POPULATIONS OF WILD TURKEYS IN RELATION TO FIELDS

JAMES C. LEWIS

Tennessee Game and Fish Commission

ABSTRACT

Turkeys were observed significantly closer to fields than would be expected if they were distributed systematically over the entire area or systematically along the gravel roads, where many observations were made. Turkeys were observed closer to fields which contained more than 3 acres. Apparently fields larger than 3 acres were more attractive habitat.

Fields containing 10 to 20 acres contributed 54 per cent of the brood observations, more than twice the number expected if the broods had been equally distributed over the entire area. Concentrated series of small fields were also satisfactory brooding habitat. Broods were seen closer to fields early in the summer.

Gobblers did not utilize the fields regularly during the summer months. Both hens and gobblers used the fields and their vicinities during the late winter and spring months.

An attempt was made to evaluate the influence of forest openings on turkey populations in study areas in Michigan and Tennessee. Higher populations in Michigan were associated with 10 per cent of the acreage in fields. No consistent relationship was found between per cent in forest openings and turkey populations on the Catoosa Wildlife Management Area. Field influence was apparently masked by other factors in the local habitat, such as stand size, tree species, and water availability.

INTRODUCTION

A study was made, to see how fields contributed to turkey population densities, in Michigan's Allegan State Forest. Observations were made to numerically measure the use of fields and determine optimum field size, in Tennessee's Catoosa Wildlife Management Area. The predominant forest type on both areas is oak, with a large amount of yellow pine also present on the Catoosa Area. The topography is moderately hilly in the Allegan Forest, and terrain on the Catoosa Area ranges from 1,000 to 2,000 feet above sea level. The Allegan Forest contains 50,000 acres and the Tennessee study area, 80,000 acres.

Literature on the Eastern Wild Turkey *(Meleagris gallopavo silvestris* Vieillot) stresses the importance of well dispersed forest openings as a part of good habitat. Wheeler (1948) felt the per cent of openings was arbitrary and should vary with terrain and cover. The suggested per cent of the total habitat which should be fields varies from 5 to 50 per cent (Mosby and Handley, 1943; Dalke, et. al., 1946; Kozicky and Metz, 1948). The size recommended for forest openings varies from ½ to 2 acres (Kozicky and Metz, 1948; Holbrook, 1961) and to 6 acres (Wheeler, 1948).

I wish to thank personnel of the Tennessee and Michigan Game Divisions for keeping records of their turkey observations.

METHODS

Observations of Turkeys

Turkey observations were recorded on the Catoosa Wildlife Management Area from July 1, 1960 to September 1, 1964. The forestry crew, law enforcement officers, farming aides, and biologists assisted by keeping records of turkeys they observed. Many of their observations were made while traveling the area's gravel roads (56 miles) to and from work, although their work duties took them into all parts of the area. The locations of observations are not thought to be significantly biased, but this factor is discussed later.

The records contained the sex, age, numbers, and location where the turkeys were observed. Sighting locations were later recorded on a map and the distance to the nearest field measured in ⅛-mile units. Field acreages were determined from previous records.

Michigan observations were made in a similar manner and were used as a basis for census. In order to avoid repeated counting of the same turkeys, observations were plotted on a map and attempts made to delineate the range of each flock. Most groups were individually identifiable by unique characteristics of sex and age composition, range, and flock size.

CENSUS

Both winter and summer surveys of the turkey populations were made on Catoosa (1960-64) and the Allegan Forest (1957-58). The late winter surveys gave our most accurate minimum population figures because the turkeys frequently concentrate around green fields where they are easier to observe and occasional snows permit tracking observations. Turkeys are consistent in daily habits and easier to observe in deciduous forests during this period, when access to the study areas is mainly limited to Commission employees. The daily range of turkeys is restricted as snow depths increase, thereby reducing the probability that some flocks might be counted twice.

Three distinct types of Allegan Forest turkey range were outlined by plotting turkey population densities of 0-2, 3-5, and 6-10 birds per square mile. Four sample units, each of nine square miles, were chosen within these density regions to determine what habitat conditions were associated with low, medium, and high turkey populations.

Turkey flocks comprising the average winter population (1960-63) were listed on the Catoosa Area map. Study units were located on the area and the boundaries established around various flock "homesteads," which were thought to be separate. The flocks resident on these units were assumed to be the annual product of the same habitat. Summer surveys indicated no appreciable population shift from habitat used in the winter. The study units varied from 1,400 to 3,900 acres.

Topographic and timber type maps provided information on habitat conditions on both study areas. Habitat data were then compared with population densities.

To test the statistical significance of the data the T-test and Chi-square test were used. The null hypotheses were rejected only when the observed difference would occur less than one per cent of the time.

RESULTS

Six hundred and twelve observations of turkeys were recorded on the Catoosa Wildlife Management Area. These were observations of 3,354 turkeys, including 381 gobblers, 494 hens, 1,294 poults and 1,185 turkeys of undetermined sex or age. The relationship between turkeys and the 148 fields, varied with sex and age of turkeys, with season, and among field size groupings.

50

BROODS AND FIELDS

Each turkey sighting was associated with the field nearest to it, and the fields separated into various size groupings. The T-test was used to see if the average number of birds per observation differed significantly between the various field size groupings. The average number of turkeys seen was significantly greater in fields of 10 to 20 acres (Table 1). There was not a significant difference between the average numbers of turkeys observed in fields containing less than 10 acres or more than 20 acres.

The Chi-square test was used to see if the observed and expected number of brood observations were similar enough to accept a null hypothesis of no difference between field size groupings. A significantly higher number of observations were made in field size groups of 10-14.5 (Chi-square = 185) and 15-19.5 acres. Brood observations in fields smaller than 5.5 acres were significantly fewer than expected. Fields containing 10 to 19.5 acres, and their vicinities, seemed to be preferred habitat for nesting and brooding, or perhaps hens are more successful there.

Fields in the 10 to 19.5 acre grouping would have contributed 14.5 per cent of the 153 broods if observations had been equally distributed along the gravel roads. If brood observations had been equally distributed over the entire area, the fields in the 10 to 19.5 acre grouping would have contributed 19.5 per cent. Fifty-four per cent of the broods were observed around this field grouping and 40 per cent around the fields containing 10 to 14.5 acres. Thus, the data shows that fields between 10 and 20 acres contributed more to turkey productivity, on the Catoosa Wildlife Management Area, than smaller or larger fields.

Broods were seen closer to fields early in the summer, although the differences were slight. The monthly averages were: June, 1.3; July, 1.1; August, 1.9, and September, 2.1 units from the nearest field. Wheeler (1948:23) noted such a trend: "Hens lead their broods to the open areas where insects occur in large numbers and remain almost exclusively in and around such localities until after mid-July."

An average of 6.5 fields were found within a one mile radius of fields where broods were observed. A ½ mile radius contained an average of two fields and a ¾ mile radius contained four fields. Within a 1 mile radius an average of 2.7 per cent was cleared fields, not including the field where the broods were observed. The acreage of the entire wildlife area was 1.4 per cent fields; therefore, brood producing areas were around large fields or in areas where a concentration of several fields provided suitable habitat.

The number of hens per brood declined as field size increased, implying that nesting predation might be heavier around small fields. However, two other factors might also explain this trend. First, some hens may not nest as yearlings and might prefer habitat around the smaller fields. Another explanation is that hens which nested unsuccessfully may also be attracted to habitat around smaller fields.

ADULT TURKEYS AND FIELDS

The T-test was used to see if the average distance from turkey observations to fields differed significantly from the average observed with a systematic distribution. The null hypothesis was rejected for all except the smallest field grouping of 0-2.5 acres. Average distances were significantly lower for the other field groupings.

From January to May, gobblers were observed an average distance of 1.2 units from fields. The April harvest location for 78 gobblers averaged 1.3 units from the nearest field. A T-test showed gobblers were observed significantly closer to fields, in the January to May period, than would be expected with a systematic distribution.

51

Table 1. Field size groups and average number of turkeys observed,
Catoosa Wildlife Management Area, Tennessee, 1960-64.

Field Size Groups (Acres)	Average Number of Turkeys Observed				Total	Number of Broods Observed	Average Number of Poults Per Brood	Hens Per Brood
	Toms	Hens	Poults	Unidentified				
0-2.5	.8	.6	1.7	.8	3.9	16	10.9	4.0
3-5.5	.6	.8	1.7	1.2	4.3	19	8.1	2.1
6-9.5	.7	.4	1.7	1.6	4.5	15	7.9	3.9
10-14.5	.5	.9	3.2	3.4	8.0	62	7.6	3.7
15-19.5	.3	.9	2.7	2.7	6.7	20	9.3	2.9
20-39.5	1.0	1.3	1.7	1.0	4.9	8	11.1	1.2
40 plus	.6	.8	1.2	1.8	4.5	13	7.7	1.5

In contrast, gobblers were seen an average of 2.8 units from fields during the summer months. Their summer habitat needs apparently differ from the hens and poults. Gobblers are seen then, in sections which contain only transient or low turkey population densities, far out of proportion to normal sex ratios. The summer average of 2.8 units closely approached the averages for distribution without relation to fields and a T-test showed no significant difference.

From January through April, turkey hens were as closely associated with fields as during the nesting and brooding season. They were observed an average of one unit from the nearest field. The T-test was used to see if the average distance of hens from fields differed significantly from a systematic distribution without respect to fields. Hens were observed significantly closer to fields in both the January to April and May to August periods. Observations made in the September to December period were too infrequent to make conclusions.

FIELD SIZE AND ATTRACTIVENESS

The average distance from turkey observations to field size groupings was computed and used as a measure of the attractiveness of various field groupings. The Chi-square test was used to see if the observed and expected number of turkey observations were similar enough to accept a null hypothesis of no difference between field size groupings. A significantly greater number of observations were made in fields of 10-14.5 and 40 or more acres (Chi-square = 193 and 25) (Table 2).

The turkeys use of 22 openings was studied in the Allegan Forest by observing turkeys, their tracks and droppings. Fields larger than 6 acres provided habitat for a greater variety of such activities as breeding, brooding, dusting, feeding, loafing, and nesting.

The influence of large fields (10-20 acres) or groups of fields might be less obvious on an area where the recommended minimum 5 per cent in forest openings was available.

VEGETATIVE COVER AND FIELD SHAPE

Wildlife food plots were not present in the Allegan Forest, and the fields had not been cultivated for several years. Grasses were the predominant vegetative cover. Those fields which contained a heavy grass cover, without woody vegetation present, were used more frequently than those containing considerable woody vegetation (sumac, sassafras, blackberry).

Most of the fields on the Catoosa Area periodically contain food plots. The winter grains and clovers were the only crops which were obviously more attractive to turkeys than natural vegetative cover.

The centers of large fields (30 to 60 acre, old farmsteads) were not readily used, unless a peninsula of woods jutted into the field to provide cover for access. Birds are more frequently observed feeding, loafing, and dusting close to field borders. Fields should be wide enough to prevent excessive edge competition from the surrounding forest.

POPULATION DENSITIES AND FOREST OPENINGS

Michigan study units, representing high and medium turkey densities, were characterized by well dispersed fields comprising about 10 per cent of the total area, and water, with its associated lowland hardwood timber types, within 1 mile of nearly all the area (Table 3). Low turkey population densities, in the other sample units, were associated with 23 and 30 per cent openings, and 33 per cent was over 1 mile from water and associated lowland hardwood timber types. The factors which made these latter units less attractive as turkey ranges were thought to be insufficient water, a scarcity of lowland mixed hardwoods (im-

53

Table 2. Field size groups and attractiveness to wild turkeys, Catoosa Wildlife Management Area, Tennessee, 1960-64.

Distance From Observations To Nearest Field (⅛ Mile Units)

Field Size Groupings (Acres)	Turkey Observations			Systematic Points Along Gravel Roads			Systematic Points Over Entire Area		
	Average Distance	Sample Size	Per Cent of Observations	Average Distance	Sample Size	Per Cent of Points	Average Distance	Sample Size	Per Cent of Points
0-2.5	3.0	105	17.2	3.6	35	11.5	4.4	43	31.2
3-5.5	.9	91	14.9	2.6	19	12.6	4.3	26	18.8
6-9.5	1.7	69	11.3	3.0	6	5.2	3.0	19	13.8
10-14.5	1.0	146	23.8	1.9	8	8.3	3.3	17	12.3
15-19.5	.7	68	11.1	2.0	5	6.2	2.5	10	7.2
20-39.5	1.1	53	8.6	4.2	12	19.8	3.9	11	8.0
40 plus	1.1	80	13.1	3.2	11	36.4	4.5	12	8.7

portant winter habitat), and excessive fields.

There was no detectable relationship between population densities and soil types on either the Allegan Forest or Catoosa Wildlife Management Area.

A relationship between turkey population density and the per cent of habitat which was fields, was not evident for 13 study units on Catoosa. Other factors apparently masked the influence of clearings. The study units were compared with specific turkey habitat needs outlined by Kozicky and Metz (1948) for Pennsylvania. Their description of habitat needs apparently cannot be applied in Tennessee. Good populations were frequently present in spite of exceeding the maximum or having less than the minimum recommended for factors such as sawlog size trees, and percentage in oak timber types.

Table 3. Turkey population densities and associated habitat characteristics for four study units, Allegan Forest, Michigan, 1958

Percentage Composition—Nine Square Mile Units				
	Unit 1	Unit 2	Unit 3	Unit 4
Turkeys Per Square Mile	6–10	3–5	0–2	0–2
Per Cent More Than One Mile From Water	8	3	33	50
Cover Type				
Oak (9-16"dbh)	19	17	41	17
Oak (0-9"dbh)	44	37	27	23
Pine	9	2	2	5
Lowland Hardwoods	7	23	2	5
Aspen	9	9	5	17
Marsh	2	2	0	2
Clearings	10	10	23	33

DISCUSSION

One of the first questions that came to mind was the validity of using data which might be biased to favor fields. Observations could be biased by the work habits of observer, which may have taken them to fields more frequently than to forested areas. I feel this can be largely discounted because many observations were made while traveling the main roads, from which many fields were not visible. The distribution of turkeys along these roads was tested against what would prevail if distribution had been systematic. Observations still favored the areas closer to fields. Second, the observers were engaged in many types of activities other than farming; such as timber marking, boundary sign posting, and road maintenance, which did not involve regular work in the vicinity of fields.

Also, observations might be biased because turkeys are more easily seen in openings. I certainly cannot dispute the fact that turkeys are more easily seen in fields and other forest openings, than in woods. If the observations were influenced in this manner, to such an extent that all the data was biased, then the number of observations of turkeys should increase as field size increases because more work activities are required around the larger fields. There was no direct correlation between field size and the number of observations made or the number of turkeys observed. And it would not explain why so many broods were seen around the intermediate size fields or why the relation to fields varied with the season and sex of the turkeys.

I believe that the data was influenced some, by the fact that turkeys are more easily observed near fields, but not to the extent that it

detracts from the two most important findings of the study. One was that more turkeys were resident around intermediate (10 to 20 acres) size fields; this was due to more broods being observed near these fields. The second was that in the absence of fields containing 10 to 20 acres, concentrated series of small fields provided the other brooding habitat on the wildlife area.

Fields containing about 10 acres, or a concentrated series of small fields, would probably provide better brooding habitat than well dispersed fields containing ½ to 2 acres each, on areas which do not and cannot have the recommended minimum of 5 per cent of the habitat in openings.

Why should fields of 10 to 20 acres or a concentrated series of small fields be preferred brooding habitat? "Insects are paramount in the dietary habits of the poult during the first two months of its existence. Grasses and insects, the principal foods of the wild turkey during two-thirds of the year, require open situations; the forest clearing, therefore, is of inestimable value." (Wheeler. 1948:23).

The larger fields on the Catoosa Area are divided into ½ to 2 acre units in various stages of vegetative succession. These larger fields, managed in this manner, provide a greater variety and quantity of foods, with different seeds and insects providing the bulk of the food at various parts of the summer. A concentrated series of small fields, readily accessible to poults, would provide a similar situation.

A study has been initiated on the Catoosa Area to test the value of having units with 5 and 10 per cent openings. Openings are being created in a series of hunting compartments (2,500 to 6,350 acres) and population surveys will be continued, to determine trends in the resident turkey populations, as the per cent in openings is increased.

LITERATURE CITED

Dalke, P. D., A. S. Leopold and D. L. Spencer. 1946. The ecology and management of the wild turkey in Missouri. Conserv. Comm., State of Mo., Tech. Bull. No. 1, 86pp.

Holbrook, H. L. 1961. Timber and turkeys. Proc. First SE Conf. on Mgt. of Native and Pen-raised Game Birds. Univ. Ga.

Kozicky, E. L. and R. Metz. 1948. The management of the wild turkey in Pennsylvania. Pennsylvania Game News. 19(4):3, 20-21, 26-27, 30-31.

Mosby, H. S. and C. O. Handley. 1943. The wild turkey in Virginia: its status, life history and management. Comm. Game and Inland Fisheries, Richmond, Va., 281pp.

Wheeler, R. A., Jr. 1948. The wild turkey in Alabama. Ala. Dept. Conserv. 92pp.