WHITE-TAILED DEER HUNTING IN OKLAHOMA: AN ECONOMIC ANALYSIS OF DEER HUNTER PREFERENCES IN 1998

By

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LIST OF VARIABLES AND SYMBOLS

X^2	Chi Square Value
YEAR	Years Spent Hunting in Oklahoma
FREQ 1-3	Frequency of Deer Hunts This Season, 1-3 Days, Dummy Variable
FREQ 30+	Frequency of Deer Hunts This Season, 30+ Days, Dummy Variable
PREF DOE	Harvest Preferences, Doe, Dummy Variable
PREF ANY	Harvest Preferences, Any Deer, Dummy Variable
PAID	Paid to Hunt in Oklahoma
LANDFR	Current Season Land Hunting On, Friend or Family Owned, Dummy Variable
LANDLS	Current Season Land Hunting On, Leased, Dummy Variable
LANDPB	Current Season land Hunting On, Public, Dummy Variable
AC<50	Acreage Available, Less than 50 Acres, Dummy Variable
AC<150	Acreage Available, 100 to 150 Acres, Dummy Variable
AC<200	Acreage Available, 150 to 200 Acres, Dummy Variable
AC<250	Acreage Available, 200 to 250 Acres, Dummy Variable
AC>250	Acreage Available, 250+ Acres, Dummy Variable
TRVL<50	Miles Traveled, Less than 50 Miles, Dummy Variable
TRVL<150	Miles Traveled, 100 to 150 Miles, Dummy Variable
TRVL<200	Miles Traveled, 150 to 200 Miles, Dummy Variable
TRVL>200	Miles Traveled, 200+ Miles, Dummy Variable

GNDR	Gender
AGE	Age
ADHUNT	Adults in Household that are Hunters
LIVELM	Area Lived Most of Life In, Large Metro, Dummy Variable
LIVELC	Area Lived Most of Life in, Large City, Dummy Variable
LIVEMC	Area Lived Most of Life in, Medium City, Dummy Variable
LIVESM	Area Lived Most of Life in, Small City, Dummy Variable
LIVETN	Area Lived Most of Life in, Town, Dummy Variable
OWNLAND	Do Respondents Own Enough Land to Hunt Deer On
INC<$40	Income, $20,000 to $39,999, Dummy Variable
INC<$60	Income, $40,000 to $59,999, Dummy Variable
INC<$80	Income, $60,000 to $79,999, Dummy Variable
INC<$100	Income, $80,000 to $99,999, Dummy Variable
INC>$100	Income, $100,000 or greater, Dummy Variable

CHAPTER I

Introduction

Citizens of Oklahoma have a rich tradition of enjoying nature. Accounts from early explorers have told stories of the abundance of white-tailed deer in Oklahoma. White-tailed deer remained relatively abundant until the late 1870's when the Oklahoma territory was opened for settlement. The unregulated hunting and mismanagement of white-tailed deer after this time reduced the deer population to approximately 500 deer by 1916. White-tailed deer hunting in Oklahoma was closed in that year until 1933 (Masters et al, 1997). Since 1933, deer management and conservation practices in the state have helped to relocate and repopulate many suitable areas of the state with white-tailed deer. Currently, Oklahoma is home to a population of approximately 325,000 white-tailed deer.

The state of Oklahoma has largely diverse geographical areas in which white-tailed deer hunting can be pursued. Oklahoma offers its hunters regions that vary from the dry arid regions of the Panhandle, the northeast's heavily forested and lake covered region, from the south central's flat prairies to the southeastern mountain ranges and southern pine regions.

As populations grow in Oklahoma and there is a decline in the amount of agriculturally based economies, there is an increase in the need for economic information looking at the increase in wildlife-related recreation in the state of Oklahoma. Questions about the characteristics of the recreational users of Oklahoma wildlife, the attitudes of these users about management and conservation practices in their state, the level of

support the users give and feel is needed to conserve their right to the wildlife, and the means of determining the value the users place on the wildlife.

Humans value wildlife and the habitats and ecosystems on which they depend for a number of reasons. Values are the different characteristics that make wildlife useful and desirable to humans. Most wildlife can be assigned more than one value, and some are easy to quantify monetarily, and some are not. There are two types of wildlife values: positive and negative. Positive values are those attributes such as inherent beauty, artistic appreciation, ecosystem renewal, or recreational values. Recreational values are those quantities assigned to wildlife-related sports or hobbies. Recreational values can be divide into two categories: consumptive uses and non-consumptive uses. The most common consumptive use is hunting, while bird watching and photography are some of the more common non-consumptive uses (Edge, 1999).

Objectives of the Study

To effectively manage such a broad expanse of issues in the state of Oklahoma, individuals need to have an assessment of the public's expectations, opinions and activities concerning the use of wildlife resources and wildlife management. This study was designed to examine;

1. The demographic characteristics of the Oklahoma deer hunter and his uses for the wildlife resource;
2. Attitudes of Oklahoma deer hunters towards the management, conservation and resource allocation of white-tailed deer;
3. Expectations of Oklahoma deer hunters of the property and the landowner whose land on which they are leasing to hunt.

4. Public demand of Oklahoma deer hunters for wildlife-related activities and access to hunting areas; and
5. Willingness of Oklahoma hunters to pay for leased land, trophy buck hunts, and conservation/management of wildlife and habitat.

White-tailed deer hunting is one of the largest wildlife-related recreational opportunities in the state of Oklahoma. As the percentage of individuals involved in this sport increases the need for market information increases greatly. Currently, information about the recreational values that consumers, i.e. hunters, place on this opportunity is lacking. The concept of outdoor recreation has been approached over the years as a supply side issue: how much should the producer charge the consumers, and what can the producers of the goods do to influence the willingness of consumers to purchase.

Economic Reasoning and Theory

Economics plays a vital role in the management of wildlife resources. As the science studying how individuals and society make decisions, economics helps to understand the problems relating to wildlife management. These problems include but are not limited to the study of positive and negative externalities, public and private benefit, and environmental sustainability. Economics is also used to estimate the benefits and costs of alternative wildlife management strategies. Methods have been developed through economics to evaluate non-market values of wildlife to assist in the policy actions. Wildlife conservation usually involves the management of natural resources outside the realm of the formal market structure. Value is placed on wildlife through the costs and distance of travel to recreation sites, willingness to pay for the use and conservation of wildlife, hedonic pricing schemes, shadow pricing alternatives, and

through the use of habitat and sustainable lands in set-aside programs through the federal government. Market values encompass those values that can to be bought and sold in the market, such as purchases of licenses, equipment, property and game for guided hunting, and environmental benefits. Non-market values are traditionally non-traded resources, such as willingness to pay for and sell the rights to the resource, externalities such as incomplete property rights, and public goods, including the problem with free riders.

Economics applies to wildlife management and conservation through a variety of facets. First, it helps individuals and society to make scarce resource allocation decisions and to estimate the benefits and costs of those decisions. The concept of opportunity cost is key: What goods and services will the consumers have to give up to increase wildlife management and conservation, or what management and conservation goals will be given up? Is the relative worth of wildlife management and conservation to the consumer greater than alternative economic benefit derived from the use of the land? If certain benefits are chosen then economics can be used for allocation decisions to reach the least cost approaches to the management of the resource. There are certain components of total economic value that are factored into each management and conservation decision: use value, the benefit that people directly or indirectly derive from wildlife management and conservation, option value, a way of reserving the right to available populations of wildlife for future use, bequest value, the value to the consumer of having the resource available for future generations, and existence value, the reflection of spiritual, moral, and ethical values associated with environmental preservation.

Recently in the state of Oklahoma there has been a shift in the availability and location of areas for white-tailed deer hunters to pursue their sport. In the early and

middle 1900's most white-tailed deer hunting was done through out the state with little or no regulation. As the urban centers of Oklahoma began to expand, available hunting land became more scarce. More individuals are moving away from overcrowded public land due to private lands or leasing property for their wildlife recreational purposes. This creates a marketable opportunity for landowners to lease property for this recreation. Most wildlife-related studies in Oklahoma have looked at supply side issues, studying the lease options and the landowners minimum acceptable charges for a lease. But, little has been done in Oklahoma to find the relative range of willingness to pay of the consumers of this good, the hunters.

Study Areas

The southeastern area, near survey locations Antlers and Mt. Herman is encompassed by the Ouachita Mountains and much of this area is the location for large harvests of lumber by the logging company Weyerhaeuser. It is an extremely rural area with no interstates or large cities near.

In the south central area surveyed, near Ardmore, the land is situated near the Arbuckle Mountains. This area is adjacent to Interstate 35 south of Oklahoma City and is one of the more heavily human populated areas in the south.

In the north east region of Oklahoma, near Miami and Sand Springs, the land is dotted with lakes and rivers. Interstates bisect these areas and are rather heavily human populated and concentrated. This area houses the Ozark Plateau, a large, deeply dissected plateau. This region also contains the Grand Lake Region.

In the central portion of Oklahoma, the surveyed areas near Chandler and Stillwater are mainly prairie land and light forests. These areas are heavily populated and

are considered urban by most accounts, with intricate interstates and highways connecting them.

The western areas surveyed (Woodward, Alva, and Ft. Cobb) are mainly short and mixed grasslands, with little to no forests, consisting mainly of rolling plains. In these areas there are few interstates and main highways.

Organization of Thesis

The remainder of the thesis is devoted to the stated objectives. A review of relevant literature and procedure is presented in Chapter II. The characteristics of the surveyed Oklahoma deer hunters is analyzed in Chapter III. Chapter IV emphasizes the importance of understanding respondent's preferences, benefits and expectations. Willingness to pay and income evaluation of respondents is the major emphasis of Chapter V. The importance of property rights and land values is discussed in Chapter VI. The attitudes of respondents towards management and conservation of wildlife and land in Oklahoma are discussed in Chapter VII. Summary and conclusions are presented in Chapter VIII.

CHAPTER II

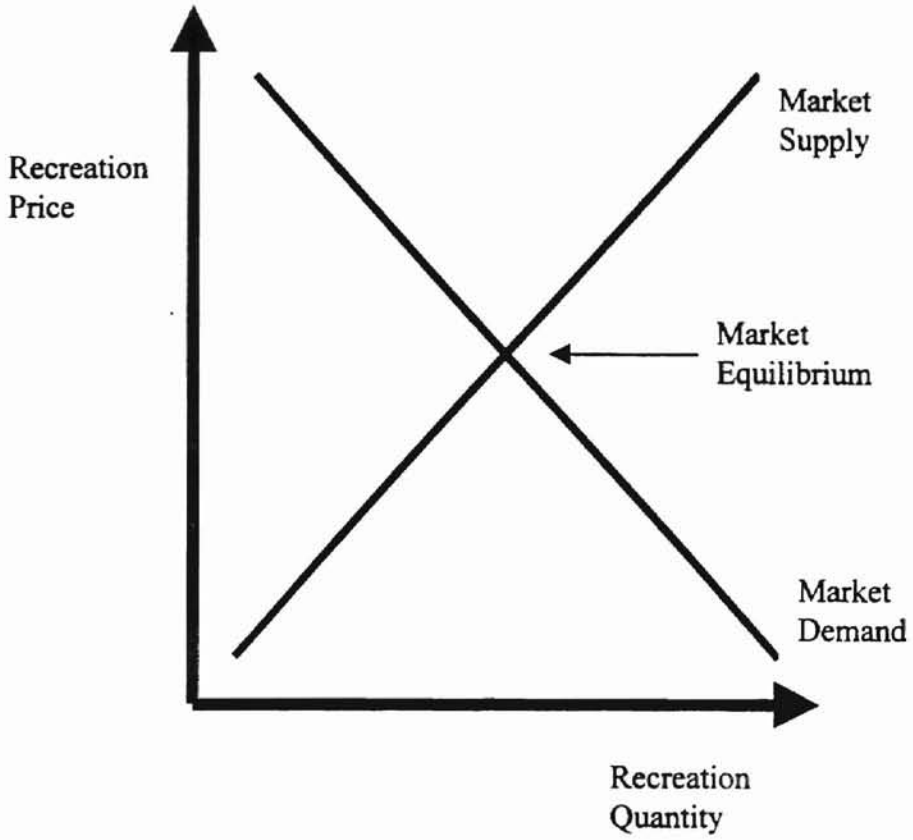
Review Literature and Procedure:

Wildlife-related outdoor recreational activities have fast become one of the largest industries in the United States. In 1996 more than 77 million Americans sixteen years or older, (nearly 40 percent of the United States population) enjoyed some form of wildlife-related recreation. Wildlife-related recreation as a research area has interested agricultural economists for the past 40 years. As the American society moves to an increasingly recreation-orientated society, the number of individuals involved in some form of wildlife-related recreation has increased. Resource managers are entrusted with maintaining the recreational availability of this nation's natural resources. Information is needed in this area to educate both the recreational activity consumers and the recreational activity providers as well as public decision makers.

Outdoor Recreation Demand Analysis

Responding to this call for knowledge about the economic value of a commodity such as wildlife-related recreation, which like any commodity provides/satisfies consumer wants and needs, economists are devoting resources to study and interpret all the factors underlying the consumer demand or "willingness to pay" for wildlife-related recreation. The simplest demand illustration, Figure 1 shows the relationship between the number of times a recreational experience is used and the price of the entire recreational experience. Demand side can be represented by a market demand curve, which shows the amount of the commodity buyers would like to purchase at various prices. Demand

Figure 1.


Recreation
Price
Market
Supply
Market
Equilibrium
Market
Demand
Recreation
Quantity

shows a inverse relationship between price and quantity. As the price of a good increases the quantity demanded for that good falls. Market demand curves are based on the assumption that tastes, incomes, number of consumers, substitute goods are held constant. A change in any of these factors is likely to shift the position of a goods demand curve. The supply side of the market is represented by a market supply curve that shows the amount of the commodity that the sellers would offer at various prices. Supply curves show a complementary relationship. As the price of a good increases the quantity supplied of that good will rise. Market supply curves are based on the assumption that technological inputs and input prices are held constant. Changes in these factors are likely to cause shifts in the supply curve. The interaction between the demand and supply market curves shows that an equilibrium point can be reached given a certain set of inputs and outputs. The effects that the different survey variables have on the supply and demand curves will be discussed in the specific chapters where they are applicable.

Wildlife-related recreation presents some problems for demand analysis, such as the lack of a formal pricing mechanism and the factors other than price that affect recreational spending. The lack of market price estimates has presented researchers with problems when estimating demand (Pope and Stoll, 1985). This does not mean that wildlife-related recreation is a "free" good, for it competes with other forms of recreation for a position in consumer budget constraints. The relationship between the ownership of the wildlife and the control of the wildlife is a paradox in itself. The public owns the wildlife, yet the property owners control the property rights to the wildlife and the management of the wildlife. Problems exist when discussing "free riders" of wildlife and

conservation efforts. Free riders are those individuals who use the recreational resources in question but do not pay for the conservation of said recreational resources (Walsh, 1986). These users increase the cost to the consumers who already are paying for the resource with no spending of their own resources. Free riders are a problem because it is difficult to manage all of the resources for consumer use without funds and the more consumers involved in wildlife-related recreation, the higher the costs.

Recreational Land Importance

In the absence of relevant demand side data, mainly the market price, agricultural economists must turn to other factors to interpret the demand for wildlife-related recreation. The willingness of consumers of wildlife-related recreation to pay for the opportunity to pursue this style of recreation is based on multiple factors.

Clawson and Knetsch (1971) indicated that money was not the only constraint faced by the recreationist. Time values and recreation preferences also constrain those enjoying the use of wildlife-related recreation. Walsh (1986) discussed the economist's ability to derive demand and show shifts in demand based on such non-price variables. He found that demand and shifts in demand could be closely estimated using non-price variables, including the use of shadow pricing.

Land leasing for the opportunity to pursue wildlife-related recreation has consistently been addressed as an important issue concerning the management and conservation of wildlife. Nearly all the agricultural lands and 64 percent of the rangelands are privately owned. However, an additional 71 percent of the total forestland is owned by private landowners or private industry. Copeland (1998) shows that private lands or open range make up nearly 60 percent of the nation's total land area. The lack of

available lands for wildlife-related uses has increased the need for research into the feasibility of hunting leases. Studies done by Porter (1992), Masters et al (1995), and Yarrow (1987) are examples explaining the concept of recreational land leasing. Recreational leasing is an agreement between a person controlling the access to property and those wishing to use the property in question for the right to participate in a recreational activity. Benefits of leasing lands include but are not limited to the increase of rural landowner incomes and lessees tend to help manage and care for the property.

Richardson (1987) discusses the different alternatives for landowners and the considerations in developing fee-access recreation on their property. Consumptive and non-consumptive uses for land and wildlife are discussed by the U.S. F&W Service (1996), Thomas (1998), and Edge (1999). These studies found that there has been an increase in consumptive and non-consumptive uses over the past several decades. Consumptive uses on the land such as fee hunting, fee fishing, sporting clays are usually the most sought after uses for leased land. Non-consumptive uses on the land include such activities as bird watching, park use, and camping. In 1990 over 14.1 million hunters spent $12 billion on consumptive uses of wildlife while 76.1 million people spent $18.1 billion on non-consumptive uses of wildlife according to Edge (1999). The large difference in consumptive spending versus non-consumptive spending not only includes actual on site expenditures, but travel costs and loss of income (opportunity cost of leisure) according to Clawson and Knetsch (1971).

Wildlife Management

There is an interesting paradox between the ownership of wildlife in our society and those allowed using the wildlife according to Porter (1992). The public is supposed

to own the wildlife, but the private landowners manage and control the wildlife. As populations grow and agricultural-based economies decline, the increase in wildlife-related recreation and tourism are greatly affecting the rights of individuals towards the use and conservation of wildlife.

Adams and Thomas (1998), Ward (1998), Yarrow (1987), and Pass (1999) have voiced concerns such as these in their research. Many landowners in Texas have built high fence enclosures to increase their ability to regulate the gene pool of the deer in the enclosure. These genetically manipulated deer grow to large size and body mass greater than that of the unrestrained deer. Then, hunters are charged premium prices for the opportunity to harvest one of these deer. Does privately confining a free ranging deer constitute the theft of a public resource? This has become one of the hot issues concerning deer hunting and deer hunters. Legal, ethical and moral questions have been raised about those who hunt deer in escape proof enclosures according to Pass (1999).

Since most hunters are usually from the lower to middle income classes, this increase in price for a trophy deer hunt would remove the largest sector of hunters from the opportunity to pursue these large deer. This is a way for landowners and the government to increase the number and size of trophy animals. But, whether this is a feasible way of increasing income for rural landowners is undecided. In research done by Schuh (1997) he shows that as the government begins to regulate the number of hunters for a particular species. the revenue from this type of enterprise falls. The raising of fees has a direct correlation with the lower number of hunters involved in the sport and decreases in state revenues. But, the blue-collar workers are being priced out of pursuing their sport. Williams (1998) voices the concerns of the hunters showing the ramifications

of treating a wild animal as domestic stock. Williams (1998) also shows concerns that the hybridization of wildlife can causes disease, loss of habitat, smaller ranges, and the cost to the public is greater than the increase in benefits from ranching wildlife.

Leasing Factors

When leasing lands for wildlife-related recreation such as hunting many factors must be considered. The development of the hunting lease enterprise into an economic enterprise given certain constraints, can be accomplished through the management of wildlife on private lands according to Ramsey (1998). While free roaming wildlife can not usually be bought and sold according to Pass (1999), the access to the property is controlled by the landowner. But, wildlife also has a negative benefit is some regions according to Nelson (1998). In certain areas the number of deer is greater than the carrying capacity. Deer enter urban areas and must be killed or removed. In certain circumstances deer have been known to cost upwards of $75,000 in damages to individual orchards and vegetable farms.

Economic Benefits

While most landowners enjoy having wildlife on their property, many fail to realize that wildlife are economically valuable. The development of the wildlife resources on the private lands is another important issue when considering whether to provide land for leasing. Thomas (1998), Shult (1998), and Yarrow (1987) show the importance of having good resources available to both the lessees and lessors. According to Shult (1998) one of the most important things for the potential lessor to have is an inventory of available resources on his property. These resources are described as biological resources (including game animals present), physical resources (including such

items as lodging and blinds), and human resources. Initially, the quantity of land available for the wildlife-related experience must be large enough to carry the capacity of deer and deer hunters that will create a benefit to the hunter and the landowner.

Lease type and lengths must be considered along with the value of the game they are marketing and its income potential must be realized. Marsinko, Smathers, Guynn, and Stuckey (1992) researched the value (cost) of lease fees compared to the value recorded by the individuals leasing the land and found that the benefits to consumers outweighed the costs. Having cooperative deer management programs between landowners with adjacent lands is another way to manage deer for hunting on privately leased lands. Weishuhn (1999) shows how small acreage ranches can form cooperatives for the optimal management and harvest of deer on multiple properties with minimal affect on lease agreements and harvest numbers.

One of the largest concerns of landowners who are attempting to increase their incomes through the use of leasing lands for the purpose of deer hunting is the demand for this type of recreation and the benefit they can derive from this type of opportunity. Wildlife has an economic value because people are willing to pay for the right to hunt and observe wildlife. Guynn (1998) has shown that the economic incentives for the management of wildlife are key to maintaining existing wildlife habitats on private lands. Harmel (1998) and Blakenship (1998) discuss different ways of ranch and livestock management on the property to reach optimal wildlife benefit. Since consumer satisfaction can be derived from consumer willingness to pay for hunting services and harvest potential, it is important to understand the economics of deer hunting.

Trophy hunters. those wishing to harvest a large specific type of deer, can be extremely specific regarding the characteristics of the game they wish to harvest and many are willing to pay a premium price for the opportunity to harvest game that reaches the standards they have set. Differential pricing for the opportunity to harvest deer based on antler size, sex and age are important considerations when leasing lands. Another important aspect of demand is utility theory. How much utility a consumer gains from a good in relation to the cost of the good. This is especially important when considering risk aversion. Risk aversion is the willingness of a consumer to gamble the expected value of the good versus the possibility of gaining a level of utility greater than the cost of the gamble itself according to Varian (1990). Guynn (1998) estimated the net present value for bucks harvested at different age levels. Net present value was positively correlated with both age and body size. Brabander, Masters, and Short (1985) have estimated values for game animals in southeast Oklahoma. Estimates on a man-day value for hunting ranged from $4.80 to $124.80 in this region based on the type of species hunted. Guynn (1998) also shows that the proper management of wildlife can create an income from lease hunting, sometimes greater than that from traditional ranching.

Adams and Thomas (1998) described the characteristics and opinions of Texas hunters towards hunting specific game animals during the 1982-1983 hunting season. These characteristics give the landowners important information into the preferences and demand side issues that must be provided to the hunters to increase the marketability of the hunting experience they are offering. The main concern of hunters was the cost of leasing lands and the cost of hunting permits, a issue voiced by Adams and Thomas (1998), Guynn (1998), and Burger and Teer (1981). Many felt that the cost to hunt on

leased land was too high to warrant the continuation of pursuing the sport. Other concerns voiced in research by Pope and Stoll (1985) included the quality of game available, quantities of game available, different types of game available.

Stuckey, Guynn, Marsinko, and Smathers (1989) showed other issues as having importance to hunters. These included but are not limited to the length of the leasing period and the availability to harvest all different game animals on the lease during there respective seasons. Hunter characteristics, willingness to pay and preferences are important knowledge for those individuals attempting to create a management area for wildlife with the intent of leasing the rights to the property to individuals for the pursuit of wildlife-related recreation.

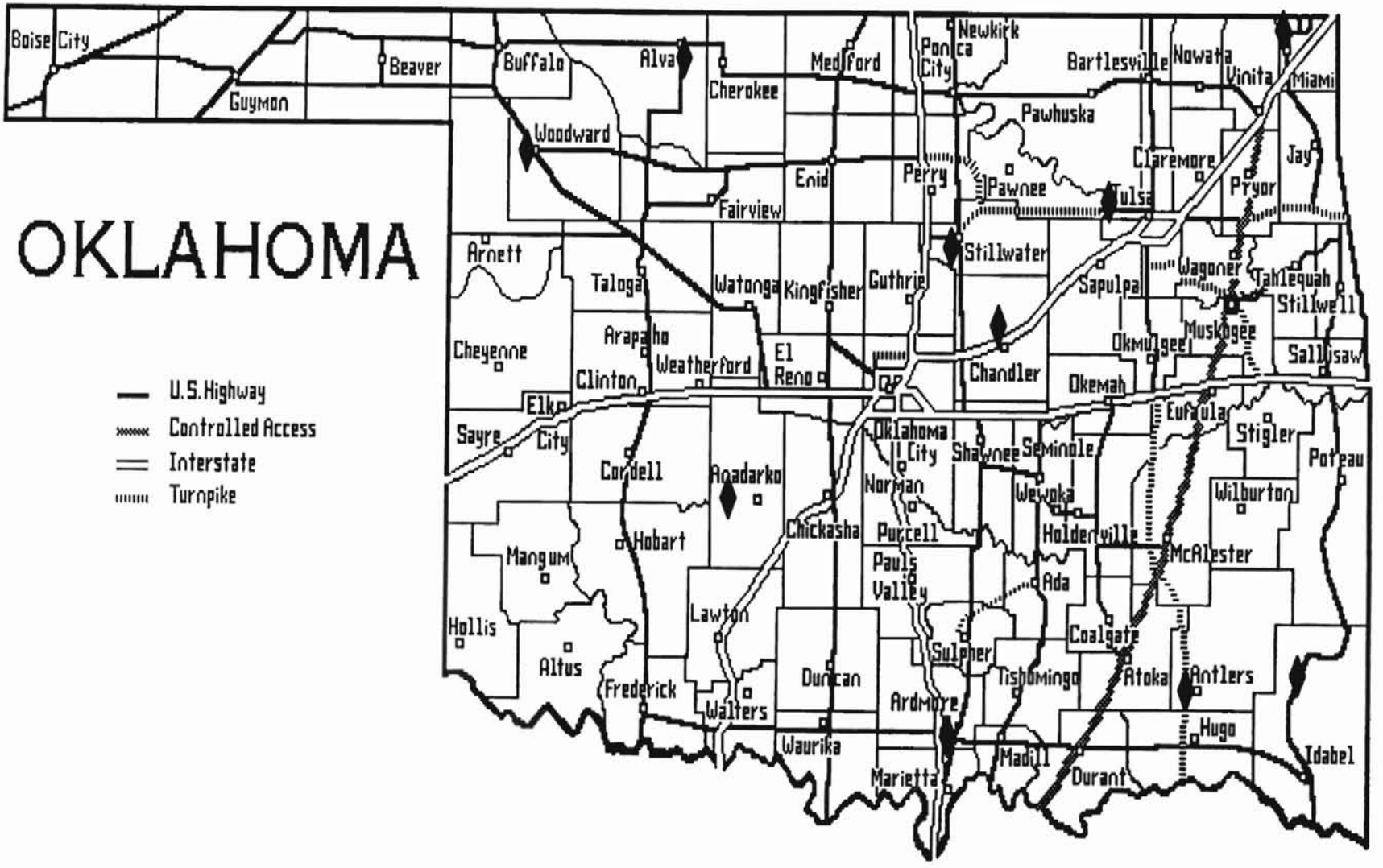
Survey Design and Procedure

A hand-delivered survey was prepared to obtain information on the willingness to pay of Oklahoma Deer Hunters for certain types of wildlife-related recreation and conservation, the opinions that the deer hunters of Oklahoma have toward government intervention in conservation and management of wildlife resources, the frequency of hunts and preferences of harvest of deer hunters, the property ownership and acreage availability of the land being used for deer hunting, and the expectations and attitudes of deer hunters towards leasing land for hunting. The survey was short, one page front and back with 32 multiple choice questions; it was designed for clarity and simplicity of questions. It was printed on multi-colored paper for area distinction and clarity during analysis and for notability at the surveyed locations. A copy of this survey is attached as Appendix A in this report.

Considering that white-tailed deer hunting is one of the most marketable hunting experiences in Oklahoma, it is for research in this area that the survey was conducted. Due to budget constraints, the population to be studied was limited to ten deer hunter check stations spread across the state of Oklahoma. Given the small sample surveyed due too the budget constraints, it is difficult to extrapolate data to the entire state of Oklahoma. If a larger budget had been available at the time of survey construction, the design of the survey would have been built to encompass the entire state and not just the selected regions currently under study. Also, a follow up mail survey in the spring looking at a random sampling of all those individuals in the state that bought deer tags for the 1998 season. These follow up survey efforts would have increased the overall sample size of the study and given comparison data for analyses.

Figure 2 shows a map of the state of Oklahoma and the check stations surveyed. The surveyed areas are separated into approximately six sections, (1) northwestern Oklahoma to represent a western location in the state where there is a predominance of leased lands, (2) northeastern Oklahoma in areas around Keystone public hunting areas to represent public hunting near a large urban area, (3) east-central Oklahoma in areas between Tulsa and Oklahoma City to represent private land hunting near urban pressure, (4) southeastern Oklahoma to represent an area where the timber industry and its unique land access issues are dominant,(5) southwestern Oklahoma to represent large areas of underdeveloped rural communities and, (6) north-central Oklahoma to represent moderate to intense hunting pressures near semi-urban areas. These areas will allow for meaningful statistical cross comparisons across the state of Oklahoma.

Figure 2.


OKLAHOMA
U.S. Highway
Controlled Access
Interstate
Turnpike
Boise City
Beaver
Guymon
Buffalo
Alva
Cherokee
Medford
Ponca City
Newkirk
Bartlesville
Nowata
Vinita
Miami
Woodward
Enid
Perry
Pawhuska
Pawnee
Tulsa
Claremore
Pryor
Jay
Fairview
Arnett
Taloga
Watonga
Kingfisher
Guthrie
Stillwater
Sapulpa
Wagoner
Tahlequah
Stilwell
Cheyenne
Arapaho
Weatherford
El Reno
Chandler
Okmulgee
Muskogee
Sallisaw
Clinton
Okemah
Elk City
Sayre
Oklahoma City
Shawnee
Seminole
Eufaula
Stigler
Poteau
Cordell
Anadarko
Norman
Wewoka
Wilburton
Chickasha
Purcell
Holdenville
McAlester
Hobart
Mangum
Pauls Valley
Ada
Lawton
Hollis
Coalgate
Sulphur
Altus
Frederick
Duncan
Tishomingo
Atoka
Antlers
Walters
Ardmore
Hugo
Waurika
Madill
Idabel
Marietta
Durant

These check stations were chosen for the number of deer checked during the 1997 season, geographical and habitat dispersion, proximity or lack there of too larger urban areas, state parks, and wildlife refuges. Regionally, each check station was chosen for not only its proximity to the area, but for the number of deer checked in each area in the past year, with the intent of increasing the number of survey responses. In northwestern Oklahoma the stations chosen were in Woodward and Alva, with 1997 harvests of 639 and 478 white-tailed deer respectively. In the northeastern area surveyed the stations chosen were Miami and Sand Springs, with 1997 harvests of 870 and 412 white-tailed deer respectively. In the east central region of Oklahoma the station chosen was Chandler, with a 1997 harvest of 433 white-tailed deer. In the southeastern region of Oklahoma the stations chosen were Antlers, Mt. Herman and Ardmore with 1997 harvest of 439, 225, and 283 white-tailed deer respectively. In southwestern Oklahoma, due to a lack of large numbers of deer checked in at many of the stations, the only station checked was in Ft. Cobb, with a 1997 deer harvest of 552 white-tailed deer. In the north central region of Oklahoma two stations were originally chosen, Stillwater and Ponca City, but with no assistance from the Ponca City station the only station surveyed was Stillwater, with a 1997 harvest of 644 white-tailed deer.

The sample was conducted during a two week time period from November 21, 1998 to December 1, 1998. This time period was chosen because it encompasses the rifle and shotgun season for deer in Oklahoma, the time frame when the most deer are harvested in the state. It also encompassed four days of archery season, so as not to limit the respondents to just firearm hunters. The overall population size is difficult to adjust for, due to the fact that to have filled one of these surveys out all the respondents had to

do was frequent one of the deer hunter check stations. The population consisted of all those visiting the deer hunter check stations, whether checking in deer or not. Throughout the state the surveyed sites had good response rates, approximately 10 to 12 percent of the number of individuals who checked in deer last year filled out one of the surveys. Overall response rate on this survey was 323 respondents. Three surveys were not used due to inconsistent information leaving the adjusted sample size at 320. All data analysis was done from this group of 320 surveys.

This survey was based on studies done by the United States Fish and Wildlife Service and Texas A & M University. This surveys strengths lie in its ability to question the activities of the Oklahoma deer hunter and to gather data into the general characteristics of the Oklahoma deer hunter. This survey asked questions that address certain concerns of hunters, landowners and those of government agencies. Another strength that is encompassed in this survey is that it does not show any attempt by the surveyor to increase his personal gain from the information he receives from this survey. The length of the survey was only one page to keep time and effort filling out the form at a minimum and to increase the number of respondents. Some of the weaknesses of this survey are that is only encompasses a small group of the total deer hunters in the state and that the number of questions allow a small number of significant responses for analyses. Also, the small sample size lead to difficulty in cell count size and in variable grouping.

At the deer hunter check stations a small area was set aside for the purpose of conducting this survey. The surveys were laid out in front of a large poster explaining the reason for the survey and importance of the study. The legitimated purpose of the

survey was established by the use of university logo on the poster and on the actual survey sheets. The questions were given as an experiment intended to provide economic and socio-economic results of white-tailed deer hunters in the state of Oklahoma. While respondents could be biased in their responses, the possibility for bias in this survey is limited. Most respondents were consistent with the national averages in this survey and because of the frequency of surveys that hunters are requested to fill out, usually national surveys that will have an effect on them, the responses are thought out and consistent. Certain areas may seem biased as based on an inspection of the data, but those questions are consistent with the national averages or Oklahoma data gathered from other research studies.

Demographic Comparison

A test of how well the sample represents the population is to compare the respondent's socioeconomic characteristics to the U.S. Census for Oklahoma. This shows generally that the sample is representing the population well. Table 1 shows the socioeconomic characteristics for both the survey respondents and population of Oklahoma. For most comparisons the socioeconomic characteristics of the sample are consistent with the state population. The male/female ratio is skewed heavily to the male side and does not sum to 100 percent due to non-responses of those surveyed. It is more likely that hunters will be male in all states (Schuh, 1997). Average age was slightly lower; possible due to the fact that two college towns were surveyed. Geographic dispersion of the sample closely approximated the population, with the large metro and large city areas being the exception. But, most hunters are from rural or small cities, so this discrepancy was expected (USDA, 1996). These values do not sum to 100 percent

Table 1. Comparison of Socioeconomic Characteristics of the Sample and Population of Oklahoma

Variable	Sample(%)	State Population(%)
Male/Female Ratio, percent	75.3/2.8	47.8 / 52.2
Average Age, years	33.4	35.47
Age Distribution, percent		
Under 18	5.6	29.5
18 – 29	25	13.4
30 – 44	32.2	21.5
45 – 64	13.8	21.9
65 and over	1	13.5
Household Size, persons	3.4	2.53
Average Income, range		
Under $19,999	12.8	23.5
$20,000 - $39,999	19.7	13.2
$40,000 - $59,999	18.8	25.2
$60,000 - $79,999	10.9	22.0
$80,000 - $99,999	4.3	15.0
$100,000 and up	4.7	1.1
Geographic Distribution		
Large Metro Area	5.3	31.8
Large City	8.1	16.9
Medium City	9.7	11.5
Small City	13.1	8.9
Small Town	14.1	12.8
Rural Area	27.2	18.2

Sources: [1]Survey conducted by Bret Collier, Department of Agricultural Economics, Oklahoma State University
[2]U.S. Department of Commerce, and Oklahoma Department of Commerce.

due to non-responses by those surveyed. Income ranges were consistent with state values, with lower and middle-income levels over represented in the sample. These values do not sum to 100 percent due to non-responses by those surveyed.

Respondents were asked to report on the number of years hunting deer in Oklahoma, the frequency of hunting per year, their harvest preferences, and other game hunted during the past two years. These rather specific questions are to be compared to the national averages of hunters in the United States to determine if Oklahoma hunters are statistically different from the national average. Respondents were asked to report to a series of willingness to pay questions for hunting and leasing services. The dollar amount groupings were taken from data gathered from studies done by Oklahoma State University and Texas A & M University in regards to the cost to landowners and average prices paid by the hunters. In these questions respondents were requested to report their willingness to pay for a trophy buck hunt both with and without a proven success rate. This was done to show if a guarantee increases the willingness to pay for the service, and to study if income type and other demographic information has a statistically significant effect on the survey respondent's willingness to pay.

Respondents were asked to report on the primary property that they had hunted for deer on in the past two seasons (1996-1997), this season (1998), and the acreage available for them to hunt on. These questions were intended to reach a conclusion on which of the land types are used most frequently and to compare to the demographic information for statistical differences in land access and availability.

Respondents were requested to report on the different aspects of the hunting experience that which they leased land for, and the expectations of the land and the

landowner of land that they had leased. These expectations are to be used to infer if individuals who lease lands are more likely to have specific wants, needs or guarantees of the leased lands.

Respondents were asked to report their attitudes towards the state of Oklahoma on its conservation efforts of wildlife habitat, if the respondents give financial resources to conserve wildlife and hunting in Oklahoma, and if not would they be willing to donate for the conservation of wildlife and what form of donation would they prefer. These questions are meant to infer if those who are in different socio-economic groups have different opinions of donations and conservation of wildlife in Oklahoma. These questions should give a fair idea if there is a "free rider" problem in the state of Oklahoma when it comes to conservation.

Chapter III

Characteristics of Oklahoma Deer Hunters

John Madson in his essay, "Out Home," (1983) said: "Hunting is one of the last genuine, personal adventures of modern man. Just as game animals are the truest indicators of quality natural environment, so hunting is the truest indicator of quality natural freedom."

The concept of outdoor recreation use is based on the economics of consumer demand, explained as the relationship between the prices for the recreation use and the ability and willingness of the consumers to consume the recreation in question. Recently, there has been an increase in the demand for outdoor-related recreational opportunities, such as hunting (U.S. Fish and Wildlife Service).

The average respondent to the survey can be characterized as follows: male, age 34, income level in the $40,000 to $60,000 range, spent most of his life in a small city or town or rural area with a population less than 25,000; part of a household of 3-4 people with 1-2 hunters per household, and has spent 15 years hunting white-tailed deer in Oklahoma.

Hunting Trip Frequency and Harvest Preferences

Table 2 shows the average years spent hunting white-tailed deer in the state of Oklahoma, as reported by Oklahoma deer hunter check station respondents in the fall

Table 2: Average Years Spent Hunting White-tailed Deer in Oklahoma.
As Reported by Oklahoma Deer Hunter Survey Respondents, Fall 1998.

	Years	Std. Dev
Antlers	21.6	10.3
Mt. Herman	14.7	9.1
Ft. Cobb	12.0	9.3
Stillwater	9.3	5.2
Woodward	15.1	11.2
Ardmore	15.3	10.5
Chandler	16.1	9.8
Alva	14.5	8.7
Sand Springs	16.2	10.1
Miami	15.4	10.5
Totals	15.0	9.47

Source: Survey conducted by Bret Collier, Department of Agricultural Economics, Oklahoma State University

of 1998. The overall average years spent hunting in the state by the survey respondents was 15 years. The areas with the highest and lowest average years spent hunting, respectively, were Antlers, at 21.64 years on average, and Stillwater, at 9.27 years on average. All but one of the other areas surveyed fell in the 14 to 17 year range, with Fort Cobb at 12.03 years being an exception. The city of Stillwater, a college town, may exhibit the lower average due to the lower age of students, as opposed to the area surrounding Antlers, a very rural area, which, demographically speaking, is an older community (OK Dept of Commerce, 1999). The standard deviation shows the square root of the variance (average of the squared deviations from the mean of each area) and is used as a measure of dispersion shown in the same units as the original variates and their means.

Table 3 shows the average days in 1997 spent white-tailed deer hunting in Oklahoma according to the 1998 survey respondents. According to the 1996 National Survey of Fishing, Hunting, and Wildlife Associated Recreation, sportsmen are placed into three categories depending on the time devoted to hunting or fishing in previous years. These categories are: avid, an individual who hunted thirty days or more in the survey year; average, a individual who hunted four to twenty-nine days in the survey year; and infrequent, an individual who hunted at least one day but less than three days in the survey year. Of the 95 percent of the survey respondents that replied to this question, 17 percent were considered infrequent hunters, 50 percent were considered average hunters and 28 percent were considered avid hunters for the 1997-hunting season.

Based on the survey results, Woodward and Miami have the largest percentage of active and avid hunters in the state compared to all areas surveyed . Also, based on the

Table 3: Days in the 1997 spent hunting White-tailed deer in Oklahoma.
As reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
1-3 Days	1	3	2	5	22	3	2	2	8	7	55	17%
4-29 days	10	5	12	8	45	11	15	18	8	29	161	50%
30+ Days	0	6	11	2	14	8	6	5	15	23	90	28%
												% Total Response
Totals	11	14	25	15	81	22	23	25	31	59	306	96%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

survey results, it is possible to hypothesize certain classifications of hunters: Individuals who are infrequent hunters are strictly meat hunters, out to harvest any white-tailed deer for venison. Active hunters are individuals that are probably hunting more than just one season or using more than one method, are meat hunters, and are looking to harvest multiple deer or specific (antlered) deer. Avid hunters are most likely individuals that are trophy hunters, multiple season and multiple methods hunters, and commercial hunters. In the state of Oklahoma, 78 percent of the survey respondents were classified as active or avid hunters having spent more than four days hunting during the 1997 season. Future study should be done in deciding whether or not a day spent scouting for deer, setting up blinds and tree stands, and traveling constitute a day spent hunting, but for this study it is considered as a day spent hunting.

Table 4 shows the average expected days spent white-tailed deer hunting in Oklahoma in 1998 according to the survey respondents. Of the 99 percent of survey respondents that replied to this question, 14 percent were considered infrequent hunters, 57 percent were considered average hunters and 28 percent were considered avid hunters for the 1998 hunting season. Again, based on the survey results, Woodward and Miami have the largest percentage of active and avid hunters in the state.

A major concern for those leasing land and/or managing white-tailed deer is the demand for a specific gender of deer. Based on the survey responses as shown in Table 5, 99 percent of the responding Oklahoma deer hunters had the following preferences: 31 percent would prefer to harvest a buck, two percent would prefer to harvest a doe, 34 percent would prefer to harvest any gender or type of deer, and only 33 percent would s

Table 4: Days expected in 1998 to be spent White-tailed deer hunting in Oklahoma.
As reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
1-3 Days	1	2	3	4	23	2	2	1	4	3	45	14%
4-29 Days	10	8	16	11	45	11	14	15	14	38	182	57%
30+ Days	0	4	9	1	15	9	8	8	15	21	90	28%
												% Total Response
Totals	11	14	28	16	83	22	24	24	33	62	317	99%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 5: Harvesting Preferences by Oklahoma Deer Hunters, 1998.
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Buck	5	7	6	3	22	7	8	7	12	22	99	31%
Doe	0	0	0	1	3	0	2	0	0	0	6	2%
Any Deer	3	4	7	5	32	7	5	11	11	23	108	34%
Trophy Buck	3	3	15	7	26	8	9	7	10	17	105	33%
												% Total Response
Totals	11	14	28	16	83	22	24	25	33	62	318	99%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

prefer to harvest a trophy buck. Based on the survey results, in Ft. Cobb and Stillwater approximately half of the respondents would prefer to harvest a trophy buck over all other choices. Based on the results in Ardmore, Sand Springs, and Chandler over one third would prefer to harvest a trophy buck. The low level of respondent preferring to harvest a doe breeds some concern. In Richard Nelson's "Deer Nation," (1998) he shows that there is a large number of deer being killed or given infertility drugs to control over-population. This is shown to be a true statement from preferences shown in this study about the willingness to harvest a doe. Proper management techniques would keep the population in check, but unregulated harvests or disinterest in harvesting does can be detrimental to certain regions. Over-population of does creates a strain on viable deer habitat by not having the ability to sustain the necessary nutrient levels to feed a larger herd of deer.

Since many hunters enjoy the opportunity to harvest other game animals both before and after deer seasons, it is relevant to delve into the other game pursued by deer hunters. Table 6 shows the game other than white-tailed deer actively hunted in Oklahoma during the past two years. The most actively-hunted game other than deer in the state of Oklahoma was dove, with 59 percent of those surveyed participating in this activity. Dove hunting was followed closely by quail hunting (56 percent), and turkey hunting (55 percent). There is a drop in interest to waterfowl hunting (24 percent), and pheasant hunting (21 percent). Elk and antelope follow at the lowest levels with 3 percent and 2.5 percent respectively. According to respondents, doves were most actively hunted by respondents in the northeast, central, and northwest areas of Oklahoma. Quail hunting was also most actively pursued by those respondents living in

Table 6: Game Other Than White-Tailed Deer Actively Hunted In Oklahoma During the Last Two Years.
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Turkey	7	9	14	8	52	12	17	17	14	27	177	55%
Pheasant	1	1	2	5	25	1	6	15	6	4	66	21%
Quail	4	4	18	6	55	12	17	20	11	33	180	56%
Waterfowl	1	4	7	5	14	4	14	5	8	15	77	24%
Antelope	0	2	0	0	3	0	1	1	0	1	8	3%
Elk	0	2	0	0	3	1	2	1	1	0	10	3%
Dove	3	8	14	9	57	9	14	18	16	41	189	59%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.
Footnote: Survey respondents were instructed to circle all the categories that applied to them.

the northeast, central, and northwest areas of Oklahoma. Turkey hunters are distributed rather evenly over the entire state, while waterfowl hunting and pheasant hunting are usually pursued in the north and central parts of the state. Elk and antelope are hunted more by hunters from the north and southeast than in any other region.

Paid to Hunt

Because of the decrease in the availability of land for wildlife-related recreation, it is important to know if hunters in the state of Oklahoma are paying for the opportunity to pursue game. Table 7 shows the respondents who have paid to hunt in the state of Oklahoma. Of the 98 percent responding, only 36 percent had paid to hunt in the state of Oklahoma. Sixty-two percent have not paid to hunt in Oklahoma. Respondents in Sand Springs and Antlers are the only areas with more hunters paying to hunt than not. Chandler, Mt. Herman and Stillwater are close to equal of those paying and not. This could be because of the fact that Sand Springs, Chandler, and Stillwater have high population densities with less public available land for hunting, and that hunters in Antlers and Mt. Herman have to pay land access fees to Weierhauser (logging company) for the right to hunt on the large tracts of land that is owned in this region.

Different species of game have different values to hunters; some species are harder to find, some are not available on public lands, and some are only allowed to be hunted in specific areas. Table 8 shows the game that the survey respondents have paid to hunt in the state of Oklahoma. Of the 36 percent who paid to hunt in Oklahoma, 33 percent paid to hunt white-tailed deer, 12 percent paid to hunt turkey, six percent paid to hunt quail and five percent paid to hunt dove. There is then a decline to three percent for waterfowl, two percent for both pheasant and elk, and only one percent for antelope.

Table 7: Respondents whom have paid to hunt in the state of Oklahoma.
As reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
YES	7	5	5	6	26	9	10	8	18	22	116	36%
NO	4	8	23	9	57	13	14	17	15	39	199	62%
												% Total Response
Totals	11	13	28	15	83	22	24	25	33	61	315	98%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 8: Game Respondents Have Paid To Hunt In The State Of Oklahoma.
As Reported By Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Deer	7	5	6	5	22	8	8	7	15	21	104	33%
Turkey	3	3	1	2	10	2	2	3	6	5	37	12%
Pheasant	2	0	0	1	1	0	0	1	0	0	5	2%
Quail	1	0	1	1	6	1	2	2	2	4	20	6%
Waterfowl	1	1	0	1	3	1	1	0	0	2	10	3%
Antelope	0	1	0	0	0	1	0	0	0	0	2	1%
Elk	0	1	0	0	0	1	1	0	1	1	5	2%
Dove	1	0	0	1	3	1	1	0	5	5	17	5%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.
Footnote: Survey respondents were instructed to circle all the categories that applied to them.

Future study should be done to examine if those who paid to hunt have the same willingness to pay as those that have not paid to hunt. Deer, by far, is the most sought after game in the state, but considering that individuals usually do not own large tracts of land that can be used for hunting, it shows that Oklahomans do show some willingness to pay for the right to hunt deer in the state. According to respondents, deer, turkey and quail are the three species most often paid for. All areas show that at least one third of all respondents have paid to hunt deer. The southeast and north show at least one fifth have paid to hunt turkey, and those respondents in northern Oklahoma have shown to be willing to pay for quail hunting.

Willingness to Pay for Hunting

In Table 9, respondents were asked to give their willingness to pay for a trophy buck hunt in the state of Oklahoma. Eighty-three percent of the survey respondents answered this question, with an overwhelming 55 percent responding that they would be willing to pay less than $200. Twenty percent responded that they would be willing to pay between $200 and $400 for a trophy buck hunt, falling to five percent willing to pay between $400 and $600, one and a half percent willing to pay between $600 and $800, and one percent for both the $800 to $1000 and the $1000 plus levels. This table is used in comparison with Table 10, willingness to pay for a trophy buck hunt with a proven 90% success ratio. Respondents in Antlers, Ft. Cobb, and Mt. Herman are almost totally unwilling to pay more than $200 for a trophy buck hunt. Areas with high populations, Sand Springs, Miami, Woodward, and Ardmore have higher willingness to pay for a trophy buck hunt. This could be due to the lack of available space for deer hunting, the pressures put upon the deer, or the cost factor of leasing property or guided hunts.

Table 9: Willingness To Pay For A Trophy Buck Hunt (8 Points Or Larger).
As Reported By Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
$200 or less	8	12	13	8	41	7	14	17	17	38	175	55%
$200-$400	0	1	4	2	15	11	5	2	12	12	64	20%
$400-$600	1	0	2	1	6	1	0	0	0	5	16	5%
$600-$800	0	0	0	0	1	0	0	1	0	3	5	2%
$800-$1000	0	0	1	0	2	0	0	0	0	0	3	1%
$1000+	1	0	0	0	2	0	1	0	0	0	4	1%
												% Total Response
Totals	10	13	20	11	67	19	20	20	29	58	267	83%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 10: Willingness to Pay For a Trophy Buck Hunt (8 Points Or Larger) With a Proven 90% Success Rate. As Reported By Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
$200 or less	8	12	10	5	35	5	14	17	12	29	147	46%
$200-$400	0	1	4	3	18	9	1	1	15	12	64	20%
$400-$600	1	0	2	2	6	4	2	0	2	10	29	9%
$600-$800	0	0	2	1	2	0	1	1	0	4	11	3%
$800-$1000	0	0	0	0	3	0	0	0	0	1	4	1%
$1000+	1	0	1	0	4	0	2	0	0	1	9	3%
												% Total Response
Totals	10	13	19	11	68	18	20	19	29	57	264	83%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Theoretically, as the success rate improves, the willingness to pay for a service should increase. This is based on the theory of consumer risk. With this new success rate in the question, only 45 percent said they would be willing to pay less than $200 for a trophy buck hunt. Twenty percent still said they would be willing to pay $200 to $400, but nine percent said they would be willing to pay $400 to $600, an increase of four percent. Three percent said they would be willing to pay $600 to $800, an increase of one and a half percent, one percent said they would be willing to pay $800 to $1000, and three percent said they would be willing to pay more than $1000, an increase of two percent. As the success rate increases the willingness to pay should increase somewhat. Respondents in Alva, Antlers, Mt. Herman, and Chandler show no change in their willingness to pay with the proven success rate, but most other areas have approximately ten percent of the individuals willing to pay less that $200 move to another pricing bracket, most usually into the $200 to $400 bracket or the $400 to $600 bracket. Also, several respondents moved up to the $1000 or greater category. This trend lends credibility to the hypothesis that as success rates are increased individual willingness to pay will increase.

Land Rights and Acreage Available

Hunters tend to put higher values on hunts with proven success rates, such as all the managed hunts in Texas where deer are managed for antler size and body mass (Blankenship, 1998). In Texas, the management deer that are harvested to reduce the breeding population in certain high fence hunting preserves are trophies by most hunters' standards. But they are genetically inferior to the prime bucks on that range so they are harvested yearly to keep the largest bucks with the best genetics breeding the does. This

is done because the state of Texas has the most highly developed commercial hunting system on the continent (Burger and Teer, 1981).

As early as the 1920's Texas landowners realized that managing deer was a feasible economic alternative to farming. Profits were higher, it was less labor intensive, less capital intensive, and it was a underdeveloped marketing opportunity in that state. Now, individuals pay upwards of $10,000 for a guided hunt on a managed whitetail deer farm. But in a society where wildlife is considered to be public property, the commercial system is at odds with the state. Considerable controversy exists about charging for hunting on private lands (Burger and Teer, 1981).

Property rights are important issues when outdoor recreation is involved. Access fees and lease agreements for outdoor-related recreation are commonplace in today's society for both the sportsman and the casual outdoor recreation user. Survey respondents in Oklahoma were requested to classify the ownership of the property that they have hunted on in the past two years and the 1998 season in Tables 11 and 12 respectively. With 98 percent of those surveyed responding, 31 percent stated that they hunted on private property that they owned during 1996-1997, with only 24 percent so stating for the 1998 season. Forty-nine percent state that they hunted on private property owned by a friend or family member in 1996-1997, as opposed to 52 percent in the 1998 season. Thirteen percent of the respondents hunted on leased property in 1996-1997, compared to 15 percent hunting on leased land during the 1998 season. Only five percent hunted on public property in 1996-1997, with a slight increase during the 1998 season to six percent.

Table 11: Classification of Property On Which White-Tailed Deer Were Hunted, 1996-1997.
As Reported By Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Private own	5	4	7	6	22	6	11	8	6	24	99	31%
Friend/family	4	1	17	10	38	13	8	15	20	30	156	49%
Leased	0	0	4	0	20	2	4	1	4	6	41	13%
Public	2	8	0	0	2	0	0	0	3	1	16	5%
												% Total Response
Totals	11	13	28	16	82	21	23	24	33	61	312	98%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.
Footnote: only one response was circled for each survey.

Table 12: Classification of Property on Which White-Tailed Deer Were Hunted, 1998.
As Reported By Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Private own	4	4	7	4	16	4	7	6	4	21	77	24%
Friend/family	4	1	17	11	37	15	11	16	22	33	167	52%
Leased	1	1	4	1	21	2	5	2	5	7	49	15%
Public	2	7	0	0	8	0	0	0	2	0	19	6%
												% Total Response
Totals	11	13	28	16	82	21	23	24	33	61	312	98%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.
Footnote: only one response was circled for each survey.

their family with enough land on which to hunt. Hunting on privately-owned land also contains a very large group of the survey respondents. Another quarter of the respondents during the 1998 season hunt on private property they own. This combined with the number of hunters on friend's or family member's land leaves only a small number of hunters who have to look for locations to hunt. These individuals either have to look to hunt on the public land in the state of Oklahoma or they need to look at leasing land in Oklahoma for hunting. Individuals who are leasing land in Oklahoma have many choices about where they would choose to have hunting leases at. The type of hunting they would prefer will in some ways distinguish in what area they should hunt in. In southeastern Oklahoma, the logging companies privately own much of the land. In this area few individuals surveyed hunted on leased land, less than one percent. In western Oklahoma, including Alva, Woodward, and Ft. Cobb, there are larger landholdings by private individuals and a less dense human population. This area showed 16 percent of the hunters leasing land for deer hunting. The larger tracts of land and availability of game tend to make this area of Oklahoma a prime hunting spot for hunters who lease land. Smaller numbers of hunters in the northeast near Miami and Sand Springs leased land for hunting, approximately ten percent of the respondents from that area. Near urban areas the number of hunters who lease land increases as a percentage of the total respondents.

In theory the closer hunters are to an urban area the more difficult it is to locate available private and public lands to hunt on so leasing becomes the only viable option. Yet these areas still show a high number of hunters going on friends and families lands. One surprising increase is in the Woodward area where in 1996-1997 only two hunters

were going to hunt on public land, in the 1998 season another six joined in to bring the total number to nearly ten percent of those responding from that area. All other areas show a decrease in the number of hunters on public lands and privately owned lands with increases in leased land hunting and hunting on friend or family member's land.

Table 13 shows the number of acres that were available for the survey respondents to hunt on. Ninety-eight percent of those surveyed responded to this question. Sixty-one percent of those responding had greater than 250 acres to hunt on, seven percent had between 200 and 250 acres available to them, eleven percent had 150 to 200 acres, six percent had 100 to 150 acres and 13 percent had less than 100 acres. Compared to the responses from Table 11, most of those hunting on privately owned property (76 percent) had relatively large tracts of land available to them.

Table 14 shows the distance that respondents had to travel from the nearest public road to their blind/stand. Of the 98 percent responding to this question, the largest group responding were those traveling more than 1000 yards (23 percent) to reach their blind/stand. Twenty-one percent responded traveling between 200 and 400 yards, 18 percent traveled 400 to 600 yards. Twelve percent traveled 600 to 800 yards, ten percent traveled less than 200 yards, eight percent traveled 800 to 1000 yards and only six percent responded N/A to this question. Theoretically, respondents to this question will compare the concept of willingness to pay for hunting services using travel cost concept and the concept of time spent in the field.

Willingness to Pay for Leased Land

Table 15 shows the survey respondents willingness to pay per 100 acres leased for deer hunting. With 88 percent of those surveyed responding, 50 percent indicated a

Table 13: Acreage Available to Respondents for White-Tailed Deer Hunting, 1998.
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
50 or less	0	1	0	1	2	2	0	1	3	6	16	5%
50-100	1	0	3	2	4	1	2	0	4	8	25	8%
100-150	0	0	2	1	6	1	3	1	1	5	20	6%
150-200	0	0	6	0	5	6	1	1	4	13	36	11%
200-250	1	0	2	1	7	0	3	0	2	7	23	7%
250+	9	13	15	11	59	11	14	21	19	23	195	61%
												% Total Response
Totals	11	14	28	16	83	21	23	24	33	62	315	98%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 14: Distance Between Blind/Stand and a Public Road.
As Reported By Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
200 or less	0	3	3	2	7	2	1	3	5	6	32	10%
200-400	4	0	9	4	15	1	6	6	7	15	67	21%
400-600	1	2	7	5	11	5	4	4	3	16	58	18%
600-800	1	0	3	2	8	3	6	1	3	10	37	12%
800-1000	1	1	2	2	4	5	4	3	2	2	26	8%
1000+	0	6	3	1	32	4	1	6	11	11	75	23%
N/A	4	2	1	0	5	1	1	1	2	2	19	6%
												% Total Response
Totals	11	14	28	16	82	21	23	24	33	62	314	98%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 15: Respondents Willingness to Pay Per 100 Acres for a Deer Hunting Lease.
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
$100 or less	10	13	12	8	33	11	13	17	20	25	162	51%
$100-$200	0	0	4	4	19	5	5	2	7	16	62	19%
$200-$400	0	0	3	1	15	3	1	2	5	14	44	14%
$400-$600	0	0	1	0	1	0	1	1	0	3	7	2%
$600-$800	0	0	0	0	0	0	0	0	0	1	1	0%
$800+	1	0	2	0	2	0	1	0	0	0	6	2%
												% Total Response
Totals	11	13	22	13	70	19	21	22	32	59	282	88%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

willingness to pay of less than $100 per 100 acres. Nineteen percent stated a willingness to pay between $100 and $200 per 100 acres, and 14 percent stated a willingness to pay between $200 and $400. Two percent had a willingness to pay between $400 and $600, three percent had a willingness to pay between $600 and $800 and two percent had willingness greater than $800 for 100 acres of leased land.

These values coincide with the research done by Albert Ward in Edwards County, Texas in 1998 on what landowners in that area felt was a fair price to charge for a hunting lease in dollars per acre. His responses ranged from $1 to $10 per acre, with the mean being in the $3 to $5 range dependent on variables that were not explained in the study. On this occasion, the value placed on the lease by the landowners is closely correlated to the values given by the Oklahoma survey respondents. Given the distance between these two areas this is an interesting aspect of the study. It shows that even though there is a large difference in the types of land and hunting done in Texas and Oklahoma, the market price mechanism may have overlapped into nearby states.

Lease Benefits and Expectations

When an individual has leased property for outdoor-related activities, there are certain aspects of the leasing agreement that are discussed. According to the survey respondents who have paid to lease property, as shown in Table 16, nine percent said that they had a formal leasing contract with the landowner. Sixteen percent responded that they had rights to hunt the property by themselves and/or with their hunting party. Nine percent responded that they had to share the property with another hunting party. One percent had a hunt guided by the landowner and/or had stands or blinds set up in pre-

Table 16: If Paid to Lease, Did You Have a...
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Contract	0	0	0	1	12	3	4	1	1	6	28	9%
Private Land	1	3	6	4	12	5	4	3	4	9	51	16%
Shared Land	2	0	3	1	7	3	1	1	8	4	30	9%
Guided Hunt	0	0	1	1	1	0	0	0	0	0	3	1%
Preset Blinds	0	0	0	0	1	0	0	0	2	0	3	1%
Transport	0	0	1	0	3	0	1	0	0	0	5	2%
Lodging	2	0	0	0	3	0	0	0	0	0	5	2%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

determined areas. Two percent had transportation provided to and from the hunting site and/or lodging, food, or camping locations available for their use.

Individuals who have paid to lease lands have the right to expect certain things from the land and the landowner. These expectations of the Oklahoma survey respondents are shown in Table 17. Twenty-seven percent of those who leased land expected to have high quality game available on the leased land, but only 5 percent expected to have a higher quantity but of less quality of game. This shows that the sportsmen are more interested in the quality of the hunting experience than in just harvesting any deer. Twenty-eight percent of the respondents had expectations of good food, water and cover on the leased land while only twelve percent expected to have leases near their home. Fifteen percent had expectations of lease length with an option to renew while 20 percent had expectations of exclusive rights to the leased land. Twenty-seven percent of the respondents had expectations about the ability to use different hunting methods to harvest on the leased property and only four percent had expectations of lodging, food or camping locations available on the leased land. The respondents showed an interest in traveling, to find locations fitting these descriptions.

Travel Distance and Hunting Party Size

In Table 18 the survey respondents were asked to estimate how many miles they must travel from their home to reach their hunting areas. Fifty-six percent of the respondents replied that they had traveled 50 miles or less to reach their hunting areas. Nine percent traveled between 50 and 100 miles, four percent traveled between 100 to 150 and 150 to 200 respectively, Increasing to almost seven percent who traveled more

Table 17: Expectations of Leased Land and the Landowner.
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Quality	3	2	9	5	23	5	4	9	10	17	87	27%
Quantity	1	2	1	0	6	1	0	0	3	2	16	5%
Food,cover	3	1	6	6	23	8	8	7	12	17	91	28%
Near home	2	1	4	2	10	5	0	4	6	5	39	12%
Lease length	3	2	3	1	13	4	1	2	9	13	51	16%
Lands rights	2	1	3	3	18	6	4	6	7	14	64	20%
Methods	3	5	8	5	23	7	4	7	9	16	87	27%
Lodging	3	1	1	0	2	1	1	0	4	2	15	5%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 18: Distance (In Miles) Traveled to Reach Hunting Area.
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
50 or less	8	6	22	10	31	15	9	14	20	45	180	56%
50-100	1	2	2	3	3	0	6	1	6	5	29	9%
100-150	0	0	0	1	8	1	0	2	1	0	13	4%
150-200	0	1	0	1	11	0	0	0	0	0	13	4%
200+ miles	1	2	0	0	14	1	1	0	0	2	21	7%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

than 200 miles to reach their hunting areas. Due to the time and monetary constraints of this study, it was difficult to set up a travel zone and estimate travel costs for each region.

Estimation of hunting party size is an important economic factor when looking at hunting group spending. Table 19 shows the respondents who hunted alone accounted for only six percent of the survey respondents, while those that hunted with one to three other hunters accounted for 47 percent of the respondents. Seventeen percent of the respondents hunted with three to five other hunters and ten percent hunted with more than five extra hunters in the party.

Financial Donations and Resources

Because the federal government usually funds wildlife management, individual donations to wildlife causes are usually given through groups or organizations. In Table 20 survey respondents were asked if they gave financial resources to conserve wildlife and hunting lands. With 79 percent reporting, 33 percent responded that they gave financial resources to conserve wildlife and hunting lands while 46 percent responded that they did not give financial resources. Table 21 shows the survey responses when asked their willingness to give in a yearly donation, with 66 percent of those surveyed reporting, 55 percent said they would be willing to give less than $100, and eight percent gave a willingness to donate of $100 to $200. From $200 and up the willingness to donate was constant around one percent with the exception being the $400 to $500 level, where not one respondent was willing to donate. Table 22 shows the respondents opinions when requested in what form these donations would be given. Fourteen percent of those responding stated some type of income tax forms, 37 percent would prefer to

Table 19: Number of Hunters Currently In Hunting Party.
As Reported By Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Zero(Alone)	0	0	3	0	5	3	3	3	1	1	19	6%
1 to 3	3	7	20	11	46	7	5	8	13	30	150	47%
3 to 5	2	4	0	4	9	5	5	4	8	16	57	18%
More than 5	5	0	1	0	8	2	3	2	5	5	31	10%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 20: Do You Give Financial Resources to Conserve Wildlife and Hunting Lands.
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Yes	5	3	5	5	28	9	14	5	12	21	107	33%
No	5	8	17	9	34	7	7	12	15	32	146	46%
												% Total Response
Totals	10	11	22	14	62	16	21	17	27	53	253	79%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 21: Willingness to Give a Yearly Donation of...
As Reported By Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
$100 or less	10	10	14	9	36	13	15	13	20	36	176	55%
$100-$200	0	1	2	0	4	1	7	0	4	6	25	8%
$200-$300	0	0	0	0	4	0	0	0	0	0	4	1%
$300-$400	1	0	0	0	1	0	0	0	0	1	3	1%
$400-$500	0	0	0	0	0	0	0	0	0	0	0	0%
$500+	0	0	1	0	0	0	0	0	0	1	2	1%
												% Total Response
Totals	11	11	17	9	45	14	22	13	24	44	210	66%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 22: If Yes to Question 21, Would It Be Donated Through,
As Reported By Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Tax Forms	1	1	3	1	7	2	9	4	6	12	46	14%
Hunting Club	3	2	10	7	30	10	12	8	13	22	117	37%
Other	1	3	1	0	3	2	3	2	2	1	18	6%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

donate through hunting clubs or hunting organizations, while five percent chose other forms of donations.

Organizational Affiliation

Table 23 shows the responses when respondents were requested to indicate all the organizations that they are affiliated with. Twenty-eight percent are affiliated with the National Rifle Association. Fourteen percent are associated with Ducks Unlimited. Involvement with the Quality Deer Management Association was only four percent, a rather small percentage given that QDMA is one of the largest management and conservation organizations for white-tailed deer in the country and this was a survey of deer hunters. Quail Unlimited involvement was eight percent. The Rocky Mountain Elk Foundation was affiliated with five percent of those surveyed, while the National Sporting Clays Association had one percent of those surveyed affiliated with it. The National Wild Turkey Federation involvement was seven percent.

Respondents Demographics

Table 24 shows the gender of the respondents, 75 percent being male and three percent being female, with 22 percent of those surveyed not responding to this question. In the United States, 91 percent of the hunters are men and nine percent of the hunters are women (U.S. Fish and Wildlife Service, 1996). Of the women hunters responding to the surveys, the majority comes from the eastern survey regions, four respondents in the Antlers/Mt. Herman area, and three in the Miami area. Woodward and Chandler reported one female respondent each. Traditionally, hunting has been a more male orientated sport, but with the infusion of female involvement through conservation groups such as Buckmasters and the Quality Deer Management Association, women are becoming more

Table 23: Organizational Affiliation of Respondents.
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Ducks Unlimited	3	2	4	2	15	2	5	2	4	8	47	15%
Quail Unlimited	1	0	0	0	10	2	4	3	1	6	27	8%
Quality Deer Mgt. Assoc.	1	1	2	0	4	0	2	1	0	3	14	4%
Rocky Mtn Elk Foundation	1	1	1	0	7	0	0	0	2	3	15	5%
National Wild Turkey Foundation	1	1	0	1	11	0	2	2	1	3	22	7%
National Rifle Assoc.	4	5	4	6	27	6	8	4	11	16	91	28%
National Sporting Clays Association	1	0	0	0	2	0	0	0	0	0	3	1%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 24: Gender of Respondents
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Yearly sum	% of Total
Male	8	9	23	14	64	16	15	17	26	49	241	75%
Female	2	2	0	0	1	0	1	0	0	3	9	3%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 25: Age
As reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Average Age
Mean Age	35.4	32.7	30.0	25	35.8	37.4	37.3	29.1	36.5	34.6	33.4

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

involved in outdoor related activities such as hunting. Questions arise in that do females have different harvest preferences, willingness to pay for hunts and hunting services, and are they more marketable for guided hunting and/or hunting clubs than males.

The average age of the survey respondents is shown in Table 25 with a mean age for all respondents being 34 years. According to the U.S. Fish and Wildlife Service, this age bracket would encompass eight percent of all the hunters in the U.S. Areas such as Stillwater, with an average age of 25, and Alva, with an average age of 29.1 are the two lowest areas of average age. This is probably due to the colleges that exist in both areas and the younger student population that hunts in these areas. More rural areas such as Woodward, Antlers, Miami, and Mt. Herman have much higher average ages, 35.8, 35.4, 34.6 and 32.7 years respectively. But areas near large cities, such as Sand Springs near Tulsa and Chandler near Oklahoma City, the two of the highest average ages are shown with 36.5 in Sand Springs and 37.3 in Chandler. Respondents in these areas having higher average ages is not surprising since these areas would mainly consist of the middle income, middle age professionals who live in the large cities but do still enjoy the hunting experience. These surveyed areas were chosen for this reason, to see how responses would fluctuate due to pressures from the urban community. The city of Ardmore shows the highest average age of hunters at 37.4 years old. One explanation for this is that the respondents who are hunting in this area are coming from the larger urban areas to hunt the Arbuckle Mountains and the large deer that live in these mountains. The different ages will be evaluated through a statistical model to determine if age has a significant affect on willingness to pay and hunter preferences.

Table 26 shows the average household size and average number of hunters per household according to the survey respondents. The overall average of survey respondents was 3.4 persons per household, and 1.5 hunters per household. Most respondents had families ranging from two to five individuals. This shows how the average became the median between three and four. The average shows that in most three person families probably two of the family members were hunters. The data shows that Antlers has the greatest hunter/household ration with Sand Springs and Chandler having the lowest hunter/household ratio. The differences in these areas is obvious, Antlers is a more rural area where hunting is way of life so it would be expected that the hunters per household size would be greater than in areas such as Chandler and Sand Springs. In Chandler and Sand Springs the respondents are most probably urban dwellers where hunting is more of a part-time hobby than a lifestyle.

Table 27 shows where the survey respondents have lived most of their lives. Twenty-seven percent of those responding lived in a rural area with a population of less than 2,500 people. Fourteen percent lived in a town with a population between 2,500 and 9,999. Thirteen percent lived in a small city with a population between 10,000 and 24,999. Ten percent lived in a medium sized city with a population between 25,000 and 99,999. Eight percent lived in a large city with a population between 100,000 and one million people and only five percent lived in a large metro area with a population greater that one million people. These responses are to be expected since opportunities and enjoyment of outdoor related recreation are usually more limited to those individuals who are living or have lived in more rural areas.

Table 26: Average Household Size and Number of Hunters in Household.
As reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Average Size
Household	3	3.4	3.5	3.4	3.4	3.5	3.4	3.4	3.4	3.3	3.4
Hunters	2.1	1.4	1.4	1.6	1.5	1.7	1.2	1.5	1.2	1.6	1.5

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 27: Area In Which Respondents Lived Most Of Their Lives.
As Reported By Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Area Sum	% Total Response
Large Metro	0	0	0	3	9	0	1	0	3	1	17	5%
Large City	0	2	1	0	10	2	3	0	7	1	26	8%
Medium city	0	0	3	3	10	2	2	0	5	6	31	10%
Small city	0	2	2	0	18	3	0	0	4	13	42	13%
Town	3	2	2	2	4	6	3	8	3	12	45	14%
Rural Area	7	5	15	5	14	3	7	9	3	19	87	27%
												% Total response
Totals	10	11	23	13	65	16	16	17	25	52	248	78%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 28 shows how many of the survey respondents have large enough tracts of land to be used for deer hunting. Thirty three percent of all those surveyed stated that they had enough land to hunt deer on and 45 percent of all those surveyed replied that they did not have enough land to hunt deer on, with 22 percent not responding to this question. In the more rural areas, mainly Antlers, Mt. Herman and Ft. Cobb, those surveyed had more personally owned land available for them to hunt deer on. Those living in more populated areas, such as Sand Springs, had less privately owned land available for deer hunting.

If individuals own enough land to hunt deer on maybe they should be concerned not only with what they are doing on their property, but with what their neighbors are doing. David Morris's article, "Harvest Strategies for a Healthy Herd," (1998) he discusses how individuals who own land can cooperate with adjacent landowners to create viable white-tailed deer habitat. Cooperation of managing tracts of privately owned lands to increase the white-tailed deer herd size and genetic maniputability: buck to doe ratio optimization through management for optimal harvest; time constraints in growing (managing) deer for antler and body size; harvesting "low end" management bucks vs. "high end" larger antlered bucks out of all herds

Table 29 shows the estimated income levels before taxes for all the survey respondents. Thirteen percent of the respondents made $19,999 or less in income, 20 percent made between $20,000 and $39,999 in income, and 19 percent made between $0,000 and $59,999 in income. These figures encompass 54 percent of the U.S. population when estimated in comparison to the data received by the 1996 National

Table 28: Do You Own Enough Land to Deer Hunt On.
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Area Sum	% Total Response
Yes	7	7	14	5	24	5	9	8	7	20	106	33%
No	3	4	10	9	40	11	7	9	20	31	144	45%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 29: Estimation of Household Income Levels
As Reported by Oklahoma Deer Hunter Check Station Respondents, Fall 1998.

	Antlers	Mt. Herman	Ft. Cobb	Stillwater	Woodward	Ardmore	Chandler	Alva	Sand Springs	Miami	Area Sum	% Total Response
$19,999 less	6	2	8	3	3	2	1	2	3	11	41	13%
$20-39,999	0	3	4	2	16	4	6	7	5	16	63	20%
$40-59,999	3	1	6	3	17	4	2	3	9	12	60	19%
$60-79,999	0	3	3	3	10	3	2	3	4	4	35	11%
$80-99,999	1	1	0	2	4	1	1	0	3	1	14	4%
$100,000+	0	0	2	0	9	0	1	1	1	1	15	5%

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Survey of Fishing, Hunting and Wildlife Associated Recreation done by the U.S. Fish and Wildlife Service. Eleven percent of those surveyed had income levels between $60,000 and $79,999; four percent had between $80,000 and $99,999 in income and five percent had income levels greater than $100,000.

This data shows that there is a direct relationship between income levels and outdoor-related activities. Hunting has always had a greater following in middle to lower income level individual (Schuh, 1997). He questions the activities of state governments in the raising of out of state hunting licenses and fees. The raise in fees limited the number of non-resident hunters who can afford to hunt in certain state. Since middle income hunters make up the greatest part of the hunting population in the United States, having an increase in the price of fees, tags, licenses will only push many individuals who would prefer to travel to hunt to stay in their home states and find opportunities there. What the policy makers in the state governments are not realizing is that hunting involves more than just fees, tags and licenses. There are travel costs in food and gas, lodging costs including motels, game camps, supply costs in equipment, shells, clothing, etc. If all of these costs were included into the figures used by these state governments then they would have been able to make a more educated decision in how much more to charge for a license. Since it is so difficult to locate a good hunting area in another state guide services are used regularly. But, since guiding services usually jack the price of these fees by 100 percent or more than the usual rate it is impossible for the average income man or woman to be able to afford to hunt in another state. In the case of this happening in Idaho the state increased the price of licenses, tags and fees and the government showed a decrease in revenue for the concurrent seasons (Schuh). State

agencies promote hunting for kids and women, but do little for the middle class white male, the main consumers in the hunting industry. Exploitation of higher pricing for non-residents continues to make hunting only rich man's pursuit.

The responses from those individuals surveyed are basic in their interpretation, but they reveal important information about the demographics, attitudes, preferences, and expectations of hunters in the state of Oklahoma. Using this data meaningful statistical interpretation will be given to show the effect that certain characteristics of the Oklahoma deer hunters has on the willingness to pay for wildlife-related recreation, conservation of land and wildlife, and land usage.

Statistical Inferences

Test variables were chosen during survey preparation to attempt to give insightful results into the importance of these variables to the many different consumers of wildlife-related recreation. Having this type of information will encourage producers and managers of wildlife-related activities to alter certain management and production practices to increase wildlife-related recreational consumption. The significance of the independent variables will help to show the importance of that specific variable to respondents. Since some of the variables tested showed individual significance but not group significance the table lists both the variables that were statistically significant and those that were not significant. The variables were compared for significance individually and as a group if the question included multinomial responses. The Wald Chi-Squared (X^2) test was used to check for significance of the individual variables (Prob > X^2), while the grouped variables were tested using the Likelihood ratio test. These tests are important to test whether the variables individually or as a group have a

specific effect on hunter's preferences. If results show some significance, they can be used by the providers of the hunting services to increase demand for their goods. This test can be computed using Log Likelihood Ratio Test as shown in Figure 3.

Figure 3.

Likelihood Ratio Test: -2[Restricted Log Likelihood – Unrestricted Log Likelihood]

This common test, which is similar to the F-test that showing all slopes in a regression are zero, is the likelihood ratio test that all the slope coefficients in the probit model are zero. For this test, the constant terms remain restricted to zero. When using this test the group of variables to be tested is deleted from the functional form and forced into the intercept where they remain restricted. The change in the restricted and unrestricted likelihood functions is then checked against the chi-square values to check if the grouping of variables is statistically significant to the model. Degrees of freedom for the statistical significance tests are equal to the number of variables in the group being restricted, varying from group to group. When estimating statistical significance for a group of variables, there must be a base variable in the group initially removed before any analysis can be done. This base variable becomes the null hypothesis (H_O=0), that the independent variables in question have no effect on the dependent (base) variable. This is done to attempt to either prove that the variables in question are either statistically significant, which would cause us to accept the alternative hypothesis, ($H_A \neq 0$) or that they are not statistically significant which would cause us to reject the alternative hypothesis and not reject the null hypothesis. The base variables consist of those

variables with the largest means in each group of variables that was tested. This was done to test if the smaller samples of the surveyed population are significantly different from these groups. Table 30 through Table 37 shows the statistical importance of each different demographic, frequency, and location (base) variable of the respondents to the formulation of a demand function for the independent variables.

Table 30: Probit Procedure Regression Estimates using Demographics to Analyze the Respondents Preferences of Deer Harvested.

Variable	DF	Estimate	Std Error	Chi Square	Pr>Chi	LLR Chi Squared Test
Intercept	1	0.612622	0.663917	0.851447	0.3561	Chi Squared Value
YEAR	1	0.005405	0.010185	0.281676	0.5956	
FREQ 1-3	1	0.444004	0.247871	3.208652	0.0732*	3.8040846
FREQ 30+	1	-0.070260	0.194531	0.130449	0.718	
PAID	1	0.099800	0.17031	0.343389	0.5579	
LANDFR	1	0.056604	0.231852	0.059606	0.8071	
LANDLS	1	-0.034200	0.30361	0.012689	0.9103	0.2710316
LANDPB	1	0.134260	0.358955	0.139899	0.7084	
AC<50	1	0.476607	0.449433	1.124581	0.2889	
AC<150	1	-0.504390	0.431923	1.363707	0.2429	
AC<200	1	0.101456	0.388893	0.068061	0.7942	4.802222
AC<250	1	-0.068966	0.401855	0.029454	0.8637	
AC>250	1	-0.547938	0.320291	0.029267	0.8642	
TRVL<50	1	0.259148	0.270585	0.887527	0.3461	
TRVL<150	1	0.749202	0.422844	3.139334	0.0764*	4.5684742
TRVL<200	1	0.623808	0.406823	2.35121	0.1252	
TRVL>200	1	0.133736	0.397483	0.113204	0.7365	
GNDR	1	-1.662607	0.506043	10.79494	0.001*	
AGE	1	0.008392	0.009604	0.763606	0.3822	
ADHUNT	1	0.027167	0.083722	0.763606	0.7456	
LIVELM	1	-0.220188	0.353972	0.105301	0.5339	
LIVELC	1	-0.375708	0.319696	0.386949	0.2399	
LIVEMC	1	0.097587	0.267329	1.381105	0.7151	3.4206144
LIVESM	1	0.113782	0.235267	0.133259	0.6286	
LIVETN	1	-0.216762	0.229613	0.233897	0.3452	
OWNLAND	1	-0.019005	0.196484	0.891196	0.9229	
INC<$40	1	-0.289435	0.227377	0.009356	0.203	
INC<$60	1	-0.274088	0.23553	1.620361	0.2445	
INC<$80	1	-0.564445	0.265034	1.354222	0.0332*	5.50539
INC<$100	1	-0.370134	0.390322	4.53565	0.343	
INC>$100	1	-0.147682	0.37849	0.899236	0.6964	

Source: Formulation for the Log Likelihood Function (Greene).

* Denotes Significant Pr>Chi Values at the .10 significance level

Table 31: Probit Procedure Regression Estimates using Demographics to Analyze the Respondents That Paid to Hunt

Variable	DF	Estimate	Std Error	Chi Square	Pr>Chi	LLR Chi Squared Test
Intercept	1	0.09079855	0.717091	0.016033	0.8992	Chi Squared Value
YEAR	1	-0.0176073	0.012966	1.843935	0.1745	
FREQ 1-3	1	-0.3679741	0.291636	1.59203	0.207	3.7605766
FREQ 30+	1	-0.4005477	0.232185	2.976043	.0845*	
PREF DOE	1	-1.017714	0.741058	1.886022	0.1697	2.6277882
PREF ANY	1	0.1276344	0.205361	0.386277	0.5343	
LANDFR	1	0.01967574	0.270778	0.00528	0.9421	
LANDLS	1	-0.5890269	0.352145	2.797871	.0944*	6.4698158*
LANDPB	1	0.51547585	0.47575	1.173976	0.2786	
AC<50	1	0.02409296	0.501423	0.002309	0.9617	
AC<150	1	0.46215813	0.512774	0.812323	0.3674	
AC<200	1	0.09631558	0.462849	0.043303	0.8352	1.660126
AC<250	1	0.41730485	0.487486	0.732796	0.392	
AC>250	1	0.24911449	0.3763	0.438258	0.508	
TRVL<50	1	-0.2162999	0.317726	0.463456	0.496	
TRVL<150	1	-0.4409208	0.514802	0.733568	0.3917	3.5201534
TRVL<200	1	0.57037092	0.536199	1.13152	0.2875	
TRVL>200	1	-0.0508573	0.469751	0.011721	0.9138	
GNDR	1	0.49366763	0.501137	0.970411	0.3246	
AGE	1	0.00536746	0.011996	0.200191	0.6546	
ADHUNT	1	0.05118806	0.100132	0.261333	0.6092	
LIVELM	1	-0.8164915	0.439893	3.445165	.0634*	
LIVELC	1	-0.1758083	0.375939	0.218698	0.64	
LIVEMC	1	-0.2980539	0.315655	0.891589	0.345	6.3406834
LIVESM	1	0.20057344	0.290616	0.476329	0.4901	
LIVETN	1	0.15184684	0.286678	0.280558	0.5963	
OWNLAND	1	0.08671296	0.238239	0.132478	0.7159	
INC<$40	1	0.074073	0.27352	0.07334	0.7865	
INC<$60	1	0.05604592	0.283042	0.039209	0.843	
INC<$80	1	-0.2865589	0.3124	0.841404	0.359	4.5942774
INC<$100	1	-0.6413421	0.458821	1.953853	0.1622	
INC>$100	1	0.3318343	0.462398	0.515005	0.473	

Source: Formulation for the Log Likelihood Function (Greene).

* Denotes Significant Pr>Chi Values at the .10 significance level

Table 32: Probit Procedure Regression Estimates using Demographics to Analyze the Respondents Willingness to Pay to Hunt

Variable	DF	Estimate	Std Error	Chi Square	Pr>Chi	LLR Chi Squared Test
Intercept	1	-0.8706834	0.76116	1.308477	0.2527	Chi Squared Value
YEAR	1	-0.0174344	0.01449	1.446005	0.2292	
FREQ 1-3	1	0.1585011	0.32901	0.232085	0.63	0.6122094
FREQ 30+	1	-0.1126071	0.23481	0.229967	0.6315	
PREF DOE	1	-0.2701369	0.65568	0.169738	0.6803	0.2512176
PREF ANY	1	0.0514375	0.21215	0.058783	0.8084	
PAID	1	-0.3015804	0.20438	2.177355	0.1401	
LANDFR	1	-0.380484	0.29435	1.670859	0.1961	
LANDLS	1	-0.475565	0.37594	1.606878	0.2049	2.1145576
LANDPB	1	-0.2424857	0.49454	0.240417	0.6239	
AC<50	1	-0.0056751	0.53221	0.000114	0.9915	
AC<150	1	0.5159619	0.54114	0.909107	0.3404	
AC<200	1	-0.0264614	0.48997	0.002917	0.9569	1.3652668
AC<250	1	0.1173631	0.49727	0.055703	0.8134	
AC>250	1	0.1267036	0.39084	0.105091	0.7458	
TRVL<50	1	-0.2043013	0.31443	0.422155	0.5159	
TRVL<150	1	0.4487761	0.59899	0.56133	0.4537	3.7910006
TRVL<200	1	-0.3413553	0.52343	0.425299	0.5143	
TRVL>200	1	-0.6561968	0.49020	1.79192	0.1807	
GNDR	1	1.1410317	0.50640	5.076939	.0242*	
AGE	1	0.0423135	0.01396	9.176526	.0025*	
ADHUNT	1	0.1682455	0.14513	1.34375	0.2464	
LIVELM	1	0.0678877	0.48329	0.019731	0.8883	
LIVELC	1	-0.5703631	0.40641	1.96956	0.1605	
LIVEMC	1	-0.7193817	0.32847	4.79639	.0285*	8.728633
LIVESM	1	-0.6360075	0.29341	4.698431	.0302*	
LIVETN	1	-0.266594	0.28795	0.857147	0.3545	
OWNLAND	1	-0.2096783	0.26162	0.642328	0.4229	
INC<$40	1	-0.375814	0.28637	1.722179	0.1894	
INC<$60	1	-0.4860368	0.29177	2.774941	.0958*	
INC<$80	1	-0.1624866	0.33359	0.237243	0.6262	10.8401718*
INC<$100	1	0.3441863	0.55130	0.389769	0.5324	
INC>$100	1	-1.3026685	0.47311	7.581116	.0059*	

Source: Formulation for the Log Likelihood Function (Greene).

* Denotes Significant Pr>Chi Values at the .10 significance level

Table 33: Probit Procedure Regression Estimates using Demographics to Analyze the Respondents Willingness to Pay to Hunt With Constraint

Variable	DF	Estimate	Std Error	Chi Square	Pr>Chi	LLR Chi Squared Test
Intercept	1	-0.56009	0.70713	0.627366	0.4283	Chi Squared Value
YEAR	1	-0.01228	0.01317	0.869832	0.351	
FREQ 1-3	1	0.48678	0.30236	2.591925	.1074*	4.5607734
FREQ 30+	1	-0.19817	0.22113	0.803128	0.3702	
PREF DOE	1	0.20380	0.64970	0.0984	0.7538	0.1146046
PREF ANY	1	0.03091	0.19954	0.024007	0.8769	
PAID	1	-0.34049	0.19132	3.147251	.0761*	
LANDFR	1	-0.39318	0.26900	2.13635	0.1438	
LANDLS	1	-0.42748	0.35386	1.459416	0.227	3.066606
LANDPB	1	0.02322	0.46692	0.002473	0.9603	
AC<50	1	-0.14100	0.51023	0.076367	0.7823	
AC<150	1	-0.09979	0.49568	0.040532	0.8404	
AC<200	1	-0.23307	0.46546	0.250741	0.6166	1.0224674
AC<250	1	-0.36128	0.46071	0.614925	0.4329	
AC>250	1	-0.08142	0.37762	0.046499	0.8293	
TRVL<50	1	0.03923	0.28876	0.018461	0.8919	
TRVL<150	1	0.03743	0.47547	0.006197	0.9373	1.134573
TRVL<200	1	0.00274	0.47498	0.000033	0.9954	
TRVL>200	1	-0.41764	0.45453	0.84426	0.3582	
GNDR	1	0.94921	0.48019	3.907506	.0481*	
AGE	1	0.03428	0.01214	7.968848	.0048*	
ADHUNT	1	0.09932	0.12184	0.664464	0.415	
LIVELM	1	-0.69886	0.41169	2.881633	.0896*	
LIVELC	1	-0.93625	0.36626	6.534484	.0106*	
LIVEMC	1	-0.79448	0.31035	6.553204	.0105*	12.957855*
LIVESM	1	-0.77810	0.27366	8.084293	.0045*	
LIVETN	1	-0.31033	0.27690	1.255993	0.2624	
OWNLAND	1	-0.26802	0.23956	1.251715	0.2632	
INC<$40	1	-0.22699	0.27096	0.701248	0.4024	
INC<$60	1	-0.48645	0.26639	3.334469	.0678*	
INC<$80	1	-0.18359	0.31006	0.350612	0.5538	11.3219064*
INC<$100	1	0.37909	0.47263	0.643366	0.4225	
INC>$100	1	-1.18314	0.44585	7.041875	.0080*	

Source: Formulation for the Log Likelihood Function (Greene).

* Denotes Significant Pr>Chi Values at the .10 significance level

Table 34: Probit Procedure Regression Estimates using Demographics to Analyze the Respondents Available Acreage for Hunting

Variable	DF	Estimate	Std Error	Chi Square	Pr>Chi	LLR Chi Squared Test
Intercept	1	-0.8197037	0.61680	1.766117	0.1839	Chi Squared Value
YEAR	1	0.00007662	0.01196	0.000041	0.9949	
FREQ 1-3	1	-0.0302689	0.27519	0.012098	0.9124	3.45491
FREQ 30+	1	-0.3888584	0.21422	3.293995	.0695*	
PREF DOE	1	-6.3262222	7351.97	7.404E-07	0.9993	5.343616*
PREF ANY	1	0.25779927	0.1884	1.872405	0.1712	
PAID	1	0.04597071	0.18486	0.06184	0.8036	
LANDFR	1	-0.4090236	0.24513	2.784035	.0952*	
LANDLS	1	-0.7818856	0.34010	5.285057	.0215*	12.9475182*
LANDPB	1	-1.6155511	0.56674	8.125752	.0044*	
TRVL<50	1	0.02527688	0.26916	0.008819	0.9252	
TRVL<150	1	-0.2527617	0.44764	0.318834	0.5723	10.5122046*
TRVL<200	1	-0.4606683	0.50971	0.816801	0.3661	
TRVL>200	1	-1.7060784	0.69064	0.6102244	.0135*	
GNDR	1	-0.8532752	0.43981	0.3763913	.0524*	
AGE	1	0.01379492	0.01009	0.1866973	0.1718	
ADHUNT	1	0.03509968	0.0857	0.167745	0.6821	
LIVELM	1	0.23693427	0.42912	0.304849	0.5809	
LIVELC	1	0.69660631	0.36865	3.570548	.0588*	
LIVEMC	1	0.46146481	0.27405	2.835343	.0922*	6.8749448
LIVESM	1	0.18747751	0.24657	0.578122	0.447	
LIVETN	1	-0.1313497	0.25555	0.264184	0.6073	
OWNLAND	1	-0.1102844	0.21268	0.268884	0.6041	
INC<$40	1	-0.3920533	0.23869	2.697714	.1005*	
INC<$60	1	-0.3745097	0.23850	2.4656	0.1164	
INC<$80	1	-0.3956266	0.27866	2.015627	0.1557	12.5539492*
INC<$100	1	-1.2065673	0.45755	6.953867	.0084*	
INC>$100	1	-1.2321316	0.51451	5.734814	.0166*	

Source: Formulation for the Log Likelihood Function (Greene).
* Denotes Significant Pr>Chi Values at the .10 significance level

Table 35: Probit Procedure Regression Estimates using Demographics to Analyze the Willingness to pay for A 100 Acre Deer Hunting Lease

Variable	DF	Estimate	Std Error	Chi Square	Pr>Chi	LLR Chi Squared Test
Intercept	1	-0.64496	0.68261	0.892725	0.3347	Chi Squared Value
YEAR	1	-0.01315	0.01299	1.023543	0.3117	
FREQ 1-3	1	-0.08261	0.28678	0.082975	0.7733	1.3101912
FREQ 30+	1	-0.24745	0.21605	1.31175	0.2521	
PREF DOE	1	-0.05005	0.63528	0.006208	0.9372	0.3757586
PREF ANY	1	0.11703	0.19666	0.354123	0.5518	
PAID	1	-0.19514	0.18677	1.091597	0.2961	
LANDFR	1	-0.49781	0.27248	3.337622	.0677*	8.63513448*
LANDLS	1	-0.93613	0.35623	6.905648	.0086*	
LANDPB	1	-0.01209	0.48332	0.000626	0.98	
AC<50	1	-0.62926	0.47576	1.749334	0.186	6.9741754
AC<150	1	-0.46035	0.47838	0.926048	0.3359	
AC<200	1	-0.26279	0.43841	0.359319	0.5489	
AC<250	1	-0.27993	0.44349	0.398408	0.5279	
AC>250	1	0.12433	0.36464	0.116269	0.7331	
TRVL<50	1	0.04798	0.28211	0.02893	0.8649	2.9248632
TRVL<150	1	0.15647	0.46151	0.114945	0.7346	
TRVL<200	1	-0.40651	0.49262	0.680953	0.4093	
TRVL>200	1	-0.57076	0.44484	1.646235	0.1995	
GNDR	1	0.70531	0.47690	2.18728	0.1392	
AGE	1	0.02874	0.01179	5.942211	.0148*	
ADHUNT	1	0.02415	0.09446	0.065388	0.7982	
LIVELM	1	0.24999	0.40044	0.389742	0.5324	4.2218924
LIVELC	1	0.37036	0.37979	0.950966	0.3295	
LIVEMC	1	-0.21859	0.29905	0.534299	0.4648	
LIVESM	1	-0.27045	0.26409	1.048763	0.3058	
LIVETN	1	-0.18199	0.25939	0.492239	0.4829	
OWNLAND	1	-0.09640	0.22834	0.178254	0.6729	
INC<$40	1	0.22920	0.25764	0.791447	0.3737	4.4496216
INC<$60	1	0.14928	0.26058	0.32822	0.5667	
INC<$80	1	0.13940	0.29020	0.230763	0.631	
INC<$100	1	0.14442	0.44990	0.103049	0.7482	
INC>$100	1	-0.56702	0.42109	1.813204	0.1781	

Source: Formulation for the Log Likelihood Function (Greene).

* Denotes Significant Pr>Chi Values at the .10 significance level

Table 36: Probit Procedure Regression Estimates using Demographics to Analyze the Respondents Distance Traveled

Variable	DF	Estimate	Std Error	Chi Square	Pr>Chi	LLR Chi Squared Test
Intercept	1	1.34005	0.79480	2.842652	.0918*	Chi Squared Value
YEAR	1	-0.00627	0.01275	0.242482	0.6224	
FREQ 1-3	1	-0.21067	0.26589	0.627806	0.4282	8.0193896*
FREQ 30+	1	0.59514	0.25227	5.565246	.0183*	
PREF DOE	1	-0.05633	0.65507	0.007397	0.9315	0.3557942
PREF ANY	1	-0.12468	0.20887	0.356336	0.5505	
PAID	1	0.15054	0.21309	0.499133	0.4799	
LANDFR	1	0.06143	0.28262	0.04726	0.8279	
LANDLS	1	-0.55899	0.33818	2.73218	.0983*	12.7646806*
LANDPB	1	-1.00195	0.39264	6.511617	.0107*	
AC<50	1	-0.59454	0.72408	0.674199	0.4116	
AC<150	1	-1.26286	0.67085	3.543667	.0598*	
AC<200	1	-0.50152	0.69259	0.524367	0.469	10.3643762*
AC<250	1	-0.69202	0.69847	0.98162	0.3218	
AC>250	1	-1.17740	0.61437	3.672674	.0553*	
GNDR	1	0.56848	0.46108	1.520132	0.2176	
AGE	1	0.01062	0.01177	0.814498	0.3668	
ADHUNT	1	-0.07765	0.09819	0.625414	0.429	
LIVELM	1	-1.25542	0.3734	11.304	.0008*	
LIVELC	1	-1.42519	0.31878	19.98767	.0001*	
LIVEMC	1	-0.32244	0.30924	1.087189	0.2971	33.4738248*
LIVESM	1	0.40321	0.35406	1.29694	0.2548	
LIVETN	1	-0.31135	0.29252	1.13288	0.2872	
OWNLAND	1	0.05115	0.22910	0.049849	0.8233	
INC<$40	1	-0.08894	0.29530	0.090727	0.7633	
INC<$60	1	-0.30828	0.30064	1.051503	0.3052	
INC<$80	1	-0.05246	0.32455	0.026135	0.8716	4.4776538
INC<$100	1	-0.45538	0.39752	1.3123	0.252	
INC>$100	1	-0.74217	0.43356	2.930199	.0869*	

Source: Formulation for the Log Likelihood Function (Greene).

* Denotes Significant Pr>Chi Values at the .10 significance level

Table 37: Probit Procedure Regression Estimates using Demographics to Analyze the Respondents Willingness to Give Financial Donations

Variable	DF	Estimate	Std Error	Chi Square	Pr>Chi	LLR Chi Squared Test
Intercept	1	-0.71613	0.76483	0.876699	0.3491	Chi Squared Value
YEAR	1	-0.00181	0.01278	0.02013	0.8872	
FREQ 1-3	1	0.14059	0.32143	0.191314	0.6618	1.3723582
FREQ 30+	1	-0.21756	0.22976	0.896634	0.3437	
PREF DOE	1	0.96732	0.88068	1.206422	0.272	1.3458556
PREF ANY	1	0.06031	0.20655	0.085276	0.7703	
LANDFR	1	0.60184	0.28311	4.519113	.0335*	7.1274564*
LANDLS	1	0.95702	0.39597	5.841195	.0157*	
LANDPB	1	0.74562	0.45584	2.675505	.1019*	
AC<50	1	0.36810	0.55147	0.445549	0.5045	7.8828852
AC<150	1	0.01403	0.53504	0.000688	0.9791	
AC<200	1	-0.21086	0.48519	0.188881	0.6638	
AC<250	1	-0.69110	0.49810	1.925067	0.1653	
AC>250	1	-0.56756	0.40025	2.010758	0.1562	
TRVL<50	1	0.36385	0.31257	1.355044	0.2444	7.9052092
TRVL<150	1	-0.33083	0.50584	0.427752	0.5131	
TRVL<200	1	-0.19173	0.49636	0.149216	0.6993	
TRVL>200	1	-0.70402	0.49656	2.010156	0.1562	
GNDR	1	1.35904	0.56347	5.817305	.0159*	
AGE	1	-0.01998	0.01171	2.912605	.0879*	
ADHUNT	1	0.06662	0.09794	0.462732	0.4963	
LIVELM	1	-0.55472	0.44815	1.532146	0.2158	7.807408
LIVELC	1	-0.06628	0.39928	0.027556	0.8682	
LIVEMC	1	-0.80383	0.32668	6.054578	.0139*	
LIVESM	1	-0.35889	0.29360	1.49421	0.2216	
LIVETN	1	-0.07186	0.28108	0.065366	0.7982	
OWNLAND	1	0.05392	0.24577	0.048133	0.8263	
INC<$40	1	0.61197	0.29034	4.442737	0.03515	7.820135
INC<$60	1	0.05130	0.27343	0.035198	0.8512	
INC<$80	1	0.07501	0.31731	0.055884	0.8131	
INC<$100	1	-0.55335	0.51311	1.162975	0.2808	
INC>$100	1	0.15631	0.49100	0.101355	0.7502	

Source: Formulation for the Log Likelihood Function (Greene).

* Denotes Significant Pr>Chi Values at the .10 significance level

CHAPTER IV

Oklahoma Deer Hunter Survey Respondents Preferences, Benefits, and Expectations

Wildlife has an economic value because it is a scarce resource and people want the right to use it, through hunting, fishing and observation. Table 9 showed the willingness to pay for a trophy buck hunt. The table summarizes responses to the question " How much would you be willing to pay for a trophy buck hunt (8-pts or larger)." Respondents were asked to rate their willingness to pay in monetary values of (1) Less than $200, (2) $200 to $400, (3) $400 to $600, (4) $600 to $800, (5) $800 to $1000, and (6) $1000 or more.

When discussing the willingness to pay for white-tailed deer hunting there are considerations that the provider of the service must consider. Because of the economic pressure being put upon farmers and ranchers lately, changes are necessary to maintain economic stability. Wildlife present on these properties creates an opportunity for the farmer to create an extra source of income. This income whether it comes from leasing fees, guided hunting fees, wildlife watching, may be ways to increase rural community's income. The agricultural producer must take advantages of all the resources available on his property. There has been discussion on the rights that the landowners have to the game present on their property.

The current "hot issue" concerns the hunting of deer in game proof enclosures. In some areas these enclosures are considered acceptable, but in others concerns are coming up about the legal and moral issues. Does the landowner have the right to use the free

ranging game on his property in any way in which he sees fit, or is the landowner "stealing a public resource" (Pass, 1999). This debate is heated by the discussion of turning deer into a domestic animal, bred for size and mass, the ethical question that if artificial barriers characteristic of selective breeding for hunters willing to pay for the right to harvest one of these large bucks. Are the confined or managed white-tailed deer a theft of a public resource, or an economic opportunity for the landowners? In Oklahoma this type of economic opportunity has not been feasible. But, what other types of market could be available for the landowners in Oklahoma. The type of market that is available in the area will help to determine if this is a feasible option for a large farmer/rancher.

Management and Marketing

Initially, the landowner needs to see if there is a feasible market in the area to create a marketable hunting experience? Does the landowner have the information and skill to decide what type of experience should be marketed in his state?

Deer management for marketing strategies has several aspects. First of all the landowner must decide which approach to operate under. The two extremes are the trophy program and the high deer/high harvest program (Guynn, 1998). In the trophy approach the deer numbers are managed to reduce the pressure on habitat and sustainability so that antler sizes are at an optimum. In the high deer/high harvest approach the deer are managed for density and ease of harvest, bringing in hunters with lower willingness to pay schedule. In some states there is the discussion of how little land is still available for hunting. Urbanization has taken its toll on wildlife and the

hunting opportunity. The objective is to find the consumers demand for the deer hunting experience.

Willingness to Pay based on Preferences

Initially, the landowner must know if a market is available to him for this type of business. In Oklahoma there is a lack of information on the deer hunters demand. Table 38 shows the interaction between Oklahoma Deer Hunter Survey respondents when questioned about harvest preferences and willingness to pay for a trophy buck hunt.

According to Table 38, 65 percent of the survey respondents show a willingness to pay of less than $200 for a trophy buck hunt. In the $200 to $400 range, 24 percent showed a willingness to pay for a trophy buck hunt. Six percent of those responding showed a willingness to pay between $400 to $600 and two percent showed a willingness to pay between $600 to $800. In the $800 to $1000 and $1000 or more range one percent, respectively, showed a willingness to pay for a trophy buck hunt.

When looking at the preferences of survey respondents in conjunction with willingness to pay, of those who preferred to harvest a buck, 67 percent were willing to pay less than $200. Nineteen percent of those who preferred to harvest a buck were willing to pay between $200 and $400 and six percent were willing to pay between $400 and $600. No respondents that preferred to harvest a buck were willing to pay between $600 and $800, but, one percent were willing to pay between $800 and $1000 and four percent were willing to pay greater than $1000 to harvest a trophy buck. The outliers in the willingness to pay range above $800 dollars could be individuals who are more risk adverse, or have a greater opportunity cost of the time spent in their career. The opportunity cost of not harvesting a buck is less than their willingness to pay.

Table 38: Harvest Preferences Vs. Willingness to Pay (WTP) for a Trophy Buck Hunt

	WTP					
Preferences	Less than $200	$200 to $400	$400 to $600	$600 to $800	$800 to $1000	$1000 or More
Buck	56	16	5	0	1	3
Doe	2	1	0	0	1	0
Any Deer	62	23	4	2	0	0
Trophy Buck	54	24	7	3	1	1

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Of those respondents who preferred to harvest a doe, 50 percent showed a willingness to pay less than $200 to harvest a trophy buck. These individuals, could be theoretically classified as meat hunters and the opportunity of harvesting a trophy buck does not hold much interest for them. Twenty five percent of those preferring to harvest a doe showed some willingness to pay in $200 to $400 range and in the $800 to $1000 range.

Of those respondents who preferred to harvest any deer, 68 percent showed a willingness to pay less than $200 to harvest a trophy buck. Twenty five percent showed a willingness to pay between $200 and $400. Four percent showed a willingness to pay for a trophy buck hunt between $400 and $600 and two percent showed a willingness to pay between $600 and $800. None of the respondents preferring to harvest any deer held any willingness to pay greater than $800 for a trophy buck hunt.

Respondents who preferred to harvest a trophy buck held a greater willingness to pay for a trophy buck hunt in the price range of $200 to $800. The low points were that 60 percent were only willing to pay a maximum of $200 for a trophy buck hunt. Twenty seven percent were willing to pay between $200 and $400, eight percent were willing to pay between $400 and $600, and three percent were willing to pay between $600 and $800 for a trophy buck hunt. One percent showed a willingness to pay between $800 and $1000 and greater. Table 38 shows that the overall willingness to pay for a trophy buck hunt in the state of Oklahoma is at a very low level. Most of those surveyed responded with a willingness to pay of less than $400 (89 percent) for a trophy buck hunt. In studies done in Texas the highest willingness to pay for a trophy buck hunt is approximately $3,500, with an average near $800 (Guynn, 1998), which in comparison to

the survey respondents in Oklahoma shows that hunter willingness to pay for a trophy buck hunt are of greater value in Texas. The average for a doe is between $50 and $100, consistent with the data presented here. The scarcity concept, that society is unable to provide enough of a resource to satisfy all the consumers comes into play here. This larger willingness to pay in Texas could be due to the fact that only three percent of the land in Texas is owned by the state and this creates a shortage of available hunting lands that Oklahoma hunters do not experience.

Willingness to Pay Preferences Given a Pre-Determined Success Rate

A follow up question was asked to find out if improving the success rate on the trophy buck hunts would increasing willingness to pay. Table 39 shows the same harvest preferences as Table 38, and the same willingness to pay monetary levels, but the willingness to pay question is based on the improved success rate of 90 percent. According to Table 39, 55 percent of the survey respondents now show a willingness to pay of less than $200 for trophy buck hunt, a decrease of nearly ten-percent from Table 38. In the $200 to $400 range, no change was shown in willingness to pay for a trophy buck hunt. Eleven percent of the respondents showed a willingness to pay between $400 and $600, and four percent showed a willingness to pay of between $600 and $800, an increase of five and two percent over Table 38 respectively. In the $800 to $1000 range there was a increase of one percent to two percent showing a willingness to pay for a trophy buck hunt, and in the greater than $1000 range a two percent increase to three percent showing a willingness to pay for a trophy buck hunt.

The decrease in the lower willingness to pay levels with a proven success rate exhibits a relationship to risk adverse individuals. Those who were unwilling to pay for

Table 39: Harvest Preferences Vs. Willingness to Pay (WTP) For a Trophy Buck Hunt With A 90% Proven Success Rate

	WTP					
Preferences	Less than $200	$200 to $400	$400 to $600	$600 to $800	$800 to $1000	$1000 or More
Buck	48	18	10	2	0	4
Doe	2	1	0	0	1	0
Any Deer	51	22	11	4	0	2
Trophy Buck	45	23	8	5	3	3

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

the opportunity for a trophy buck hunt are given a less risk averse position with the installment of a guarantee like a success rate. This less risky position tends to increase the willingness of an individual to purchase a good such as a hunt.

When looking at the corresponding preferences of the survey respondents with the pre-determined success rate, of those who preferred to harvest a buck, 57 percent were still willing to pay less than $200. Twenty-one percent, an increase of two percent from Table 38, were willing to pay between $200 and $400 for a trophy buck hunt. Twelve percent were willing to pay between $400 and $600; an increase of six percent, and two percent fell in the $600 to $800 range, an increase of two percent. No respondents fell into the $800 to $1000 range, and in the $1000 or greater range five percent exhibited a willingness to pay for a trophy buck hunt with a 90 percent success rate, an increase of one percent.

Of those respondents who preferred to harvest a doe, the results are unchanged with the insertion of a constraint. All hunters who preferred to harvest a doe had the same willingness to pay as in Table 38.

Those respondents who preferred to harvest any deer showed a decrease of eleven percent to 57 percent being willing to pay less than $200 for a trophy buck hunt. The $200 to $400 range remained unchanged. The largest increase was in the $400 to $600 range, with an increase of eight percent, to 12 percent being willing to pay for a trophy buck hunt. Four percent were willing to pay in the $600 to $800 range, and two percent were willing to pay in the $1000 or more range. No respondents were willing to pay in the $800 to $1000 range.

Of those respondents who preferred to harvest a trophy buck, 57 percent were willing to pay less than $200 for a trophy buck hunt, a decrease of three percent. The $200 to $400 range remained consistent at 27 percent showing a willingness to pay. Nine percent showed a willingness to pay in the $400 to $600 range, a one percent increase, and six percent were willing to pay between $600 and $800 for a trophy buck hunt. In the $800 to $1000 range and the greater than $1000 range three percent in each group showed a willingness to pay, an increase of two percent respectively.

Cook (1981) and Welge (1981) have demonstrated that a demand exists for the harvesting of anterless deer. But, according to the survey respondents in Oklahoma, this seems to be a insufficient area of interest to hunters and landowners. Of the 320 individuals surveyed only six (two percent) preferred to harvest a doe. It is desirable to market a anterless hunt to control the population ratio of buck to does. The fact of the matter is that anterless deer must be harvested if for sustainability reasons only. The responses for this question may hold some bias since Oklahoma has a separate doe only tag each year.

The constraint of a proven success rate has shown that for most survey respondents the less risk involved, i.e. the proven success rate, the higher the willingness to pay for a trophy buck hunt. The discussion of economic considerations in the management of deer should include culling, sustained yield, etc, but a model for this topic can not be evaluated since the market for deer is poorly understood (Guynn, 1998).

Leasing Benefits

Survey respondents who have paid to lease the land that they are hunting on have certain arrangements and expectations of the land and the landowner that they are leasing

land from. If the respondents that paid to lease land have higher income levels, are they expecting a greater involvement from the landowner and the lease? If income is a determinant of willingness to pay, then the higher the income level, the greater the involvement from the lessor that is expected.

According to Table 40 those individuals who paid to lease the land that they are hunting on, twelve percent had a formal leasing contract. The formal lease contract is an agreement between the landowner and the lessee on the way that the property will be used. Is the lease a multi-sport lease, what is the length of the lease, who carries the liability if an injury occurs on the lease, and what other factors affect those on the land? The effect that income levels have on these factors is of great importance to those landowners whom are leasing land. If higher income levels have greater willingness to pay for a lease, then the landowners that wish to market to a more "upscale client" will want to have the benefits from the lease in accordance with the preferences of these clients.

Of those individuals with incomes less that $60,000, eight percent stated that they had a formal lease contract, while those with incomes greater that $60,000 showed 22 percent having a formal leasing contract. Those individuals in the lower income brackets could have a "gentlemen's" lease agreement with a friend or a landowner with which they are very familiar. Those in the higher income brackets could possibly be leasing land from an individual who they are not familiar with and/or leasing larger tracts of land and want the extra protection of a formal agreement with the landowner.

Under having a formal leasing contract falls many variables that are a intricate part of any leasing agreement. The rights to the leased property are an important

Table 40: Income Levels vs. Land Hunting on Benefits

	Income (in $1000)					
	Under 19	20 to 39	40 to 59	60 to 79	80 to 99	More than 100
Formal Contract	2	7	4	11	2	1
Private Rights	9	11	9	7	1	5
Shared Rights	6	5	7	3	4	2
Owner Guided	1	0	0	1	0	1
Preset Stands	1	0	2	0	0	0
Transportation	1	2	1	0	0	1
Lodging	1	1	0	1	1	0

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

issue when discussing leasing land. Who has the rights to the land, how many hunters are allowed on the property, is the lease shared or private, is the hunted guided and are blinds and stands set up in pre-determined areas. Does the landowner offer transportation to the hunting sites or offer lodging, food, or camping facilities on the property?

When discussing land rights most hunters would prefer to have the property that they are hunting on restricted to their hunting party only. The main consideration in this case is safety and familiarity with those in their party (Copeland, 1998). Of the survey respondents, 18 percent had a leasing arrangement that gave then private access to the property on which they were leasing. In the different income groups, those below $19,999 and above $100,000 had the highest percentage of leases with this type of agreement, 22 percent and 33 percent respectively. In the income range from $20,000 to $79,999, 17 percent had the land restricted to their hunting party, while those respondents with incomes between $80,000 and $99,999 had only seven percent with this type of agreement. The two income extremities are an interesting parallel, those with high and low incomes have agreements giving them private access rights. Theoretically, the lower incomes benefit from larger available areas and less competition from others while the higher income hunters probably pay for the rights to have the land to themselves.

When the constraint of sharing the land with another hunting party is introduced, the percentages for each respective group decrease substantially, except for those with incomes between $80,000 and $99,999. This group increased from seven percent to 29 percent. Reasoning behind this could be that this income level is not willing to pay for the right to have the land privately and are more willing to share the land with another party to reduce the cost.

Another possibility is the game available on the property is pursued by one party but not another, such deer and waterfowl leases on the same property. The deer hunters want the woods and grass fields while those fowling want the rights to the waterways and flooded fields. If this is possible then it is a benefit for the landowners to separate the leases and have different species hunting on different sections of the land by integrating the land to provide different habitats in different areas (Lyons and Ginnett, 1998).

In the United States, the industry of guided hunts has become a profitable expansion for many landowners. The main guided hunts in the U.S. are usually for the big game animals, moose, elk, bear, and surprisingly waterfowl. But, there is a large closet industry available for the landowners to take advantage of. Leasing fees could be increased by the landowners by guiding those hunters on their property to the best hunting locations on the property. This would take considerable time and preparation in the scouting and blind/stand preparation. But, if done correctly the first few years it could be accomplished relatively quickly in the future years with little cost of time or money.

According to the survey respondents, only one percent have been guided by the landowners, with two-thirds of the respondents falling in the greater than $60,000 income category and the remaining one-third falling in the less than $19,999 category. Those hunters who had blinds/stands at preset areas on the land they lease all fell in the less than $60,000 income category. This shows some difference from the norm because the lower to middle income levels usually are the more avid hunters who have the time to scout and set up for themselves, instead of having everything prepared for them.

Those respondents to the question of transportation showed some surprising results. Of the total respondents, 80 percent who had transportation to the lease by the landowner fell in the less than $60,000 income level. Those responding to the question of lodging on their lease showed a somewhat similar response, with 50 percent having incomes less than $39,999, but with 50 percent having incomes between $60,000 and $99,999.

If a landowner wishes to lease land for wildlife-related recreation he must have information on what the consumer expectations of the lease would consist of. According to economic theory to create a market for a good the producer must identify a niche in the market that is either not available at this time or that he can provide at a less cost than other producers of the good in question. These different niches are the cause for competition in markets. One producer may offer great game densities, but have less quality, while another may offer smaller quantities, but of less quality. Each area has its benefits and costs, and it is up to the producer to decide which niche he can fill.

According to the Oklahoma Deer Hunter Survey respondents, if they paid to lease land they would have certain expectations of the land and the landowner. As shown in Table 41, if the land is leased, 34 percent of the total respondents expected to have high quality of game on the lease. In each income category the lowest (less than $19,999) and highest income levels (greater than $100,000) showed the largest number of respondents expecting high game quality on the land they are leasing, 39 percent and 40 percent in each range, respectively. All other income levels had approximately one third of the respondents showing the expectation of high quality game on the land.

Table 41: Income Levels vs. Leased Land Hunting on Expectations

	Income (in $1000)					
	Under $19	$20 to $39	$40 to $59	$60 to $79	$80 to $99	More than $100
Game Quality	16	20	19	13	4	6
Game Quantity	2	6	2	5	0	1
Quality Habitat	16	21	21	14	4	7
Near Home	9	6	10	7	1	2
Lease Length	8	13	15	8	3	1
Exclusive Rights	8	16	14	16	3	3
Hunting Methods	15	18	25	14	4	4
Lodging	3	3	0	7	1	1

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Certain types of hunters prefer to have a better opportunity of a harvest as opposed to the chance to harvest a higher quality animal. Those respondents who wish greater quantity of game on the land but of less quality, 94 percent of those responding to this question had incomes of less than $80,000. Those individuals with incomes greater than $80,000 seem to show that if paying for a lease that they would prefer to have quality game on the lease instead of higher quantities.

Another aspect of leasing lands is the expectations of the actual habitat on the land. If an individual paid for a lease 36 percent expected the land to have good food, water, and cover available on the land. In the less than $39,999 income level, 36 percent of those responding expected the land to have these habitat traits. From $40,000 to $79,999, 37 percent expected the land to have these habitat traits, and of those respondents with incomes greater than $80,000, 38 percent showed the same expectations of the habitat on the land. This is an important consideration for the landowners to understand what with greater than one third of the respondents to this question expecting quality habitat to be available on the leased land. If the land is to be marketed for leasing, this is one expectation that is consistent among respondents of all income levels.

Travel distance is an important consideration when attempting to market land for lease hunting. It would not be feasible for a landowner in southwestern Oklahoma to concentrate his advertising in the northeast, unless he has some special type of hunt to offer. The distance to travel and the cost to the clients would be great and the return would have to be high to entice prospective clients from this distance away. He must market to those in the area nearest to his property to increase his leasing potential. Of those respondents to this question, 15 percent felt that the distance to the lease was an

important expectation of the lease. The income levels of less than $19,999 and those with incomes between $60,000 to $79,999 showed the greatest expectations of the lease being near their homes with responses of 22 percent and 20 percent, respectively. Given that 15 percent felt that leases near their homes was an important expectation, this would be a consideration for the landowner when considering his marketing options.

The length of the lease and the option to renew the lease is another important factor for the landowner to consider when he markets the rights to his land. Clauses must be written into the lease discussing how long the lease is going to be for, the types of game the lease is for, the renewal options on the lease, and the reasoning for cancellation of a lease. Of the survey respondents, all income categories felt that the length of the lease with an option to renew was an important expectation of the landowner (approximately 20 percent), except for those respondents with incomes greater than $100,000. This group had only six percent feel that this was an important expectation. The low response in this income level could be due to the fact that the highest income level respondents are not as active hunters as those respondents in the lower income levels.

The expectation of exclusive rights to the property in the lease is another important consideration for the landowner. Does he maximize the number of individuals on his lease or does he try to minimize the hunters and charge more for the right to have a lease to one individual or group. Of the survey respondents, 26 percent felt that this was an important expectations of the landowner. Of the respondents to this question, approximately 20 percent of the respondent in each income level felt that this was an important expectation. But, in the $40,000 to $59,999 income level, nearly 46 percent

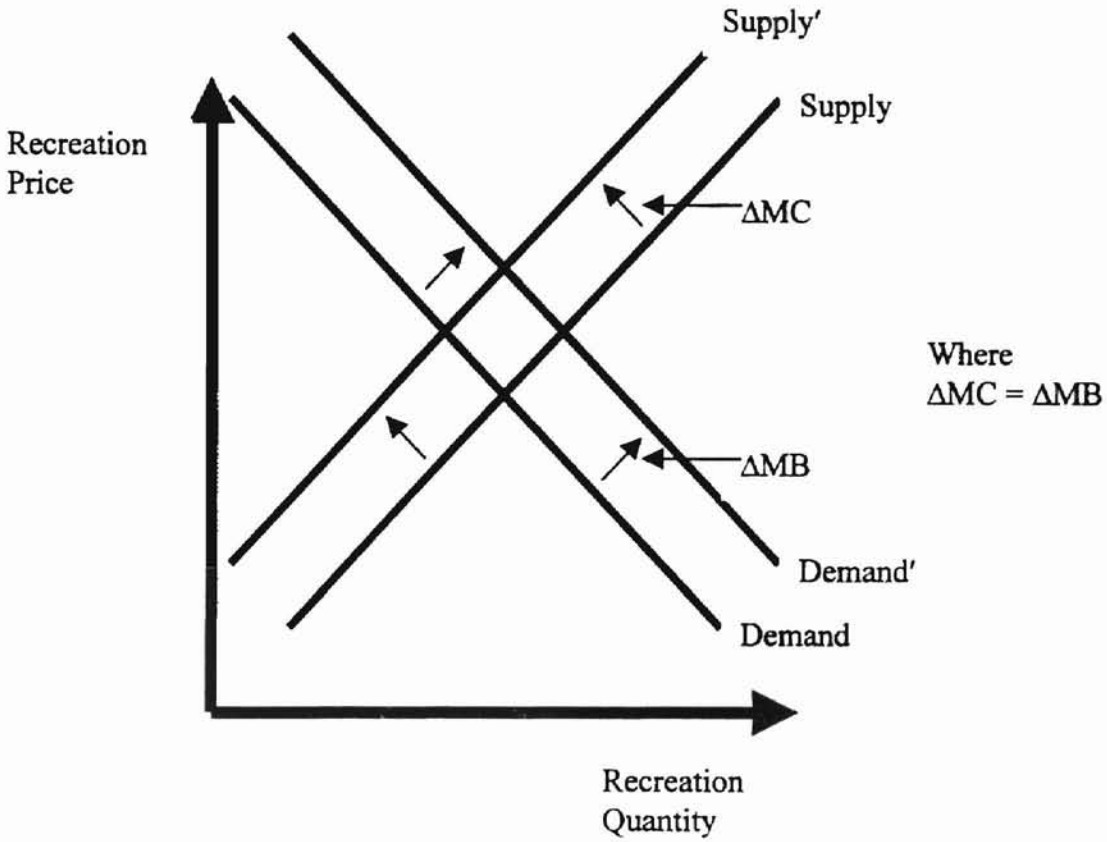
felt that this was a important consideration. This larger percentage shows that this income level places a higher value on the exclusive rights to the land, possibly because of a larger percentage of their income being spent to lease land than in higher income levels.

Given the many different hunting methods available to hunters today the opportunity to hunt with different techniques has become more prevalent in society. If the landowner were to restrict the hunter on the lease to only one method, would it affect the possibility of increasing new consumers for his property. Thirty five percent of those surveyed responded that the option for different hunting methods is an important expectation of the lease. Some individuals may use a rifle for meat hunting to increase the chance of success, but may like to use a primitive weapon, such as a muzzle-loader or a bow for the sport. By restricting the type of hunting methods on the land the landowner may decrease the demand for his land.

Consumer demand is the willingness of the consumer to pay for a good or services. Price is not only the only factor affecting consumer demand. Non-monetary factors such as consumer preferences, travel distance, land availability, income and leisure, and hunting frequency are all factors that can contribute to the demand for wildlife-related recreation. The effect of travel distance on the demand for a wildlife-related recreation could be determined through the use of a contingent valuation method (CVM), or the travel cost method (TCM). These forms involve the use of surveys to elict hypothetical willingness to pay information. Other non-monetary factors have a certain effects on the consumers demand for wildlife-related recreation. If a landowner wishes to provide some of these non-monetary goods, like guides, blinds, transportation, it may cause a increase in the demand for the wildlife-related recreation that is offered, but it

will increase the marginal cost of providing the recreation in question and shift the supply curve as well. This would cause an increase in the price of the good offered, but no change in the quantity sold of the good. An example of this is shown in Figure 4. The landowner must then increase the number of individuals who request his wildlife-related recreation, through advertising or marketing strategies, so that the increase in demand for the recreation is greater than the increased cost to the landowner. Figure 5 shows an example of how these strategies will increase the quantity demanded of the good as well as the price received by the landowner for the good

Figure 4.


Supply'
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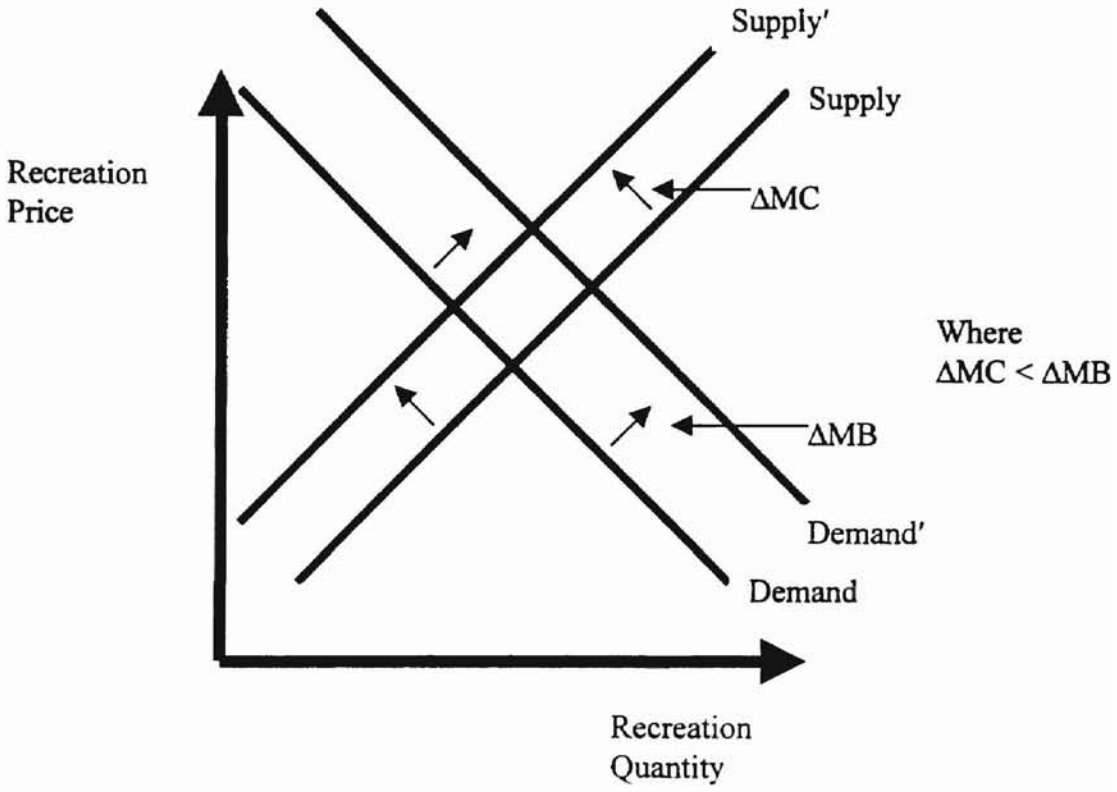
ΔMB
Demand'
Demand
Recreation Quantity

Figure 5.


Supply'
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Recreation Price
ΔMC
Where ΔMC < ΔMB
ΔMB
Demand'
Demand
Recreation Quantity

CHAPTER V

Willingness to Pay and Income Evaluation

The objective of this section is to examine the willingness-to-pay of white-tailed deer hunters in the state of Oklahoma. These respondents, when aggregated for the whole population of deer hunters in the state, will provide important information for the suppliers of the goods and services that go along with white-tailed deer hunting.

Individual willingness to pay for a good depends on his budget and the relative utility the individual gains from the good. The utility gained from the good may be direct or indirect. Other individuals may be willing to pay for the existence of the good without any possibility of use in the present or foreseeable future (existence value).

If the opportunity for outdoor recreation exists, and the consumers are given the choice to consume, then a majority of them will spend their money and a fraction of their time pursuing outdoor-related recreational activities. The personal values of outdoor recreation are reflected by what the individuals are willing to give up to obtain them.

Demand, as applied to outdoor recreation, means a schedule of volume (user-days, etc.) in relation to a price (cost of the recreational experience) (Clawson and Knetsch, 1966). In its simplest terms, the demand schedule is a statement of the amount of a particular good or service that will be purchased at specific prices per unit.

Demand evaluation of outdoor recreation presents some problems for economists. For most commodities and services, price is easily measurable into dollars. But, in outdoor recreation, dollars, travel and time are always involved. For a great deal of

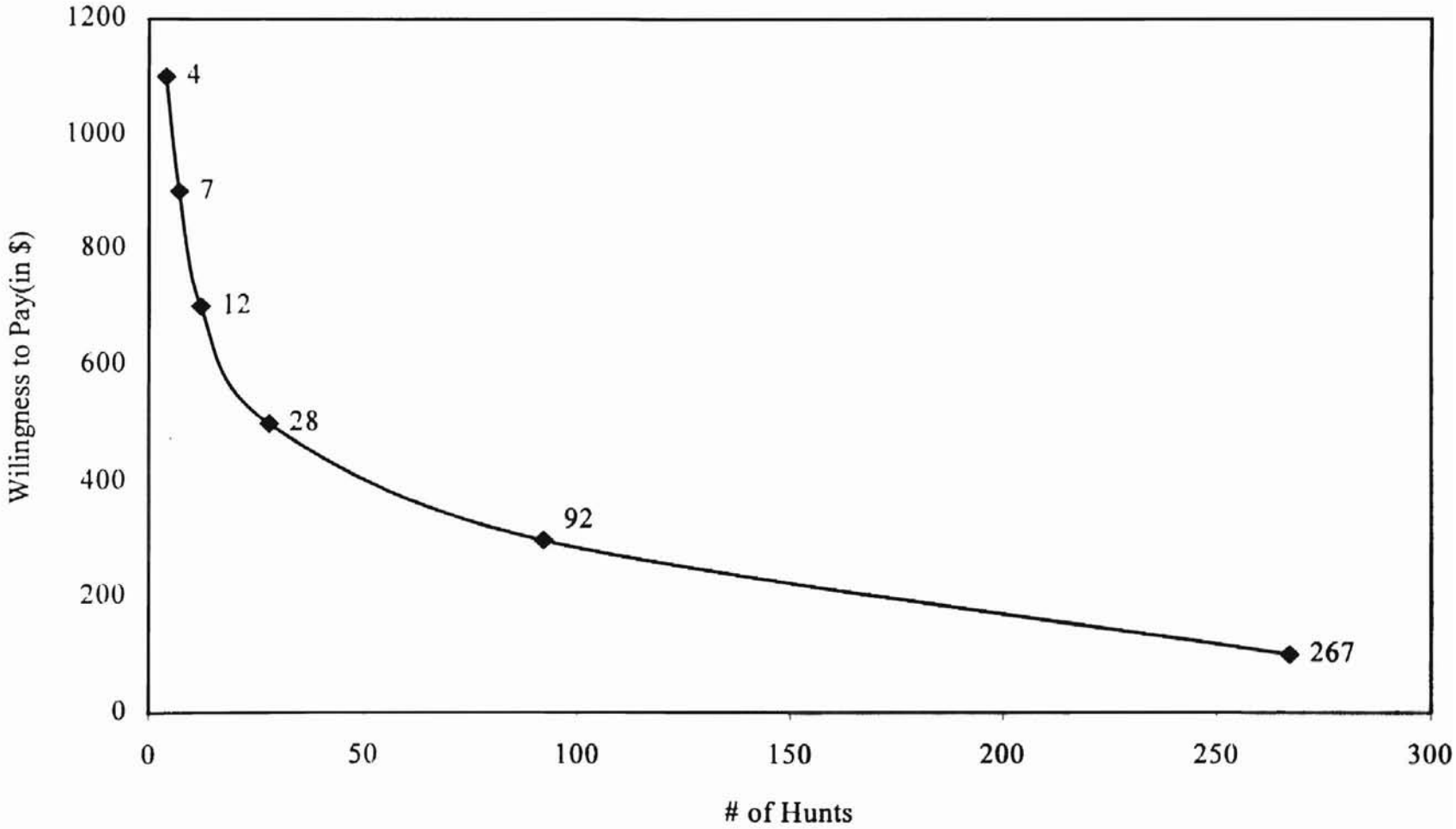
outdoor recreation, time dollars and travel are closely correlated, and in such cases dollars may serve as an index for all three variables. But, there are circumstances where three variables are largely different. Wealthy individuals have money, but not time, while poor people have time, but no money. The trade-off between time and money are possible, the opportunity cost of giving up a days income for a days recreation.

Willingness to Pay Frequency Distributions

Figure 6 shows the cumulative frequency distribution of the Oklahoma Deer Hunter survey respondents responses to the question "How much would you be willing to pay for a trophy buck hunt (8-pts or larger)". While this is not a true demand curve for willingness to pay, it gives a practical explanation into the willingness of Oklahoma deer hunter survey respondents to pay to hunt. This is not a true demand curve because it is not based on specific willingness to pay values, only on approximate ranges. The survey design did not have a question that would give the respondents the opportunity to give their personal willingness to pay, only the possibility of choosing a range. These preset ranges can not evaluate the demand for consumers inside the individual ranges, whether they are on the high or low end of each range, and therefore can not be used to estimate a true demand schedule.

This distribution shows the relationship between the different willingness to pay levels stated on the survey and the number of individuals willing to pay that amount for a hunt. Since the price levels were broken into $200 intervals, it is difficult to estimate whether the respondents are at the low or high end of willingness to pay for each level, so the mean was used for plotting the number of hunts for each willingness to pay level. This downward sloping distribution shows that as the number of respondents increases

Figure 6. Willingness to Pay for a Trophy Buck Hunt, (in $)
Values Represent Cumulative Responses Across Payment Levels

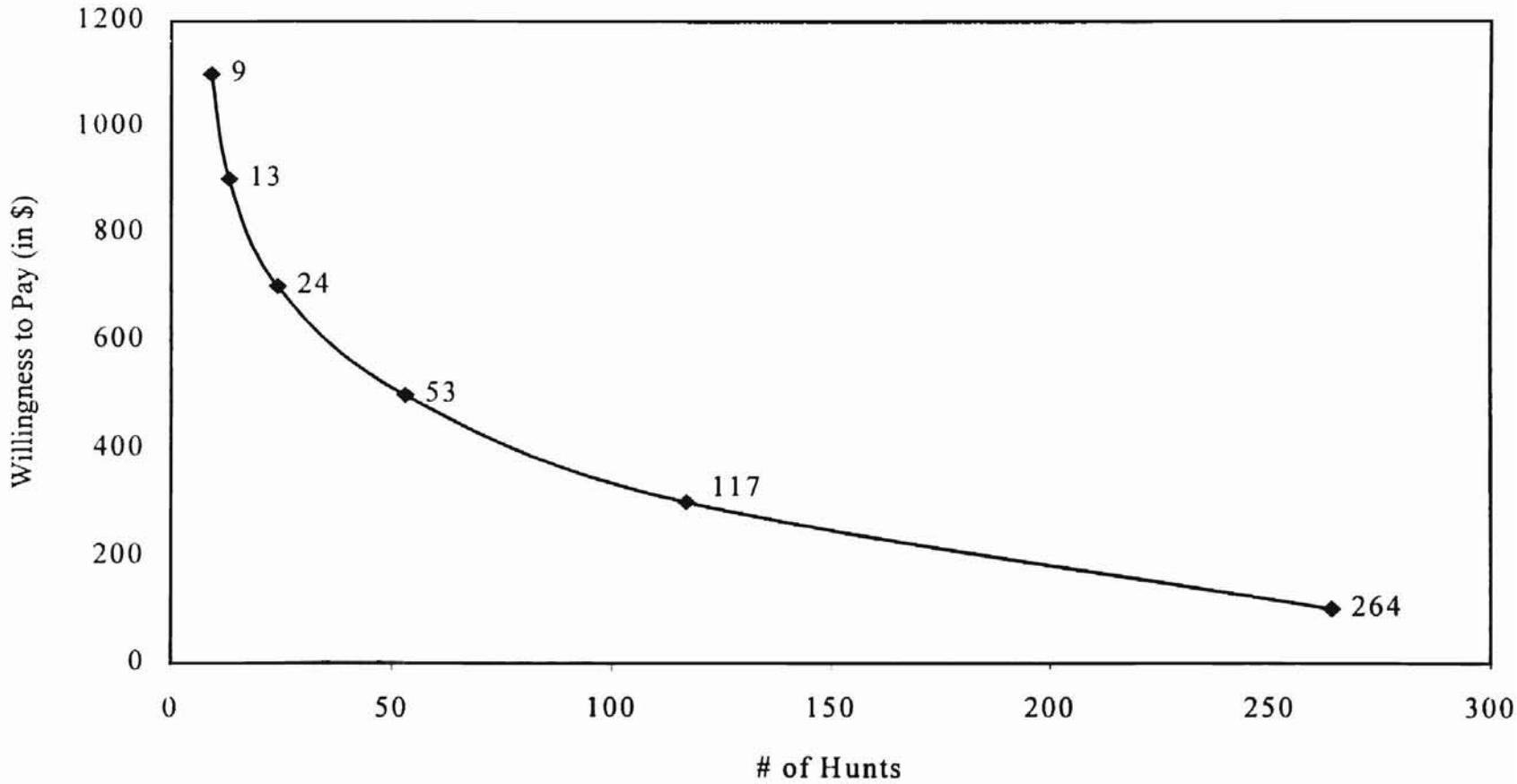


Source: Survey Conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

the mean willingness to pay falls. This distribution shows that most respondents (90%) of the respondents are willing to pay less than $400 for a trophy buck hunt. Over half of the remaining respondents fell into the $400 to $600 level. The higher willingness to pay values, above $600, show a very inelastic curve. But, the values below $600 show a very elastic curve. The inelastic curve above $600 show that a change in price levels does little to change the number of respondents willing to pay levels. The elastic curve below $600 shows that a change in price levels does much to change the number of respondent's willingness to pay levels. While the distribution shows that values below $1000 are normal goods, it is important to note that there are more respondents willing to pay greater than $1000 than those willing to pay between $800 and $1000.

Figure 7 shows the cumulative frequency distribution of the Oklahoma Deer Hunter survey respondents responses to the question "How much would you be willing to pay for a trophy buck hunt (8-pts or larger) with a 90% success rate". The reasoning for the constraint of a 90% success rate is to see if consumer preferences change with the inclusion of a type guarantee. This guarantee is that there is only a ten- percent chance that they will not harvest a trophy buck. This is a relevant guarantee since most data shows that the harvest rate per hunter is about 50 percent (Masters, et al). This constraint was also included to examine if the success rate would show a shift of individuals to higher willingness to pay levels to examine if hunters are willing to pay for a less risk averse outdoor recreational experience.

Figure 7. Willingness to Pay for a Trophy Buck Hunt with a 90% Sucess Rate, (in $)
Values Represent Cumulative Responses Across Payment Levels



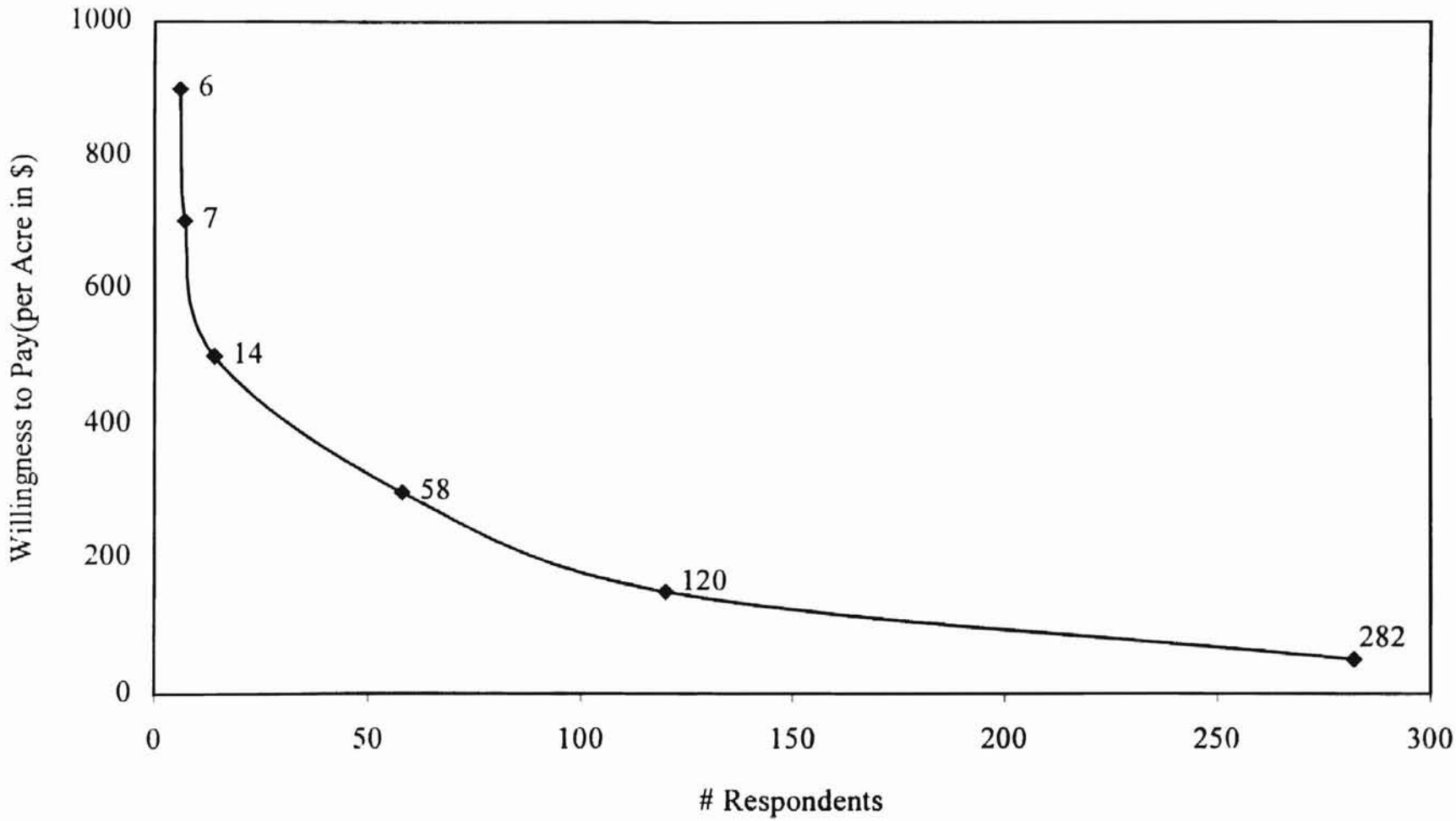
Source: Survey Conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

This distribution shows the relationship between the different willingness to pay values stated on the survey and the number of individuals willing to pay that amount for a hunt. Again the mean willingness to pay values were used to plot the responses. This distribution also show that as the number of respondents increases the mean willingness to pay falls. This distribution is more elastic than the distribution in Figure 6, at levels of willingness to pay below the $800 to $1000 range. Again we see that there are several more respondents in the greater than $1000 range willingness to pay than in the $800 to $1000 range, showing a inelastic curve at this willingness to pay level.

Figure 7 shows a definite shift in the respondent's willingness to pay after a constraint has been introduced. The distribution shows that most respondents (80%) are willing to pay less than $400 for a trophy buck hunt with a 90% success rate. Given the constraint the number in the less than $400 range decreased by ten percent. 211 respondents were now willing to pay less than $400, a decrease of 28 respondents. Most of these respondents moved into the $400 to $800 range and the greater than $1000 range. Only one moved into the $800 to $1000 range. This constraint has increased the number of respondents for all levels of willingness to pay, except for the less than $200 level where it decreased. This is consistent with the discussion of risk aversion, that as the risk of a opportunity decreases, the willingness to purchase that opportunity will increase.

Figure 8 shows the willingness of the survey respondents to pay for a 100-acre deer-hunting lease. This question was asked to see if Oklahoma deer hunters are different from the national average of $3 to $5 per acre for a deer-hunting lease. This

Figure 8. Willingness to Pay for a 100 acre Deer Hunting Lease, (in $)
Values Represent Cumulative Responses Across Payment Levels



Source: Survey Conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

distribution shows that most respondents (95%) are willing to pay less than $400 for a 100-acre deer lease, approximately $4 per acre. But, it is apparent that some individuals hold leasing land a higher priority than others since almost half of the remaining respondents fell in the greater than $800 range.

These willingness to pay values are used to show the respondents approximate demand for a good at a particular price. They are consistent with the theory of demand that as price for a good increases the demand for the given good will decrease. They have also shown that given a pre-determined success rate there will be a shift upward, on average, by the respondents to higher willingness to pay values. This gives the providers of land and hunts information into the willingness of these individuals to pay for this type of good that can be used when looking at the possibility of marketing goods such as these.

Income Levels Effects on Willingness to Pay

Another area which must be looked at when discussing willingness to pay is the effect of income on the demand for a good or service. If prices for a good remain constant and income levels increase, then it is probable that the quantities demanded for that good would rise. Some goods are very responsive to changes in income such as luxury goods while some goods are not as responsive to changes in income. Income also has an effect on the amount of people who are paying to hunt in Oklahoma.

A factor that can be used to determine if individuals will be willing to pay for hunting services in the state of Oklahoma is to see how many of the hunters have already paid to hunt in the state. If individuals from different demographic groups are willing to pay different amounts to hunt, and it is provable, then it creates a incentive for producers

to market their good to certain clientele. Table 42 shows the number of survey respondents that have paid to hunt in the state of Oklahoma compared to the respondent's income levels.

Of the respondents, 36 percent had paid to hunt in Oklahoma, while 64 percent had not paid to hunt in Oklahoma. Of those with incomes less than $19,999, 30 percent had paid to hunt, those with income between $20,000 and $39,999 had 32 percent paying to hunt, and those with income between $40,000 and $59,999 had 30 percent paying to hunt. Respondents with income between $60,000 and $79,999 had 46 percent paying to hunt, those in the $80,000 to $99,999 range had 57 percent paying to hunt and those with income greater than $100,000 had 40 percent paying to hunt. Respondents in the lower income ranges, below $60,000, on average 31 percent had paid to hunt, while those in the higher income levels, above $60,000, on average, 47 percent had paid to hunt. Theory suggests that those individuals that live in rural communities, on average, have lower incomes that those in urban areas, it is not surprising that the lower income brackets had few respondents relying that they had paid to hunt. Since higher income generating employment is usually located in the urban areas, this holds true. It is also theoretical to conclude that those individuals who live in more rural settings have most access to lands to use for hunting and are not accustomed to having to pay for the hunting experience.

Table 43 shows the comparison between income levels and willingness to pay for a trophy buck as reported by the Oklahoma Deer Hunter Survey respondents. The respondents show an income distribution that is consistent with the population of the state of Oklahoma. Some of the percentages in the groups may seem extremely large or small

Table 42: Income Levels vs. Paid to Hunt in Oklahoma

Income (in $1000)	Paid To Hunt	Did not Pay to Hunt
Under $19	12	28
$20 to $39	20	42
$40 to $59	17	40
$60 to $79	16	19
$80 to $99	8	6
More than $100	6	9

Source: Survey conducted by the Department of Agriculture Economics at Oklahoma State University, 1998.

but that is because the overall sample size varies in each of the income brackets. Of the respondents 65 percent showed a willingness to pay of less than $200. Twenty three percent showed a willingness to pay between $200 and $400 for a trophy buck hunt, while seven percent showed a willingness to pay between $400 and $600. For the willingness to pay ranges greater than $600, each range had two percent responding with a willingness to pay for a trophy buck hunt.

In the income level below $19,999, 90 percent were willing to pay less than $400 for a trophy buck hunt, while five percent were willing to pay between $400 and $600 and two and one-half percent were willing to pay in the $600 and $800 and $1000 or greater ranges, respectively.

In the income level from $20,000 to $39,999, 88 percent showed a willingness to pay less than $400 for a trophy buck hunt, while ten percent showed a willingness to pay between $400 and $600. Two percent showed a willingness to pay between $600 and $800, and no respondents showed a willingness to pay greater than $800.

In the income level from $40,000 to $59,999, 88 percent showed a willingness to pay less than $400. Eight percent showed a willingness to pay between $400 and $600, while two percent showed a willingness to pay between $600 to $800 and $800 to $1000, respectively. No respondents in this income bracket showed a willingness to pay more than $1000 for a trophy buck hunt.

In the income bracket from $60,000 to $79,999, 90 percent showed a willingness to pay less than $400 for a trophy buck hunt. Seven percent showed a willingness to pay between $400 to $600, while three percent showed a willingness to pay between $600 and $800. No respondents showed a willingness to pay greater than $800.

Table 43: Income Vs. Willingness to Pay (WTP) for a Trophy Buck Hunt

Income (in $1000)	WTP					
	Less than $200	$200 to $400	$400 to $600	$600 to $800	$800 to $1000	$1000 or More
Under $19	27	8	2	1	0	1
$20 to $39	32	14	5	1	0	0
$40 to $59	34	12	4	1	1	0
$60 to $79	21	6	2	1	0	0
$80 to $99	9	2	0	0	0	0
More than $100	5	4	0	0	2	2

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

In the income bracket from $80,000 to $99,999, 100 percent showed a willingness to pay less than $400. No respondents showed a willingness to pay of greater than $400.

In the greater than $100,000 income level, 70 percent showed a willingness to pay less than $400. No respondents showed a willingness to pay between $400 and $800, while 15 percent, respectively, showed willingness to pay between $800 to $100 and greater than $1000 for a trophy buck hunt.

From the responses in this table many inferences into the demand for this type of good in Oklahoma can be drawn. The data shows that the survey respondents do not have a large willingness to pay for a trophy buck hunt. Breaking the income brackets into two groups, below $60,00 and above $60,000, should give an insight into the specific differences between the higher and lower income classes. The reasoning between the break in income brackets is to determine if the lower and lower-middle class income levels show different willingness to pay for the upper-middle and upper class income levels.

Of those making less than $60,00, 89 percent showed willingness pay less than $400, but of those making more than $60,000, 85 percent showed a willingness to pay of less than $400. In the $400 to $800 range ten percent of those with incomes less than $60,000 showed a willingness to pay for a trophy buck hunt. But of those incomes greater than $60,000, only five percent showed a willingness to pay for a trophy buck hunt.

Income Effects and Constrained Willingness to Pay

Economic theory would suggest that as income levels increase willingness to pay levels would increase. But, the respondents to the Oklahoma Deer Hunter survey show a

decrease in willingness to pay as income levels increase. This difference from theory could have many reasons. There exists the possibility that individuals with higher income are less interested in the type of deer they harvest, have less time to spend out hunting for deer, and value their time more than those with lower incomes. The higher income individuals most likely live in more urban areas while most hunters in the U.S. come from lower to middle income families that live in smaller cities, towns and rural areas.

Large hunting preserves in Texas have enticed consumers to purchase hunts on the basis of quality of game and the success rates of their preserve. These hunts with guarantees are usually high priced and are catered to individuals with little time and large incomes. Table 44 shows the comparison between income levels and willingness to pay for a trophy buck hunt with a 90 percent success rate as reported by the Oklahoma deer hunter survey respondents. By having the pre-determined 90% success ratio included into the model economic theory would lead to the conclusion that willingness to pay values would increase for each income bracket due to a less risk averse position. Some may argue that this type of hunt is a different commodity, but, for the sake of this study it will be considered the same type of commodity as a regular hunt.

Of the respondents, 55 percent showed a willingness to pay of less than $200 for a trophy buck hunt with a 90% success rate. Twenty three percent showed a willingness to pay between $200 and $400, while twelve percent showed a willingness to pay between $400 and $600 for a 90% guaranteed successful trophy buck hunt. Five percent showed a willingness to pay between $600 and $800, while two percent showed a willingness to pay between $800 and $1000. Four percent showed a willingness to pay

Table 44: Income Vs. Willingness to Pay (WTP) for a Trophy Buck Hunt with a 90% Proven Success Rate

	WTP					
Income (in $1000)	Less than $200	$200 to $400	$400 to $600	$600 to $800	$800 to $1000	$1000 or More
Under $19	25	5	3	4	0	2
$20 to $39	27	14	6	2	2	0
$40 to $59	27	15	7	2	0	2
$60 to $79	18	6	4	2	0	0
$80 to $99	8	3	1	0	0	0
More than $100	4	2	3	0	1	3

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

more than $1000 for a trophy buck hunt with a guaranteed 90% success rate. In comparison to the responses in Table 43, respondents to the question with the constraint of a 90% success rate moved to higher willingness to pay values overall. The only decrease was in the less than $200 bracket, while all other willingness to pay brackets either increased or remained constant. In the income bracket of less than $19,999, 77 percent showed a willingness to pay less than $400, while eight percent showed a willingness to pay between $400 and $600. Ten percent were willing to pay between $600 and $800, and five percent were willing to pay more than $1000 for a trophy buck hunt with a 90% success rate.

In the income bracket of $20,000 to $39,999, 80 percent showed a willingness to pay less than $400, while twelve percent showed a willingness to pay between $400 and $600. Four percent showed a willingness to pay in the $800 to $1000 range and the greater than $1000 range.

In the income bracket from $40,000 to $59,999, 79 percents showed a willingness to pay less than $400 for a trophy buck hunt with a 90% success rate. Thirteen percent showed a willingness to pay between $400 and $600. while four percent showed a willingness to pay between $600 to $800 and greater than $1000, respectively.

In the income bracket from $60,000 to $79,999, 80 percent showed a willingness to pay less than $400. Thirteen percent showed a willingness to pay between $400 and $600 while seven percent showed a willingness to pay between $600 and $800 for a trophy buck hunt with a 90% success rate.

In the income bracket from $80,000 to $99,999, 92 percent showed a willingness to pay less than $400, and eight percent showed a willingness to pay between $400 and $600 for a trophy buck hunt with a 90% success rate.

In the greater than $100,000 bracket, 62 percent showed a willingness to pay less than $400 for a trophy buck hunt with a 90% success rate. Twenty three percent showed a willingness to pay between $400 and $600 and greater than $1000, while eight percent showed a willingness to pay between $800 and $1000.

When including the constraint into the question the responses decrease from the lower willingness to pay level and shifted to the higher willingness to pay levels. This is consistent with economic theory that the less risk is involved the higher the willingness to pay will be. Even thought the data shows that there is a increase in willingness to pay for all income levels, it is important to note that even thought the higher income levels have a greater percentage of higher levels of willingness to pay, they are estimated from a small sample size. Overall, the lowest income levels have the same number or more respondents willing to pay at the higher levels as the highest income levels. This is important to consider because of the fact that it shows that in some cases there may be other factors involved in the determination of the demand for a good, such as a deer hunt.

Income Effects on Land Leasing

Table 45 is a comparison of the survey respondent's willingness to pay for a 100-acre deer-hunting lease to their income levels. Of the respondents, 18 percent were willing to pay less than $200 for a 100-acre deer lease, while 28 percent were willing to pay between $200 and $400. Twenty seven percent showed a willingness to pay between $400 and $600, and 16 percent showed a willingness to pay between $600 and $800..

Table 45: Income Vs. Willingness to pay (WTP) for a 100 Acre Deer Hunting Lease

	WTP					
Income (in $1000)	Less than $200	$200 to $400	$400 to $600	$600 to $800	$800 to $1000	$1000 or More
Under $19	20	35	35	22	6	5
$20 to $39	9	12	11	3	5	5
$40 to $59	7	10	7	5	0	3
$60 to $79	0	1	3	3	0	0
$80 to $99	0	0	0	0	0	0
More than $100	2	0	0	0	0	1

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Five percent showed a willingness to pay between $800 and $1000 for a 100-acre deer lease with seven percent showing a willingness in the greater than $1000 range. The cost of hunting leases in Texas ranged from $1 to more than $500 depending on the species hunted. According to one study the average White-tailed deer lease cost was $393 (Thomas, et al). If this value is transferred to Oklahoma it would encompass only 28 percent of the survey respondents

Those respondents with incomes less that $19,999 showed the largest number of those willing to pay for each category. Nearly 50 percent of those in this income class showed a willingness to pay in the range between $200 to $800 for a 100-acre deer lease. In comparison, of all respondents with income greater than $60,000, only three percent showed a willingness to pay in the same range, and all of those respondents fell in the $60,000 to $79,999 income range. In the greater than $1000 willingness to pay range, of the incomes below $60,000, six percent showed a willingness to pay, while in the greater than $60,000 income range barley one half of one percent showed any willingness to pay more than $1000 for a 100 acre deer lease. In the $80,000 to $99,999 income range, no respondents were willing to pay for a 100-acre deer lease.

This data has shown that as income levels increase, there is direct correlation to a lower willingness to pay for leasing land. Theory aside, this is surprising since it would seem as income levels increased, the willingness to pay for land use would increase also. Possible explanations for this could be that these individuals do not place as much value on the experience as those with lower incomes, are constrained by time and travel distance, are allowed to hunt on private property or hunt on public lands, or that the opportunity cost of hunting is less than that of the income lost from work.

Income levels have a very significant effect on consumer willingness to pay. Whether the effect shows an increase or decrease in willingness to pay, income still has a significant affect on the willingness to pay of consumers for wildlife-related recreation. Because income is one of the basic determinants of demand, it has a specific effect on the demand for wildlife-related activities. If income levels increase, the demand schedule for the activities will shift out and to the right showing an increase in the quantity demanded of the good and if supply is held constant, an increase in the price of the good. The inverse is true if incomes fall. The demand schedule will shift back and to the left lowering quantity demanded and in turn lowering price. These effects are shown in their most simple form in Figure 9 and Figure 10 respectively.

Figure 9.

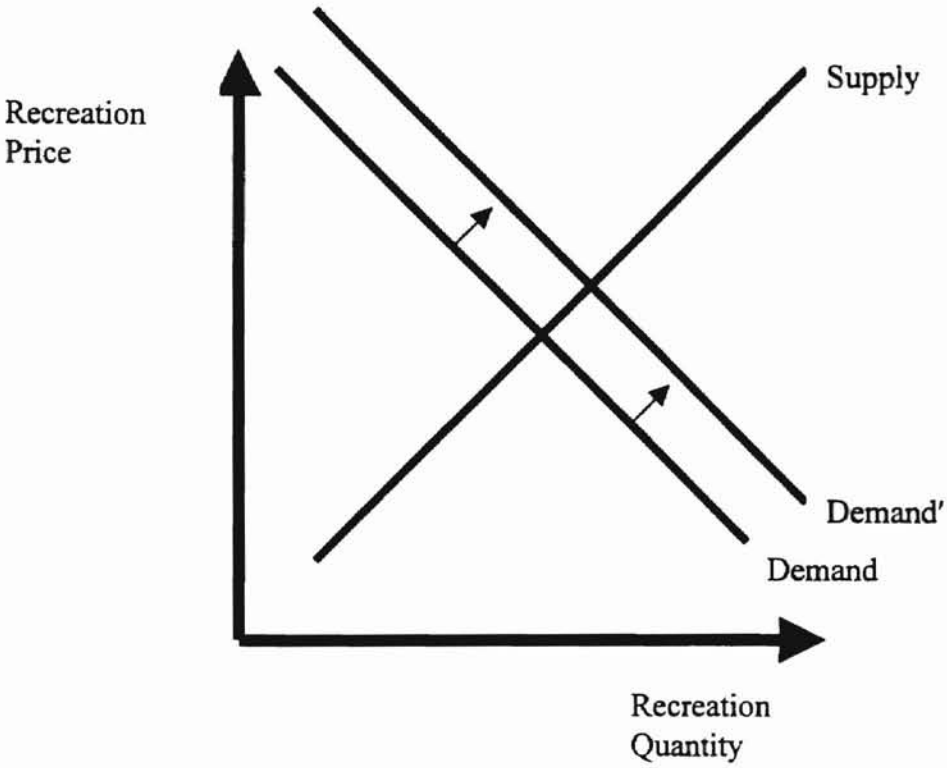
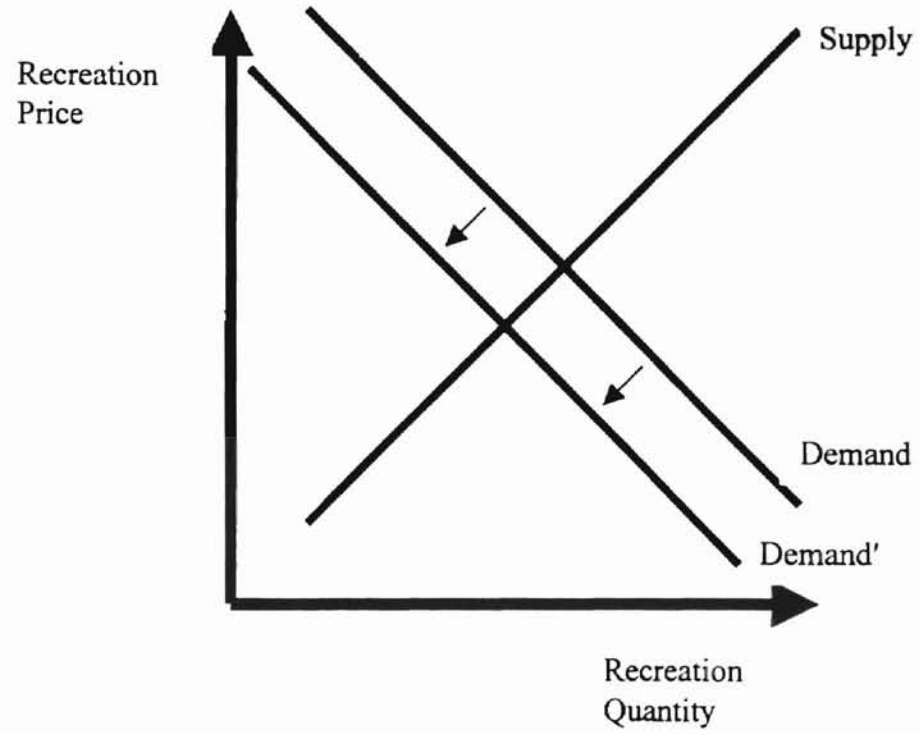


Figure 10.



CHAPTER VI

Hunter Property Rights and Land Values

In Oklahoma with the large private land holdings and large tracts of public accessible land there exists the possibility that the willingness of the hunters to pay for the option to lease land for deer hunting could increase for the recreational experience. This is important information for the landowner with the interest in leasing lands for hunting. It shows the amounts and willingness of hunters to pay for a right to deer hunting land. Rural incomes can be increased with the use of leasing land to hunters. The cost to the landowner is small and the time spent working on this is minimal. But, the income generated from this type of enterprise could be large. To maximize profit from this type of lease the landowner needs to know how many hunters he can accommodate, what are the habitat requirements for the deer, how much land is totally available for the hunters, and what is the number of deer he wants to be harvest on a yearly basis.

The study done by Master's et al (1995) shows a way for the landowners to estimate deer population, allowable harvest, and the number of hunters a lease can support. The main area of interest to the landowner will be maximizing profits, hence maximizing the number of individuals he can lease land to for hunting. First, he must figure the population estimate, which is the size of the area divided by the acres per deer. Then what is considered a allowable harvest, usually 30 percent of the population of deer on his property, is multiplied by the number of deer on the property. Then the allowable

harvest is divided by the success rate (approximately 50%) to determine the number of potential hunters. This will give the number of potential hunters that the lease can support for a season. Of course this number will vary yearly and need to be re-estimated annually (Master et al, 1995).

Land Values over Past Two Seasons

The primary reason that hunters lease land is to obtain private rights to a section of land so that they can maximize their recreational experience. Hunters look to lease land for many reasons (Masters et al):

- The quality and quantity of game on the lease.
- Convenience and/or near home.
- Little or no competition from other hunters.
- Safety (control of persons hunting and hunter distribution).

By having the information available to the landowners about the willingness of the hunters to pay for leased property, and what type of property the hunters have hunted on in the past and are hunting on currently it increases the ability of the landowners to market the lease rights to his land.

According to Table 46, 57 percent of the survey respondents showed a willingness to pay for a 100-acre deer lease of less than $200. In the $200 to $400 range, 22 percent showed a willingness to pay for a 100-acre deer lease. Fifteen percent showed a willingness to pay between $400 and $600, three percent between $600 and $800, one percent between $800 to $1000, and two percent of those responding were willing to pay greater than $1000 for a 100-acre deer lease.

Table 46: Land Hunted (Past Two Seasons) Vs. Willingness to Pay (WTP) For a 100 Acre Deer Hunting Lease

	WTP					
Land Hunted	Less than $200	$200 to $400	$400 to $600	$600 to $800	$800to$1000	$1000 or greater
Private Property	60	12	9	3	1	2
Friend/Family Property	70	39	26	1	0	3
Leased Property	14	11	8	3	0	1
Public Property	16	0	0	0	0	0

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

When comparing the property hunted on the last two seasons versus the survey respondents willingness to pay, of those who hunted the past two seasons on private property that they own, 69 percent were willing to pay less than $200 for a 100-acre deer lease. Fourteen percent of those surveyed showed a willingness to pay between $200 and $400, and ten percent were willing to pay between $400 and $600 for a 100-acre deer lease. Three percent of those who hunted private property the past two seasons were willing to pay in the $600 to $800 range, one percent in the $800 to $1000 range and two percent were willing to pay greater than $1000 for a 100-acre deer lease. Those individuals who hunt on private property have no inclination to pay for the right to a 100-acre lease, since they already own the property that they are hunting on, so the low number of those willing to pay, as a percentage of the total, is expected.

Of those respondents who hunted the past two seasons on property owned by a friend or family member, 50 percent were willing to pay less than $200 for a 100-acre deer lease, 28 percent were willing to pay between $200 and $400, 17 percent were willing to pay between $400 and $600, and one percent were willing to pay between $600 and $800. No respondents were willing to pay between $800 and $1000, and two percent were willing to pay more than $1000 for a 100-acre deer lease. Again, those individuals who hunt on private property owned by a friend or family member have no inclination to pay for the right to a 100-acre lease, since they already have the right to hunt on the property that they are hunting on, so the low number of those willing to pay, as a percentage of the total, is also expected.

Of those individuals surveyed who leased property the past two seasons to hunt on, 38 percent were willing to pay less than $200 for a 100-acre deer lease. Thirty

percent were willing to pay between $200 and $400, 22 percent were willing to pay between $400 and $600, and eight percent were willing to pay between $600 and $800 for a 100-acre deer lease. Again no respondents were willing to pay between $800 and $1000, and three percent were willing to pay greater than $1000 for a 100-acre deer lease. The large number of respondents who gave a willingness to pay between $200 and $600 for a lease (52%) are consistent with the national average of lease cost per acre (U.S. Fish and Wildlife Service, 1996).

The individuals in this survey who lease land have more information available to them since they are already involved in the leasing process. This could be a reason that this group's willingness to pay is more consistent with the national average. Given that the average range of lease fees in Oklahoma for a deer lease is $.25 to $2.00 per acre with the maximum being $4.00 per acre (Masters et al), the survey respondents show somewhat of a greater willingness to pay for a 100 acre deer lease that is consistent with the national average but, is higher than the average charge in Oklahoma.

Of those individuals who hunted the past two seasons on public property, all (100 percent) showed a willingness to pay of less than $200 for a 100-acre deer lease. This is normal because of the fact that they do not have to pay for the right to hunt, but they also do not have to pay for the upkeep of the property and hunting areas. They may pay for these things in taxes, but it is a small fraction of what they pay and is easily forgotten.

Land Values this Season

Table 47 shows the interaction between the Oklahoma Deer Hunter Survey respondents when questioned about the property rights of the land they will be hunting on this season.

Table 47: Land Hunted (This Season) Vs. Willingness to pay (WTP) for a 100 Acre Deer Lease

	WTP					
Land Hunted	Less than $200	$200 to $400	$400 to $600	$600 to $800	$800 to $1000	$1000 or More
Private Property	44	9	7	2	1	2
Friend/Family Property	86	36	26	2	0	2
Leased Property	16	15	9	3	0	2
Public Property	15	2	1	0	0	0

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

The individuals in Table 47 show that no change from Table 38 was recorded in the percentage of individuals that used each type of property for hunting and the respondents willingness to pay.

The actual percentages of hunters in each given willingness to pay range may have remained consistent for question to question, but the changes were made in the individual groups of respondents. Those hunting this season on private property that they own, 67 percent showed a willingness to pay of less than $200, a two- percent decrease from Table 46. Fourteen percent still showed a willingness to pay between $200 and $400, unchanged form before. Eleven percent were willing to pay between $400 and $600, a one- percent increase over Table 46. Those willing to pay between $600 and $800, $800 to $1000, and greater than $1000 all stayed consistent with responses of three percent, one percent and two percent respectively. The decrease in those hunting on private property that they own, 18 respondents, shows a possible shift in the availability of game or property that is owned by respondents.

Of those individuals who are hunting on private property owned by a friend or family member, 56 percent were willing to pay less than $200 for a 100-acre lease, an increase of six percent. In the $200 to $400 range, 24 percent showed a willingness to pay, a decrease of four percent. In the $400 to $600 range, 17 percent showed a willingness to pay, no change from Table 46. Of those respondents in the $600 to $800 range and $800 to $1000 range there is no change in willingness to pay values and in the $1000 plus range, a decrease from two percent to one percent is shown in willingness to pay for a 100-acre deer lease. The increase of those individuals who are hunting on

private property owned by a friend or family member, the increase of 16 respondents, partially encompasses the loss of those hunting on private property that they own.

Of those individuals that are hunting on leased land this season, 36 percent were willing to pay less than $200 for a 100-acre lease, a decrease of three percent. In the $200 to $400 range, 33 percent showed a willingness to pay, a increase of three percent. In the $400 to $600 range, 20 percent showed a willingness to pay, a two- percent decrease. In the $600 to $800 dollar range and the $800 to $1000 range, no respondents showed a change in willingness to pay, and in the greater than $1000 range, four percent showed a willingness to pay, a one percent increase. During the current season the willingness to pay increased from the lower willingness to pay values to the higher values.

Of those individuals who are hunting on public property in 1998, 83 percent were willing to pay less than $200 for a 100-acre deer lease, a decrease of 13 percent from Table 38. In the $200 to $400 region, eleven percent showed a willingness to pay, and in the $400 to $600 range, six percent showed a willingness to pay for a 100-acre deer lease. No respondents showed a willingness to pay greater than $600.

Demographics and Land Values

The importance of showing the changes in property rights over time is to see if individuals that do not have access to private property are willing to pay more to lease land for deer hunting. Those individuals who hunt on privately owned property have the lowest willingness to pay for the right to lease 100 acres for deer hunting. Those who already lease land have the highest percentages of willingness to pay values, possibly because they are already paying to lease land, but at a lower price, and are looking to

increase the land they have available, or that they are not satisfied with the game on the property or the leasing agreement that they are in.

There is also reason to believe that those individuals that live in more urban areas, cities with populations greater than 10,000 people will have different areas that they hunt. They have got less access to available private lands and farther distances to travel to reach hunting areas. Those in large cities would be likely to lease lands or to hunt on public property. Table 48 shows the different types of property hunted on during the current season, in comparison with the respondent's area in which they lived most of their lives. For the purpose of this study, rural and urban will be separated by areas with a population greater than 10,000 people being considered urban and areas less than 10,000 people being considered rural.

Of those individuals that hunted on private property that they own this season, 43 percent were considered urban and 57 percent were considered rural. This is not surprising in that those individuals that live in more rural areas tend to own enough property to hunt deer on. Those individuals that hunted on a friend or family member's property consisted of 43 percent urban and 57 percent rural. Again, this is not surprising in that those individuals that live in more rural areas tend to own enough property to hunt deer on. Those individuals that leased land for this season consisted of 63 percent urban, and 34 percent rural. Leasing of land is greater in the urban respondents than in the rural respondents, due to the fact that those individuals in urban areas do not usually own property in tracts large enough hunt on, therefore they purchase the right to hunt on other individuals property. Some of these who lease could also be receiving guiding services, lodging, and other benefits that come with the least: such as increase opportunity of

Table 48: Land Hunted in 1998 Vs. Location Lived in Most of Life

	Location					
Land Hunted	Large Metro	Large City	Medium City	Small City	Town	Rural
Private Property	4	5	7	8	11	21
Friend/Family Property	7	9	16	27	26	51
Leased Property	3	9	7	5	6	7
Public Property	3	2	1	2	2	7

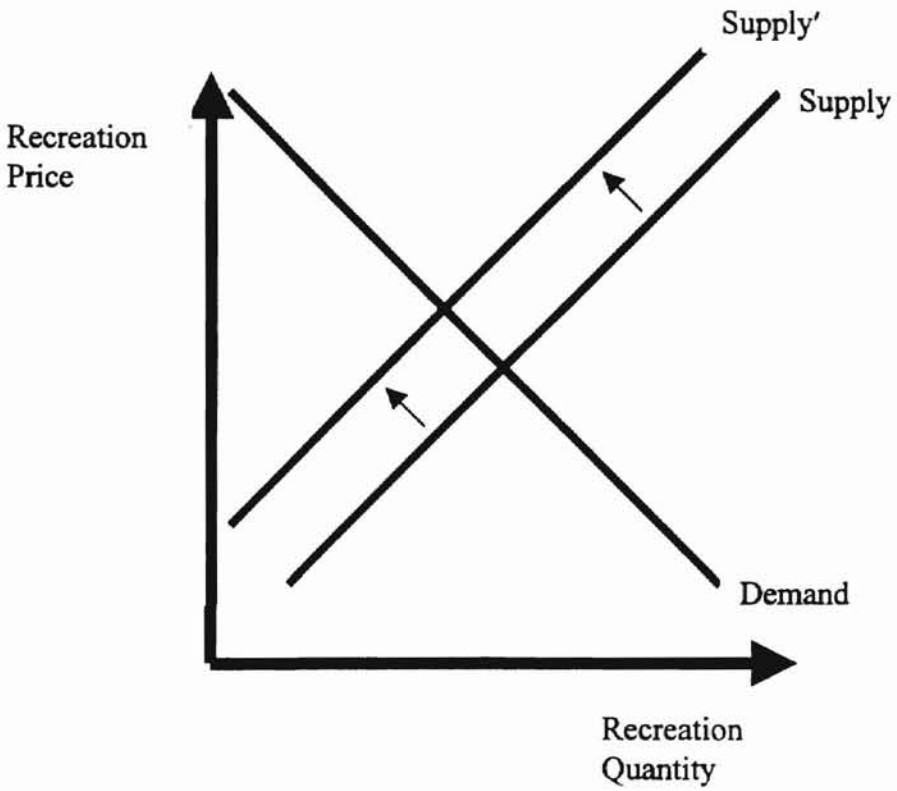
Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

harvesting a deer, the availability of other species to hunt, location of the lease is near their homes. Of those individuals that hunted on public property, 47 percent were urban, and 53 were rural. It could be hypothesized that the urban respondents would hunt on more public property or leased property than the rural respondents, due to the fact that they are less likely to have a set place to hunt. But, the number of respondents from rural areas that hunted on public property and those that hunted on leased land are equal. The land access issues in effect near some rural areas could have some affect on the proportionality large number of rural hunters using private lands.

One question not fully addressed by the survey is the effect of time dependence on land use variability. How much the changes in the demand for different types of available land have changed or will change in the in the future. What are the differences in the availability of land and uses of land in the short and long run?

In today's world more and more of the available property for wildlife-related recreation is falling under private or corporate ownership. This increases the number of middle income users of land for recreation that have to pay for the right to use the land for wildlife-related recreation. As shown in Figure 11, this lack of available land will cause a shift in the supply schedule to the left and will cause the price of land used for wildlife-related recreation to increase. The increase in prices and decrease in availability in land is a problem that has not been faced in Oklahoma yet, but, in the future it will become one of the most important issues in outdoor recreation.

Figure 11.


Supply'
Supply
Recreation
Price
Demand
Recreation
Quantity

CHAPTER VII

Attitudes towards Wildlife and Habitat Management and Conservation

Fish and wildlife are an important economic, aesthetic, ecological, educational, recreational, cultural, and scientific resources (U.S. Fish and Wildlife Service, 1996). Wildlife are essential in maintaining biological diversity, contribute significantly to local economies and are fundamental elements of all United States communities. More than two-thirds of all the nations wildlife habitat occurs on privately owned property. Therefore there is a need to expand the educational/informational programs to help these landowners to use proper management techniques for the wildlife that habitat their property.

Demand for wildlife-related recreation and resources on public lands and private lands has increased since the first Extension wildlife programs in 1936. The associated economic and recreational benefits have also increased substantially in this time frame. Given that 77 percent of the United States population sixteen and older has participated in some type of wildlife-related recreation, and have expended almost $56 billion in pursuit of these activities, it create the need for the owners, consumers, and government to develop a plan to benefit wildlife and recreational users of wildlife. The management and conservation of wildlife must be an integral part of government policy into the next century.

In the state of Oklahoma, before 1916, the harvest of deer was widely unregulated and mismanaged, causing a reduction in state deer populations to a low of 500. But, with

intensive management and conservation the deer population has rebounded to a present day level of 325,000.

Extension programs must be a part of the educational efforts for owners, managers, and users of agricultural lands for wildlife-related recreation. These programs can help recreational users and landowners in the improvement of land use, increased economic benefit, range and agricultural productivity and profitability, increased recreational opportunities, and improved relationships between urban and rural groups in relationship to conservation and management.

Government Spending on Conservation of Wildlife and Hunting Lands

Since hunters are the main group of consumers of consumptive wildlife-related recreation and deer hunting is the most popular consumptive wildlife-related recreation in the state of Oklahoma, the Oklahoma deer hunter survey respondents were asked a series of questions to denote if they contributed to the conservation and management of wildlife in the state. They were also asked if they felt the government of Oklahoma was spending enough time and resources to conserve wildlife habitat in the state overall and for several species that hunters in Oklahoma tend to pursue.

Table 49 shows a comparison of the different survey respondent's income levels to whether they make financial donation to conserve wildlife and hunting lands in the state. Of those respondents with incomes below $19,999, 33 percent give financial resources to help to conserve wildlife in the state, while those who have incomes in the $20,000 to $39,999 range had 30 percent giving donations. Respondents who had incomes between $40,000 and $80,000 had an average of 46 percent giving financial

Table 49: Income Levels vs. Financial Donations to Conserve Wildlife and Hunting Lands in Oklahoma

	Financial Donations	
Income (in $1000)	Made Donations	Did not Make Donations
Under 19	13	27
20 to 39	18	43
40 to 59	29	30
60 to 79	14	20
80 to 99	10	3
More than 100	8	6

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

donation to conserve wildlife while those respondent with incomes greater than $80,000 had on average, 67 percent giving financial resources to conserve wildlife and hunting lands in the state of Oklahoma. Those individuals in the lower income categories that do not have as large a percentage of respondents giving to conserve wildlife could possibly be constrained by their income levels and might not feel the benefit they would gain from the donation would be equivalent to the loss of income.

Landowner Spending on Conservation

Land ownership is also an important part of management and conservation of wildlife and habitat in the state. The private landowners are responsible for the management of these factors on their property and can derive the greatest benefit, whether, consumptive or non-consumptive, economical or not, from the wildlife on their property. Table 50 shows a comparison of those individuals who own enough property to hunt deer on and the number of them that donate to the conservation and management of

Table 50: Financial Donations for Conservation vs. Own enough Land to Hunt on.

	Land Ownership	
Financial Resources	Own Land	Do not Own Land
Have Donated	46	56
Have not Donated	54	86

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

wildlife and habitat in the state. Almost 42 percent of all the respondents are donating to the conservation of wildlife in the state. Of those respondents that own enough land to hunt on, 45 percent are giving donations to the conservation of wildlife. This relatively large percentage gives great hope that the individuals who own enough land to hunt on

are truly concerned about the conservation practices and habitat requirements for wildlife in the state.

Hunter Opinions on Spending per Species

Since those individuals who are the main consumptive users of wildlife are hunters, and they come from all types of backgrounds and income levels, it is important to know their opinions on how much the government is doing to conserve the main types of wildlife that they are pursuing. Since few hunters restrict their hunting activities to only one species, or to hunting on only private property it is feasible to ask hunters how they feel the government is using its funds to benefit other wildlife species and habitat that the respondents use. Attention will be paid to the four largest species hunted in the state of Oklahoma according to the Oklahoma Department of Fish and Wildlife. These species are, in no specific order, white-tailed deer, turkey, quail, and waterfowl.

Using income levels as the simplest demographic determinant, as shown in Table 51, those individuals who had incomes less than $60,000, seven percent felt that the government was spending too much time and money on wildlife habitat for deer, 33 percent felt the government was spending to little, and 60 percent felt that the government was spending about the right amount on conserving habitat for deer. Of those respondents with incomes greater than $60,000, five percent felt that the government was spending too much, 25 percent felt the government was spending too little, and 70 percent felt that spending on deer habitat was about right. Oklahoma has had great success with the management of white-tailed deer and the large number of respondents agreeing that the government spending is about right attests to that.

Table 51: Income Levels vs. Attitudes towards state time and money devoted to conservation of deer.

Income (in $1000)	Amount of Conservation Too Much	Too Little	About Right
Under $19	1	15	20
$20 to $39	8	17	37
$40 to $59	2	20	36
$60 to $79	2	8	25
$80 to $99	1	3	9
More than $100	0	5	10

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 52 shows the respondents opinions on the conservation of wild turkeys. Of those respondents who had incomes less than $60,000, seven percent felt that the government was spending too much on turkey habitat conservation, 37 percent felt that the government was spending too little on turkey habitat, while 56 percent felt that spending was about right. Of those respondents with incomes greater than $60,000, two percent felt that the government was spending too much too turkey habitat, 35 percent felt that too little is being spent, and 63 percent felt that the government was spending about the correct amount. A relatively large number of respondents, nearly one third, felt that the government is not spending enough on turkey conservation. This raises some concern that either the government does not do enough for turkey habitat in Oklahoma, or that the government is not informing the hunters about what they have done.

Table 53 shows the survey respondents opinions on the conservation of quail habitat in the state of Oklahoma. Of those respondents with incomes less than $60,000, five percent felt that too much was being spent on quail habitat, 40 percent felt that too little is being spent, and 55 percent felt that government spending was about right. Those respondents with incomes greater than $60,00 had seven percent feel that too much was being spent on quail habitat, 40 percent felt too little was being spent, and 53 percent felt that government spending is about right for conserving quail habitat. Again the large number of respondents who felt that the government was not spending enough on quail conservation (40%) could be from hunters having a lack of information.

Table 54 shows the survey respondents opinions on the conservation of waterfowl in the state. Of those respondents with incomes less that $60,000, nine percent felt too

Table 52: Income Levels vs. Attitudes towards state time and money devoted to conservation of turkey.

Income (in $1000)	Amount of Conservation		
	Too Much	Too Little	About Right
Under $19	1	15	19
$20 to $39	6	22	33
$40 to $59	3	19	34
$60 to $79	0	12	22
$80 to $99	1	4	7
More than $100	0	5	9

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 53: Income Levels vs. Attitudes towards state time and money conservation of quail.

Income (in $1000)	Amount of Conservation Too Much	Too Little	About Right
Under $19	1	17	17
$20 to $39	5	23	33
$40 to $59	1	20	34
$60 to $79	3	13	17
$80 to $99	1	4	8
More than $100	0	7	7

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Table 54: Income Levels vs. Attitudes towards state time and money devoted to conservation of waterfowl.

Income (in $1000)	Amount of Conservation		
	Too Much	Too Little	About Right
Under $19	1	16	18
$20 to $39	10	16	33
$40 to $59	2	20	29
$60 to $79	4	9	20
$80 to $99	1	4	7
More than $100	1	4	9

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

much was being spent on waterfowl habitat, 36 percent felt too little is being spent, and 55 percent felt government spending is about right. Of those respondents with incomes greater than $60,000, ten percent felt too much is being spent on waterfowl habitat, 29 percent felt spending was too little on waterfowl, and 61 percent felt spending on conservation of waterfowl habitat is about right.

These values are of importance to those individuals who approach those consumptive users of wildlife, because they show the trends in hunter opinion on how the spending of government resources is seen by the consumers of the goods.

Non-Regular Donator's Willingness to Donate

Since many hunters are not approached for donations on a regular basis unless the belong to hunting clubs or conservation groups, it is important to gain information on those who have not given financial resources to conserve wildlife and to see if they are willing to donate. Again given income is the simplest demographic determinant, a comparison of income levels and willingness to donate for the conservation of wildlife in Oklahoma, of those that have not already donated, is shown in Table 55. Of those respondents with incomes less than $60,000, 96 percent had some willingness to donate between $100 and $300. One percent was willing to donate less than $100 and three percent were willing to donate more than $300. Of those respondents with incomes greater than $60,000, 92 percent were willing to donate between $100 and $300. No respondents in this income category were willing to donate less than $100, and eight percent were willing to donate more than $300 for the conservation of wildlife in Oklahoma.

Table 55: Income Levels vs. Willingness to Donate for Conservation

	Willingness to Donate					
Income (in $1000)	Less than $100	$100 to $200	$200 to $300	$300 to $400	$400 to $500	$500 or More
Under $19	0	28	5	0	2	0
$20 to $39	1	44	3	0	0	0
$40 to $59	0	39	5	1	1	0
$60 to $79	0	26	3	1	0	0
$80 to $99	0	9	2	0	0	0
More than $100	0	5	1	0	0	1

Source: Survey conducted by the Department of Agricultural Economics at Oklahoma State University, 1998.

Since the conservation of wildlife is an important resource for the present and the future, this could be the reason that the percentages of those who have never donated before have a relatively high willingness to donate in the $100 to $300 levels on a annual basis. These individuals might not be consumers of wildlife right now, but could want to reserve the right to use the wildlife in the future or to be sure of having wildlife available for their children.

Hunter Concerns

A section of the survey was left available for the respondents to give qualification to any question they did not understand or to give feedback on what they felt problems, solutions, or other programs that should be implemented in the state. These are the opinions of the respondents in issues that they felt are important to the sport of white-tailed deer hunting in the state of Oklahoma. These opinions/responses are listed in no particular order, with the number of respondents having each opinion in parenthesis.

- Regulate harvesting small bucks (4).
- Resolve trespassing issues, more public land (3).
- Longer seasons (9).
- Stricter policies on poaching (3).
- Control burn areas better (6).
- Raise license fees to lease land for public hunting (2).
- Increase mandatory does harvests (4).
- Combine doe and buck tags, 3 point system (2).

CHAPTER VIII

SUMMARY AND CONCLUSIONS

The general objective of this study was to develop a needed set of economic baseline data on the hunters of the state of Oklahoma. This data will give insight in the relevant consumer characteristics of Oklahoma deer hunters to be used in marketing approaches by providers of wildlife-related recreational opportunities.

To effectively manage such a broad expanse of issues in the state of Oklahoma, individuals need to have an assessment of the public's expectations, opinions and activities concerning the use of wildlife resources and wildlife management. This study was designed to examine;

1. The demographic characteristics of the Oklahoma Deer Hunter and his uses for the wildlife resource;
2. Attitudes of Oklahoma Deer Hunters towards the management, conservation and resource allocation towards white-tailed deer;
3. Expectations of Oklahoma Deer Hunters of the property and the landowner that they are leasing to hunt on.
4. Public demand of Oklahoma Deer Hunters for wildlife-related activities and access to hunting areas and;
5. Willingness of Oklahoma hunters to pay for hunting services.

The need for this study arose because there is a serious lack of relevant data on demand side characteristics of Oklahoma hunters. Most studies done in the state

encompass the possible effects of land leasing and management using supply side issues such as leasing arrangements and land values according to state landowner surveys. But, without consumer information on preferences, expectations and opinions, there is no economic way to analyze the supply/demand schedule for this type of recreation. Thus, the purpose of this study was to inform the suppliers of wildlife-related recreation of the multiple demand characteristics of the hunters in the state of Oklahoma.

To achieve the study objectives concerning the characteristics of Oklahoma deer hunters, a survey was developed. This survey was used to gather responses, opinions and characteristics of deer hunters in the state. A sample was drawn from ten deer hunter check stations spread across the state The surveyed areas were separated into approximately six sections, (1) north western Oklahoma to represent a western location in the state where there is a predominance of leased lands, (2) north eastern Oklahoma in areas around Keystone public hunting areas to represent public hunting near a large urban area, (3) east central Oklahoma in areas between Tulsa and Oklahoma City to represent private land hunting near urban pressure, (4) south eastern Oklahoma to represent an area where the timber industry and its unique land access issues are dominant,(5) south western Oklahoma to represent large areas of underdeveloped rural communities and, (6) north central Oklahoma to represent moderate to intense hunting pressures near semi-urban areas.

Data Analysis

The types of data analyzed for the deer hunter characteristics were: (1) annual and total time spent hunting in Oklahoma, (2) harvest preferences, (3) willingness to pay to hunt and lease land, (4) land availability and acreage constraints, (5) benefits and

expectations from leased land,; and (6) conservation and management opinions and characteristics. The data analyzed also included grouping of small cells of data to attempt to gather more meaningful results. This analysis was a process of collection, tabulation, and comparison of primary data both from Oklahoma survey respondents and earlier studies done in Texas and South Carolina.

Characteristics of Oklahoma Deer Hunters

Respondents to the Oklahoma deer hunter survey showed certain distinct characteristics when responding to the survey. The hunters on average have been deer hunting for 15 years, and prefer to harvest a buck or trophy buck. Nearly thirty-six percent of the respondents have paid to hunt in Oklahoma and of these respondents 33 percent had paid to hunt deer, the largest number of those who paid to hunt. Nearly 70 percent of all surveyed hunters hunted on privately owned lands and 61 percent had greater than 250 acres available to hunt on. Greater than 50 percent traveled less than 50 miles to reach their hunting location and nearly 50 percent had one to three hunting partners. Of the respondents, 79 percent were affiliated with some sort of conservation or hunting rights group and/or gave donations to conserve wildlife and hunting lands in Oklahoma. A majority of the survey respondents came from small cities, towns or rural communities and had an income level of less than $60,00. Nearly all respondents were male and had households of 3.4 people with 1.5 hunters per household.

Cross tabulation comparisons on the raw data were run for a number of comparisons to evaluate the effect of different demographics, preferences, incomes, and land availability issues on certain hunter characteristics or willingness to pay questions. These inferences give results showing the effects that different demographic, income, and

preferences have on the willingness of the respondents to consume wildlife-related recreation. This data gave insightful, useful results for the providers of the wildlife-related recreation to market their goods to the demanders of the recreational experience.

Conclusions

The purpose of this study was to gather information about the deer hunters of Oklahoma and their willingness to pay for hunting services, preferences of harvest, benefits and expectations of land availability and land leases for hunting, opinions about wildlife management and conservation in the state, and the basic demographics of deer hunters in the state. This study addressed the problem of the lack of relevant demand side information for the providers of wildlife-related recreation opportunities.

Specifically, it was shown that the consumers of wildlife-related recreation in the state have low willingness to pay values for both the right to hunt and the right to lease. But, given certain constraints the willingness to pay of these consumers does increase. These constraints include proven success rate, benefits and expectations of leased land, and harvest preferences. Given the difficulties with availability of quality locations for the pursuit of this type of recreation, is does show the ability for a market to develop in the state that could be used to increase income levels and wildlife-related recreation to greater levels than are currently attainable. In other words, there is an available market developing in the state of Oklahoma for the rights to hunt and pursue other wildlife-related recreational opportunities, both consumptive or non-consumptive.

Need for Further Research

This study developed a baseline set of data figures for the providers of wildlife-related recreation with demand side information on the wants, needs, expectations,

preferences, and benefits expected by those individuals consuming wildlife-related recreation. However, this study was a rather small sample of the hunters in the state of Oklahoma. Additional research is needed on a larger scale to determine with more certainty the true value that hunters place on wildlife-related recreation. Demand functions need to be determined for this type of industry, for both consumptive and non-consumptive wildlife uses.

Studies are needed into recreational demand analysis for consumptive and non-consumptive uses of wildlife. Also, studies are needed on the effects of various methods of marketing and management this recreational enterprise. These studies should be based not only on the local and state level, but on the national level as well.

More research is needed to determine if this type of recreational enterprise can be self-supporting in the state, or if it must be combined with livestock or farming operations. What is the effect on wildlife or livestock when introducing the other species into the enterprise? Also, additional research on cost benefit analysis is needed to consider the true affect that this type of industry will have on rural landowners, rural communities, and the state as a whole.

More research also need done in conjunction with a concurrent landowner study to create a wildlife-related recreational market model. Finally, there needs to be research into the aspect of private property rights and the market values associated with them, including trespass and liability laws.

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APPENDIX A

THE SURVEY INSTRUMENT

OSU RESEARCH

DEER HUNTER'S SURVEY

1) How many years have you hunted deer in Oklahoma?
_____

2) How often did you hunt deer last year?
   a) 1 to 3 days
   b) 4 to 29 days
   c) 30 days or more

3) How often will you hunt deer this year?
   a) 1 to 3 days
   b) 4 to 29 days
   c) 30 days or more

4) When you hunt deer would you rather harvest?
   a) Buck
   b) Doe
   c) Any Deer
   d) Trophy Buck(8-pts or Larger)

5) What game other than deer have you actively hunted in OK during the last two years?(Please circle all that apply)
   a) Turkey
   b) Pheasant
   c) Quail
   d) Waterfowl
   e) Antelope
   f) Elk
   g) Dove
   h) Other (please specify)_____

6) Have you ever paid to hunt in Oklahoma? (circle one)
   Yes No

7) Which animals did you pay to hunt for?(Please circle all that apply)
   a) Deer
   b) Turkey
   c) Pheasant
   d) Quail
   e) Waterfowl
   f) Antelope
   g) Elk
   h) Dove
   i) Other (please specify)_____

8) How much would you be willing to pay for a trophy buck hunt (8-pts or larger)?
   a) Less than $200
   b) $200 to $400
   c) $400 to $600
   d) $600 to $800
   e) $800 to $1000
   f) $1000 or more

9) How much would you pay for a trophy buck (8-pts or larger) hunt with a 90% success rate?
   a) Less than $200
   b) $200 to $400
   c) $400 to $600
   d) $600 to $800
   e) $800 to $1000
   f) $1000 or more

10) When you hunted for deer in the past two years, where did you primarily hunt for this game?(Please circle only one response)
   a) Private property you own.
   b) Private Property owned by a friend or family member.
   c) Leased Property.
   d) Public Property
   e) Other (please specify)_____

11) This current season, is the land you are hunting on...(Please circle only one response)
   a) Private property you own.
   b) Private Property owned by a friend or family member.
   c) Leased Property.
   d) Public Property
   e) Other (please specify)_____

12) How many acres were available for you to hunt on?
   a) Less than 50.
   b) 50 to 100
   c) 100 to 150
   d) 150 to 200
   e) 200 to 250
   f) 250 or more.

13) How much distance between your hunting stand/blind and a county/public road?
   a) Less than 200 yards
   b) 200 to 400 yards
   c) 400 to 600 yards
   d) 600 to 800 yards
   e) 800 to 1000 yards
   f) 1000 or more yards
   g) Not Applicable

14) How much would you be willing to pay per 100 acres to lease land for deer hunting?
   a) Less than $100
   b) $100 to $200
   c) $200 to $400
   d) $400 to $600
   e) $600 to $800
   f) $800 or more

15) If you paid to lease the land you are hunting on, did you...(Please circle all that apply)
   a) Have a formal leasing contract.
   b) Have the land totally to yourself and/or your hunting party.
   c) Share the land with another hunting party.
   d) Have your hunting trip guided by the landowners.
   e) Have stands and blinds set up in pre-determined areas by the landowner.
   f) Have transportation to and from your hunting sites by the landowner.
   g) Have Lodging, food or camping locations.
   h) Other (please specify)_____

16) If you paid to lease land for deer hunting what would be your expectations of the land and landowner?(Please circle all that apply)
   a) High quality game on the lease.
   b) Higher quantity of game, but of less quality.
   c) Good food, water, and cover on the land.
   d) Near to your home.
   e) Length of the lease with option to renew.
   f) Exclusive rights to the land in the lease.
   g) Hunting methods (Rifle, Bow, Shotgun, and Muzzleloader) are all options.
   h) Lodging, food or camping locations.

17) How far from home did you travel to get to your current hunting area?
   a) Less than 50 miles
   b) 50 to 100 miles
   c) 100 to 150 miles
   d) 150 to 200 miles
   e) 200 miles or more.

18) How many hunters are currently in your hunting party?
   a) Zero(No additional hunters)
   b) One to three
   c) Three to five
   d) More than five

19) Do you feel that the state of Oklahoma spends enough time and money conserving wildlife habitat?

	Deer	Turkey	Quail	Waterfowl
a. Too Much				
b. Too Little				
c. About right				

20) Do you give financial resources to conserve wildlife and hunting lands in Oklahoma (Not including License purchase and taxes)? (circle one)
   Yes No

21) If not, would you be willing to give a yearly donation for the conservation of wildlife in Oklahoma of...
   a) Less than $100
   b) $100 to $200
   c) $200 to $300
   d) $300 to $400
   e) $400 to $500
   f) More than $500

22) If yes to #21, would it be through
   a) Income tax forms
   b) Hunting clubs/Hunting Associations
   c) Other:_____

23) Please circle all organizations you are affiliated with.
   a) Ducks Unlimited (DU)
   b) Quail Unlimited (QU)
   c) Quality Deer Management Association.
   d) Rocky Mountain Elk Foundation (RMEF)
   e) National Wild Turkey Federation (NWTF)
   f) National Rifle Association (NRA)
   g) National Sporting Clays Association (NSCA)

24) Gender (Circle One)
   Male Female

25) What is your age? _____

26) How many people are in your household?_____

27) How many adults in your household are hunters?

_____

28) Which best describes where you have lived most of your life?
   a) Large metro area (over 1 million people)
   b) Large City (100,000 to 1 million people)
   c) Medium sized city (25,000 to 99,999 people)
   d) Small City(10,000 to 24,999)
   e) Town (2,500 to 9,999)
   f) Rural Area or small town(less than 2,500)

29) Do you or you spouse own enough land to hunt deer on? Yes No

30) What is your Primary occupation (Job that accounts for more than half of you income)?

_____

31) Estimate your household income last year before taxes?
   a) Under $19,999
   b) $20,000 to $39,999
   c) $40,000 to $59,999
   d) $60,000 to $79,999
   e) $80,000 to $99,999
   f) $100,000 and up

32) What is your postal zip code at home? _____

If you have any comments that you would like us to consider on the subject this survey has covered or to qualify your responses to specific questions?

_____

_____

_____

Your contribution to this effort is very much appreciated. If you would like a summary of the results please provide your name and address below.

APPENDIX B

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD

Date: July 1, 1999 IRB #: AG-99-032

Proposal Title: "WHITE-TAILED DEER HUNTING IN OKLAHOMA: AN ECONOMIC ANALYSIS OF DEER HUNTER PREFERENCES IN 1998"

Principal Investigator(s): David Henneberry
Bret Collier

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Signature:

Carol Olson, Director of University Research Compliance

July 1, 1999
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modification to the research project approved by the IRB must be submitted for approval. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

VITA

Bret Aaron Collier

Candidate for the Degree of

Master of Science

Thesis: WHITE-TAILED DEER HUNTING IN OKLAHOMA: AN ECONOMIC ANALYSIS OF DEER HUNTER PREFERENCES IN 1998.

Major Field: Agricultural Economics

Biographical:

Personal Data: Born in Mattoon, Illinois, September 1, 1973, the son of Malcolm E. and Vicky D. Collier.

Education: Graduated from Mattoon senior High School, Mattoon, Illinois, in 1991; received the Bachelor of Arts degree from Eastern Illinois University, Charleston, Illinois, in 1997; engaged in graduate study toward the degree of Master of Science at Oklahoma State University, Stillwater, Oklahoma, from July, 1997 to the present.

Professional Experience: Master Meat Cutter, Wal-Mart Stores Inc., October, 1989 to October, 1997, Research Assistant, Oklahoma State University, May, 1998 to July, 1999, Teaching Assistant, Oklahoma State University, August, 1998 to June, 1999, Fraternity House Director, June, 1997 to August, 1999.