Home Ranges of Wild Turkey Gobblers in Central Mississippi

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Abstract: Fifty-two eastern wild turkey (*Meleagris gallopavo silvestris*) gobblers were monitored by telemetry on Tallahala Wildlife Management Area, Bienville National Forest, Mississippi, from January 1986 to September 1987. Annual home range (HR) for 6 adults and 3 juveniles averaged 1,680 ha. Annual HR's averaged 1,409 ha when the very large HR (3,850 ha) of 1 juvenile was not included. Based on 79 seasonal HR's, average HR in spring 1986 was 812 ha, summer 688 ha, fall 447 ha, and winter 506 ha; and average HR for spring 1987 was 1,441 ha and for summer, 775 ha. Pre-hunting season HR's were not significantly different between harvested and non-harvested gobblers. Gobbler HR size during the 1986 hunting season (378 ha) was smaller ($P < 0.05$) than during the 1987 season (799 ha).

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Several studies have been conducted using telemetry to determine home ranges of wild turkeys in the southeastern United States (Speake et al. 1975, Everett et al. 1979, Wigley et al. 1986, and Exum et al. 1987). The objective of our study was to delineate home range size of gobblers on an annual, seasonal, and age-class basis. We also studied the relationship of home range size to a gobbler's fate during the hunting season.

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Methods

The study was conducted on Tallahala Wildlife Management Area (TWMA), which is a 14,140-ha tract in the Strong River District, Bienville National Forest, about 56 km west of Meridian, Mississippi. Topography is flat to gently rolling. Mean annual temperature is 18° C and mean annual precipitation is 144 cm. The study area is located in the Jackson Prairie Region of the lower coastal plain province (Pettry 1977).

Mature pine stands, dominated by loblolly pine (*Pinus taeda*), mixed pine-hardwood stands, and pine regeneration areas occupy 67% of the area, while mature, mixed hardwood, bottomland hardwood, and hardwood regeneration areas comprise the remaining 33%. Fields are not present on the area but are present at the study area periphery (Phalen 1986).

The study area has many roads. Forest Service roads are gated and locked from 4 January to 4 March and again from 15 May to 15 September.

Gobblers were captured at permanent bait sites from mid-January to early March 1986 and 1987 and from early July to late August 1986 by cannon-netting (Bailey 1976) or tranquilization (alpha-chloralose treated corn) (Williams et al. 1966), and released at the capture site. Gobblers were aged (Williams 1981), leg-banded, and wing-tagged (numbered cattle ear tags). A transmitter (80 g) was attached "backpack style" with nylon-coated rubber tubing (Phalen 1986). We used TR-2 receivers with TS-1 scanners (Telonics, Inc., Mesa, AZ) and hand-held, 3-element Yagi antennas to determine signal direction.

Gobblers were located twice daily on alternate days from January to August and at least once weekly during fall and early winter (Sep-Dec). Locations were plotted by triangulation (Cochran and Lord 1963) using angles as close to 90° as possible (Heezen and Tester 1967). Azimuths were taken to the nearest degree with a hand-held compass. Maximum time between readings on the same bird was 10 minutes. The extensive road system permitted rapid access to all parts of the study area. Accuracy tests were performed (Mech 1983), and an error of $\pm 5.4°$ was obtained (Kelley 1987).

Turkey locations, by x-y coordinates were summarized graphically using a modified version of TELEM (Koeln 1980). Home ranges were constructed using the convex polygon method (Mohr 1947). Data analyses were performed using SPSS-X (SPSS 1983) using a 0.05 significance level.

Annual home ranges (HR's) were computed for gobblers monitored a full year. Number of locations per gobbler varied from 81–133 and averaged 116. The Mann-Whitney test (Siegel 1956) determined differences in HR size between age classes. Data from gobblers monitored at least 1 full season were used to derive seasonal home ranges. Seasons were: summer (June-Aug), fall (Sep-Nov), winter (Dec-Feb), and spring (Mar-May). A nonparametric factorial analysis (Hollander and Wolfe 1973, Marascuilo and McSweeney 1977) was used to test for seasonal differences in home range sizes and Dunn's distribution-free multiple comparison test was used to locate differences (Hollander and Wolfe 1973).

Home ranges were calculated for gobblers monitored during the hunting seasons 22 Mar-1 May). Since harvested gobblers were excluded, this method may have been biased. Pre-hunting season HR sizes were used to assess differences in home range size between harvested and non-harvested gobblers. The pre-hunting season dates of 1 Dec-21 Mar were chosen as the comparison period. Significant differences in pre-hunting season HR size between harvested and non-harvested gobblers were tested by the Mann-Whitney *U* Test.

All harvested gobblers were checked at TWMA headquarters, and harvest location recorded. Observations of monitored (known color and number) gobblers at bait sites or ancillary observations also were recorded.

Results

Fifty-four gobblers (22 adults and 32 juveniles) were instrumented with transmitters from January 1986 to February 1987. Two gobblers were lost within 1 week of capture. The remaining 52 gobblers were monitored for various lengths of time between January 1986 and August 1987. A total of 3,765 locations (fixes) was made with an average of 72.4 fixes/turkey. Average monitoring period per gobbler was 7.5 months. Of the 54 gobblers transmittered, 33 died (25 were harvested), 10 were lost to unknown causes and 11 were alive at the end of August 1987.

Due to high harvest rates, annual HR's could only be calculated for 9 gobblers (6 adults and 3 juveniles). Annual HR averaged 1,418 ha (SD = 452) for adults and 2,204 ha (SD = 1,426) for juveniles. No difference ($P > 0.05$) in HR size was found between age classes. One juvenile (No. 27) had a very large HR (3,850 ha); if his HR data were excluded, average HR for juveniles would be 1,382 ha (SD = 70). Overall, HR for gobblers was 1,680 ha (SD = 889), or 1,409 ha (SD = 383) excluding No. 27.

A total of 79 seasonal HRs was obtained. No significant differences in HR size between juveniles and adults were found. However, pooled HR size varied significantly among seasons (Table 1). The HR size in fall 1986 was smaller than HR size in spring 1986 and spring 1987. No significant age by season interaction occurred.

No significant differences in pre-hunting season HRs were found between harvested and non-harvested gobblers. During the pre-hunting period (1 Dec-22Mar) average HR size for gobblers ($N = 9$) that were harvested subsequently was 731 ha (SD = 159). Non-harvested gobblers ($N = 5$) had an average HR of 919 ha (SD = 809). If gobbler No. 27's HR (2,355 ha) was excluded, the average for non-harvested gobblers was 560 ha.

Hunting season HR sizes of non-harvested gobblers in 1987 (799 ha) were larger ($P < 0.05$) than those in 1986 (378 ha) (Table 2). No significant differences were detected between adult and juvenile HRs within years.

All field observations of gobblers being monitored by telemetry were within that gobbler's HR. Also, every gobbler was harvested in its HR.

Table 1. Seasonal home range sizes (ha) for wild turkey gobblers on Tallahala Wildlife Management Area, Mississippi, 1986–87.

Season	Adult			Juvenile			Pooled $\bar{x}$	
	N	$\bar{x}$	Range	*N*	$\bar{x}$	Range		
1986								
Spring[a]	4	817	(646–982)	13	810	(389–2,229)	812	B,C[b]
Summer	4	772	(587–967)	8	646	(389–1,340)	688	A,B
Fall	8	455	(186–944)	7	437	(150–842)	447	A
Winter	7	451	(190–679)	6	569	(244–943)	506	A,B
1987								
Spring	8	1,329	(797–2,704)	4	1,730	(997–2,536)	1,462	C
Summer	6	554	(171–1,032)	4	1,108	(760–1,528)	775	A,B,C
Overall	37	733		42	798		768	

[a]Spring = Mar–May; Summer = Jun–Aug; Fall = Sep–Nov; Winter = Dec–Feb.
[b]Pooled means that share the same letter are not different ($P>0.05$) according to Dunn's Multiple Comparison Test.

Discussion

We agree with Brown's (1980) view that reported HR's of wild turkeys are highly variable. Several factors might be responsible for variations in HR sizes. First, early studies did not use telemetry methods. Barwick and Speake (1973) found that HR's based on telemetry were about twice as large as HR's based on observations of marked gobblers. Secondly, more recent studies, including the present study, were conducted in mostly forested habitats with few fields. Other factors probably causing variation in HR size were short-term studies, too few telemetry locations, and small sample sizes. Finally, improved transmitters permit monitoring turkeys for a full year.

Sizes of annual and seasonal ranges of wild turkeys may be a function of habitat quality (Everett et al. 1979) or depend on suitability of available resources, especially food (Legion 1946). Areas with a diversity of habitat types provide more diverse food resources and support higher population densities (Speake et al. 1975).

Table 2. Home range sizes (ha) for non-harvested wild turkey gobblers during 2 spring hunting seasons on Tallahala Wildlife Management Area, Mississippi, 1986–87.

Hunting season	Adults			Juveniles			Pooled		
	N	$\bar{x}$	SD	*N*	$\bar{x}$	SD	*N*	$\bar{x}$	SD
1986[a]	4	463	51	11	347	224	15	387	198
1987[b]	8	693	343	4	1,013	430	12	799	388

[a]21 Mar–1 May.
[b]22 Mar–1 May.

Location of food supplies frequently has been indicated as a factor affecting turkey movements (Wheeler 1948, Ellis and Lewis 1967).

Diverse habitats may be associated with high turkey population densities and small HR's. In Missouri, a study area containing 49% forest and the remainder in old fields, pastures, and cultivated lands yielded annual HR for 4 adult gobblers of 446 ha. Estimated density was of 1 per 10.1 ha (Ellis and Lewis 1967). In northwestern Alabama, a study area with >90% mature forests yielded annual HR's of 1,631 ha for gobblers. Population density was estimated to be 1 per 58–142 ha (Everett et al. 1979). In other mostly forested areas, large HR's were associated with comparatively low population densities (Wigley et al. 1986, Exum et al. 1987). Annual HR for gobblers on totally forested TWMA was 1,680 ha and preliminary population density, based on capture-recapture estimates and harvest data, was 1 per 34 ha (Gribben 1986). Annual HR size might reflect habitat composition and habitat potential (quality) (Speake et al. 1975).

Largest HR's on TWMA were in the spring. Movements related to courtship/mating behavior were probably the dominant factors influencing HR size. Wheeler (1948) reported greatest HR's for gobblers during the breeding season. Food shortages did not appear to be the cause of increases in breeding season movements (Davis 1973). Large HR's in spring may assist gobblers in finding hens during the breeding season.

During the fall, HR size on TWMA was smaller than all other 1986 seasons. An exceptionally large acorn (*Quercus* spp.) crop occurred on TWMA in fall 1986 and this could have caused a reduction in HR size.

Since prehunting season movements were not different between harvested and non-harvested gobblers, other factors must affect harvest. It is unclear why hunting season HR size during the 1987 season was larger than in 1986. Hunting regulations and vehicle access were nearly identical. However, hunting pressure, as measured by number of permit cards returned, changed. A total of 472 cards was returned in 1986 and 570 in 1987.

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