SOME CHARACTERISTICS OF AN EXPANDING TURKEY POPULATION *

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ABSTRACT

A turkey population was established near Auburn, Alabama, in 1965 by releasing 26 wild-captured birds that had been wing-tagged for individual identification. In 1967 and 1968, 76 unbanded descendants of the original stock were captured, wing-marked, banded and released at their capture points. There were also 22 recaptures. All turkeys were captured after being drugged with alpha-chloralose. Weights and some measurements of captured turkeys are presented.

From March 1965 through December 1968, 294 trips involving 1,020 hours were made to the study area to observe, count, capture and recapture turkeys and to patrol to prevent poaching. A total of 764 positive identifications of individually marked turkeys was made.

Continued observations on this population, most of which was marked, made it possible to estimate spring-breeding populations and late-summer populations each year from 1965 through 1968 on 7,293 acres of the study area. The turkey population more than quadrupled between May 1966 and October 1968 to an estimated 10.4 turkeys per square mile.

Losses of adults and large poults were low until 1968 when the loss rate increased. Estimates of age and sex structure of the population were made annually; late summer counts gave hen-poult ratios and estimates of total reproductive success. Estimated hatching dates of captured poults from progress of primary molt were obtained.

Movement patterns of turkeys stocked on the study area indicated that most of them established ranges which were included within an approximate two mile radius of their release sites.

Management implications are discussed.

INTRODUCTION

In 1965 the Saugahatchee Wildlife Research Area was established through an agreement between the Alabama Cooperative Wildlife Research Unit and the 21 owners of a 9,083-acre tract near Auburn, Alabama (Fig. 1). The major habitat types in the tract were cutover pine woods, mixed pine and hardwoods, upland hardwoods, streambottom hardwoods, and permanent pasture. The local turkey population had been exterminated many years before the establishment of a study population in 1965. The primary purpose for establishment of the study area was to obtain a suitable tract, near the Wildlife Unit, for the study of the population dynamics and management of the eastern wild turkey (*Meleagris gallopavo silvestris* Vieillot).

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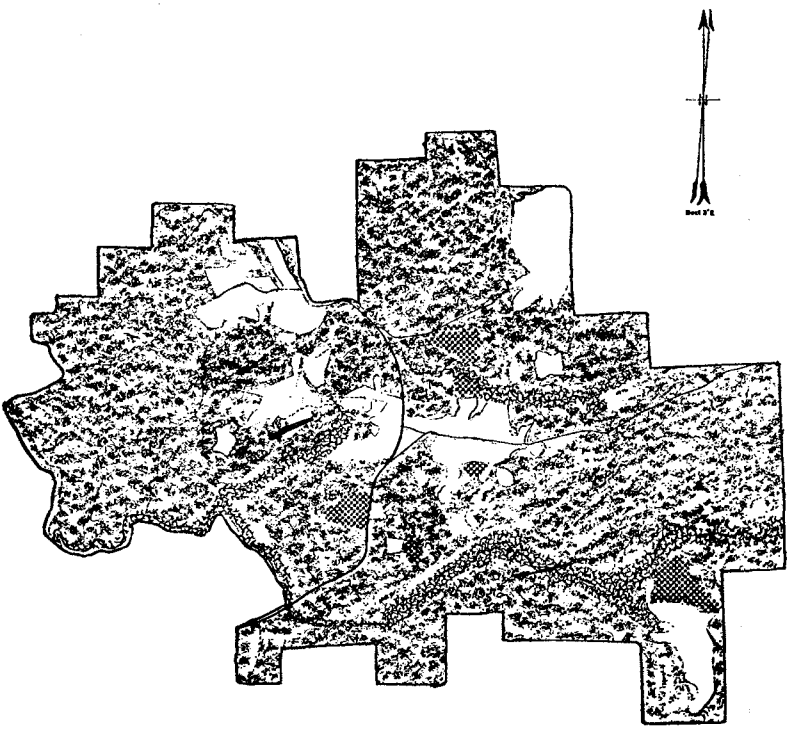

LEGEND

Fields and Pastures

Pine Woods

Streambottom Hardwoods

Mixed Pine and Hardwoods

FIGURE 1

SAUGAHATCHEE WILDLIFE RESEARCH AREA
LEE COUNTY, ALABAMA
taken from
Aerial Photographs
September 8, 1966
for
Ala. Coop. Wildl. Res. Unit
by
Walker Stickney
Scale

We believed that turkey population dynamics might be studied to advantage in a population that: (1) was relatively low originally, (2) was not influenced by possible immigration from surrounding areas, and (3) was mostly composed of individually marked turkeys so that population estimates could be arrived at from direct count.

Recently remarkable success has been achieved in re-establishing wild turkeys by transplanting small numbers of wild-trapped birds (Hardy 1959, Preston 1959, Powell 1967). It was thought advisable to investigate such a population to determine the factors that would limit its numerical increase. Knowledge about factors limiting an expanding turkey population could obviously be of importance to the game manager.

We were interested in studying the following characteristics of this population: (1) changes in number of turkeys, (2) sex and age structure, (3) annual reproductive success, (4) loss rate through mortality and emigration, and (5) movements and other behavioral characteristics.

METHODS

Capturing, Marking and Releasing Turkeys

All turkey captures, including those to obtain brood stock, were made using the method described by Williams (1966) which employed the drug alpha-chloralose on a cracked corn bait.

Birds brought to the research area and unmarked birds captured there through October 1968 were leg-banded and marked with colored patagial tags in the manner described by Knowleton et al. (1964).

Between March 13, 1965, and February, 1966, we captured a total of 26 wild turkeys at three different locations in southern Alabama. After marking, they were released near the geographical center of the Saugahatchee Research Area. The sex and age composition of the released turkeys was as follows: 5 mature and 6 immature gobblers, and 6 mature and 9 immature hens. Only 6 of these turkeys (3 gobblers, year-class I; 2 hens, year-class I; and one mature hen) were on the area during the 1965 reproductive season.

Weights and Measurements

Captured or recaptured turkeys were weighed. For gobblers, the lengths of the spurs and beards were determined and recorded.

Captured turkeys were aged as accurately as possible by wing feather characteristics. It was possible to identify subadult (year-class I) hens and gobblers by examining primary wing feather number ten and also the configuration of the greater upper secondary covert patch, unless they were captured after the second post-nuptial molt. This method is described by Williams (1961). Until late in the bird's second summer, subadult gobblers could often be distinguished from older gobblers in the field by the relative length of their beards.

Occasionally subadult hens could be distinguished from older hens in the field by close inspection of the greater upper secondary covert patch.

When poults were captured, the length of the latest growing postjuvenile primary was measured, and their ages in days were estimated using the method reported by Knoder (1959). Since there are probably some differences in rate of primary feather growth between pen-reared poults from Pennsylvania and wild poults in Alabama, our estimates of hatching dates based on Knoder's relationship may be somewhat inaccurate.

Obtaining Observations

Most of our observations on turkeys in this study were made during trips to the study area for the following purposes: (1) to systematically search for turkeys or turkey sign, (2) to search for turkeys where they had been reported to us, (3) to check bait sites when capture attempts were being made, and (4) to post boundaries or to patrol the area to prevent poaching and trespass.

From March 1965 through December 1968, a total of 294 trips involving approximately 1,020 trip hours was made to the study area by the authors to locate or to observe turkeys. In addition to those made on these trips, other positive sightings of marked turkeys were obtained from other staff members or graduate students of the Alabama Cooperative Wildlife Research Unit, and locations of marked turkeys were obtained from landowners on the area.

When searching for turkeys, a portion of the tract was covered on foot or by jeep and the presence or absence of turkey sign was noted. Turkey tracks were sought in logging roads and trails, on creek banks, sand bars, and in fields. Turkey scratchings, dusting sites, and droppings were all useful field signs which indicated the presence of turkeys. Scratching and dusting sites were especially useful in forest areas with few roads or other areas of bare ground where tracks could be seen. If sign indicated the presence of turkeys, persistent searching usually resulted in observations of turkeys which were recorded on maps of the study area. An important factor facilitating observations of turkeys was the central location of most of the open pasture on the area (Fig. 1). Turkeys of all ages and sexes concentrated in and around the pastures during spring and summer.

We initially planned to census turkeys periodically by direct count on the entire 9,083-acre study area. Parts of the area totaling 1,790 acres had poor accessibility, being without a network of logging roads, and since our time was limited we attempted to count turkeys on only 7,293 acres. One or two trips per week, on the average, were made by us to the study area from March through October. From November through February several trips were made per month. We had less time available for field work in the winter than during other seasons.

We used 10 x 50 binoculars when in the field and on occasion a spotting scope was useful.

Estimating Turkey Populations and Losses

Population estimates were made at six month intervals beginning October 31, 1965, and for each May 1 and October 31 through 1968. The May 1 estimate represented the breeding population after fall, winter and early spring losses while the October 31 estimate represented the maximum population after reproduction and early poult mortality had occurred.

Population estimates were made for each census period from accumulated field records in August 1969 as follows: any marked turkey that had been seen on the study area on the census date or later was assumed to have been a part of the population on the census date. The number of marked turkeys that had "disappeared" or were known to be dead or off the study area were subtracted from the population. A "disappeared" turkey was subtracted from the population only if a year or more had elapsed since its last sighting.

In arriving at this means of estimating loss of marked turkeys, the maximum interval between sightings from January 1966 through December 1968 was recorded for forty-five banded birds. This interval was longer than one year in only 5 turkeys—that is, only 5 out of the 45 "disappeared" for as long as or more than one year and then reappeared at a later date.

A total of 16 marked turkeys was subtracted from the population estimates in the manner previously described. Of these, 13 had not been seen in 17 months or longer (6 had been missing for 2½ years or more), and 3 had not been seen for 1 year and 15 days to 1 year and 2 months.

The rate of loss of unmarked turkeys between census periods was assumed to be the same as that of the marked turkeys and their number (figured separately for hens and gobblers) was reduced accordingly.

The October 31 estimate of poult production was based on summer reports. Since more than half of the hens were individually marked

and most were seen numerous times in open pastures with or without poults, it seems likely that a reliable count was obtained each year.

The last reliable count of the summer in each poult group (usually September or October) was used as the number alive on October 31. The total poult production for the year was then calculated. The sex ratio of poults was considered to be 50:50 since a two-year sample of 49 captured poults from seven different capture sites in 1967 and 1968 contained 24 hens and 25 gobblers. The sex identification of these 49 poults was verified when all were seen later as adults.

Losses of unmarked poults in the population between October 31 and May 1 were assumed to have been at the same rate as those in the marked sample. All surviving poults were considered as year-class I birds in the May 1 population estimate following their hatching year.

Ratios of marked to unmarked turkeys (excluding poults) were obtained in 1966, 1967, and 1968. Population estimates were made using the number of marked turkeys known to be in the population as of May 1 and solving for the number of unmarked in an equation based on the observed ratio of marked to unmarked turkeys. These estimates were compared to the May 1 population estimate based on direct counts.

Estimating Reproductive Success

Each summer the number of hens with and without poults and also the number of poults surviving per hen was determined from field observations.

Determining Movements of Turkeys

The locations of all sightings of individually marked turkeys from March 1965 through December 1968 were plotted on maps of the study area. From these maps maximum movement from release point and percentages of the total number of observations at various distances from release points were calculated for 27 turkeys seen 10 or more times.

RESULTS

Capture and Release of Turkeys

During 1966 we made no attempts to capture turkeys on the study area, but beginning in September 1967, we captured as many unbanded turkeys as time and circumstances would permit. This activity resulted in the capture, leg and wing-banding, and release at capture points of 76 unbanded descendants of the original release and 22 recaptures.

Weights and Measurements

Weights and measurements of beard and spur lengths were obtained from 20 known-age gobblers (Table 1). Except for five turkeys in the one year old class, all were birds that had been captured earlier as poults.

Measurements and weights from another group of nine gobblers of unknown age but which were at least two years old were obtained on the study area. Their average weight was 16.1 pounds, average beard length was 244 millimeters, and their average left and right spur lengths were 22 and 23 millimeters, respectively.

There was a general tendency for weight, beard length, and spur length to increase with age up to at least four years. However, there was considerable overlap between the year-classes except between year-class I and older gobblers.

Hens of year-class I averaged about one pound less than older hens, but there was little variation in weight between hens two years old or older. Nine hens of year-class I averaged 7.3 pounds, five hens of year-class II averaged 8.2 pounds, three hens of year-class III averaged 8.0 pounds, and ten hens in year-class IV or older averaged 8.2 pounds in weight.

In an earlier Alabama study at the Salt Springs Sanctuary, Wheeler (1948) found similar beard lengths in a sample of adult gobblers.

Weights of adult gobblers and hens were also similar to the weights in our study. Average gobbler weights from the Salt Springs Sanctuary ranged from 16 pounds 8 ounces in December to 17 pounds 7 ounces in April, and hens averaged 8 pounds 5 ounces in November.

TABLE 1. Weights and beard and spur measurements obtained from 20 gobblers of known age released on or captured on the Saugahatchee Wildlife Research Area (1965-1969)

Turkey Band No.*	Capture Date	Year Class	Estimated Age in Months	Weight (lbs.)	Spur Length (MM) Left	Right	Beard Length (MM)
501	1/19/66	I	?	10.7	bumps		29
506	2/24/66	I	?	12.0	bumps		41
2301	3/11/65	I	?	14.5	bumps		99
2302	3/11/65	I	?	12.0	bumps		86
535	3/31/69	I	11	13.0	8	8	105
548	3/31/69	I	10	12.0	5	4	68
509	4/ 3/68	I	10½	11.7	3	4	95
507	9/ 6/67	I	?	13.0	9	13	177
24	9/22/68	I	15	14.0	23	20	186
25	9/22/68	I	15	14.0	19	18	173
Avg.				13.0	11	11	134
24	2/18/69	II	19½	14.5	23	22	254
508	2/18/69	II	22	17.5	15	15	241
509	2/18/69	II	22	17.5	21	20	229
20	2/18/69	II	20	19.0	26	24	216
Avg.				17.1	21	20	235
7	9/16/68	III	?	14.0	23	23	290
6	9/16/68	III	?	16.0	30	29	246
1	9/16/68	III	?	17.0	25	25	270
5	9/16/68	III	?	17.5	30	30	250
Avg.				16.1	27	27	264
6	4/ 1/69	IV	?	20.0	34	33	236
1	4/ 1/69	IV	?	18.0	25	26	260
Avg.				19.0	30	30	248

Population Estimates

From 1965 through 1968 a total of 764 sightings of 87 identified marked turkeys was recorded. There were numerous additional sightings of unidentified marked turkeys, and numerous sightings of unmarked turkeys. In some cases it could not be determined whether the turkeys were marked or unmarked—these were recorded as "unidentified."

The estimated population size, based on direct counts, increased from 27 turkeys on May 1, 1966, to 118 October 31, 1968. The last release of brood stock was made on February 25, 1966, and the stocked population more than quadrupled in three breeding seasons (Fig. 2). The 1968 fall population size estimate was 10.4 turkeys per square mile on the censused area.

* Turkeys number 1, 5, 6, and 7 were captured as a group of poults accompanied by one hen in early October 1965, and they are probably siblings. Numbers 20, 24 and 25 and numbers 508 and 509 probably represent two groups of siblings since they were captured together (one group September 6 and the other October 12, 1967) and their estimated hatching dates are the same.

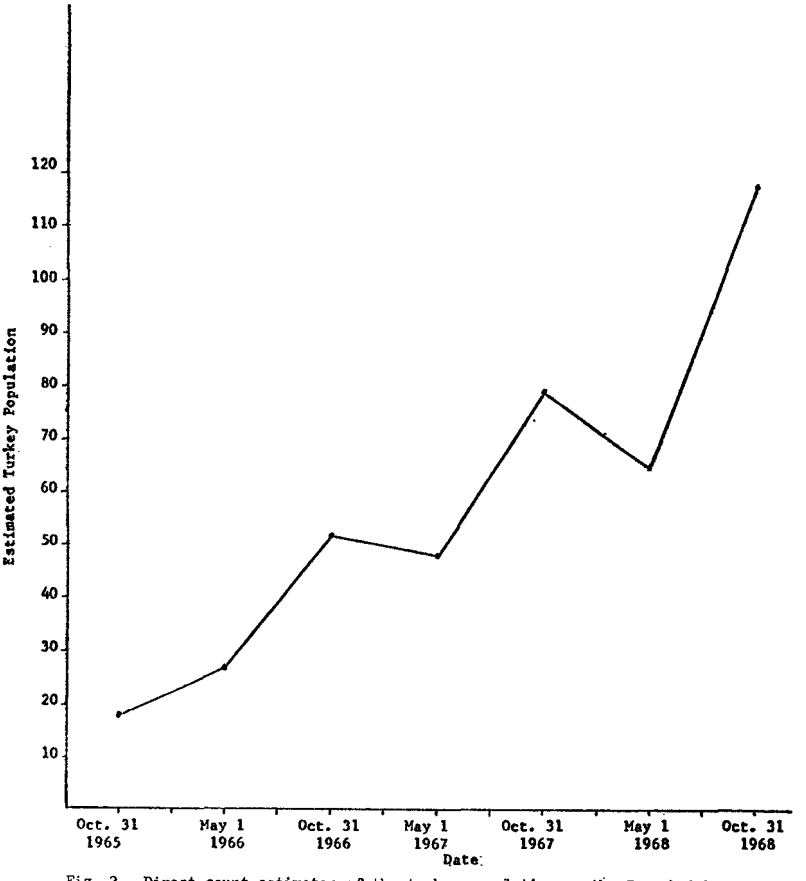

Fig. 2. Direct count estimates of the turkey population on the Saugahatchee Wildlife Research Area (1965--1968)

Annual increases (spring to fall) were 93 percent in 1966, 64 percent in 1967, and 81 percent in 1968.

Populations were also estimated for 1966, 1967, and 1968 by using a ratio of marked to unmarked turkeys as previously explained. This estimate for each year was compared with the population estimate for May 1 obtained from direct counts. The results, with the direct count estimate being given first are as follows: 1966—27 and 30; 1967—48 and 29; and 1968—65 and 60. The results are similar for two years and dissimilar one year. No explanation can be given for the disparity in 1967 but the estimate derived from the ratio method is too low. The estimate of unmarked turkeys in the population derived from the 1967 marked to unmarked ratio was 9. However, at least 26 unmarked poults were observed in the population during September and October, 1966, and 4 or 5 unmarked turkeys were left from 1965 reproduction. It is unlikely that very many of the poults were lost by 1967 because no losses of marked poults occurred in 1965-66 and 1967-68.

Estimated Losses of Adults and Large Poults

Losses of marked adults and large poults were estimated to be low through most of 1967 but the loss rate increased after October, 1967 when the population was higher. From October 31, 1966, to October 31,

1967, the loss rate for 21 marked turkeys known to be on the study area at the beginning of the period was 9 percent. Thirty percent of 40 marked turkeys known to be on the area October 31, 1967, disappeared by October 31, 1968.

There was no overwinter loss of marked poults for two periods, according to available data. In October 1965, seven large poults (part of the original release) that were captured without the hen were released on the area. On May 1, 1967, all seven still remained. In October 1967, eighteen poults were captured and released at their capture points; and by May 1, 1968, all 18 of these poults were still on the area.

Of 25 marked turkeys presumed lost between March 1965 and October 1968 or that were later found dead, only seven were known to have died (4 to poachers, 2 to predators, and 1 that died of unknown cause). Seventeen of the 25 turkeys simply disappeared and one was known to have emigrated.

Age and Sex Structure of the Population

The sex ratio of the original stocking was 42 gobblers to 58 hens and this ratio gradually changed in favor of gobblers. In October 1966 the estimated sex ratio of adult birds was 50:50; in 1967 it was 51:49; and by October 1968 it had changed to 55:45. As mentioned before, the ratio of sexes in a large sample of poults was practically even. Indications are that the loss rate was slightly but consistently higher for adult hens in this unhunted turkey population.

As the population increased, the percentage of poults in the population remained about the same. Fifty percent were poults in October 1966, 40 percent in 1967, and 53 percent in 1968. The one-year class gradually decreased in percentage from 33 percent of the population in 1966 to 30 percent in 1967 and 22 percent in 1968. Since mortality was relatively low, the segment of the population that was two years old and older increased from 17 percent in 1966 to 30 percent in 1967 but then decreased slightly to 25 percent in 1968. The estimated percentage of hens two years old or older in the adult hen population increased steadily from 38 percent in October 1966, to 48 percent in 1967, and to 60 percent in 1968. This may have contributed to the increase in average number of poults raised per successful hen from 3.2 in 1966, to 4.6 in 1967, and to 4.8 in 1968.

Old gobblers (2 years old or older) increased steadily from a total of 5 in May 1966 to 31 in October 1968.

Hen-Poult Ratios and Estimated Reproductive Success

In 1965 there were three banded hens on the study area, two of which were in year-class I and one that was at least two years old. One of the young hens successfully raised three young gobblers and the old hen raised two hen poults. One young turkey raised no poults.

The number of hens that raised poults was estimated in 1966, 1967 and 1968. The number of hens without poults was estimated by subtracting the number of hens with poults from the October population estimate of hens. These data are presented in Table 3 along with the average number of poults raised per successful hen.

TABLE 3. Reproductive success of hen turkeys on the Saugahatchee Wildlife Research Area for a three-year period (1966-1968)

Year	Estimated No. of Hens Without Poults	Estimated No. of Hens With Poults	Average No. Poults Per Successful Hen
1966	5	8	3.2
1967	16	7	4.6
1968	12	13	4.8

The estimated percentage of hens successfully raising one or more poults was 62 in 1966, 30 in 1967, and 52 in 1968. During the reproductive season of 1966, there were five marked hens in year-Class I that produced poults and they raised an average of 3.8 poults each. Three older hens raised an average of 2.0 poults each in 1966. During 1967 no year-class I hens were seen with poults, whereas seven older hens raised an average of 4.6 poults each. In 1968 three hens of year-class I raised an average of 3.7 poults each and ten older hens raised an average of 5.1 poults each. The estimated number of poults raised per successful hen in the study population is close to that for the population studied by Wheeler (1948) who gave the average brood sizes in July for the three years, 1943 through 1945, as 5.0, 4.9, and 4.5, respectively. He also found that only about half of the hens observed in August 1944 had poults. The successful production of poults by hens in year-class I noted in this study is not in accordance with Wheeler's opinion that few if any of the young hens nest the first year.

Estimated Hatching Dates of Poults

In 1967 hatching dates of 18 poults were estimated. These poults were captured between September 6 and October 26 at three capture sites. Five hens were captured with these poults, and there were four hatches represented with the earliest being May 10 and the latest June 18. One brood apparently hatched in May and the others in early- to mid-June.

In 1968 hatching dates were estimated for 42 poults captured at three sites between September 2 and September 16. There were probably seven hatches represented in this sample of poults which were accompanied by nine hens. Seven of these hens were caught. The earliest hatching date was April 25 and the latest was June 10. All but two broods probably hatched in May while one hatched in late April and one in early June.

The hatching season was about six weeks long during both years. It included the month of May and the first half of June. The short hatching seasons in 1967 and 1968 coupled with the fact that less than half of the hen turkeys were estimated to have raised poults during the same two years suggest that renesting attempts were few or unsuccessful. An alternate hypothesis is that about half the hens on the research area did not attempt to nest and of those that did attempt early nesting very few lost their nests. The latter alternative is unlikely.

It is hoped that data collected by radio telemetry will result in estimates of the number of hens that attempt nesting and renesting and the loss rate of nests. It is generally expected that the loss rate of nests of ground nesting birds will average fifty percent or more (Kalmbach 1939). Investigations of turkey nesting success have shown that at least a 50 percent nest loss is the rule with turkeys. Mosby and Handley (1943) found that 67 percent of 27 wild turkey nests observed in Virginia were failures. Williams et al. (1968) reported that only eight nests hatched of 21 under observation during the summer of 1968 in Florida. The other 13 nests were destroyed by predators or abandoned. Davis (1959) conducted a study of the fates of 107 "dummy" nests in Alabama and found that 85 percent were destroyed by predators.

Wheeler (1948) concluded that the majority of hatches in his study occurred within a period of two weeks. This suggests, as in our study, that renesting did not contribute greatly to population increment.

Movements of Marked Turkeys

Seven hundred and sixty-four positive identifications of 87 marked turkeys obtained between March 1965 and December 1968 were plotted on maps of the study area. Twenty-seven of these turkeys were seen ten or more times, and the distances they moved from respective release points were estimated from the sightings (Table 4).

An indication of the rather low dispersal rate of turkeys released in unfamiliar but suitable habitat can be obtained from the data. Twenty-three of the 26 turkeys released near the center of the study area in

1965 were still on the area six months later. One of the 26 turkeys, a hen, was seen seven miles from its release point three months later. Another turkey, a gobbler, was seen on the study area three months after release but never again, and a third turkey, a hen, was never seen after release. Twenty-one of the 26 released turkeys were known to be on the study area one year after release. Williams et al. (1968) noted that 18 hens that were captured and moved some distance just before the nesting season, settled down and nested in the new territory.

There was no observable difference between gobblers and hens with respect to average maximum distances moved from their release points (Table 4). Movement patterns of turkeys stocked on the area, and those raised on the area appeared similar in every respect. Most stocked turkeys quickly selected ranges centering around the more familiar area of the release site. Eighty-six percent of the sightings of marked turkeys were within two miles of their release points and only rarely were they seen three miles or more from these points. This indicates that a suitable range of 8,000 to 10,000 acres can supply all the needs of a turkey population.

Some of the turkeys that "disappeared" undoubtedly dispersed into surrounding habitats. We have received reliable reports of marked turkeys off the research area, and we have seen turkey sign since 1967 in areas adjacent to it. Time has not permitted us to make observations on turkeys off the study area.

Most turkeys, regardless of sex and age, seemed to be strongly attracted to permanent pastures from March through October. If unmolested, they learned to tolerate normal farm operations or wildlife biologists at a distance. It appeared that the distribution pattern of large openings had an important influence on the movement patterns of turkeys.

Lovett E. Williams, Jr. and numerous others of the Florida Game and Fresh Water Fish Commission took the time to instruct us in the use of drugs for capturing turkeys. The experience gained with their help greatly aided this study.

From time to time, Wildlife students and staff members of Auburn University reported turkey sightings to us and we wish to recognize this assistance.

LITERATURE CITED

Davis, J. R. 1959. A preliminary report on nest predation as a limiting factor in wild turkey populations. Proc. 1st National Wild Turkey Symposium. Memphis. pp. 138-145.

Ellis, J. E., and J. B. Lewis. 1967. Mobility and annual range of wild turkeys in Missouri. J. Wildl. Mgt. 31(3):568-581.

Hardy, F. C. 1959. Results of stocking wild-trapped and game farm turkeys in Kentucky. Proc. 1st National Wild Turkey Symposium. Memphis. pp. 61-64.

Kalmbach, E. R. 1939. Nesting success: its significance in waterfowl reproduction. Trans. N. Am. Wildl. Conf. 4:591-604.

Knoder, E. 1959. An ageing technique for juvenile wild turkeys based on the rate of primary feather molt and growth. Proc. 1st Nat. Wild Turkey Symposium. Memphis. pp. 159-176.

Knowlton, F. F., E. D. Michael, and W. C. Glazener. 1964. A marking technique for field recognition of individual turkeys and deer. J. Wildl. Mgt. 28(1):167-170.

Mosby, H. S. and C. O. Handley. 1943. The wild turkey in Virginia. Va. Comm. Game and Inland Fisheries. Richmond. 281 pp.

Powell, J. A. 1965. The Florida wild turkey. Fla. Game and Fresh Water Fish Comm. Tech. Bull. 8, 28 pp.

Powell, J. A. 1967. Management of the Florida wild turkey and the eastern turkey in Georgia and Alabama. pp. 409-451. In Oliver H. Hewitt (Editor), The wild turkey and its management. The Wildlife Society. Valley Offset, Inc. Deposit, N. Y. 589 pp.

Preston, J. R. Turkey restoration efforts in the Ozark region of Arkansas. Proc. 1st National Wild Turkey Symposium. Memphis. pp. 43-55.

Wheeler, R. J. 1948. The wild turkey in Alabama. Ala. Dept. Cons. Bull. 12, 92 pp.

Williams, L. E., Jr. 1961. Notes on wing molt in the yearling wild turkey. J. Wildl. Mgt. 25(4):439:440.

Williams, L. E., Jr. 1966. Capturing wild turkeys with alpha-chloralose. J. Wildl. Mgt. 30(1):50-56.

Williams, L. E., Jr., D. M. Austin, N. F. Richholz, T. E. Peoples, and R. W. Phillips. 1968. A study of nesting turkeys in southern Florida. Proc. 22nd Ann. Conf. of S. E. Game and Fish Comm. (in press).

A TECHNIQUE FOR CAPTURING WHITE-TAIL DEER IN THE DELTA MARSH BY USE OF AIRBOATS AND HELICOPTERS

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For many years the people who have been responsible for capturing and moving large numbers of whitetail deer have worked hard to improve known techniques. The wooden box trap with its many modifications has probably seen more consistent use than any other, though its weight and bulk have been a major disadvantage.

Like many other states, Louisiana has tried various methods and techniques in its deer trapping program, including the net trap, the collapsing net stretched through the woods and supported at the top with clothespins, the snare and the tranquilizer, both orally and intramuscularly (syringe gun) administered. All these methods have serious limitations which have been discussed in previous publications. There is little need to go into detail in this paper. It became apparent a new technique was needed and the pursuit and capture method described below was first initiated in Louisiana in March, 1963, by the Louisiana Wild Life and Fisheries Commission.

The helicopter has been successfully employed by game managers to capture medium to large size animals for a number of years and on several continents. Elk have been herded into drive traps by use of these machines (Howe, 1963) and captured by shooting with immobilizing drugs from the helicopter (Denney, 1966). A similar syringe-gun technique was used for capturing moose (Nielson-Shaw, 1967). Polar bears have been tracked across ice and shot with immobilizing drugs by helicopter (Leutfer, 1968). The Canadian Wildlife Service has captured caribou and moose for tagging using pontoon equipped helicopters to take the animals while swimming. Pienaar (1967) describes the capture of elephants in Africa and Russell (1967) took rhinos with helicopters and drugs. Deer have been taken in New Zealand by dropping weighted nets from pursuing helicopters.

The happy combination of suitable prairie marsh, well populated with deer, and the availability of helicopters and the modern, powerful airboats has enabled personnel of the Louisiana Wild Life and Fisheries Commission to capture relatively large numbers of deer in a short time. The airboats used in the operations are of tough, fiberglass construction, 15 feet long and powered by 150 hp aircooled aircraft engines. Each can hold four to six deer. If overloaded, these craft do not perform properly in the shallow waters often encountered in the delta marshes.

The first attempt was made in the coastal marshes of south central Louisiana near Pecan Island. Deer had been observed in substantial numbers on the State Wildlife Refuge, an area administered by the Louisiana Wild Life and Fisheries Commission. A commercial helicopter, Bell Model 47G2A/47-64 with three man capacity, was hired from a local petroleum exploration company. This machine is highly maneuverable, affords the pilot maximum visibility and permits him to keep the pursued animal in sight at all times.

During the initial phase of the operation the helicopter crew attempted to both locate and capture the deer. It was soon discovered that using this expensive machine to spot deer was a needless waste, therefore, the Piper Super Cub, which was being used as an overall observation platform, was used to find the deer which were hiding in tall roseau cane (Phragmites communis) or bedded down in wire grass (Spartina patens) clumps. Then when the helicopter returned from ferrying a load, usually four or five animals, to the central collection point, it was not necessary for the pilot to spend time searching for more deer. By this time the Super Cub observer had them located and either circled over or dived to show the exact location.

Originally attempts were made to shoot the deer from the helicopter with syringe guns; however, this resulted in many lost darts, at $5.00 each, and most of the deer which were hit did not have the dart properly placed. Add to this the fact that they were in a highly excited state which prevented the tranquilizer, Sernalin, from having the desired effect. The syringe gun idea was soon abandoned.

Of the 13 deer captured during the first use of the helicopter, the majority were taken by the observer who alighted from the machine after it was landed near the exhausted animal. Usually only five to ten minutes fast chase was needed to run even the stronger deer down. Small deer were caught and tied by the observer alone. In some instances when a strong animal was encountered, the pilot gave an assist. The deer were then loaded and ferried back in carrying racks, rectangular metal boxes, two feet wide by aproximately six feet long and a foot deep, attached to the top of each pontoon.

Almost as an afterthought some of the personnel from nearby Rockefeller Waterfowl Refuge had brought along an airboat. It was used toward the end of the six-hour operation and from it three or four deer were captured. In this small effort the potential of this type surface craft became apparent.

The second attempt to capture deer by helicopter was made in April of the same year. Permission was obtained from the Bureau of Sport Fisheries and Wildlife to conduct the operation on the Delta Waterfowl Refuge near the mouth of the Mississippi River. Many deer had been seen by air and sparse vegetation on the marsh flotant islands was more suitable to the pursuit and capture technique than on State Wildlife. Eighty deer were taken in two days. The operation was more successful than expected and there were not sufficient hauling crates on hand to properly transport the animals so many were left tied until they reached the release site.

Probably one of the most costly lessons of this operation was the folly of allowing the feet of the deer to remain tied for such an extended period. Many of the deer could not stand, others with difficulty, after the ropes and straps were removed. The ultimate mortality associated directly with this type injury was impossible to determine but it was suspected to be high.

Using only airboats, ten deer were captured on the Delta Refuge a week later. Without aerial observation the location of herds on suitable terrain was difficult. Without supporting aircraft and personnel to turn back the deer they have a frustrating habit of running to the tree covered passbanks where footing is firm, thereby making pursuit and capture impossible.

Deer capture by helicopter and airboat got underway during the early part of April, 1964, when 162 deer were taken and moved to release sites around the state. Hauling crates capable of holding five to six deer each were loaded on a barge and transported to the Delta Refuge. Each crate was well ventilated and had straw or hay placd inside to provide soft bedding.

As the animals were captured they were given an antibiotic injection. Purpose of this precaution was to combat foreign body pneumonia and other respiratory infections. Either Combiotic (a penicillin-streptomycin preparation) or Tylan (tylosin) was used, the latter being recommended by the L.S.U. Veterinary Science Department and used exclusively during the later operations.

Each captured deer was eartagged, antlers removed from the bucks, ectoparasites collected and blood samples taken, primarily to determine the incidence of domestic livestock disease. Findings related to this latter operation have contributed materially to the exoneration of the whitetail deer as possible carriers of some of the livestock diseases such as brucellosis and leptospirosis.

Two notable improvements were initiated during the 1964 operation, the most significant being the increased employment of airboats as catch vehicles. On signal from the observer circling above the scene of operation in the Super Cub that the deer were out in the marsh and in favorable position to be taken, the airboats would move to the location indicated. Each airboat was equipped with a walkie-talkie radio, thereby enabling the operator to be in constant communication with the plane and the helicopter. The entire operation was directed by the observer in the Super Cub, usually the assistant director of the Louisiana Wild Life and Fisheries Commission, who was also the pilot.

The other improvement was the provision to untie the legs of the deer as soon as possible and place them in the comfortable crates transported to the central point of operation. They were kept tied a maximum of 30 minutes and usually much less. After the crates were loaded with deer they were transported upriver and placed on pick-up trucks which made the trip to the release sites.

Generally, the 1964 technique was employed in February of 1965 when 174 deer were taken in two days of capture activity. There were some basic improvements, however, such as the use of two deer hauling crates, each capable of holding 50 deer, and mounted on flat bed trucks. The trucks with the crates in place were driven onto the barge at Venice, Louisiana, and transported to the scene of operations. Each crate was partitioned into four separate chambers running lengthwise the entire length of the crate to facilitate the passage of air over the deer.

Excessive heat had been a problem in April of the previous years, therefore it was necessary to conduct the operation earlier in the year during cooler months. Even in February, however, there is no guarantee against warm days occurring in the coastal marshes of this state. Large fans are kept on hand to force air through the crates in the event the heat becomes excessive and were used effectively on at least one occasion. To further combat the heat buildup, the crates are painted silver to reflect as much heat as possible.

Another notable development in 1965 was the exclusive use of straps instead of ropes. Ropes tend to cut, scrape and otherwise cause injury to a struggling animal. It was found that a six foot strap, one inch wide, and preferably of web construction, was ideal. It could be rolled into a neat three inch diameter package and secured with a rubber band. An adequate supply can be kept conveniently at hand and supplied to the airboats as needed.

The tying technique involves securing the two front feet first with two or three turns of the strap, then forcing one of the hind feet under the tie and between the front legs. A wrap or two is taken around this foot and the other hind foot brought up alongside the first but outside front legs. The remainder of the strap is then used to secure both hind feet and the terminating end of the strap is tucked in a fold and pulled tight. There is enough friction between the surfaces of this strap to hold it in place. The major force exerted by the deer is kicking outwardly with the hind legs. This only tightens the tie between the front legs and prevents escape by all but the most carelessly tied deer. By tucking the end of the strap under, and avoiding knot tying, the crew loading the animals in hauling crates is not forced to cut the strap. It is convenient to have this material available for reuse.

Hurricane Betsy passed directly over the Delta Refuge in September of 1965, destroying large numbers of deer and much of their habitat. Due to this severe herd reduction to attempt was made to take deer from the area in 1966.

Capture operations were resumed in 1967, resulting in the taking of 102 animals. All these were taken in one day and no notable modifications of the 1965 technique occurred.

Two more improvements were added in 1968, when 162 deer were captured on February 7 and 8 of that year. Though all the airboats (four