

## TURKEY HARVEST PATTERNS ON A HEAVILY HUNTED AREA

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*Abstract:* A heavily hunted turkey (*Meleagris gallopavo osceola*) population was monitored by radio-tracking during 6 hunting seasons. In the sample of 125 radio-instrumented birds, there was no difference in the rate of harvest of turkeys that had been transplanted to the area and those that had been captured on the area, or between adults and juveniles or between males and females. Nearly all harvest in the sample occurred during the first week in the 3 hunting seasons that both sexes were legal game. Harvest was more evenly distributed throughout the 7-week-long season when only gobblers were legal. Instrumented birds were not crippled and unretrieved, because cripples were retrieved by other hunters. Movement behavior of the turkeys was not greatly affected by hunting, but turkeys hid from hunters at times. Hunting regulations are probably the most cost effective turkey management tool available in many populations and this subject warrants much more research attention than it is now receiving.

Proc. Ann. Conf. S.E. Assoc. Fish & Wildl. Agencies 32: 303-308

Wildlife managers have differing opinions about the effects of hunting on turkey populations but there is a consensus that unregulated hunting was responsible for the extirpation of the species in much of its former range (Markley 1967). It is surprising, then, that so little is known about the effects of regulated hunting and that there has been so little research to develop optimum hunting regulations for turkey management.

Legal hunting pressure on turkeys in Florida has increased very markedly in recent years. In the late 1960's we began to suspect that over-harvest was taking place on a few public hunting areas. This led to the present study. We found that the hunting area was severely over-harvested without substantial illegal hunting. This paper describes the harvest patterns and some of the related factors.

We thank C. P. Lykes and B. Swendsen of Lykes Brothers, Inc. for making the study area available, and Richard Scheaffer for statistical advice and calculations. J. B. Lewis, V. Beville, and D. W. Speake made helpful suggestions on the manuscript.

### METHODS

The study was conducted during 6 of the 7 fall hunting seasons of 1968 through 1975 (except 1970) on Lykes Fisheating Creek Wildlife Management Area, a 13,000 ha area managed for public hunting by the Florida Game and Fresh Water Fish Commission, in Glades county. The hunting season population was about 200 turkeys or about 1 per 20 ha in the 4,000 ha of turkey habitat. During the period of this study, 355 turkeys were trapped and moved into the hunting area from a nearby refuge.

One hundred and twenty-five turkeys, captured with drugs (Williams et al. 1973) or cannot nets (Austin 1966), were leg banded, fitted with 70g transmitters for radio-tracking, and released at the trap site (70) or moved into the study area (55) from a nearby refuge. The remaining 300 stocked turkeys were released in the study area following the fall hunting seasons, usually during late winter.

Hunting consisted of 7 or 8 weeks of daily hunting during November and December. Shooting hours were from one-half hour before sunrise until one-half hour after sundown. The daily bag limit was 1 turkey of either sex per day and 2 per season in 1968, 1969, and 1974 and 1 gobbler per day and 2 per season in 1971, 1972, and 1973. There was no tagging system. Rifles were prohibited. The regulations were similar to those in effect in other parts of Florida. Hunters were primarily after turkey, deer (*Odocoileus virginianus*) or feral hog (*Sus scrofa*). All hunters who bagged radio-instrumented

turkeys were interviewed for information about their hunting. For a detailed description of the study area, see Williams et al. (1973).

We did not have an accurate measure of hunter pressure that could be related meaningfully to harvest data. Hunters entered and left the area through the checking station at will at all hours and many persons were there only to camp, go fishing, or for some other activity besides hunting. Furthermore, some hunters hunted all species of game at the same time, others hunted turkeys only, and some did not hunt turkeys at all. Hunter visits to the management area were 1,500 to 2,000 during the first week each year of the study and about 5,000 to 6,000 total visits each season, without substantial variation from year to year.

## RESULTS

### Effects of the Instrument Package

The possibility of lower survival of radio-instrumented turkeys troubled us at first, but not after we noticed that radio-instrumented turkeys were impossible to distinguish in the field from non-radio-instrumented turkeys by their behavior. In other turkey studies, we have now tracked and closely observed more than 324 turkeys that were radio-instrumented. In only 2 cases did instrumented turkeys show any sign of injury from the radio package or harness. Both of these injured birds had been fitted too tightly across the back with surgical rubber loops. These injuries occurred early in the study and special care was taken thereafter—no similar problem was detected.

### Vulnerability of Translocated Wild-trapped Turkeys

Harvest rates of turkeys translocated and turkeys not translocated were similar (80% and 82%, respectively). This calculation is based on the 43 translocated turkeys that were legal game and the 42 not translocated turkeys that were legal game. (Hens were not legal in 1971, 1972, and 1973 and were not included in these calculations.)

### Hunting Vulnerability by Sex and Age Class

Fisher's Exact Test for comparisons indicated no significant difference between harvest rates of males and females (Table 1). Even in years when hens were not legal game, the lower harvest rate for hens was not significant at the 0.4 level.

Table 1. Ratios of turkeys harvested/unharvested by sex for all either sex and all gobbler-only years.

Sex	<i>Hunting season regulations</i>		
	<i>Either sex</i>	<i>Gobbler only</i>	<i>Total</i>
Male	25 = 0.83 30	29 = 0.74 39	54 = 0.78 69
Female	33 = 0.89 37	12 ≥ 0.63 19	45 = 0.80 56
Total	58 = 0.86 67	41 = 0.71 58	

Fisher's Exact Test between adult and juvenile harvest rates (Table 2) indicated that harvest rates were similar for adults and juveniles in years that either could be legally shot, but it indicated that adults were bagged at a lesser rate in years when hens were protected.

Table 2. Ratios of turkeys harvested/unharvested by age class for all either sex years and gobbler-only hunting regulations.

Age class	Hunting season regulation		
	Either sex	Gobbler only	Total
Adult	25 = 0.89	14 = 0.64	39 = 0.78
	28	22	50
Juvenile	33 = 0.85	27 = 0.75	60 = 0.80
	39	36	75
Total	58 = 0.86	41 = 0.71	
	67	58	

### Effects of Hen Protective Regulations

Fisher's Exact Test (Table 1) indicated that the lower hen harvests in the years when hens were protected (63% killed when protected by law; 89% killed when legal game) was significant but not greatly so (0.0325 level). The gobbler-only hunting regulation was not as effective in reducing the killing of hens as we had hoped.

We expected that protection of hens would result in a lower harvest of gobblers but Fisher's Exact Test (Table 2) does not indicate much significance to the difference detected (83% in either sex years to 74% in gobbler only years).

### Seasonal Harvest Patterns

Very high kills occurred during the first few days of the season (Fig. 1, Table 3). In years when either sex hunting was legal, more than one-half of the harvest occurred during the first 2 days of the season (Table 3) and approximately 80% had occurred by the end of the first week. We believe that when high hunting pressure was accompanied by the degree of shooting caution that is required for sex identification in gobbler-only hunting, lower early season kills and better distribution of the kill throughout the season occurred (Fig. 1, Table 3). A shorter gobbler-only hunting season would have materially reduced the total harvest, but a shorter season would have had little effect on harvest when both sexes were legal.

Harvest patterns during the 3 gobbler-only hunting seasons were similar with a slight trend each successive season toward an either-sex pattern of harvest (Fig. 1). This corresponded with a change in hunter attitudes we sensed during the study. Hunters seemed to be more aware of and compliant with the gobbler-only rule when the rule was new. For example, during the first gobbler-only year (1971), we monitored hunting and detected only a few hens being shot by accident. In 1972, the second gobbler-only year, more hens were shot illegally (both radio-instrumented and not). In 1973, 5 out of 6 hens that were radio-monitored were killed by hunters. During that three-year period, the first week harvest rose from 16% to 29% (1972), to 57% (1973).

### Crippling

One of the objectives of the study was to measure crippling losses by finding radio-instrumented turkeys injured or dead. We found no cripples but upon routinely interviewing all successful hunters we learned that they were recovering turkeys that had been crippled by others, and, in some cases hunters admitted that they were certain that their bird had first been shot at by somebody else.

### Escape Behavior

Movement was monitored before and during hunting. The turkeys radio-tracked did not move away to escape hunters. Their movement during short intervals was increased

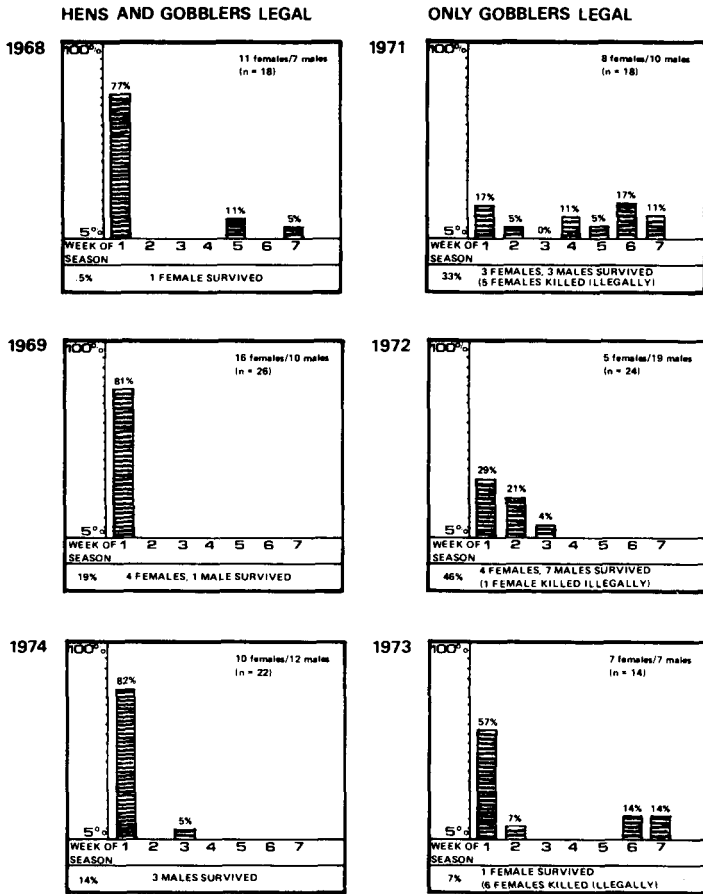


Fig. 1. Harvest rate of radio-tracked turkeys by week of open season during 6 fall hunting seasons. Seasons in 1968, 1969, and 1974 were open for either sex. Seasons in 1971, 1972, and 1973 were open to gobblers only.

by encounters with hunters only when they were flushed several successive times during a brief interval, but in many cases, hunter activity curtailed movement as when they remained stationary in a tree for several hours after being flushed and landing there. Generally, the experimental birds continued to use their pre-hunting season ranges and roosting places until they were killed by hunters, or, in a few cases, until they had survived the hunting season.

Three turkeys (including both sexes) that were flushed successive times by hunters, finally hid on the ground in thick cover and stayed still while observers approached within 6 m. In 2 such cases, observers were able to nearly touch adult gobblers before the turkeys jumped up and ran away without flying. Experienced turkey hunters have described such behavior to us. Such behavior would be difficult to observe except with a technique like radio-telemetry. This is different from the occasional incidents when turkeys are surprised as hunters come upon them suddenly. In such cases they often "freeze," especially if the ground cover is heavy.

Table 3. Survival of radio-instrumented turkeys under heavy hunting pressure.

Year	<i>Number instrumented</i>				Total	<i>% harvested</i>				<i>Period killed (all turkeys)</i>		<i>Confidence interval (95%)</i>
	<i>Adult</i>		<i>Female</i>			<i>Adult</i>		<i>Juvenile</i>		<i>First 2</i>	<i>Whole</i>	
	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>		<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>Days (%)</i>	<i>Season (%)</i>	
1968	4	0	7	7	18	100	--	86	100	50	94	± 0.11 -- (0.83, 1.00)
1969	6	2	10	9	27	100	100	70	78	63	81	± 0.15 -- (0.66, 0.95)
1970	No study conducted this year											
1971	4	4	4	6	18	75	50	50	83	11	67	± 0.22 -- (0.45, 0.89)
1972	2	9	3	12	26	0	67	67	67	15	62 <sup>a</sup>	± 0.19 -- (0.43, 0.81)
1973	1	2	5	6	14	100	100	80	100	36	93 <sup>a</sup>	± 0.14 -- (0.79, 1.00)
1974	6	10	4	2	22	100	70	100	100	64	86	± 0.15 -- (0.71, 1.00)
Total	23	27	33	42	125							

<sup>a</sup>These percentages are not the same as in Fig. 1 because they reflect the total harvest that year which includes a few turkeys for which exact dates of kill are not known. Those killed on unknown dates could not be used in Fig. 1.

On 5 occasions, turkeys that had been closely pursued by hunters roosted at night on the ground rather than in trees. We know of no other example of an adult turkey roosting on the ground, except hens with flightless broods. The hunted turkeys known to roost on the ground were later found roosting in trees, indicating that they were not crippled, or at least not seriously so, and that this behavior was temporary.

## DISCUSSION

A few generalizations based on the data seem warranted. The very high first week harvests during years when both sexes were legal as compared to the lower first week harvests in gobbler-only years, was probably due to the greater killing success hunters had when they did not have to take the time to determine the sex of the target before shooting. Such a "handicap" (having to look closely before shooting) worked to distribute the legal harvest better throughout the season even while the hunting pressure was similar.

At least some of the hens that were illegally killed during gobbler-only years had been mistaken for gobblers as indicated by the fact that they were left where they fell. In one case, we found a dead hen under her roost and saw fresh human foot prints leading directly to the carcass. The foot prints indicated that the hunter turned away from the carcass and left the scene when he found that he had shot a hen. In other cases, hunters brought in dead hens that they had found dead. This raises a question about the wisdom of having regulations that hunters are not capable of following.

Limiting the number of hunters would presumably reduce the accidental hen kill in proportion to the size of the hunter reduction, but such a limitation on hunting pressure would not be necessary if more direct means of reducing the hen-kill accident rate could be found. Three more direct solutions are: 1) the no-hen rule could be removed, 2) hunters could be selected for their prior ability to comply with the rules, and 3) hunters could obtain the skills required to comply. The first remedy is not appropriate because the hen kill would be excessive, as demonstrated in our study. The second and third ideas would probably solve the problem but the better idea is to select qualified hunters because that would tend to stimulate other hunters to train themselves if they wanted to hunt, thus automatically accomplishing also the third solution.

Crippling losses were zero for turkeys that were legally shot because hunters retrieved turkeys that had first been shot by somebody else. Retrieval of all crippled turkeys would probably seldom happen at lower hunter densities.

Few turkey hunters will accept the idea that all turkeys are equally vulnerable to the gun without regard to age or sex. We should stress that such was the case only in terms of total harvest. Our sample sizes were too small to analyze the chronology of the harvest with respect to these categories, thus it could well be that young birds or hens were killed sooner, and therefore presumably with greater ease, than old birds or gobblers. Vulnerability of sexes and age classes is probably closely related to hunting pressure and the magnitude of the total kill. Vulnerability differences will be more clearly expressed in total harvest data when the harvest is low.

The behavior of the turkeys we observed under heavy hunting pressure suggests that the major impact of hunting was the effect of the harvest itself and not to disturbances associated with hunting. Turkeys did not escape hunters by dispersing. This is probably influenced greatly by the size of the area, hunter density, and the character of the surrounding range. Under other circumstances, turkeys may disperse in response to hunting pressure.

In this study we learned that legal hunting could virtually eliminate the turkey population. Conversely, logic tells us that a different set of hunting regulations would prevent this over-harvest effect if it substantially reduced the harvest of hens. We would like to stress this point. Effective hunting regulations have a potential for greater effect on turkey management goals than food plots, restocking, or almost any other game management practice that is being used in turkey management. Effective harvest regulations are probably the most cost effective turkey management practice available to turkey managers at this time.

We believe that these and other aspects of turkey hunting should be thoroughly studied under various levels of hunting pressure and habitat conditions. While this may not be as attractive as the more basic biological problems are to many researchers, it probably has greater relevance to turkey management than the information in much of the current wild turkey literature.

When the present study was completed in 1974, we initiated a new, closely monitored "pilot study" to adjust turkey hunting regulations on the study area. Hunting was limited to a few days per week with no more than 50 hunters at the same time. The turkey population has increased steadily since then. This was without restocking or additional management. We are pursuing this research further.

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