

2012

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Recommended Citation

Johnson, Jason L.; Rollins, Dale; and Reyna, Kelly S. (2012) "What's A Quail Worth? A Longitudinal Assessment of Quail Hunter Demographics, Attitudes, and Spending Habits In Texas," *National Quail Symposium Proceedings*: Vol. 7 , Article 112.

<https://doi.org/10.7290/nqsp070m8p>

Available at: <https://trace.tennessee.edu/nqsp/vol7/iss1/112>

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WHAT'S A QUAIL WORTH? A LONGITUDINAL ASSESSMENT OF QUAIL HUNTER DEMOGRAPHICS, ATTITUDES, AND SPENDING HABITS IN TEXAS

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ABSTRACT

Funds generated and spent on the pursuit of quail (*Colinus virginianus*, *Callipepla squamata*) hunting in Texas are sizable. We surveyed a population of quail hunters in Texas in 2000 and 2011 to assess hunter demographics and spending habits. The population of hunters for the 2000 survey consisted of members of Quail Unlimited who lived in Texas while the 2011 population consisted of the former group's successor in Texas—Quail Coalition. The initial (2000) survey was a mail questionnaire while the 2011 survey instrument was delivered electronically. We achieved response rates of 47% in 2000 but only 9% in 2011. The number of resident quail hunters in Texas decreased 72% from 1981 to 2010. Quail hunters in Texas can be characterized as white males (97%) and affluent (65% reported annual household incomes above \$125,000 in 2010). Survey respondents documented an average expenditure of \$8,606 in pursuit of quail during an average of 8.8 days of hunting during the 2010–2011 season. This resulted in a cost of \$254 per quail bagged when combined with harvest estimates provided by respondents; an estimated increase of 23% over the last 10 years.

Citation: Johnson, J. L., D. Rollins, and K. S. Reyna. 2012. What's a quail worth? A longitudinal assessment of quail hunter demographics, attitudes, and spending habits in Texas. *Proceedings of the National Quail Symposium* 7:294–299.

Key words: *Callipepla squamata*, *Colinus virginianus*, community development, demographics, economics, hunting, northern bobwhite, scaled quail, Texas

INTRODUCTION

Quail hunting is a pastime steeped in tradition and culture for many American sportsmen, especially in the southeastern United States and southern plains. Those sportsmen lament the steady decline in their favorite game bird, the northern bobwhite and the recreation it has afforded for the past century. Today, bobwhite abundance is only a remnant of what it was just 30 years ago for most of the southeastern United States (Sauer et al. 2011). More recently (within the past decade), hunters in traditional strongholds like Oklahoma and Texas have witnessed dramatic reductions in quail abundance (Fig. 1). Bobwhite and scaled quail, the 2 most popular of Texas' 4 species of quail, declined to record low abundance in 2011 (Texas Parks and Wildlife Department 2011). Breeding Bird Survey data indicate annual declines of 5.3 and 3.1% for bobwhites and scaled quail, respectively, from 1999 to 2009 (Sauer et al. 2011).

The decline of quail in Texas has prompted a concomitant decrease in number of hunters pursuing

quail (Fig. 2). Quail hunter participation in Texas declined 79% from 1981 to 2010 (Purvis 2011). Attrition in the ranks of quail hunters is disconcerting in several respects (Rollins 2002). First, revenues lost from a decrease in hunting license sales affects effort, and at times interest, in quail management from state wildlife agencies. Second, an important avenue for income diversification for many rural landowners and local economies (i.e., fee-based hunting) is threatened (Burger et al. 1999). Continued participation of quail hunters is rapidly approaching critical mass in Texas. Quail hunting in Texas is an economically important sport and industry (Brennan et al. 2007, Conner 2007). Many rural counties in West and South Texas receive an economic pulse during the hunting season from increased hunting-related tourism. Hunting equipment (e.g., shotguns), amenities (e.g., off-road vehicles), and dog-related expenses (e.g., training collars, veterinary fees) contribute to sizeable expenditures (Conner 2007). Fee-hunting for quail provides an economic boon to private landowners in Texas who often receive more for hunting lease fees than for grazing leases (Rollins 2007).

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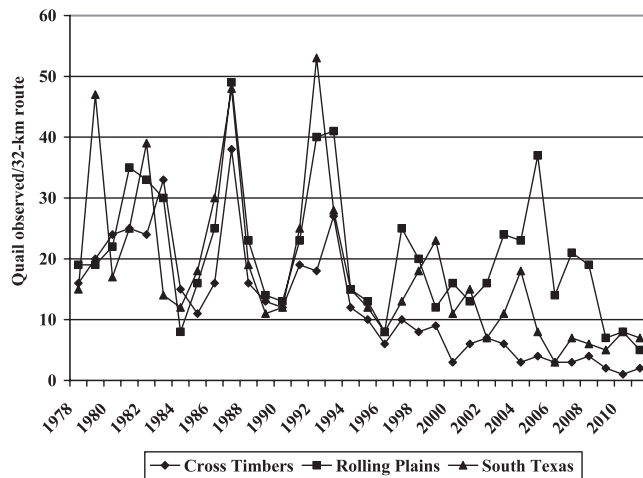


Fig. 1. Population trends of northern bobwhites in 3 ecoregions of Texas, 1978–2011, estimated from roadside counts (Texas Parks and Wildlife 2011).

The most thorough and comprehensive review of hunting demographics and economic impact is the U.S. Department of the Interior (USDI) 2006 National Survey of Fishing, Hunting, and Wildlife-associated Recreation (USDI 2008). This survey indicates 979,000 Texas residents hunted in Texas in 2006 and Texas was the destination for 1.1 million hunters. Texas hosted over 14 million days of hunting during 2006 with the average hunter pursuing game for about 13 days. The average Texas hunter spent \$1,984 on a broad array of hunting and travel-related amenities.

The USDI (2008) survey documented that: 62% of Texas hunters come from urban residences (i.e., population > 250,000); 92% are male; 98% are Caucasian; and 25% had household incomes exceeding \$100,000. Approximately 45% of Texas hunters were 35 to 54 years old with 25% over age 55. Educational levels indicated 40% of Texas hunters had a high school education or less with 60% having pursued higher education at some level.

The USDI (2008) survey estimated that small game hunters (359,000) spent an average of \$286 per hunter with 2.9 million days of participation. There were 163,000 Texas quail hunters within the small game category with 835,000 days of participation. No average expenditure was reported for individual small game species.

The specific demographics, hunting activity, and expenditure patterns of the average hunter might not reflect those that could be considered 'avid' quail enthusiasts. It is likely this type of hunter is willing to spend significantly more time, money, and energy in pursuit of their quail hunting experience. We surveyed a population of Texas quail hunters in 2000 to assess their demographics, spending habits, and attitudes about quail management. Quail abundance was still 'good' at that time, but has decreased to record lows. We initiated a study in 2011 to re-assess demographics, activities, spending habits, and perceptions of quail hunters in Texas. The time-lag between the 2 surveys allowed us to assess the current status and trends and examine if recent

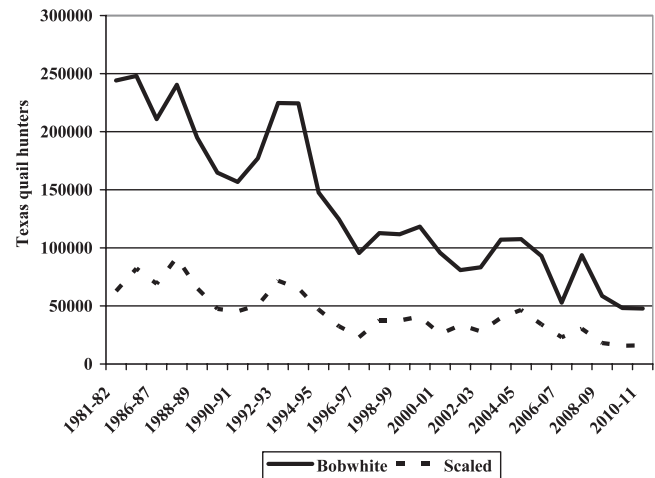


Fig. 2. Hunter participation for bobwhite and scaled quail in Texas, 1981–2011. Data from Purvis (2011).

declines in quail abundance had affected behaviors and attitudes of Texas quail hunters. Our objective was to conduct a longitudinal comparison in demographics, participation, spending patterns, and perceptions of quail hunters in Texas across the years 2000 and 2011.

METHODS

We conducted a longitudinal trend study involving solicitation of responses to the same questions and measuring the same variables in 2000 and 2011 focusing on a population of hunters that could be considered avid quail enthusiasts (i.e., members of a quail-focused conservation organization). Samples were of the same general population, but were not necessarily composed of the same individuals; the differences observed were less likely to be the result of cultural differences across generations. Longitudinal studies are often used in sociology to study events and behaviors throughout lifetimes or generations allowing researchers to distinguish short- from long-term phenomena. This methodology allowed us to analyze changes in the population and combine data from several studies of the same population to show a trend. We used hunter-harvest data obtained from Texas Parks and Wildlife Department (Purvis 2011) to evaluate trends in participation rates.

Mail Survey

The questionnaire for the 2000 survey was designed to capture data to describe the profile, activities, and attitudes of avid quail hunters. Survey questions were designed to capture intensity of quail hunting activities (e.g., days afield, number of hunting dogs owned), expenditure categories, and perceptions about the trends in huntable quail populations. We administered this survey in 2000 by direct mail to a random sample of 250 Quail Unlimited members with Texas addresses. The survey instrument was accompanied by a cover letter explaining the need to document economic impact

Table 1. Demographic profile of avid resident quail hunters in Texas across 2 time periods, 2000 and 2011.

	Year of survey			
	2000		2011	
Method	Direct mail		Internet	
<i>n</i>	250		3,940	
Response rate (%)	47.2		8.8	
Gender	100% Male		98% Male	
Average age in years (median)	53 (55)		55 (56)	
Ethnicity	97% Caucasian		97% Caucasian	
Education				
High School	15%		11%	
College	43%		54%	
Post-Graduate	42%		35%	
Household Income				
	< \$10K	0%	< \$10K	1%
	\$10K - \$40K	8%	\$10,001 - \$25K	0%
	\$40K - \$75K	16%	\$25,001 - \$50K	5%
	\$75K - \$125K	34%	\$50,001 - \$75K	7%
	> \$125K	42%	\$75,001 - \$125K	22%
			\$125,001 - \$250K	32%
			> \$250K	33%

information specifically focused on quail hunting activities and a postage-paid return envelope. A reminder postcard was sent to survey recipients 3 weeks following the initial mailing, resulting in a completed survey from 118 quail hunters (47.2% response rate).

Internet Survey

We administered the questionnaire for 2011 through an internet survey company, Survey Monkey (www.surveymonkey.com). The questions on the 2011 survey were changed slightly from the initial (2000) survey to conform to the internet website. A link to the electronic questionnaire was delivered by e-mail to 3,940 members of the Quail Coalition, a quail conservation organization in Texas (www.quailcoalition.org) which essentially succeeded Quail Unlimited in Texas in 2009. The questionnaire followed Dillman et al.'s (2008) tailored design method for internet surveys.

The e-mail contained a pre-survey letter, signed by the chairman of the Quail Coalition and a quail biologist, stating the purpose of the survey and requested member participation. The e-mail also contained a hyperlink to the internet-based questionnaire and a request that members click the link to begin. A reminder e-mail, identical to the first, was sent to all members 17 days later resulting in a total of 345 Quail Coalition members answering ≥ 1 question (8.8% response rate). We made no attempt to assess non-response bias in either survey.

RESULTS

Quail Hunter Trends

The number of quail hunters in Texas decreased 71.7% from 1981 to 2010 (Fig. 2). Most of the decline occurred from 1981 to 1996 with numbers thereafter remaining relatively stable. Resident hunters accounted

for 85 to 99% of the total quail hunters with the proportion comprised by non-residents generally increasing over time. Texas residents accounted for 98.6% of quail hunters in 1981. However, in 2008 (the year with the highest participation by non-residents) that number slipped to 89.5%. The number of non-resident quail hunters increased about 206% from 1981 to 2008.

Hunter Demographics

Texas quail hunters (50% older than 56 years of age) were somewhat older than the average Texas hunter (25% older than 55 years of age) identified in the 2006 national survey and possessed higher average household incomes and levels of education (Table 1). Gender and ethnicity reflected similar patterns to the national survey indicating the overwhelming majority of quail hunters were Caucasian men. Household incomes of quail hunters confirmed an affluent status (defined as $> \$125,000$ annual income), a statistic that increased from 42% in 2000 to 65% in 2010.

Hunter Participation and Spending Patterns

Quail hunting participation declined $\sim 50\%$ from 15.3 days in 2000 to 8.8 days in 2010 (Table 2), but participation from the surveyed population was 72% greater than participation levels cited for quail hunters in the 2006 national survey. The number of respondents that had purchased land in the last 10 years for quail hunting fell just short of 20% in both 2000 and 2011. More than half (54 and 51%, respectively) leased hunting properties for quail in 2000 and 2010, respectively, and $> 40\%$ leased ≥ 1 properties for quail hunting. Survey respondents cited average round-trip distances exceeding 643 kilometers (400 miles) to their hunting destinations. Bird dog ownership declined by 25% over the last 10 years, but $> 50\%$ of respondents still owned bird dogs in 2010. However, among dog owners, the number of bird dogs

Table 2. Quail-related hunting activities of avid resident quail hunters in Texas across 2 time periods, 2000 and 2011.

	2000 Quail Unlimited		2011 Quail Coalition	
Quail hunting participation	2000	15.3 days	2010	8.8 days
	1995	17.8 days	2005	15.5 days
	1990	19.7 days	2000	17.4 days
Purchased land in the last 10 years for quail hunting		19%		18%
Number of properties leased for quail hunting				
None		46%		49%
One		25%		33%
Two		15%		11%
Three		10%		4%
Four or more		4%		2%
Average travel distance to hunting destination		647 kilometers		671 kilometers
Hunting locations				
Quail lease		54%		57%
Leased land as guest		45%		31%
Land owned by friend/relative		45%		46%
Land owned by self		36%		57%
Public land		11%		9%
Bird dog ownership - 1 or more		77%		51%
Average among owners		6 dogs		3 dogs
Hunted pen-raised quail		62%		86%
Location of pen-raised quail:				
Shooting preserve		44%		31%
Personal property		56%		41%
both		n/a		28%
Hunter success		1999/2000 season		2010/2011 season
Bobwhites per day		3.14		3.31
blue quail per day		1.37		0.44

owned declined by 50% between the 2000 and 2011 periods. Additionally, > 62% of survey respondents indicated they had hunted pen-raised quail with > 40% using pen-raised birds on their personal property.

Survey respondents were asked to provide a number of details itemizing their quail hunting expenditures (Table 3). Lease rates per acre (2.4 ha) during the 11-year span between surveys increased 21% while per day leases increased 2%. Average quail hunting expenditures by respondents declined by 17% between the 2 study

periods. Lease fees accounted for the largest quail hunting expense category, ranging from 28 to 35% of total expenditures. Travel-related categories (lodging, meals, and transportation) increased in terms of dollars and percentage of the hunting expenditure between 2000 and 2011. Dog-related, feed-food plots, and vehicle expenditures decreased 46, 44, and 56%, respectively reducing their combined market share of hunting expenditures from 46% in 2000 to 27.5% in 2011. Both surveys indicated that > 60% of annual hunting expenditures occurred away

Table 3. Expenditure patterns of avid Texas resident quail hunters across 2 time periods, 2000 and 2011.

	2000 Quail Unlimited		2011 Quail Coalition	
Average annual quail hunting expenditure		\$10,354		\$8,606
Expenditure categories				
Guns and ammunition	\$570	5.5%	\$478	5.6%
Lease fees	\$2,900	28.0%	\$2,982	34.7%
Lodging	\$577	5.6%	\$626	7.2%
Meals	\$283	2.7%	\$482	5.6%
Dog-related	\$2,004	19.4%	\$1,068	12.4%
Transportation	\$779	7.5%	\$941	10.9%
Feed-food plots	\$645	6.2%	\$359	4.2%
Vehicles on site	\$2,122	20.5%	\$938	10.9%
Miscellaneous	\$474	4.6%	\$732	8.5%
Location of hunting expenditure				
County of residence		34%		36%
En route to destination		13%		18%
At destination county		54%		46%
Average cost per bagged quail		\$207		\$254

from the hunter's county of residence. Dividing the average quail hunting expenditures by quail harvest numbers reported by respondents indicated the estimate of the average cost per quail bagged increased 23% between surveys.

There was a unified perception among respondents that quail populations had declined versus those that were present 10 years prior (Table 4). A small percentage of each survey (< 10%) indicated that populations had actually improved over the previous 10 years. This suggests that some respondents were convinced the quail hunting environment had improved in certain locations. Survey respondents, when asked to identify the most important factors affecting quail populations most frequently cited weather, land use changes, predators, and overgrazing as the primary culprits. Attribution to disease-parasites was elevated taking prominence away from fire ants as additional factors affecting populations. Respondents were least likely to name pesticides and overhunting in both surveys as influencers on quail populations.

DISCUSSION

Our studies confirm that a slightly older, more affluent, group of Texas quail hunters has emerged that are willing to absorb the 23% increase in the average cost per bird (\$254), despite quail populations reaching an all-time low. There was a striking consistency of results across the 2 surveys separated by 11 years and using different delivery methods. Thus, a number of conclusions can reasonably be drawn that have implications for land managers, rural community leaders, and business owners that benefit from hunting expenditures of Texas quail hunters.

First, quail hunter numbers have declined 60% since 1990 and continue to decline; yet, within the population of small game hunters, there exists a passionate base of quail enthusiasts despite declining quail populations. These individuals are generally older than the average Texas hunter and possess relatively higher levels of education and household income. This cadre of hunters has demonstrated a willingness to travel long distances and spend money at higher levels than the average hunter (of any type of game). Bird dog ownership has decreased by 25% over the last 10 years, but a majority of respondents still own bird dogs, demonstrating an ongoing commitment to quail hunting. Any landowner or business venture wanting to capitalize on the spending habits of these hunters would be well advised to consider how they might position their products, services, and offerings to better appeal to this type of target market.

Second, landowners and managers capable of providing a reliable huntable quail population could reap financial benefits by catering to this group of hunters' desire for a quality quail hunting experience. Difficulty in finding properties suitably managed for quail has motivated a respectable proportion (20%) of the survey respondents to purchase land for themselves, while the majority of respondents rely on leased properties to

Table 4. Perceptions concerning quail population trends by survey respondents in 2 time periods, 2000 and 2011.

	2000 Quail Unlimited	2011 Quail Coalition
How have quail numbers changed where you hunt over the last 10 years?		
Increased	7%	5%
No change	6%	7%
Decreased	87%	88%
Which factors have affected quail populations in areas where you hunt?		
Weather	78%	82%
Land use changes	48%	39%
Predators	42%	41%
Overgrazing	39%	32%
Fire ants	33%	16%
Disease-parasites	16%	30%
Pesticides	15%	8%
Overhunting	15%	4%

provide their hunting opportunities. Hunting pen-raised quail increased 24% over the last 10 years, demonstrating the extent that hunters will go for quail hunting and to provide hunting opportunity for their bird dogs. Most rangelands that support quail are typically cattle operations (Texas Parks and Wildlife Department 2005, Rollins 2007). Proper land management (e.g., stocking rates) to enhance huntable quail populations can actually be complementary to prudent management for livestock (Conner 2007, Rollins 2007). However, conflict often arises between the cattle operator-lessor and the quail hunting lessee. We also surveyed landowners from 13 counties where quail leases were popular as a portion of our 2000 survey (D. Rollins, unpublished data). As an example of the disconnect between these livestock-oriented landowners and quail hunting lessees, 39% and 31% of hunters identified overgrazing as a serious concern for quail in the 2000 and 2011 surveys, respectively, whereas only 1% of landowners suggested overgrazing as a concern. Both enterprises could benefit financially from the use of cattle grazing that is planned around the quail lifecycle with flexible stocking rates and rested pastures. This dual species accommodation requires a willingness to forego short-term economic gains that might accrue to a livestock-only management program in return for long-term financial gains.

There is no denying that hunting has a genuine, and substantial, economic impact in Texas. The magnitude and breadth of benefits resulting from hunting are not limited to the landowner and hunter. The results from our study identify that a large percentage of a quail hunter's annual expenditures occur en route to, and at, the hunting destination. Ironically, many hunters come from urban areas making quail hunting one of those rare social and economic activities that draw money from urban to rural communities. This economic injection accrues not only to the landowners, but also to the general merchants throughout Texas who cater to the needs of those who travel across the state in pursuit of quail. Expenditures per quail hunter decreased by ~ \$2000 over the last 10 years.

Thus, a dedicated effort to preserve and protect suitable quail habitats is likely a worthwhile goal for both landowners and rural economic development advocates.

Data are available for non-resident hunter participation, but there are no numbers on expenditure patterns for this segment of quail hunters in Texas. Numerically they account for about 10% of the quail hunters, but their increasing trend suggests they have a growing economic impact on quail hunting in Texas. Bobwhite populations have declined in Texas, but the state remains a popular destination for non-resident quail hunters, a pattern that will continue given even more dire declines further east of Texas. Thus, further research is warranted on their spending patterns.

We recognize and caution that our survey population likely does not represent the mainstream quail hunter in Texas, but likely those more affluent and more committed to pursuing a quality quail hunting experience. Our characterization of the quail hunting public in Texas in terms of demographics, conforms to that of quail hunters across the southeastern U.S. (Burger et al. 1999) relative to gender and race (> 97% white males), but differs in regards to age and annual income with Texas having older and more affluent hunters on average. We cannot estimate whether our study population accounts for a minor or major portion of quail hunters. Additional information is needed from the less affluent quail hunters and their relative share of the quail hunting market in Texas. Our estimates may be typical and not exceptional given the expense of hunting quail on private lands in Texas, and the paucity of public hunting opportunities (about 97% of Texas is privately-owned land).

ACKNOWLEDGMENTS

The authors acknowledge the on-going support and encouragement of the Quail Coalition organization in efforts designed to sustain and restore huntable wild quail populations, to educate hunters and landowners, and to celebrate the quail hunting heritage of Texas. Additional

gratitude is conveyed to Jon Purvis at Texas Parks and Wildlife for providing data used to assess quail hunting trends that predated our surveys.

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