COMPARISON OF AIRPLANE, AIR-BOAT AND HELICOPTER FOR CENSUSING FLORIDA DUCKS, *Anas platyrhynchos fulvigula* [1]

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ABSTRACT

A study comparing various waterfowl census techniques was conducted to determine which is most suitable for use with the Florida Duck population. Counts made from an airplane, air-boat and helicopter, covering identical transects in the Kissimmee River Valley of Florida, were compared. Surveys made from the air-boat were the most accurate, but were found to be impractical for regular census work. Airplane surveys proved to be practical if their inherent inaccuracy was compensated for by multiplying actual counts by a conversion factor. A conversion factor of 2.5 was obtained by comparing airplane and air-boat counts of Florida Ducks on the study area.

INTRODUCTION

From May, 1967, to April, 1968, a study comparing three census techniques was conducted as part of a program of research toward more effective management of the Florida Duck, *Anas platyrhynchos fulvigula* Ridgway. The study was conducted on the Kissimmee River Valley Chain of Lakes in Polk and Osceola Counties, Florida. The census techniques involved counting Florida Ducks from a Piper Supercub float seaplane, a 1947 Bell G-2 helicopter, and an air-boat. The air-boat was used primarily to provide an absolute value for the number of birds present. Martinson and Kaczynski (1967:5) used ground census techniques to provide a true value against which the effectiveness of aerial techniques could be measured.

Previous to the present study, the Florida Game and Fresh Water Fish Commission had relied on counts made from a Piper Supercub flying selected transects to census the Florida Duck population. Although efforts were made to extrapolate total population size from the transect counts, no clear measure of the accuracy of the original counts was available.

THE STUDY AREA

Large numbers of Florida Ducks frequent the five major lakes of the Kissimmee River Valley (East Lake Tohopekaliga, Lake Tohopekaliga, Cypress Lake, Lake Hatchineha and Lake Kissimmee). This is especially true during periods of drought when waterlevels are maintained in the lakes by a system of locks and water control structures, while neighboring wetlands are dry.

Flat topography with short-grass pastures blending imperceptibly into the shallow water is typical of most of the lake shores. The shallowness permits aquatic grasses such as *Panicum* spp. and *Paspalum* spp. to grow far out in the lakes. Cattle and horses in the pastures, adjoining the lake shores, frequently wander out into the water for considerable distances while grazing on the aquatic grasses. The Florida Ducks commonly feed in the less dense stands of aquatic grasses thinned by the grazing animals, and loaf in the adjoining pastures.

While aquatic grasses represent the dominant plant form in the lakes and are the preferred habitat of the Florida Duck, other vegetation

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types are common. Most areas have scattered patches of Water Pennywort (*Hydrocotyle* spp.), Arrowhead (*Sagittaria* spp.), American Lotus (*Nelumbo lutea*), Water Shield (*Brasenia schreberi*), Water Hyacinth (*Eichhornia crassipes*), Water Lettuce (*Pistia stratiotes*), Pickerelweed (*Pontederia cordata*), Bulrush (*Scirpus californicus*), Cattail (*Typha* spp.), Smartweed (*Polygonum* spp.), White Water Lily (*Nymphaea odorata*), and Yellow Water Lily (*Nuphar advena*).

Water Hyacinth is generally considered a noxious pest in Florida, and, as such, is periodically sprayed with chemical weed killers from boats and low flying aircraft. While conducting aerial counts the senior author frequently observed Florida Ducks to swim into patches of dead Water Hyacinth when approached by the aircraft. Their mottled brown coloration effectively camouflaged the birds against a background of brown, dead Water Hyacinth. This habit may be a source of error in aerial Florida Duck counts. On one occasion, the pilot and senior author independently counted 14 Florida Ducks in a group feeding among aquatic grasses. On a second pass over the flock, 11 previously overlooked birds were spotted among dead Water Hyacinth in close proximity to the original 14.

METHODS

Florida Ducks along the shorelines of four of the five lakes (all but Cypress Lake) were counted from airplane and air-boat once a month from May to September, 1967, and in April, 1968. The same transects were surveyed each month by helicopter from June to August, 1967. Birds along the shorelines of all five lakes were counted from airplane and air-boat once a month from October to December, 1967. The airplane normally flew at an altitude of from 10 to 20 feet and an indicated air speed of 65 to 70 mph.

Several variables of uncertain effect entered into the data collection, making meaningful statistical analysis impossible. The ideal procedure for comparison purposes would have been to make the counts from the three conveyances on the same day of each month, thereby minimizing the effect of birds moving in or out of the study area between counts in the same month. Unfortunately, other commitments on the part of the personnel conducting the counts rarely permitted such perfect juxtaposition.

Weather is a factor which certainly affects the ability of a man to see ducks, but the effect is difficult to evaluate. During some trials, the air-boat count was conducted in fog or rain while the airplane and helicopter counts were made under more ideal conditions. Smith (1961:5) stated that Mottled Duck (*Anas platyrhynchos maculosa* Sennett) activity varies with weather conditions in Louisiana and that active birds are more readily spotted than inactive ones.

Another factor influencing the results was observer fatigue. This was especially serious during the air-boat counts as they normally took more than eight hours to complete and included few stops. Smith (1961:5) emphasized the effect of observer boredom and fatigue on reducing the number of birds seen on aerial duck counts.

The portable tape-recorder on which the observer kept the count was subject to occasional malfunction resulting in a garbled recording. As a consequence the recorded count could not always be interpreted with certainty.

While the pilot and observer remained the same for the airplane throughout the study, the helicopter had two different pilots, and the air-boat had five different operators and five observers. These changes in personnel were unavoidable, but probably had much to do with the wide variation in the air-boat count compared with the airplane count (Table 1). The amount of previous experience possessed by the observers varied considerably. One had no previous experience in conducting waterfowl counts, and two had never seen a Florida Duck before they acted as observers. Glahn (1967:26) suggested that observer training is es-

sential to waterfowl census efficiency. Unfortunately, the exigencies of long-term field research, especially when personnel have other commitments, do not always permit strict adherence to the ideal.

RESULTS

Relative Accuracy of the Techniques

Table 1 presents monthly air-boat counts compared with airplane counts.

The mean air-boat count was 242 per cent of the mean airplane count. However, of the air-boat counts below the mean, one was partially conducted in winds sufficiently strong to cause white caps on the water, one in intermittent rain, one in intermittent rain with strong winds and lightning, and one partially in ground fog limiting visibility to less than 50 feet in places. Such weather conditions probably limit the activity of ducks, and certainly limit the observability of waterfowl.

TABLE 1. Comparison of Florida Duck counts by air-boat and airplane on the Kissimmee River Valley Chain of Lakes
(only October to February counts include Cypress Lake)

Month	Number of Florida Ducks counted from airplane	Number of Florida Ducks counted from air-boat	Per cent of airplane count represented by air-boat count
May, 1967	321	734	229
June	381	668	175
July	195	354	182
Aug.	89	238	267
Sept.	189	230	122
Oct.	208	655	315
Nov.	454	1,757	387
Dec.	120	418	348
Jan., 1968	209	...	...
Feb.	148	...	...
March	...	...	...
April	320	497	155
Mean	239	617	242
Standard Deviation	109	439	87

Therefore, it is reasonable to suspect there are normally more than 2.42 times as many ducks present than observed from the airplane. A more accurate estimate of the number of birds present in an area surveyed from an airplane might be achieved by multiplying the actual airplane count by 2.5.

Table 2 presents helicopter counts compared with airplane counts for the three months during which the helicopter was utilized.

TABLE 2. Comparison of Florida Duck counts by helicopter and airplane on the Kissimmee River Valley Chain of Lakes
(not including Cypress Lake)

Month	Number of Florida Ducks counted from airplane	Number of Florida Ducks counted from helicopter	Per cent of airplane count represented by helicopter count
June, 1967	381	193	51
July	195	254	130
Aug.	89	77	87
Mean	222	175	89
Standard Deviation	121	73	32

The average helicopter count was 89 per cent of the average airplane count. The relatively poor results of the June helicopter count were largely due to variations in altitude of 100 to 250 feet during this flight, whereas an altitude of 100 feet was maintained on subsequent flights. In addition, the senior author served as observer on the helicopter flights, even though he had never ridden in a helicopter or other light aircraft previous to the June count. Consequently, the novelty of the experience may have influenced count accuracy. Ideally, personnel should be thoroughly familiar with their equipment before conducting a waterfowl census.

Florida Duck Reaction to Census Techniques

Of the 2,677 Florida Duck observations for which reaction to the air-boat was noted, 98.8 per cent (2,645) involved birds that flushed. The observations upon which this figure is based do not include cripples, preflight juvenals, obviously broody hens of flightless molting birds. The loud noise of the air-boat engine appeared to constitute an excessive disturbance to all species.

Of the 585 Florida Duck observations for which reaction to the helicopter was noted, 93.7 per cent (548) involved birds that flushed. The observations do not include birds obviously physically incapable of flight. Considering that the helicopter maintained an altitude of at least 100 feet at all times, the violent reaction of Florida Ducks as well as most other species is not easily explained. The rhythmic sound produced by the rotor blades may have been less familiar and therefore more disturbing to the birds than the uniform sound of an airplane engine.

Florida Duck reaction was not noted by the personnel making the airplane counts on this study. However, the senior author noted such reactions on Lake Tohopekaliga on April 24, 1967, during a flight made in conjunction with another study. The aircraft used was a Piper Supercub with conventional landing gear. The flight was made at altitudes of 35 to 50 feet. Of the 302 Florida Duck observations recorded on this occasion, only 7.9 per cent (24) involved birds that flushed. This contrasts with 93.5 per cent (400) of the 429 Blue-winged Teal (*Anas discors*) observations and 95.0 per cent (151) of the 159 Wood Duck (*Aix sponsa*) observations which involved birds that flushed.

DISCUSSION

Considerable effort was made throughout the study to avoid counting the same birds twice. This was made easier by the behavior of the Florida Ducks themselves. When the airplane, helicopter or air-boat approached, those birds that flushed either flew off to the side at right angles to the course of the craft, or flew ahead for a short time and then turned back to fly parallel to the craft but in the opposite direction, alighting behind it. Under such conditions there was relatively little chance of encountering the same bird twice as the craft moved down the shoreline.

Helicopters and air-boats appear to be unsuitable for regular waterfowl census work for the following reasons: (1) counts made from them are time consuming compared with counts from fixed-wing aircraft, (2) they are relatively uneconomical to operate, and (3) the excessive and unusual noise which they produce may have a detrimental effect on wildlife. The observations on Florida Duck reactions made on the April 24, 1967, flight over Lake Tohopekaliga suggest that Florida Ducks are little disturbed by low-flying airplanes. The fact that Florida Ducks are nonmigratory may have been responsible for their phlegmatic reaction compared with that of the Blue-winged Teals and Wood Ducks. However, this is only speculation.

The suggestion that approximately 2.5 Florida Ducks are present for each one observed from an airplane provides a useful factor for compensating for the inaccuracy inherent in airplane surveys. However, this conversion factor may only be applicable to a count made from an

airplane flying at the conditions of altitude and airspeed used in the present study, and in habitat similar to that existing in the Kissimmee River Valley.

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STATUS OF A FREE FLYING, RESIDENT FLOCK OF CANADA GEESE (Branta canadensis) IN TENNESSEE

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ABSTRACT

A free flying, resident flock of Canada geese (*Branta canadensis*) has been successfully established in Middle Tennessee. The flock is now composed of over 400 geese. It was initiated in the late 1950's by a private citizen via the release of three or four pair of game farm origin birds on a 1,200 acre estate. This improved pasture type farm, which has several large ponds, is typical of much of the agricultural land usage in Middle Tennessee. The goose population has increased, thus filling available nesting habitat on the original estate and has since expanded to nearby Old Hickory Reservoir. The Tennessee Game and Fish Commission has conducted production, mortality, and banding studies on the flock since 1966. The initial success of this nesting population indicates that the local flock concept has merit for establishment of Canada geese in the Southeast.

INTRODUCTION

Major changes in the southern distribution of Canada geese in the Mississippi Flyway have occurred in recent times (Hankla and Rudolph. 1967; Crider, 1967). Flocks that once nested in portions of Kentucky, Arkansas and Tennessee, have long since disappeared (Hanson, 1965). Only remnant populations now continue to migrate to and winter in northern Florida, coastal marshes of Louisiana, and the lower Mississippi River Valley. Opinions as to the reasons for this situation vary widely among professional waterfowl biologists. Well intented theories and the expenditures of thousands of dollars in land acquisition and transplant efforts have not had any major beneficial effect, (Hankla, 1968).

Thus we evidently have been honking up the wrong goose, or for the purist, barking up the wrong tree! At the present stage of goose management technology, we suggest that emphasis should now be placed