

Table 1. List of Materials for Construction of Alligator Trip Snare

| | |
|---|---|
| 2 | 30 cmX 1 m Boards with stakes. |
| 1 | Snare set pole. |
| 3 | Poultry staples. |
| 1 | 4 D common nail. |
| 1 | ¼ inch X 6 m nylon rope. |
| 1 | ¼ inch X 1 m cord. |
| 2 | ¼ inch X 30 cm cord. |
| 1 | No. 3 newhouse locking snare (Woodstream Corporation, Lititz, Pa.) |

LITERATURE CITED

- Chabreck, R. H. 1963. Methods of capturing, marking, and sexing alligators. Proc. Southeast Assoc. Fish Game Commissioners 17: 47-50.
- Jones, F. K., Jr. 1965. Techniques and methods used to capture and tag alligators in Florida. Proc. Southeast Assoc. Fish Game Commissioners 19: 98-101.

A COMPARISON OF DAY AND NIGHT FLOAT COUNTS FOR WOOD DUCK BROODS ON THE HOLSTON RIVER IN EAST TENNESSEE

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ABSTRACT

Day and night float counts for wood duck (*Aix sponsa*) broods were conducted on a 10.8 kilometer segment of the Holston River during the spring of 1973. Nighttime float counts were made using two boats, one down each side of the stream. Hand-held airplane landing lights were used to search the water's edge for roosting broods. Daytime float counts were made the morning following each night census on the same segment of river as the night census. The night and day methods were compared. Eight float counts during the day and eight during the night were completed. The mean number of broods seen at night was 29.5 (2.7 broods per kilometer). The mean number of broods seen during the day was 7.3 (0.7 broods per kilometer). There was a statistically significant difference between the day and night float techniques. The night counts were much more accurate and precise than the highly variable day counts. More than four times as many broods were seen at night as were seen during the day. Age classes

and numbers per brood were more easily determined at night. It was concluded that the night float count technique was superior to the day float count method in determining numbers of wood duck broods on rivers.

INTRODUCTION

Censusing techniques for wood ducks have been studied on several occasions (Mumford 1952, Stewart 1958, Martin 1959, Holland 1965, Hein 1966, Hester 1966, and Minser 1968). Most of these studies involved float counts and roosting flight counts. The reliability of each census technique appeared to vary with the season during which it was conducted and with the habitat in which it was tested.

Wood duck biologists have recognized that daytime float counts for wood duck broods are less than adequate. Geis (1966) and Minser (1968) found that daytime float counts for broods were not reliable and that no deductions could be made from them. For lack of a better method, many state and federal conservation agencies continue to use float counts for broods for determining wood duck population trends. Our objective was to determine if the accuracy and precision of brood censuses would be enhanced by conducting censuses at night.

THE STUDY AREA

The study was conducted on a 10.8 kilometer segment of the Holston River from Surgoinsville, Tennessee to the upper end of John Sevier Lake. The river is characterized by long, bending pools intermittently broken by shallow rocky segments or shoals. The average width of the river is about 100 meters. Land adjacent to the river is either forested ridges or cultivated or pastured flood plain. Few ponds and no swamps occur on or near the study area.

METHODS

Night float counts

Night float counts were begun at dark. Two canoes with 3 and 4 horsepower motors were used. The motors were run at low speed and the boats were kept abreast, one along each bank, maintaining a distance of 20 to 40 feet from shore. Hand-held airplane landing lights powered by 12-volt car batteries were used to search the bank and water's edge for roosting broods. Automobile headlights were also tried; they compared poorly to the landing lights. Although one man could satisfactorily operate the boat and light, and take notes, two men per boat simplified the operation.

Broods preferred roosting among leafy limbs which drooped into the water. When such habitat was encountered extra effort was made to search for broods. If the slightest ripples on the water were seen coming from these favored roosting places, the boat was slowed and the area thoroughly searched. Young wood ducks were recorded as a brood if at least two ducklings or one duckling and the hen were seen. Number and location of broods were recorded on the first four night counts while number, location, age class and number per brood were recorded on the last four. Broods were classified in age groups using criteria as described by the Mississippi Flyway Council (1973).

Day float counts

Day float counts were conducted on the same river segment as the night census the morning following each night census. They were conducted in two ways, four replications for each method. One method utilized one boat traveling down the middle of the river and both banks were searched with the aid of binoculars.

The other method was similar to the night float method, using two boats abreast, one along each bank. Each day float was begun about daylight and lasted from 2 to 3 hours, except when the presence of fog delayed the start. Fog was not a factor when two boats were used because the observers were close enough to the shore to detect the broods.

RESULTS

Sixteen censuses for wood duck broods were conducted during 31 May - 6 July 1973. Eight were made during darkness and eight during daylight the morning following each night census (Table 1). The number of broods seen at night ranged from 26 to 37 with a mean of 29.5 (2.7 broods/kilometer). By comparison day counts ranged from 1 to 16 broods per census, averaging 7.3 (0.7 broods/kilometer). The difference between results using one boat and two boats during the day was analyzed using the Mann-Whitney Test (non-parametric method) (Snedecor and Cochran, 1969); no significant difference was found (.05 level). The F test was used to compare the variance between the two types of day counts and again no difference occurred (.10 level). The difference between day and night counts was tested statistically using again the Mann-Whitney Test; this difference was highly significant (.01 level). Since there was no statistical difference between the two day count methods, data from these two methods were pooled and the variance between the day and night counts were compared. An F test showed a significant difference at the .025 level. The night counts were much more precise than the highly variable day counts and obviously more accurate. The average night count was more than four times that of the average day count. The ability of the observers to determine age classes and numbers of ducklings per brood during the day and during the night was compared. Approximately twice as many ducklings per brood per age class were observed at night. During the night counts 73 percent of the broods observed were counted and aged while of the daytime broods only 55 percent were counted and aged.

DISCUSSION

Censusing during the nighttime proved to be more accurate and more precise for determining numbers of broods, brood age classes, and numbers of ducklings per brood on rivers than censusing during daylight hours. At night, wood duck broods roost along the river shoreline, are asleep and stationary, and can be accurately and precisely counted. Daytime float counts are extremely variable and greatly underestimate the number of broods present (Figure 1). This variability is random and is subject to change from hour to hour and day to day.

The variation in daytime float counts was probably due to several factors. During daylight hours it was observed that the activity of wood duck broods varied with water levels, cloud cover, wind and temperature which made their availability for censusing variable. In addition, wood duck broods during the day may detect observers at distances of 500 meters or more and may hide in shoreline vegetation without being observed. These are the primary factors which render the day float count unreliable.

It may be conjectured that the number of broods seen on day counts was lower because of disturbance by night counts conducted 5 to 8 hours previously. It was believed that the lower counts made during the day were due to some other factor. Broods at night did not seem to become particularly excited by nighttime observation. In fact, broods seemed to be more alarmed by observers during the daytime. The float count conducted on 5 June was the fourth count conducted in two consecutive days and yet was higher than any of the other

daytime float counts conducted during the study (Table 1). This indicates that the lower daytime counts were due to some factor other than disturbance the previous night.

The night float census technique for wood duck broods should be useful in any area where the wood duck population is restricted to one accessible body of water as opposed to a swamp or flooded, forested, river bottom over which the population would be dispersed and inaccessible for counting. Night censusing during flooding or high water is less effective; during these circumstances broods tend to roost in shoreline vegetation making observation more difficult. Censusing should be conducted during the peak brood-rearing season which occurred between mid-May and late June on our study area. Censusing after 1 July is discouraged because older broods begin to break up and the similarity in size of the oldest juveniles and adult ducks makes the identification of broods difficult. The small variation that did occur in the results of night counts can be accounted for in 3 ways: (1) ingress and egress, (2) hatches of new broods, and (3) errors in counting.

Although the night float census technique for wood duck broods is more expensive than the traditional day float method, at least the data gained can be used with confidence as being a true representation of the population. No predictions can be confidently made from day float counts. Annual changes in numbers of broods determined by day float counts likely reflect only changes in weather conditions, water levels or observer ability rather than changes in numbers of broods.

It is concluded from this study that the night float count techniques for wood duck broods far excelled the day float count and closely approximated the productivity of the area censused in East Tennessee. In suitable habitat, the night float count should prove to be a reliable index to annual wood duck population trends.

Table 1. Numbers of wood duck broods seen on day and night float counts on the upper Holston River in East Tennessee, Spring 1973.

| Census Date | No. of Broods Night Count (2 Boats) | No. of Broods Day Count | |
|----------------|---|----------------------------|---------|
| | | 1 Boat | 2 Boats |
| 31 May; 1 June | 28 | 7 | - |
| 3, 4 June | 26 | - | 1 |
| 4, 5 June | 37 | - | 16 |
| 20, 21 June | 29 | - | 6 |
| 26, 27 June | 28 | - | 10 |
| 28, 29 June | 28 | 7 | - |
| 2, 3 July | 29 | 4 | - |
| 5, 6 July | 31 | 8 | - |

