods of prolonged winter stress when large numbers of birds were being captured. We believe the effects of crowding in the traps, the reduced physical condition of the birds in winter, and the longer time required to empty large catches were instrumental in the observed mortalities.

Often mortality was associated with the entanglement of a bird in the large 5 × 10 cm (2 × 4 in) mesh wire and although we believe that this may have been prompted by exhaustion, we suggest that use of smaller mesh wire beneath the water may in part remedy this problem. Hunt and Dahlka (1953:93) lined traps with 2.5 cm (1 in) mesh wire to reduce trap losses of diving ducks on the Detroit River, and DuBois and Palmisano (1974:481) found that smaller 2.5 × 5 cm (1 × 2 in) mesh wire was superior in reducing trap losses in coastal Louisiana.

DETERMINING AGE OF CANVASBACKS

Because dimorphic body plumage permits ready separation of the sexes of Canvasbacks in winter, the main problem was one of determining age of captured birds. We found that by apprenticeship with skilled banders, new personnel examining clean, dry birds, could quickly and accurately separate young-of-the-year from adult Canvasbacks solely by wing plumage characteristics (Carney 1964:29). By comparison, new personnel had considerable difficulty learning to age Canvasbacks by cloacal examination (Hochbaum 1942, Larson and Taber 1980:157–160, 180–182). Locating the bursa and oviduct in females was particularly troublesome and few attained proficiency at this task. Because we generally handled large numbers of birds (as many as 500 Canvasbacks in a single day: Fig. 2), we depended primarily on wing plumage methodology and reserved the cloacal technique as a backup for those individuals that could not be aged confidently by wing plumage.

The following is a description of sex- and age-specific winter plumage characteristics and additional criteria used to age Canvasbacks during this program. We have adopted the "alternate" (winter-nuptial) and "basic" (summer-eclipse) plumage terminology of Humphrey and Parkes (1959) and refer the reader to Palmer (1976:137) for more detailed description of Canvasback plumages and molts. In this description, we use the term "juvenal" interpretively to separate drab summer-fall plumages of immature birds from bright alternate (first winter) plumage. The term "juvenal" is therefore used synonymously for any drab fall basic plumage that is retained in winter. The extent of the fall basic plumage phase is unclear, although it is known to be at least partially acquired by immature birds (Palmer 1976:141).

Male wings.—The wings of adult male Canvasbacks are heavily vermiculated and appear white (Fig. 3A). Wings of immature males are gray-brown and are usually only lightly flecked and vermiculated (Fig. 3B). Immature males often exhibit a white border across the tips of greater covert feathers that is a positive juvenile trait. This character is faint in many birds, appearing only in proximal (near-body) greater covert feathers. Juvenal tertials are dark with moderate vermiculation and are often heavily worn. Many immature males, however, exhibit feather replacement during the winter: 86% of 580 immature males examined in December 1980 and January 1981 had replaced all or part of their tertial, greater tertial covert, and often several proximal greater covert feathers with first alternate feathers. The whiteness and heavily vermiculated pattern of these replaced feathers contrasts sharply with the remainder of the wing (Fig. 3C).

Female wings.—Wings of adult females exhibit heavy flecking and vermiculation near covert tips giving them a frosted, gray-brown appearance (Fig. 4A). In contrast, wings of immature females are essentially plain brown with only light flecking in lesser coverts (Fig. 4B). Like immature males, immature females frequently exhibit a white border

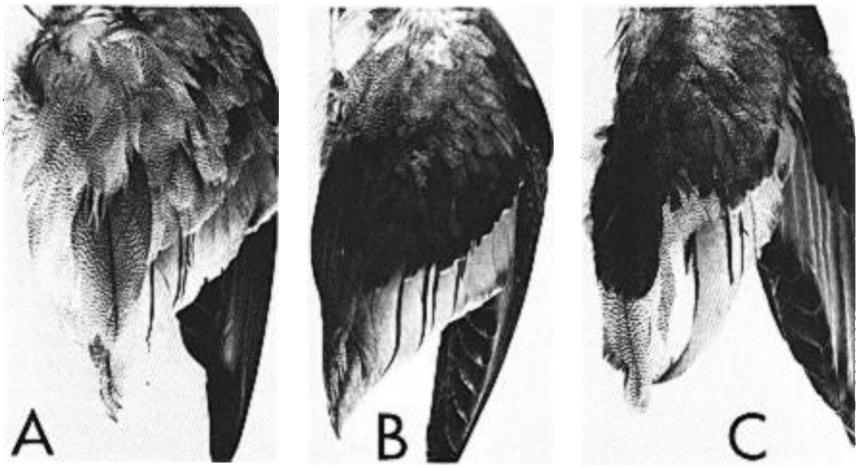

FIGURE 3. Winter wing plumage of male Canvasbacks: A—highly vermiculated adult male wing, B—juvenal-plumaged wing with worn tertials and distinct white border across tips of greater covert feathers, C—juvenal wing showing full complement of replaced tertial, tertial covert, and greater covert feathers with first alternate feathers.

across the tips of greater covert feathers. Again this character is faint in many birds and is often more prominent proximally. Juvenal tertials appear plain brown and are often badly worn. Like immature males, immature females commonly exhibit feather replacement during winter: 68% of 274 immature females examined in December 1980 and January 1981 had replaced all or part of their tertial, greater tertial covert, and several proximal greater covert feathers with first alternate feathers (Fig. 4C). These replaced feathers do not contrast as sharply as in immature males, but with experience they are easily recognized.

Additional aging hints.—Poorly vermiculated adults can usually be separated from immatures by their even vermiculation pattern throughout the wing; immatures usually exhibit contrasting patterns of vermiculation between replaced feathers in the tertial area and the remainder of the wing. The general shape of greater and middle tertial covert feathers is also diagnostic of age (Carney 1964, Larson and Taber 1980:181): juvenal tertial covert feathers are generally smaller, more narrowly tapered, and blunt-tipped than the larger more fully-rounded adult feathers. Retention of juvenal belly plumage is often obvious, particularly among male Canvasbacks in winter: 15% of 854 immatures examined in December 1980 and January 1981 had retained juvenal belly plumage. However, only 1% of this sample was found to retain one or more notched juvenal tail feathers (Larson and Taber 1980:157, 181). Although no systematic data were collected, we found key cloacal characteristics for immatures, i.e., a small unsheathed penis and a well formed

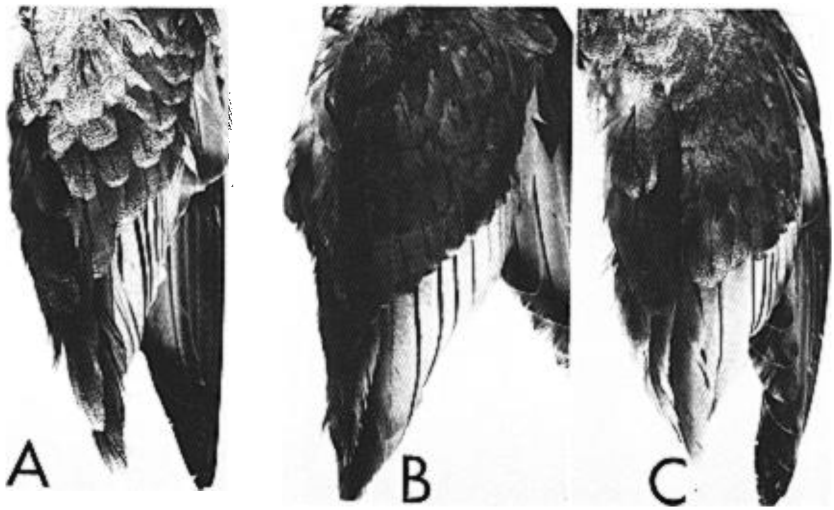

FIGURE 4. Winter wing plumage of female Canvasbacks: A—highly flecked and vermiculated adult female wing, B—juvenal-plumaged wing showing worn tertials and indistinct white border on tips of greater covert feathers, C—juvenal wing showing replacement of 2 greater covert feathers with first alternate feathers.

bursa of Fabricius, to be highly dependable through February on Chesapeake Bay. Some intermediate characteristics were observed with the advent of courtship activity in March.

BANDING AND BAND WEAR

We examined 1696 previously banded Canvasbacks (returns and foreign retrapped birds) and found aluminum bands to have a limited life on this species. Band wear varied widely on individual birds, and we suspected band loss to occur as early as 6 years and to be high after 10 years. Bands that failed to rotate concentrated wear at points adjacent to front and rear edges of the tarsus. The last digit of the prefix and the last 2 digits of the band number were most frequently the points of heaviest wear. Badly worn bands often formed deep sinuses that destroyed band numbers (Fig. 5).

Bands that were well-rounded rotated on the tarsus and promoted even wear and thus longer band life. We used special rounding pliers to assist in rounding bands; these pliers are available from a number of manufacturers. We placed bands upside down on the tarsus because uneven wear along the upper edge of the band was less likely to affect the band number.

SUMMARY

Techniques used to trap, band, and determine age of Canvasbacks during winter on Chesapeake Bay are presented. Canvasbacks were cap-

FIGURE 5. Top—New band. Middle and Lower—Differential wear and sinusing of bands caused by poor rotation on the tarsus. Note lower band was placed upside down on the tarsus.

tured with welded-wire traps baited with corn. Two trap designs were used and traps and trapping techniques are described. Ducks were dip-netted from traps and held in modified poultry crates that provided seclusion and ventilation and allowed birds to dry unsoiled. Carney's (1964) wing plumage methodology was found most efficient in determining age of Canvasbacks during large-scale bandings. This technique was rapid and was easily taught to inexperienced personnel. In contrast, the cloacal technique could be performed efficiently only by experienced and skillful banders. Band wear was observed to vary widely on individual birds and rounding of bands was recognized as an important technique in extending band life. Bands were placed upside down on the tarsus so that wear along the upper edge would be less likely to destroy band numbers. In 5 winter seasons, over 17,000 Canvasbacks were captured. Mortality rate for the program was .3%.

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