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Andrea K. Crews

*Oklahoma Department of Wildlife Conservation*

Stephen J. DeMaso

*Oklahoma Department of Wildlife Conservation*

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# DEMOGRAPHICS OF QUAIL HUNTERS IN OKLAHOMA

Andrea K. Crews

Oklahoma Department of Wildlife Conservation, P.O. Box 53465, Oklahoma City, OK 73152

Stephen J. DeMaso<sup>1</sup>

Oklahoma Department of Wildlife Conservation, P.O. Box 53465, Oklahoma City, OK 73152

## ABSTRACT

We collected information from Oklahoma hunters during a telephone survey conducted in February 1997, to compare demographics of scaled quail (*Callipepla squamata*) and northern bobwhite quail (*Colinus virginianus*) hunters to other hunters. Eight hundred ninety-two annual, 709 lifetime, and 376 senior citizen hunting license holders, stratified by county of residence, were interviewed. Respondents who hunted quail differed from other hunters by age group, age of first hunting experience, the proportion of their life ( $\geq 16$  years of age) they have owned an Oklahoma hunting license, education level, annual household income, access to a computer at work, access to a computer at home, and access to the Internet at work ( $P \leq 0.030$ ). No difference ( $P \geq 0.219$ ) was found between hunter types by residential location, hunting license type, proportion of life residing in Oklahoma, ethnic origin, and access to the Internet at home. This information can help wildlife managers better understand their quail hunting constituents and tailor agency programs to fit their needs.

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## INTRODUCTION

In Oklahoma, as many as 120,500 quail hunters harvest up to 3,242,000 quail annually (Table 1) (Thompson 1988). However, little is known about the average quail hunter in Oklahoma. The most recent demographic information available about quail hunters was reported by Ellis (1972). This information is >25 years old and may not be representative of today's quail hunters.

Understanding constituents is important to wildlife administrators and managers. Knowing the demographics of different user groups allows wildlife agencies to better understand their audience and develop programs to protect the wildlife resources, provide optimum recreational opportunity, and address, where possible, needs of constituents.

This paper reports demographic information about quail hunters in Oklahoma. The data was collected as part of a survey used to estimate the number of hunters and the magnitude of small game harvest in Oklahoma (LaPierre 1997).

## METHODS

A sample of 2,945 Oklahoma resident hunting license holders was drawn for the survey. The randomly drawn sample included 1996 hunting and combination (hunting and fishing) license holders for each of the major license types (annual, lifetime, and senior citi-

zen). The sample was stratified by both license type and county of residence.

Non-resident and disabled hunting license holders were not included in the sample. These license categories represented a very small proportion (about 6%) of the total number of valid hunting licenses in Oklahoma. Omission of non-resident and disabled hunting license holders could have biased the data but the impact was probably negligible.

Landowners hunting exclusively on their own property were not required to purchase an Oklahoma hunting license and therefore were not eligible for sampling. The magnitude of bias introduced by exclusion of landowners is unknown. The results of this study should only be generalized to Oklahoma resident hunting license holders.

Two weeks prior to the beginning of the survey, postcards were mailed to approximately 2,500 of the selected license holders. The postcard notified each license holder of their selection for participation in the survey and briefly described the purpose of the interview. License holders that were sent a postcard did not differ in any systematic way from those that were not sent a postcard.

A computer-assisted telephone interview (CATI) system was used to interview 892 annual, 709 lifetime, and 376 senior citizen license holders in Oklahoma. The CATI system provided on-screen prompting of questions to be read by interviewers and direct entry of survey data into the computer. Telephone interviews were conducted during February and March, 1997. Most calls were made on weeknights and Saturday mornings. At least 5 attempts were made to contact each selected license holder at different times of the day and on different days.

<sup>1</sup> Present address: Texas Parks and Wildlife Department, 4200 Smith School Rd., Austin, TX 78744.

Table 1. Statewide estimates for number of quail hunters, quail harvest, quail hunter success, and percent (%) of hunters who did the majority of quail hunting in their county of residence, Oklahoma, 1986–96.

Year	Sample	Mean bag/hunter	Mean days hunted	Mean daily bag	No. of hunters	No. of days hunted	Total harvest	95% confidence interval for total harvest	% hunted mostly in own county
1986 <sup>a</sup>	537	24.43	7.06	3.46	110,960	783,378	2,711,186	2,352,252–3,070,119	55.26
1987 <sup>b</sup>	517	26.90	7.51	3.58	120,517	905,083	3,242,080	2,800,473–3,683,687	63.09
1988 <sup>c</sup>	422	20.61	7.08	2.91	97,651	691,369	2,012,172	1,701,565–2,322,779	64.45
1989 <sup>d</sup>	415	24.00	7.10	3.30	92,465	656,502	2,179,840	1,805,160–2,554,520	57.70
1990 <sup>e</sup>	400	24.26	7.46	3.04	93,026	694,204	2,256,571	1,892,142–2,621,000	64.00
1991 <sup>f</sup>	799	32.98	9.85	3.35	98,268	968,171	3,240,764	2,846,242–3,635,286	65.83
1992 <sup>g</sup>	668	35.38	8.58	3.86	94,079	806,997	3,238,404	2,861,486–3,795,323	69.76
1993 <sup>h</sup>	652	22.19	8.31	2.60	90,733	754,251	2,013,098	1,778,982–2,247,214	63.34
1994 <sup>i</sup>	491	27.44	9.35	2.64	84,089	786,088	2,307,057	1,976,583–2,637,532	66.19
1995 <sup>j</sup>	569	14.42	6.86	2.15	68,646	471,111	990,118	836,199–1,144,036	52.20
1996 <sup>k</sup>	542	18.18	7.14	2.58	72,743	519,133	1,332,260	1,141,940–1,502,580	50.37

<sup>a</sup> Thompson, 1987.

<sup>b</sup> Thompson, 1988.

<sup>c</sup> Thompson, 1989.

<sup>d</sup> Stiver, 1990.

<sup>e</sup> Stiver, 1991.

<sup>f</sup> DeMaso, 1992.

<sup>g</sup> DeMaso, 1993.

<sup>h</sup> DeMaso, 1994.

<sup>i</sup> DeMaso, 1995.

<sup>j</sup> DeMaso, 1996.

<sup>k</sup> LaPierre, 1997.

The Oklahoma upland game harvest survey was conducted using similar telephone survey methodology from 1986–1996. Although the human dimensions questions changed every year, the methods used to collect and analyze harvest data for each species were consistent. Socioeconomic information about respondents was not collected in prior years and therefore was not available for comparative analysis. In 1991, the goal for completed interviews was increased from 1,000 to 2,000. The only major methodological change from 1986–1996 was that in 1994 the CATI system was implemented, replacing pen-and-paper data recording. This change was largely administrative and was not believed to bias the harvest trend data presented in this paper.

Statewide total number of hunters and harvest estimates were determined by calculating the proportion of hunters from the survey who hunted quail and their mean bag for the season. These estimates were extrapolated to the entire population of hunters after adjusting for the fact that not all license holders hunted in 1996. Chi-square tests were used to detect significant differences between categories. All tests were considered significant at  $P < 0.05$ .

Only active hunters (those survey participants who responded “Yes” to the question, “Did you hunt in Oklahoma during 1996?”) were used in the comparison between respondents that hunted quail and those that did not (Table 2). Among active hunters, hunter category was determined by participation in the 1996 quail season. Quail-hunting respondents were defined as active hunters who responded “Yes” to the question, “Did you hunt quail in Oklahoma in 1996?” Non-quail-hunting respondents were active hunters who responded “No” to this question. Quail-hunting

respondents did not necessarily hunt exclusively for quail but may have hunted other Oklahoma game species as well.

No information was gathered about participation in past quail seasons. Respondents that hunted quail in a previous year but skipped the 1996 season were not considered quail-hunting respondents. Lacking any evidence to the contrary, it can only be assumed that 1996 was similar to any other year in regard to the number of dedicated or occasional quail hunters dropping out of the sport or new quail hunters joining. Therefore, 1996 season quail-hunting-respondents were thought to be similar to hunters in other years.

Respondents were asked to report the number of years they lived in Oklahoma and the number of years they held an Oklahoma hunting license (Table 2). These variables could not be interpreted without accounting for the respondent’s current age. For analysis, both variables were converted to proportions. The proportion of life residing in Oklahoma was calculated as the number of years residing in Oklahoma divided by the respondent’s age. The proportion of life owning an Oklahoma hunting license had to be adjusted to account for the fact that a hunting license was not required before 16 years of age. This variable was calculated as the number of years holding an Oklahoma hunting license divided by the respondent’s current age, after reducing age by 15 years. Both proportion variables are presented as percentages (0–100%).

Type of residential location was determined by county of residence. Counties considered urban were those with a population density of >100 people per square mile (Oklahoma, Tulsa, Canadian, and Cleveland counties) (Oklahoma Department of Libraries 1995).

Table 2. Questions asked of survey respondents to collect human dimensions information for quail-hunting respondents and non-quail-hunting respondents in Oklahoma, 1996.

Question number	Question
1	Did you hunt in Oklahoma during 1996?
2	Asked for all upland game species under consideration ( <i>American crow, mourning dove, ring-necked pheasant, prairie chicken, quail, cottontail rabbit, jackrabbit, swamp rabbit, fox squirrel, gray squirrel, fall turkey, spring turkey, and American woodcock</i> ): a. Did you hunt [species] in Oklahoma during 1996? b. How many days did you hunt [species] in Oklahoma during 1996? c. How many [species] did you harvest during the 1996 season? d. In which county did you hunt [species] most often during 1996? e. Did you hunt [species] on private land, public land, or both types of land? f. What was the name of the public area on which you hunted [species] most often during 1996? g. How many of the [total number from part b] days that you hunted [species] did you hunt on public land? h. How many of the [total number from part c] [species] that you harvested were harvested on public land?
3	Do you have access to a computer at work? . . . at home?
4	Do you have access to the Internet at work? . . . at home?
5	For how many years have you held a hunting license in Oklahoma?
6	At what age did you start hunting?
7	For how many years have you lived in Oklahoma?
8	What is your county of residence?
9	What is your age, please?
10	What is the highest grade of school you have completed? (Multiple choices)
11	What is your ethnic origin? (Multiple choices)
12	I am going to read a list of income categories for household income from all sources, before taxes, during 1996. Please stop me when I get to yours. (Multiple choices)
13	Respondent's gender. (Not asked, simply noted.)

Near the end of the survey a shortage of time and money caused most of the human dimensions questions to be deleted from the last 510 respondent interviews. The only variables impacted in this quail hunter analysis were those pertaining to access to a computer and the Internet at work and at home (Table 2). Eighteen percent of annual ( $n = 269$ ), 19.3% of lifetime ( $n = 194$ ), and 10.4% of senior citizen ( $n = 47$ ) license holders were not asked these questions. It is possible that the disproportion of senior citizen license holders included in the analysis of the data for these questions biased the results, because senior citizens may be less likely to work and to own a home computer. However, as participation in quail season was not found to differ by hunting license type, this age-related bias was probably equally distributed among both quail-hunting and non-quail-hunting respondents, having little effect on the computer-related variables.

## RESULTS

Of the 2,945 attempted surveys, interviews were completed for 1,977 license holders. Eight hundred forty-six attempted surveys could not be completed. Reasons for incomplete surveys included: the license holder moved or was deceased; the phone number was incorrect, disconnected or not in service; no contact was made after five attempts; communication problems (hearing impaired or language barrier), the number was a facsimile machine; or the license holder was not available during the survey period. Only 9 interviews were incomplete because of communication problems. Less than half were senior citizen license holders, which reduced the likelihood that bias against the elderly was introduced as a result of the communication problems. An additional 122 license holders (4%) refused to participate in the survey. Refusals occurred in all license types and in no consistent pattern, and therefore were not likely to bias the data. After removing license holder phone numbers that could not possibly have resulted in complete interviews (deceased license holders, facsimile numbers, and wrong or disconnected numbers) the survey response rate was 78%.

Eighty-five percent ( $n = 1,681$ ) of the Oklahoma hunting license holders surveyed ( $n = 1,977$ ) hunted at least one day during 1996. Survey respondents were asked about their participation in 14 specific hunting seasons: American crow (*Corvus brachyrhynchos*), mourning dove (*Zenaidia macroura*), ring-necked pheasant (*Phasianus colchicus*), prairie chicken (*Tympanuchus cupido* and *T. pallidicinctus*), northern bobwhite (*Colinus virginianus*) and scaled quail (*Callipepla squamata*), cottontail rabbit (*Sylvilagus floridanus*), jackrabbit (*Lepus californicus*), swamp rabbit (*S. aquaticus*), gray squirrel (*Sciurus carolinensis*), fox squirrel (*S. niger*), wild turkey (*Meleagris gallopavo silvestris* and *M. g. intermedia*), American woodcock (*Scolopax minor*), and deer (*Odocoileus virginianus* and *O. hemionus*). The only major hunting season not included in the survey was the waterfowl season.

Quail (scaled quail and/or northern bobwhite) were the most popular small game species hunted by respondents (Figure 1). Of the respondents who hunted in 1996, 32.2% ( $n = 542$ ) hunted quail and 67.7% ( $n = 1,139$ ) did not. For comparison, 28.8% ( $n = 484$ ) of the active hunters hunted mourning dove, 27.7% ( $n = 466$ ) hunted fox squirrel and/or gray squirrel, and 24.5% ( $n = 412$ ) hunted wild turkey. Considering the 14 seasons in question on the survey, 25.3% ( $n = 137$ ) of the quail-hunting respondents hunted exclusively for quail (although participation in waterfowl season was not reported).

Annual, lifetime and senior citizen license holders surveyed were equally likely to hunt quail ( $X^2 = 0.06$ ,  $df = 2$ ,  $P = 0.972$ ). Statewide harvest estimates and various measures of quail hunting activity from 1986–96 are presented in Table 1. The majority (76.2%,  $n = 413$ ) of 1996 Oklahoma quail-hunting respondents hunted quail exclusively on private land. Respondent

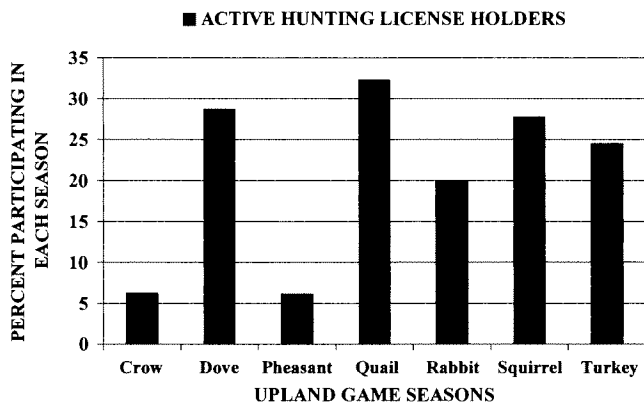


Fig. 1. Distribution of participation in Oklahoma's upland game hunting seasons by respondents that hunted in Oklahoma during 1996 ( $n = 1680$ ). See Table 2, question 2a for exact wording.

use of public land was more common for rabbit, squirrel and turkey hunting (Figure 2).

Half (50.7%,  $n = 273$ ) of the quail-hunting respondents hunted quail most often in their county of residence (Table 1). Hunters in both categories resided in similar types of locations ( $X^2 = 1.37$ ,  $df = 1$ ,  $P = 0.242$ ). Seventy-three percent ( $n = 825$ ) of non-quail-hunting respondents and 69.7% ( $n = 378$ ) of quail-hunting respondents lived in rural counties.

Age of first hunting experience (for any species) varied according to hunter category ( $X^2 = 21.61$ ,  $df = 2$ ,  $P = 0.001$ ). The distribution of age of first hunting experience for quail-hunting respondents was more skewed toward younger age categories than was the distribution of age of first hunting experience for non-quail-hunting respondents (Figure 3). Twenty-six percent ( $n = 145$ ) of quail-hunting respondents and 21.6% ( $n = 245$ ) of non-quail-hunting respondents began hunting at  $<9$  years of age.

Proportion of life residing in Oklahoma did not vary according to hunter category ( $X^2 = 2.69$ ,  $df = 3$ ,  $P = 0.442$ ). The majority of both quail-hunting re-

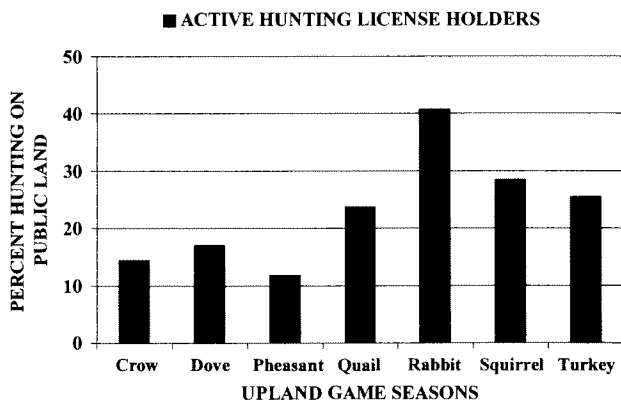


Fig. 2. Distribution of use of public land for Oklahoma's upland game hunting seasons by respondents that hunted each species in 1996. Sample sizes varied by species: crow ( $n = 104$ ); dove ( $n = 484$ ); pheasant ( $n = 102$ ); quail ( $n = 542$ ); rabbit ( $n = 333$ ); squirrel ( $n = 466$ ); and turkey ( $n = 412$ ). See Table 2, question 2e for exact wording.

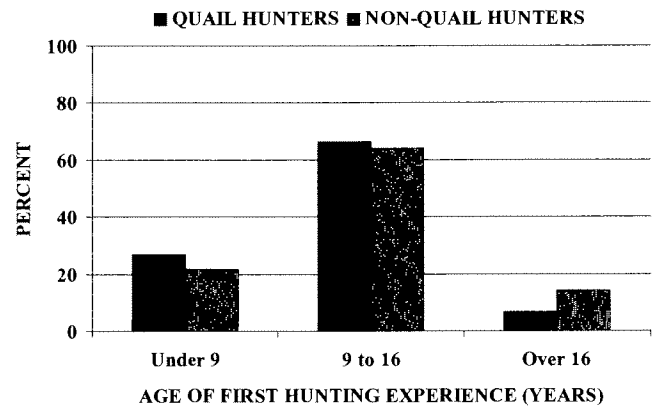


Fig. 3. Distribution of age of first hunting experience (with any species) by hunter category, in Oklahoma, 1996 ( $X^2 = 21.61$ ,  $df = 2$ ,  $P = 0.001$ ,  $n = 1676$ ). The sample size was reduced by 4 respondents who could not recall the age at which they began hunting. See Table 2, question 6 for exact wording.

spondents (77.9%,  $n = 422$ ) and non-quail-hunting respondents (74.9%,  $n = 849$ ) lived in Oklahoma 76–100% of their lives. Proportion of life ( $\geq 16$  years of age) owning an Oklahoma hunting license varied according to hunter category ( $X^2 = 28.20$ ,  $df = 3$ ,  $P = 0.001$ ) (Figure 4). Seventy-three percent ( $n = 387$ ) of quail-hunting respondents and 59.2% ( $n = 661$ ) of non-quail-hunting respondents had an Oklahoma hunting license for 76–100% of the years between 16 years of age and their current age.

Nearly all (98.3%,  $n = 533$ ) quail hunters surveyed were male, although most non-quail hunters surveyed were also male (95.5%,  $n = 1,087$ ). Quail-hunting and non-quail-hunting respondents did not significantly differ from one another according to ethnic origin ( $X^2 = 1.513$ ,  $df = 1$ ,  $P = 0.219$ ). The majority of both hunter groups were Caucasian (90.8%,  $n = 492$  and 88.8%,  $n = 1,007$ , respectively).

The current age category of quail-hunting respondents and non-quail-hunting respondents differed significantly ( $X^2 = 20.91$ ,  $df = 6$ ,  $P = 0.002$ ) (Figure 5). The age distribution of quail-hunting respondents was

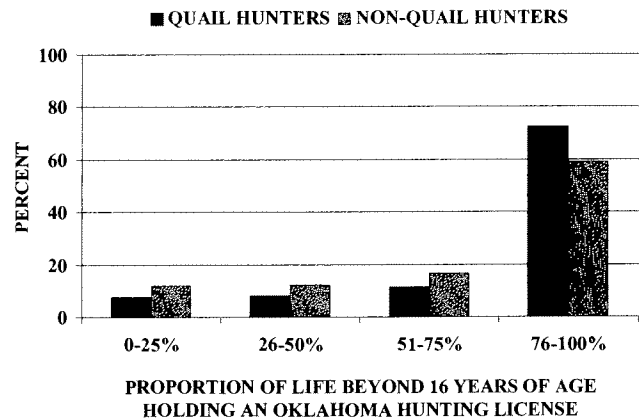


Fig. 4. Distribution of proportion of life ( $\geq 16$  years of age) that respondents owned an Oklahoma hunting license by hunter category, in Oklahoma, 1996 ( $X^2 = 28.20$ ,  $df = 3$ ,  $P = 0.001$ ,  $n = 1680$ ). See Table 2, question 5 for exact wording.

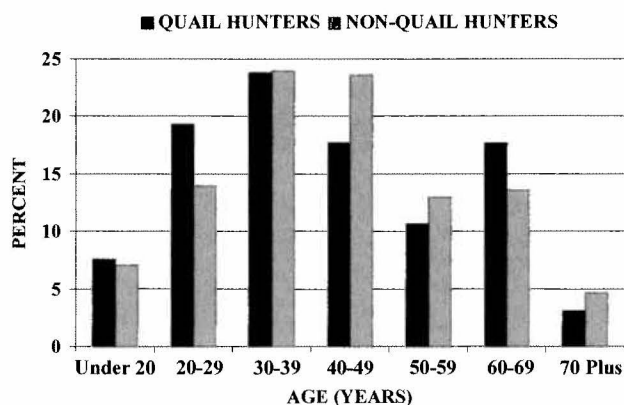


Fig. 5. Distribution of respondent age class by hunter category, in Oklahoma, 1996 ( $X^2 = 20.91$ ,  $df = 6$ ,  $P = 0.002$ ,  $n = 1680$ ). See Table 2, question 9 for exact wording.

more skewed toward the younger age classes than the age distribution of non-quail-hunting respondents. However, the proportion of quail-hunting respondents in the 60–69 year old age category was larger than the proportion of non-quail hunting-respondents in the same category.

Quail-hunting respondents were more likely to have completed a higher level of education than non-quail-hunting respondents ( $X^2 = 31.56$ ,  $df = 7$ ,  $P = 0.001$ ) (Figure 6). Thirty-eight percent ( $n = 428$ ) of non-quail-hunting respondents and 48.3% ( $n = 262$ ) of quail-hunting respondents had at least some college education.

Annual household income differed according to hunter category. Quail-hunting respondents' incomes were more likely to fall within the upper income categories than were incomes of non-quail-hunting respondents ( $X^2 = 26.66$ ,  $df = 7$ ,  $P = 0.001$ ) (Figure 7). Twenty-four percent ( $n = 250$ ) of non-quail-hunting respondents and 33.2% ( $n = 170$ ) of quail-hunting respondents reported annual household incomes of at least \$50,000; 43.9% ( $n = 463$ ) of non-quail-hunting respondents and 34.4% ( $n = 176$ ) of quail-hunting re-

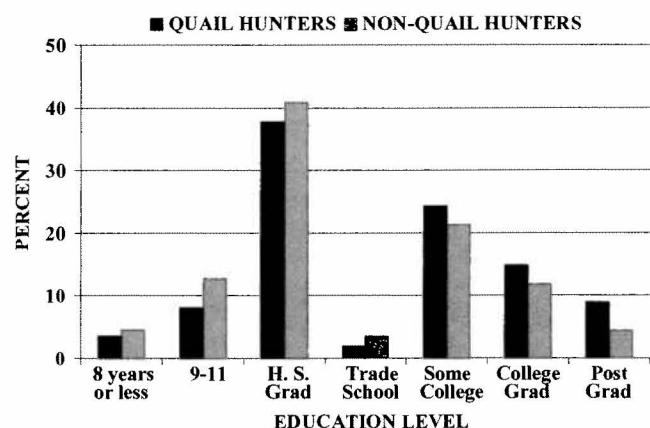


Fig. 6. Distribution of respondent education level by hunter category, in Oklahoma, 1996 ( $X^2 = 31.56$ ,  $df = 7$ ,  $P = 0.001$ ,  $n = 1675$ ). The sample size was reduced by 5 respondents who refused to answer the education question. See Table 2, question 10 for exact wording.

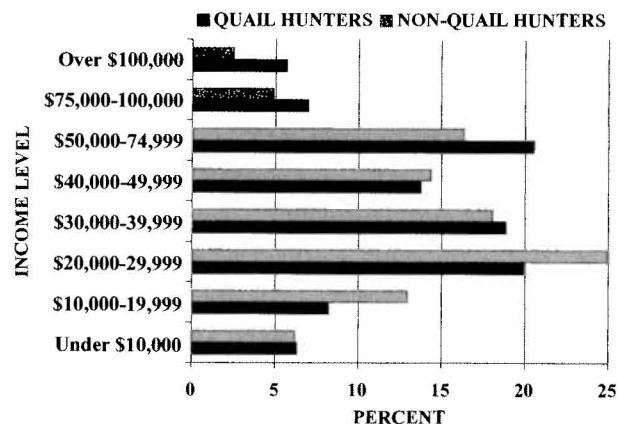


Fig. 7. Distribution of respondent annual household income by hunter category, in Oklahoma, 1996 ( $X^2 = 27.86$ ,  $df = 8$ ,  $P = 0.001$ ,  $n = 1567$ ). The sample size was reduced by 113 respondents who refused to answer the income question. See Table 2, question 12 for exact wording.

spondents reported annual household incomes under \$30,000.

Quail-hunting respondents were more likely than non-quail-hunting respondents to have access to a computer at work ( $X^2 = 10.02$ ,  $df = 1$ ,  $P = 0.002$ ), access to a computer at home ( $X^2 = 4.71$ ,  $df = 1$ ,  $P = 0.030$ ), and access to the Internet at work ( $X^2 = 9.30$ ,  $df = 1$ ,  $P = 0.002$ ) (Figure 8). Hunters in both categories were equally likely to have access to the Internet at home ( $X^2 = 0.41$ ,  $df = 1$ ,  $P = 0.520$ ).

## DISCUSSION

Some of the results of this survey can be compared to the results of the 1967 survey conducted by Ellis (1972), although the methodologies differed. Ellis con-

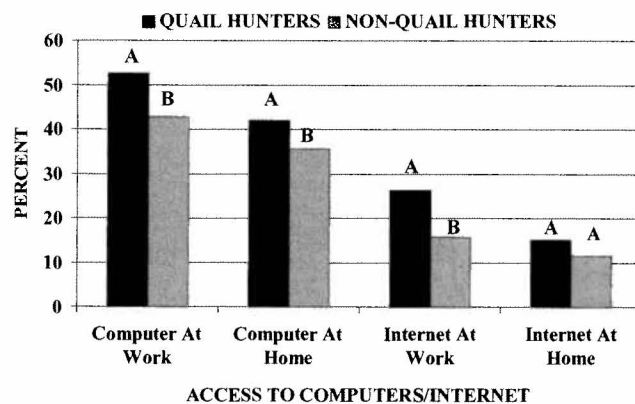


Fig. 8. Distribution of computer and Internet access at work and home by hunter category, in Oklahoma, 1996. Significant differences between adjacent columns indicated by different letters (from left to right:  $X^2 = 10.02$ ,  $df = 1$ ,  $P = 0.002$ ,  $n = 1172$ ;  $X^2 = 4.71$ ,  $df = 1$ ,  $P = 0.030$ ,  $n = 1172$ ;  $X^2 = 9.30$ ,  $df = 1$ ,  $P = 0.002$ ,  $n = 541$ ;  $X^2 = 0.41$ ,  $df = 1$ ,  $P = 0.520$ ,  $n = 443$ ). The sample size was reduced because the questions were not asked of the last 510 respondents interviewed. Respondents lacking access to a computer at home or at work were not asked about Internet access at that location. See Table 2, questions 3–4 for exact wording.

Table 3. Comparison of Oklahoma quail hunting activity by survey respondents in 1967 and 1996.

Variable	1967 <sup>a</sup>	1996
Survey methodology	Mail	Telephone
Response rate (usable/attempted, not adjusted for ineligibles)	51.2%	67.2%
Proportion of respondents that hunted quail	51.7%	32.2%
Quail hunter sample size	2,646	542
Length of quail season	26 days	98 days
Proportion of quail hunting occurring on private land	69.2%	76.2%
Estimated number of quail hunters statewide	167,000	73,318
Mean quail bag/hunter (season)	17.4	18.2
Mean quail bag/hunter (daily)	3.6	2.6
Mean number of days hunted quail	6.2	7.1
Proportion of quail hunters that were male	97.8%	98.3%

<sup>a</sup> Data from Ellis (1972).

ducted his survey by mail rather than by telephone, sending one follow-up mailing of the survey instrument to nonrespondents. Most of his survey questions pertained to quail hunting, probably resulting in a disproportionate number of surveys completed by quail hunters. For example, 51.7% ( $n = 2,646$ ) of all 1967 respondents (active hunters or not) hunted quail (Ellis 1972), while 27.4% ( $n = 542$ ) of all 1996 respondents (active hunters or not) hunted quail.

The proportion of quail hunting that took place on private land in Oklahoma during 1996 (76.2%) was higher than what was reported by Ellis (1972) (69.2%, Table 3), despite an increase in the acreage of public hunting land with suitable quail habitat available. This may partially be explained by an overall increase in hunting pressure on public land and a resulting avoidance of crowded areas. Alternatively, the decrease in public land use by quail hunters can be explained by season conflicts. During the time period in which deer and quail seasons overlap in Oklahoma, public hunting areas are restricted to deer hunting only, prohibiting use by quail hunters. This can eliminate up to the first two weeks of quail hunting on public land. The opening weekend of any season generally is the most popular, helping explain the decrease in public land use for quail hunting in Oklahoma.

The total number of quail hunters reported by Ellis was recalculated in a manner similar to the calculations done in 1996. Using this method, the estimated number of 1996 quail hunters in Oklahoma (72,743) was lower than Ellis's (1972) estimate (143,933) for 1967 (Table 3). The decline in quail hunter numbers may partially result from regional declines in quail populations (Brennan 1991) and the associated decrease in hunter interest.

Estimates of quail hunter success for this study were mean bag per hunter per season and mean daily bag. During 1996, the mean bag per hunter per season was 18.2 quail and the mean daily bag was 2.6 quail. These estimates are similar to what Ellis (1972) reported for Oklahoma quail hunters in 1967 (17.4 and 3.6 quail, respectively). The mean number of days

hunted by Oklahoma quail-hunting respondents during 1996 was 7.1 days (Table 3), while Ellis (1972) reported that Oklahoma quail hunters hunted an average of 6.2 days/season. This is surprising, considering that the 1996 Oklahoma quail season was 98 days, compared to the 1967 season of 26 days. This may indicate that the amount of time spent quail hunting is limited by factors other than season length (i.e., vacation time, access to hunting areas, real or perceived availability of quail, expense of the sport, or other).

The 1996 estimates of gender distribution of quail-hunting respondents (98.3% male and 1.7% female) were similar to those in the 1972 study by Ellis (97.8% male and 2.2% female).

Other important findings of this study were not included in the study by Ellis (1972). Quail-hunting respondents reported an age of first hunting experience (for any species) that was often younger than that of non-quail hunters. While the future of all hunting is dependent upon the recruitment of new hunters, it may be especially important for quail hunter recruitment efforts to focus on younger individuals.

Quail-hunting respondents tended to have higher annual household incomes than did non-quail-hunting respondents. Most also lived in rural counties, which is where the majority of wildlife habitat occurs. Having more discretionary income than other hunters may make quail hunters a good market segment to target for programs designed to improve wildlife habitat on private land. Although wildlife management activities (e.g., bulldozing, disking, prescribed burning, etc.) are cost-inhibitive for many rural landowners, this may not be the case for quail hunters. State agencies often lack funds to provide landowners monetary compensation, free materials, or free labor for wildlife management, but free technical assistance may be an adequate incentive for this quail-hunting market segment.

Quail-hunting respondents tended to have more education than non-quail-hunting respondents, although many non-quail hunting respondents were also well educated. This implies that some of the common myths about quail life history and management may be perpetuated *not* because hunters are incapable of understanding the science behind wildlife management, but because there is a breakdown in the transfer of this information from wildlife professionals to our constituents.

In general, computers and the Internet were more accessible for quail hunters than for non-quail hunters, although less than 50% of respondents had Internet access in either hunter category. In all likelihood, the proportion of hunters using the Internet will increase with time and electronic distribution of information will be an ever-increasingly important method by which state agencies communicate with constituents. The use of electronic communication to make information available can help wildlife managers make more efficient use of their time, as one-on-one communication with interested constituents can be time intensive. Web sites with "frequently asked questions" can conveniently provide quick answers to common hunter questions at any hour of the day. Technology

can also enable quail hunters and other constituents to e-mail questions, concerns and observations to the agency for a faster reply than by postal mail. Electronic forms of communication should not replace personal contact, but should provide economical methods to supplement traditional forms of communication.

## MANAGEMENT IMPLICATIONS

Private industry has used market analysis for years to determine key characteristics and needs of customers. It should not be different for the public sector. State wildlife agencies often know very little about their constituents other than the broad assumptions made about traditional hunters and anglers. Becoming familiar with common characteristics of specific user groups (i.e., quail hunters) allows managers to better understand their clientele and develop programs accordingly. This information can be useful not only for state agencies, but for the private industries supporting hunting and fishing as well (i.e., sportsmen's groups, manufacturers of sporting goods).

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