Characteristics of Wild Turkey Hunters in Texas

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Abstract: To determine the characteristics of wild turkey *(Meleagris gallopavo)* hunters in Texas, and their attitudes and preferences concerning turkey hunting and management, we developed and mailed a self-administered questionnaire to a sample of licensed turkey hunters in Texas and members of the Texas Chapter of the National Wild Turkey Federation (NWTF). We sampled 3,500 turkey stamp purchasers and 2,345 members of the Texas Chapter of the NWTF. We received questionnaires from 1,300 (37%) of the turkey stamp purchasers and 748 (32%) of the members of the Texas Chapter of the NWTF. We refer to turkey stamp purchasers and Texas Chapter of the NWTF as nonmembers and members, respectively. For all questions, we compared the Texas Chapter of the NWTF member responses to responses from nonmembers who bought license and turkey stamps. On average, members were older ($P=0.02$, $\bar{x}=48.9$) than nonmembers ($\bar{x}=47.5$) and nonmembers reported a greater mean number ($P=0.02$, $\bar{x}=17.6$) years of hunting turkeys in Texas than members ($\bar{x}=15.6$). About equal numbers of respondents hunted during both fall 1996 and spring 1997. More than 90% of both groups reported hunting turkeys as additional game while hunting white-tailed deer *(Odocoileus virginianus)* during fall 1996. Members ($P=0.001$), rather than nonmembers, hunted primarily with shotguns during fall 1996 and spring 1997. More nonmembers than members ($P=0.001$) hunted turkey with rifles, with or without bait, in fall 1996 and spring 1997. However, the majority (>75%) of both groups hunted with shotguns during the spring 1997 season. Members and nonmembers presented slightly different management scenarios to increase turkey production in Texas. Members preferred changing hunting methods as a management strategy. Nonmembers preferred allowing gobbler-only harvest for both seasons and implementing a 1-bird bag limit. Nearly every comparison between members and nonmembers in this study indicated that these were 2 distinct subgroups of the turkey hunting population in Texas. However, members constituted <2% of turkey hunters. Therefore, the attitudes, opinions, and

preferences of both members and nonmembers need to be considered when making management decisions.

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During 1996, 14 million U.S. hunters spent $20.6 billion dollars on hunting and hunting related expenses. Of these hunters, 11.3 million were big game hunters spending $9.7 billion hunting white-tailed deer *(Odocoileus virginianus),* black bear *(Ursus americana),* elk *(Cervus canadensis),* wild turkey *(Meleagris gallopavo),* and other big game animals. The $20.6 billion spent by big game hunters was broken down into the following categories: $0.7 billion for licenses, stamps and tags, $0.2 billion on membership dues, $3.2 billion on land leasing, $11.3 billion on equipment, and $0.7 billion on magazines and books (U.S. Fish and Wildl. Serv. 1996).

Big game hunters spent 154 million days hunting in 1996. Wild turkey hunters were the second largest big game hunting group, behind white-tailed deer hunters, with 2.2 million hunters spending 19 million days hunting. Most hunters (95%) hunted in their state of residence. Texas had the third largest number of big game hunters, numbering 715,000, behind Michigan (855,000) and Pennsylvania (816,000). Big game hunters in Texas spent almost as many days hunting as hunters in Michigan, 11.1. and 11.2 million days, respectively. Texas ranked first in the amount of money spent on big game hunting with $1.4 billion dollars spent.

The financial support provided by hunters through license sales, hunting expenditures, and stamps is important to state wildlife agencies. The financial support provided by turkey hunters is extremely important for turkey management. Many state agencies (e.g., Ariz., Ark., Md., Mich., Minn., Mo., N.J., N.Y., Ohio, Pa., S.C., Va., W.Va.) realized this and conducted studies on turkey hunters (Witter et. al. 1982, Eriksen et. al. 1985, Hawn et. al. 1987, Baumann et. al. 1990, Hazel et. al. 1990, Vangilder et. al. 1990. Siemer et. al. 1995). Turkey hunters represent a unique subgroup of the total hunting public (Wright et. al. 1977). However, little is known about turkey hunters in Texas.

Turkey hunting is a popular hunting option among Texas hunters. Adams and Thomas (1983) and Dowd (1993) found that 25% of hunters in Texas reported hunting turkeys. Turkey hunters provide stamp revenues to increase turkey hunting opportunities. Texas turkey hunting stamp sales have increased annually from 139,977 in the 1991–92 season to 154,306 during the 1994–95 season, generating more than $2.6 million in revenues.

The goal of this study was to determine characteristics of turkey hunters in Texas, and their attitudes and preferences toward turkey hunting and management. Specifically, we characterized turkey hunters and their hunting activities, identified the key factors that promoted and prevented hunter participation, determined hunters' opinions on management regulations, programs, and access to hunting areas, and examined the spatial distribution of turkey hunting activity within Texas.

Texas Parks and Wildlife Turkey Stamp Fund and the Federal Aid in Wildlife Restoration Act, Grant W-126-R provided funding for this project.

Methods

We developed a questionnaire in cooperation with Texas Parks and Wildlife Department (TPWD) staff. We followed Dillman's (1978) Total Design Method using a mark-sense, self-administered questionnaire printed by National Computer Systems, Owatonna, Minnesota. We mailed 1 questionnaire to each individual; 30 days later a postcard reminder was sent to every individual. We sent another survey to non-respondents after 2 more weeks. After another 2 weeks, we sent a final postcard reminder to the remaining non-respondents.

A random sample (N=3,500) of turkey hunters was drawn from TPWD's 1994/95 season list (N=154,306) of turkey stamp purchasers. In addition, we added a sample (N=2,345) of members (N=3,000) of the Texas Chapter of NWTF to the sampling pool. Members who may have received a questionnaire during the non-member mailing were asked to return their questionnaire indicating that they had already participated in the study. Respondents returned questionnaires to the Department of Wildlife and Fisheries Sciences at Texas A&M University (TAMU). Statistical Measurement and Research Services at TAMU scanned questionnaires and provided our data set.

We examined differences between member and nonmember responses. Members and nonmembers were considered 2 different subsets of the turkey hunter population. We used chi-square analysis to compare selected responses between the 2 subsets of turkey hunters. We combined the subgroups to determine the proportion of hunters that harvested 0, 1, 2, 3, and 4 turkeys during fall 1996 and spring 1997. We conducted Analysis of Variance (ANOVA) tests to compare the distance members and nonmembers traveled between home counties and counties in which they hunted.

Results

Questionnaires were returned by 1,300 (37%) nonmembers and 748 (32%) members. Four percent of the nonmembers (N=50) and 2% of the members (N=15) were not turkey hunters. We generalized responses from the 2,048 turkey hunters to the turkey hunter population in Texas at $\pm$3% (α=0.05). Due to time, data, and money constraints, we did not analyze a measure of non-response bias (Filion 1980). Non-response rates were closely related between members and nonmembers. Even though we were unable to investigate non-response bias other literature suggests (Lewis 1975, Brown et. al. 1981) that low response rates occur because hunters do not participate or are not successful in harvesting game.

Hunting Demographics

On average, members were older (P+0.02, $\bar{x}$=48.9) than nonmembers ($\bar{x}$=47.5). However, both groups began turkey hunting on average at $\bar{x}$=29.8 years. More

Table 1. Frequency (%) of childhood residences and present residences of turkey hunters in Texas fall 1996 and spring 1997.

Residence	Childhood residence[a]			Present residence[b]		
	Members (n = 701)	Nonmembers (n = 1274)	Total (n = 1975)	Members (n= 701)	Nonmembers (n = 1268)	Total (n = 1969)
Farm or ranch	18.2	26.8	23.8	11.8	13.6	13.0
Open country but not farm or ranch	10.5	8.3	9.1	11.2	10.3	10.6
Town with <2,500 people	6.9	10.1	9.0	3.6	6.7	5.6
Town with 2,500 to 9,999 people	13.8	9.0	10.7	7.6	8.1	7.9
Town with 10,000 to 49,000 people	18.7	12.5	14.7	19.3	14.3	16.1
City with 50,000 to 249,000 people	14.6	14.0	14.2	20.1	20.1	20.2
City with >250,000 people	17.1	18.0	17.7	26.3	26.4	26.4

a. Chi-square statistics: $\chi^2 = 49.4$, DF = 6, $P = 0.001$.

b. Chi-square statistics: $\chi^2 = 17.9$, DF = 6, $P = 0.001$.

nonmembers were raised and continue to live on farms or ranches than members (Table 1). However, more members were raised and continue to live in towns with 10,000 to 49,999 people than nonmembers (Table 1). Although most (≥95%) respondents were male, there were more (χ^2=9.7, DF=1, P=0.002) female nonmembers (4.7%) than members (1.7%). There were no differences between groups in marital status; most (>83%) were married. More members were college graduates or had graduate or professional degrees than nonmembers (P=0.001). There were no differences between groups in racial status; most (≥98%) were white. However, there were more (χ^2=17.1, DF=3, P=0.001) nonmembers of Spanish/Hispanic origin (3.6%) than members (0.5%). More nonmembers (46%) reported incomes ≤$50,000, than members (31%), whereas more members (21%) reported incomes ≥$130,000 than nonmembers (14%) (P=0.001).

Hunting Intensity, Methods, and Success

Members (24%) were more likely to lease land specifically for turkey hunting than nonmembers (17%) (χ^2=18.25, DF=1, P=0.001). Nonmembers (5%) were more likely to use public hunting areas than members (2%) (χ^2=19.22, DF=1, P=0.001). Members (18%) were also more likely to use land leased by others than nonmembers (12%) (χ^2=15.45, DF=1, P=0.001) (Table 2).

Nonmembers reported a greater mean number (17.6) of years of hunting turkeys in Texas than members ($\bar{x}$=15.6, P=0.002). Nonmembers also took more (P=0.0001) turkey-hunting trips ($\bar{x}$=4.6) and spent more days ($\bar{x}$=8.0) hunting in fall 1996 than members ($\bar{x}$=2.9 and 4.8, respectively). However, members took more (P=0.001) turkey-hunting trip spent more days ($\bar{x}$=6.0) hunting in spring 1997 than nonmembers ($\bar{x}$=1.5 and 2.6, respectively). A higher proportion (χ^2=48.5, DF=4, P=0.001) of members (51.2%) than nonmembers (36%) hunted turkeys every year since they began turkey hunting. Additionally, more (χ^2=48.0, DF=4, P=0.001) members (30.2%) than nonmembers (17.8%) increased their turkey-hunting trips over the past 3 years.

Proportionately more (χ^2=294.6, DF=3, P=0.001) nonmembers (33.6%) than members (8.4%) hunted turkeys in the fall only, but more members (42.3%) than nonmembers (12.6%) hunted turkeys during the spring only. About equal numbers of respondents hunted during both seasons. More than 90% of both groups reported

Table 2. Results of Chi-square analysis comparing a sample of member and nonmember turkey hunters in Texas by primary means of land access in fall 1996 and spring 1997.

Access type	Degrees of freedom	Chi-square values	Probability
Land leased by hunter specifically for turkey hunting	1	18.25	0.001
Land leased by others for hunting	1	15.44	0.001
Land owned by hunter	1	1.89	0.169
Land owned by friends and relatives	1	0.19	0.665
Public hunting lands	1	19.23	0.001
General hunting lease	1	2.97	0.085

Table 3. Percentage of turkey hunting methods used in Texas during fall 1996 and spring 1997.

Methods	Fall 1996[a]			Spring 1997[b]		
	Members (n = 390)	Nonmembers (n = 1097)	Total (n = 1487)	Members (n = 628)	Nonmembers (n = 877)	Total (n = 1,505)
Shotgun and bait	16.9	11.7	13.1	8.2	11.1	9.9
Rifle and bait	34.1	40.3	38.7	2.2	9.3	6.4
Shotgun only and no bait	9.0	6.0	6.8	13.2	9.3	11.0
Rifle only, and no bait	13.9	22.5	20.2	2.1	7.0	4.9
Bow, arrow, and bait	4.3	4.1	4.2	0.6	1.3	1.0
Bow, arrow, and no bait	1.8	0.9	1.1	0.8	0.7	0.7
Shotgun with a turkey call and no bait	14.4	6.7	8.7	67.2	45.2	54.4
Rifle with turkey call and no bait	2.8	5.1	4.5	1.9	12.0	7.8
Bow, arrow with turkey call and no bait	1.3	1.0	1.1	2.4	2.5	2.5

a. Chi-square statistics: $\chi^2 = 48.6$, DF = 8, $P = 0.001$.

b. Chi-square statistics: $\chi^2 = 137.2$, DF = 8, $P = 0.001$.

Table 4. Number of turkeys harvested by hunters in Texas during fall 1996 and spring 1997.

	Frequency (%)	
N turkeys harvested	Fall 1996 (n = 1,269)	Spring 1997 (n = 1,248)
0	60.1	50.4
1	28.8	29.2
2	9.8	13.5
3	1.2	5.0
4	0.1	1.8

hunting turkeys as additional game while white-tailed deer-hunting during fall 1996. However, more (χ^2=10.2, DF=1, P=0.001) members (9.3%) hunted turkeys exclusively during fall 1996 than did nonmembers (4.6%). Members (68.8%) were more (χ^2=22.4, DF=2, P=0.001) likely than nonmembers (54.5%) to hunt turkeys if they were not hunting white-tailed deer during fall 1997.

Members hunted turkeys primarily with shotguns during both fall 1996 and spring 1997 (Table 3). More nonmembers than members hunted turkeys with rifles, with or without bait, in fall 1996 and spring 1997 seasons (Table 3). However, most hunters (>75%) in both groups hunted with shotguns during spring 1997 season.

Members harvested, on average, more (P=0.001) turkeys in fall 1996 (0.7 vs. 0.5) and spring 1997 (1.1 vs. 0.5) than did nonmembers. Overall, mean spring harvests ($\bar{x}$=3.0) were higher ($P \leq 0.05$) than fall harvests ($\bar{x}$ =2.0). In fall 1996, most members and nonmembers (88.9%, $P \geq 0.05$) harvested $\leq$ 1 bird. During spring 1997, 79.6% ($P \geq$ 0.05) of all hunters harvested $\leq$ 1 bird (Table 4). On average, members reported harvesting more (P=0.001) gobblers in the spring 1997 (1.0) than nonmembers (0.5).

Turkey Hunter Participation

Only 30% of both groups of respondents said nothing prevented them from going turkey hunting more frequently. Both members (35.3%) and nonmembers (38.6%) responded that not enough time "due to work" and "family commitments" restricted their hunting activities. In related questions, respondents were asked to assess if turkey and hunter numbers had changed during the last 3 hunting seasons. More (χ^2=28.6, DF=3, P=0.001) nonmembers (26%) than members (16.7%) reported that the numbers of turkeys in counties where they hunted had decreased noticeably. Comparatively, more (χ^2=44.0, DF=3, P=0.001) members (24%) than nonmembers (13.7%) reported that numbers of turkey hunters in counties where they hunt most often had increased noticeably.

Frequency differences in selecting hunting companions by members and nonmembers were small. More nonmembers (17%) than members (11%) reported hunting with male relatives (χ^2=13.42, DF=1, P=0.001). Nonmembers (58%) were more likely to hunt with friends with whom they did not work than members (49%) (χ^2=13.70, DF=1, P=0.001) (Table 5).

Table 5. Results of Chi-squared analysis comparing a sample of member and nonmember turkey hunters in Texas by primary hunting companions in fall 1996 and spring 1997.

Companions	Degrees of freedom	Chi-square value	Probability
Son(s)	1	3.25	0.071
Father	1	0.14	0.711
Daughter(s)	1	0.46	0.496
Mother	1	3.59	0.058
Brother(s)	1	4.07	0.044
Sister(s)	1	4.62	0.032
Spouse	1	2.09	0.148
Male relatives	1	13.42	0.001
Female relatives	1	0.82	0.365
Friends with whom you do not work	1	13.70	0.001
Friends with whom you work	1	0.69	0.408
I hunt alone most of the time	1	8.59	0.003

Opinions Regarding Turkey Management and Limiting Factors

Members and nonmembers presented slightly different management scenarios to increase turkey populations ($P=0.001$). More members (17.5%) than nonmembers (7.6%) preferred changing hunting methods (e.g., shotguns and no bait) as a management strategy. More nonmembers (35.5%) preferred allowing gobbler-only harvests for both fall and spring seasons than members (28%). More nonmembers (21.7%) also preferred implementing a 1-bird bag limit than members (13.3%) (Table 6).

Overall, both members and nonmembers agreed that predators and habitat loss were the 2 major factors limiting Texas turkey populations. Members agreed more ($P \leq 0.05$) with these factors than nonmembers. The groups did not differ in opinions regarding how much hunting pressure, disease or competition limited turkey populations.

Members ($n=356$) and nonmembers ($n=366$) differed in the comments they provided at the end of the survey (Adams et. al. 1998). Multiple responses were possible addressing more than 1 subject. For example, if 1 person made a response that

Table 6. Turkey hunters' opinions regarding best management strategies to increase turkey populations in Texas fall 1996 and spring 1997.

	Frequency (%)*		
Management strategy	Members (n = 662)	Nonmembers (n = 1152)	Total (n = 1814)
Implement 1 bird bag limit	13.3	21.7	18.0
Open spring season 1 to 2 weeks later	4.7	11.5	9.0
Allow shotgun only without baiting for spring season	16.9	10.0	12.5
Allow shotgun only without baiting for spring and fall	17.5	7.6	11.2
Allow gobbler only harvest for both fall and spring	28.0	35.5	32.8
Allow gobbler only harvest without baiting for fall and spring	11.5	8.9	9.9

addressed 3 subjects, then that single comment was counted as 3 responses. The subjects on which most nonmembers commented most were fire ants, predators, weather (drought), and land access. Comparatively, members focused their comments on shotgun only hunting and limiting harvest.

Statewide Distribution of Turkey Hunters in Texas

Turkey hunters were asked to identify their county of residence and the names of 1 or 2 counties in Texas where they hunted turkeys most often during fall 1996 and spring 1997. Distances (miles) between the county seats of county of residence to counties where respondents hunted turkeys provided a rough estimate of distances respondents traveled to go turkey hunting. The State Comptroller's State Mileage Application Guide was used to calculate the distances traveled. ANOVA tests showed that members traveled farther ($P<0.001$) in the fall ($N=350$, $\bar{x}=188$ miles) and spring ($N=560$, $\bar{x}=179$ miles) than nonmembers ($N=976$ and 667, respectively, and $\bar{x}=157$ and 139 miles, respectively).

The distance between where respondents lived and went turkey hunting correlated ($r=0.91$, $P=0.001$) with a 5-year average (1991–1996) of the same information collected by the Wildlife Division of the TPWD. Further comparisons indicated high correlations in the counties where members and nonmembers went turkey hunting ($r=0.84$ $P=0.001$ and $r=0.76$, $P=0.001$, fall and spring respectively) and lived ($r=0.84$). Because of these high correlations, we used the larger TPWD data set and merged the member and nonmember responses on counties where they went turkey hunting and where they lived. Respondents resided in 176 different Texas counties, with the larger groups reported to reside in Harris, Dallas, Tarrant, Bexar, and Denton counties. Respondents reported that they hunted turkeys in 175 counties, some of which were not open to turkey hunting. In some cases, respondents may have been reporting county of residence rather than where they hunted. The 5 top turkey-hunting counties of choice were Jack, Coleman, San Saba, Menard, and Concho counties.

Discussion

Demographically, Texas turkey hunters were similar to turkey hunters of other states. Michigan reported that 97% of their turkey hunters were male with a mean age of 43 years (Hawn et al. 1987). Vangilder (1989) reported that turkey hunters in Missouri were white male (98.1%) with a mean age of 39 years old. Godwin et al. (1997) reported that 71% of turkey hunters in Mississippi were male and 39 years old. These demographic trends also follow national hunter demographic trends that reported over 90% of hunters were white males (U.S. Fish and Wildl. Serv. 1996).

The average age (29.8 years) when respondents began to hunt turkeys was older than the general Texas hunting population (18 years, Dowd 1993). It is unknown what causes a later introduction into turkey hunting. Perhaps the specialized skills and equipment required with some spring turkey hunting practices precluded younger participants. A Georgia study of spring 1993 turkey hunters also reported low recruitment of hunters <30 years old (Thackston and Holbrook 1995).

Wildlife managers in Texas have often thought that fall turkey hunting was incidental to deer hunting (Litton and Harwell 1995). For 90% of the fall 1996 hunters this was true; they hunted incidental to white-tailed deer hunting for an additional opportunity to harvest game. However, "the challenge of the hunt" was a more (+12%) important reason during spring 1997, which may have accounted for a 1 bird increase in average harvest over fall 1996. Seimer et. al. (1995) also found that most turkeys were harvested in Virginia during the first 2 weeks of deer season. In addition, he reported that 90% of the turkey hunters in New York were also deer hunters.

The predominant firearm of choice for spring turkey hunting by both groups was a shotgun (65% for nonmembers and 88% for members, Table 1). Therefore, a proposal to create a shotgun-only, spring turkey hunting season would not modify a majority of hunter behavior because most hunters already use shotguns. However, such a regulation would affect 29% of the nonmember spring turkey hunters who chose to use rifles. If a goal of the state wildlife agency is to serve all its constituents, the agency should examine and justify reasons for creating a shotgun-only spring season that could eliminate 29% of the hunters. Unlike Texas, hunting with a rifle is illegal in Mississippi, Godwin et. al. (1997) reported that 78% of the Mississippi spring turkey hunters opposed a regulation to make rifles legal. In West Virginia, where rifles are legal in the spring, Taylor et. al. (1995) reported 70% of the turkey hunters would support a regulation prohibiting the use of the rifles.

Turkey harvest data indicated that few hunters of either group harvested their 4-bird annual bag limit during fall and spring seasons. In fall 1996 and spring 1997 seasons 79.6% ($P \geq 0.05$) of all hunters harvested ≤ 1 bird. Therefore, reducing the bag limit from 4 to 1 birds as a management strategy to increase turkey populations probably will not achieve the desired effect. Even though we were unable to investigate non-response bias other literature suggests (Lewis 1975, Brown et. al. 1981) that low response rates occur because hunters do not participate or are not successful in harvesting game. Therefore, non-response bias probably exaggerated some results (Filion 1980). If this is the case, then estimates of 79.6% ($P \geq 0.05$) of all hunters harvested ≤ 1 bird is probably conservative.

It is unknown what factors caused respondents to hunt in preferred counties. Further study might investigate if choices were based on game availability, leasing alternatives, distance from residence or other factors that might have contributed to county of choice. State agencies should ask hunters these questions at check stations and in other game harvest surveys.

Nearly every comparison between members and nonmembers in this study indicated that these were 2 distinct subgroups of the Texas turkey hunting population. Bittner and Hite (1991) also found that turkey hunters in Virginia that belonged to wildlife related organizations were more likely to oppose hunter orange and not to support rifles during the spring season than nonmembers. Texas turkey hunters who are members constituted <2% of Texas turkey hunters. Therefore, the attitudes, opinions, and preferences of members probably did not reflect the attitudes, opinions, and preferences of most turkey hunters in Texas.

Many other states were concerned with hunting accidents, such as New York (Siemer et. al. 1995), Missouri (Vangilder et al. 1989), and Pennsylvania (Siemer et. al. 1995). A specific question was not asked in our study about safety; however, of the 795 comments received, only 3 nonmembers and 7 members mentioned safety as a concern.

Because wild turkeys are the second largest big game hunting group in the United States, wildlife agencies should not ignore them. Turkey hunters from different states, although similar in demographics, have different opinions, attitudes, and expectations regarding turkey hunting, management and regulations. Therefore, state agencies should study the hunters in their particular state. In addition, state agencies should not assume that the opinions and attitudes of members of wildlife organization reflect the attitudes and opinions of a general group of the hunting public. This survey provided information about Texas turkey hunters that wildlife managers and wildlife agencies should consider when making management and regulatory decisions about turkeys and turkey hunting in Texas. The success of turkey management efforts can in part be measured by how these effort are compared with the attitudes, activities, and expectations of the hunters.

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