

# LOSSES OF THE EASTERN WILD TURKEY FROM A STABLE ALABAMA POPULATION

by

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## ABSTRACT

*Loss rates of the eastern wild turkey (Meleagris gallopavo silvestris Vieillot) from the Saugahatchee Wildlife Research Area (SRA) in central Alabama, increased with increased turkey population levels. After the expanding population stabilized, winter losses of adult and young turkeys approximated 50 percent of the fall population. Poults captured as brood flocks in 1971, dispersed up to 6.44 km from their first summer range by the fall of 1972. Juvenile hens exhibited greater dispersal and variation in dispersal from their first summer range than did juvenile gobblers. Observation of turkeys in areas adjacent to the SRA indicated that dispersal resulting in emigration was a substantial factor contributing to the loss of turkeys from the SRA. Emigration from the SRA occurred during the fall break-up of brood flocks.*

*Ten of 15 radio-equipped turkey poults were lost from the SRA. Four of the losses were attributed to emigration, two observed mortality and four to illegal kill.*

An eastern wild turkey population was re-established near Auburn, Alabama in 1965 and 1966 by releases totaling 26 wild-trapped turkeys (Speake et al. 1969). Releases were made on the Saugahatchee Wildlife Research Area (SRA), located in the western part of Lee County. Barkalow (1949) reported that in 1940, turkeys were extremely scarce in western Lee County. Davis (1962) stated that no wild turkeys were in Lee County in 1960. Therefore, studies of wild turkeys on the SRA were believed to be of an isolated re-established population expanding into new range.

Most of the turkeys present on the research area through 1972 were individually identifiable by patagium markers which allowed for accurate estimates of the population by a direct count method (Speake et al. 1969). Gardner et al. (1972) reported that by 1970, fall estimates of the turkey population stabilized between 120 and 143 turkeys (1 turkey per 20 ha) while spring estimates stabilized between 40 and 60 (1 turkey per 40 ha) on the portion of the SRA that was censused. These spring and fall estimates indicated a high loss rate occurring during fall and winter months. Losses of turkeys on the SRA increased from an estimated 9 percent between October 1966 and October 1967 (Speake et al. 1969) to an estimated 54 percent during the winter of 1970-71 (Gardner 1972).

Gardner (1972) reported that the 1970-71 SRA overwinter loss of poults was greater than the loss of adults. Forty-seven percent of those marked in 1970 disappeared before 1 May 1971, whereas, 25 percent of the marked adults were lost during this period.

A spring "gobblers only" hunting season was initiated in Lee County in 1971 but legally harvested turkeys are not included in the loss rates given above. A fall turkey season has never been established on the SRA.

This study was directed toward an understanding of factors contributing to the losses of turkeys from the SRA. The objectives were to: estimate the loss of turkeys from the SRA during 1971 and compare it to previous years; examine the dispersal of brood groups for patterns relating to losses; collect data on loss of turkeys due to emigration; and determine the over-winter fate of individual turkeys from several brood flocks.

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Determination of percentages of losses attributable to various factors was not an objective of our study.

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## MATERIALS AND METHODS

The SRA is a 3676 ha tract of land located in the Alabama Piedmont. The land is under private ownership, with limited public access. The SRA and its turkey habitat was recently described by Gardner et al. (1972) and Blackburn (1975).

Turkeys were captured after they had eaten cracked corn treated with alpha chloralose (2 gr/cup) or tribromoethanol (8-13 gr/cup) as described by Williams et al. (1973). Before release, all turkeys were patagium tagged as described by Knowlton et al. (1964). Turkeys were released at their capture site.

All telemetry equipment utilized in this study was manufactured by Sidney L. Markusen Electronic Specialities, Esko, Minnesota (Reference to commercial products does not imply endorsement.) The equipment operated in the 164 MHz range. A complete transmitting unit and harness averaged 65 g in weight. Transmitters were prepared for attachment to turkeys as described by Williams et al. (1969). Transmitters were easily received at ranges up to 1.6 km.

From June 1971 to May 1973 turkeys were located and observed by driving and walking over the SRA and surrounding areas. Pastures and fields were patrolled regularly because of their heavy use by turkeys and the ease of sighting turkeys in such habitats. During the period of this study, approximately 5 days per week were spent on the SRA observing and trapping turkeys. Other researchers on the SRA during the present study also contributed numerous sightings of marked turkeys.

Radio instrumentation of turkey broods began in September of 1972. Instrumented turkeys were located by a radio-triangulation technique (Cochran and Lord 1963) and by field observations. Aerial searches were occasionally conducted to locate instrumented turkeys.

Loss of patagium marked turkeys from the SRA was determined for a certain date by subtracting the turkeys not observed during a period of 1 year following that date. This method is described in more detail by Speake et al. (1969) who used it to estimate population levels on the SRA.

Dispersal of 1971 brood flocks was estimated by plotting the location of the last sighting for each turkey during 1972 and 1973. For turkeys harvested, the location of harvest was recorded and used in estimating dispersal.

## RESULTS

### *Capture and Instrumentation*

Three brood groups comprised of 6 previously marked adult hens and 35 poults (17 females and 18 males) were captured and released during the fall of 1971 (Table 1). Unmarked poults were patagium marked and leg banded. None of the turkeys captured in 1971 were instrumented with radio transmitters.

Fourteen (8 females and 6 males) of 28 poults captured during the fall-winter of 1972-73 were instrumented with radio transmitters in addition to the described leg and patagium markers. Four marked adult hens and an unmarked subadult hen were also captured. The subadult hen was also instrumented with a radio transmitter. No significant differences were noted in the movements or behavior of the subadult hen and the instrumented poults. Therefore, to avoid lengthy description of results, we will refer to her as one of the 15 instrumented poults and will make no attempt to separate data collected from her from that of the 14 poults.

The 67 unmarked turkeys that were captured and marked during the present study brings the total number of marked descendants of the original 26 stocked turkeys to approximately 275. Persistent efforts to capture unbanded turkeys has enabled

Table 1. Capture and instrumentation record of members of five wild turkey broods captured on the Saugahatchee Wildlife Research Area between September 1971 and February 1973.

Brood Flock Number	Number of Adult Females		Number of Juvenile Females		Number of Juvenile Males		Date Captured
	Captured	Instrumented	Captured	Instrumented	Captured	Instrumented	
Brood 1	4		13		10		10-13-71
Brood 2	1				5		10-21-71
Brood 3	1		4		3		10-21-71
Brood 4	1	1 (subadult)	11	3	7	2	9-11-72
Brood 5			1	1	3	3	10- 5-72
Brood 5	1		2	2	1		10-22-72
Brood 5	3		3	3 <sup>a</sup>	1	1	1-14-73
Brood 5			2	2 <sup>b</sup>			2-13-73
Totals	11	1	36	11	30	6	

<sup>a</sup>One of the three had been instrumented in October, it was reinstrumented with a new transmitting unit.

<sup>b</sup>Both of these had been instrumented in October, they were reinstrumented with new transmitting units.

investigators to individually identify most of the turkeys on the SRA from 1967 through June 1973. Between March 1972 and June 1973, 1394 sightings of wild turkeys were recorded. Five hundred and twenty-two of these were positive recognitions of individuals. An additional 318 individual radio locations were remotely recorded by radio triangulation.

#### Losses of Adults and Large Poults

Seventeen of 30 marked adult turkeys observed on the SRA during the summer of 1971 were not seen during 1972 and therefore considered losses. Twenty of the 35 poults marked in the fall of 1971 disappeared from the area before the spring of 1972. Of 18 gobbler poults marked in 1971, only 8 were observed or harvested during 1972. The winter loss rate for hen poults marked in 1971 was slightly lower than for gobbler poults; 12 of 17 were observed during 1972. Harvested turkeys were not included in winter losses for 1971-72 because they were not included in loss rates given for previous years on the SRA.

#### Dispersal of Brood Flocks

Twenty of the 35 poults captured in 1971 were sighted during 1972.

Eleven of these poults (now sub-adult turkeys) sighted during 1972 stayed within 1.6 km of their capture site (Table 2). Juvenile hens exhibited the greatest dispersal and variation in dispersal with 42 percent being sighted more than 4.8 km from their capture site, while 50 percent remained within 1.6 km of their capture site. Eighty-seven percent of the young gobblers were observed within 3.2 km of their 1971 capture site, however, the gobblers observed during 1972 comprised only 44 percent of those marked in 1971.

There was not a definite tendency for the six adult hens of these broods to remain near or utilize the summer range they utilized during 1971. Based on last sighting records for 1972, three of the six remained within 1.6 km of their capture point and two others had moved more than 3.2 km. One of the six hens was not observed during 1972.

Table 2. Dispersal from capture sites of members of three brood flocks of wild turkeys captured on the Saugahatchee Wildlife Research Area based on sightings of brood members each year.

Age and Sex at Capture, Fall 1971	Number Captured	Number Turkeys at Distances (km)												
		1972						1973 (through June)						
		<1.6	3.2	4.8	6.4	8.0	Total	1.6	3.2	4.8	6.4	8.0	Total	
Adult females	6	3		1		1	5							
Juvenile females	17	6		1	3	2	12	3	1					4
Juvenile males	18	5	2	1			8	1		1			1	3

Seven of the 20 poults captured in 1971 and observed as adults during 1972 were observed or harvested during the spring of 1973. Four of the seven were within 1.6 km from their 1971 capture site.

#### *Egress of Turkeys from the SRA*

Numerous reports of marked and unmarked turkeys in areas adjacent to the SRA were received from motorists and hunters. Although each such report was investigated, relatively few of these resulted in subsequent observation of turkeys.

Nine observations of marked turkeys during 1971 and 1972 were made in areas adjacent to the SRA and within 1.6 km of its perimeter. Eight sightings were made between 1.6 and 3.2 km from the research area and six each were made 1.6 to 3.2 km and 3.2 to 4.8 km from the SRA. These turkeys had moved up to 8.0 km from their capture sites. A marked gobbler was found to have been harvested in 1967 or 1968 in Tallapoosa County, Alabama, approximately 12.9 km from the SRA. This gobbler was probably 1 of the original 26 released on the SRA.

Unmarked turkeys, both males and females, were observed and reported over most of the western portion of Lee County during 1971, 1972 and 1973. Reproductive success of emigrated turkeys is thought to be the reason for the large number of sightings of unmarked turkeys outside the SRA. During 1972, 1 brood group of 3 hens and 13 poults was observed 5.6 km northeast of the SRA. Reports of additional brood groups outside the SRA have also been received. No attempt has ever been made to capture and patagium tag the offspring of SRA turkeys that emigrated or their progeny. Because turkeys have been reportedly leaving the SRA since 1967 (Gardner 1972) and even earlier (Speake et al. 1969), a large number of unmarked turkeys in areas adjacent to the SRA would be expected. Sightings indicated that since the 1965-66 SRA releases, approximately 181 square km in western Lee County have been occupied or utilized at some time by turkeys. The population densities of turkeys in areas adjacent to the SRA appeared to be less than the population density of turkeys on the SRA.

#### *Fate of the 15 Instrumented Turkeys*

The 15 instrumented turkeys under study comprised approximately 25 to 30 percent of the turkey poults on the SRA during 1972. These turkeys were representative of three brood flocks captured at different locations on the SRA.

Two instrumented turkeys from each of two brood groups emigrated from the SRA (Table 3). The term emigrated is used because the turkeys failed to return to the SRA during spring dispersal. Emigration occurred during October and November in connection with the fall break-up of brood flocks and shifts to winter range.

Two of the 15 instrumented turkeys were found dead. One of these (No. 637) died within 6 days of its October capture and release. The carcass had been eaten but it could not be determined if the turkey had been killed by a predator or had been devoured after dying from other causes. The radio transmitter of this turkey was severely mangled but operating properly. The second instrumented turkey (No. 177) that was known dead was not observed by the authors. On 24 December a local sportsman retrieved the wing markers and functioning radio which he found near a chufa (*Cyperus esculentus* L.) patch which was being heavily utilized by turkeys during the winter months.

Radio contact was unexpectedly lost with four turkeys. These four, members from two brood flocks, disappeared in pairs which we shall refer to as pair A and B. After examining the circumstances surrounding the disappearance of pair A (No. 638 and 640), we ruled out a malfunction of their radios because: (1) failure to receive radio signals from both turkeys occurred simultaneously following a 2 day period of absence from the study area by the authors; (2) transmitters used during this study *all* functioned properly for periods of 4 to 5 months unless recovered and disconnected; (3) a transmitter subjected to predation or scavenging remained working in spite of its mangled external appearance; (4) a functioning transmitter lost by a turkey was easily recovered; (5) there were no signs of a weakening of signals indicating power depletion of batteries prior to the losses. The possibility of unidirectional movements was rejected because: (6) land and aerial searches covered much more territory (about 25 km square) than the maximum observed distances

Table 3. Instrumentation dates and the status as of 31 March 1973 of 15 instrumented turkeys on the Saugahatchee Wildlife Research Area during 1972-73.

<i>Flock Brood Number</i>	<i>Turkey Number</i>	<i>Sex</i>	<i>Initial Instrumentation Date</i>	<i>Recapture Date</i>	<i>Status as of 31 March 1973</i>
1	177	M	9-11-72		Found dead 12-27-72
1	178	F	9-11-72		Lost contact 1-24-73
1	179	F	9-11-72		Poaching suspected
1	181	F	9-11-72		Left SRA, transmitting
1	180	F	9-11-72		Lost contact 1-24-73
1	636	M	9-11-72		Poaching suspected
2	637	M	10- 6-72		Left SRA, transmitting
2	638	M	10- 6-72		Lost contact 3-3-73
2	640	M	10- 6-72		Suspect radio failure
2	643	M	1-14-73		Found dead 10-12-72
2	183	F	1-14-73		Lost contact 11-9-72
2	185	F	1-14-73		Poaching suspected
2	189	F	10-22-72	2-13-73	Lost contact 11-9-72
2	639	F	10- 6-72	2-13-73	Poaching suspected
2	197	F	10-22-72	1-14-73	Turkey lost radio 2-20-73
					On SRA, transmitting
					On SRA, transmitting
					Left SRA, transmitting
					Left SRA, transmitting
					On SRA, transmitting

moved by other instrumented turkeys (Fleming 1975). Other pertinent observations we considered were: (7) neither member of pair A was received or observed again although other members of the flock were frequently seen; (8) the flock was scattered during the week following the disappearances but members rejoined in their former range by the end of that week; (9) the disappearance coincided with the opening of gun season for deer in Lee County. We interpret these observations as evidence of losses due to illegal kill.

Factors 1, 3, 4, 5, 6, and 7 in the preceding paragraph can also be applied to the loss of pair B (No. 178 and 181). In addition, the following observations were considered: (1) turkeys disappeared from the vicinity of a chufa patch they frequented (25-30 turkeys were known to be regularly using this area at the time) (2) reports of poaching were received within a week following the disappearance; (3) a crude, camouflaged blind was discovered at the edge of the chufa patch soon after the disappearance. (4) the location of the patch was such that it was fairly easily accessible and approachable by man; (5) it was from this area that poachers had been previously apprehended; (6) the losses occurred before the close of gun season for deer in Lee County. We also attribute the losses of pair B to poaching.

The carcass of No. 177, found as previously mentioned, was within 200 meters of the chufa patch mentioned concerning pair B. We believe this turkey may have been a crippling loss due to poaching but evidence for this is not as conclusive as for pairs A and B.

Only 5 of the original 15 instrumented turkeys remained on the SRA as indicated by observations and radio locations. It is possible that some of the emigrated turkeys may have returned to the SRA after field observations ceased. We considered this unlikely

since 78 percent of our initial recognitions of individuals in 1972 occurred during the same months (January-June) that we were in the field in 1973.

### Nesting Mortality

Two hen flocks consisting of nine patagium marked hens were observed on the SRA in March 1972. The age ratio of the marked hens in these flocks was two adults: one young. Eight of the nine marked members of these SRA flocks were observed later in the summer of 1972, after the normal nesting season on the SRA. Therefore only one of these turkeys, a young hen, could possibly have been lost to some type of nesting mortality. In addition, four other marked hens, three young and one adult, already dispersed from their winter flocks, were observed at the beginning of the nesting season and all four were seen after the nesting season. We conclude that the mortality of hens was low during the 1972 nesting season.

## DISCUSSION

Loss rates of turkeys increased with the increase in the turkey population on the SRA (Fig. 1). No significant changes in habitat or other environmental factors that may have been responsible for this increase in loss rates, were observed on the SRA. Ellis and Lewis (1967) reported overwinter loss of 82 percent of the young females and a 19 percent loss of young gobblers on their study area in the Missouri Ozarks. Kennamer (1970) also found a high loss rate for young hens in his Mississippi Delta study areas. Bailey and Rinell (1965) believed that 70 percent of the juvenile hens might not survive to their second autumn.

Dispersal data collected during the present study supports the Ellis and Lewis (1967) observation that juvenile hens are the most mobile sex and age group. However, they stated that at a high population level (one turkey per 10.5 ha), juvenile hens are forced by crowding to seek more distant nesting sites than are adult hens. We did not notice this

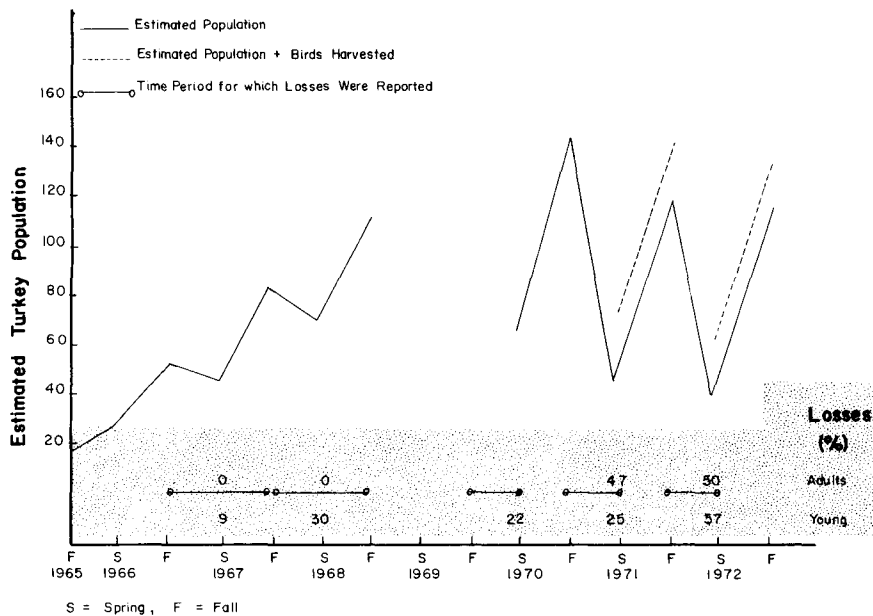


Figure 1. Relationship of loss rates of marked young (3-12 months old) and adult to total turkey populations on the Saugahatchee Wildlife Research Area, 1965-72.

tendency on the SRA, which had a lower estimated population density of one turkey per 20 ha. Speake et al. (1975) found that juvenile hens did not disperse greater distances in the spring than did adult hens on south Alabama study areas having high turkey populations. We feel that the mobility of juvenile hens was important in the overall loss rates that had been reported from the SRA in the present and earlier sites. Our observations on movements of adult hens are inconclusive due to the small sample size examined. Since relatively few of the reported observations of marked turkeys in areas adjacent to the SRA resulted in subsequent observations of turkeys by the authors, the importance of this mobility in egress could only be estimated from data collected from instrumented turkeys. Forty percent of the instrumented poults lost from the SRA emigrated into surrounding areas. All the instrumented poults that emigrated were females.

Observations of marked turkeys in areas adjacent to the SRA suggest that a substantial portion of the loss of turkeys from the SRA may be attributed to emigration.

The fate of the 15 instrumented turkey poults on the SRA during the fall-winter of 1972-73 revealed that 66 percent of these turkeys were lost from the SRA. We believe 40 or 50 percent of this loss was due to illegal kill. All losses attributed to illegal kill occurred during the gun season for deer in Lee County. The disappearance of two turkeys coincided with the opening week of deer season. The opening of the gun season for deer marked a large increase in the number of hunters afield. Wilson and Lewis (1959) thought that most turkey poaching on their study area in southwest Michigan occurred incidental to hunting for other species.

Previous studies on the SRA have also documented cases of turkey poaching. Speake et al. (1969) reported that four of 25 marked turkeys lost from the SRA between March 1966 and October 1968 were known to have been killed by poachers. Gardner (1972) reported the loss of three turkeys to poaching from 21 October 1969 to 31 October 1971 on the SRA. Poachers with turkeys were apprehended on two separate occasions in 1969 by personnel of the Alabama Cooperative Wildlife Research Unit. Gardner (1972) also reported five other cases of attempted poaching as detected by the occurrence of lead shot under the skin of trapped turkeys. The first legal turkey season on the SRA since turkeys were re-established was held after Garner finished trapping in 1971. He felt that illegal losses on the SRA were probably much higher than actually documented. It appears that illegal kill continues to be an important factor in population losses from the SRA.

Powell (1967) suggested that illegal kills in Alabama could be as much as 10 percent of the total population in some areas. Mosby and Handley (1943) thought the annual illegal turkey kill in Virginia was about 10 percent of the population. Wilson and Lewis (1959) suspected that poaching was the greatest cause of death for turkeys in southwestern Michigan. Wright and Speake (1975) thought an annual loss as high as 20 percent may have occurred at Land Between The Lakes, a multiple use area in Kentucky.

Present data from the SRA indicates that overwinter losses prior to nesting season are much greater than losses associated with nesting. This low nesting loss of hens is in contrast to Gainey's (1954) findings that the 75 percent loss of sub-adult hens in Florida could be explained by nesting mortality. He felt hens were much more vulnerable at this time of year than at any other. Williams et al. (1968) reported that 9 of 21 nests on his Florida study area were lost to predators but that no nesting hen was known to have been significantly injured. Three of eight instrumented nesting hens on the SRA during 1969 were reported by Hillestad (1973) to have been involved in a predation attempt. All three attempts were failures.

It is necessary to emphasize that the loss rates we have reported are for adults and large poults. No attempt was made to report on loss of young poults. We feel that this is an important area for future research.

Our data suggest that the high overwinter loss rates of turkeys associated with the increased turkey population on the SRA was attributable mainly to human influences. The SRA, as with other field study areas and game management areas, has boundaries established by man for his convenience. Delimiting a study area has distinct advantages for the researcher and game manager but requires careful interpretation of wildlife population levels and harvest. Emigration and immigration are characteristic of many natural populations on which artificial boundaries are placed. Although emigration and

immigration from or to an artificially defined area influences population levels and management of the area, it might have little detrimental effect on the regional population since movements and shifts in habitats and ranges are common for most animals. Artificial boundaries established on the SRA necessitated that the terms "egress" and "loss" be applied to turkeys that moved from .5 km inside the SRA to .5 km outside the SRA. A turkey that moved 2 km, but confined its movements to the SRA was not termed a loss or egress, however. Thus the term "loss" as it was used in this and previous studies conducted on the SRA must be considered in this light.

We felt illegal kill contributed significantly to the loss of turkeys from the SRA. In contrast to emigration loss, illegal kill actually removes harvestable turkeys and breeding stock from the population.

We concluded that illegal kill of turkeys was a major causative factor in loss of instrumented poults during the winter of 1972-73. In terms of the population as a whole, emigration loss was only an artificial concept. The artificiality of this loss was evidenced by the 181 square km on which turkeys resulting from the SRA releases have been observed.

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