

**CHANGING PATTERNS OF RANGELAND USE: FUNCTIONAL
CHARACTERISTICS OF THE ECONOMICS AND OPERATIONS OF FEE
HUNTING ENTERPRISES IN CENTRAL AND SOUTH TEXAS**

A Dissertation

by

SHERRY DENICE SULTENFUSS

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2009

Major Subject: Rangeland Ecology and Management

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ABSTRACT

Changing Patterns of Rangeland Use: Functional Characteristics of the
Economics and Operations of Fee Hunting Enterprises in Central and
South Texas. (May 2009)

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Ranching communities in Texas have long recognized fee hunting as a natural resource with the potential of directly affecting agricultural incomes. Hunting as an industry today, appears to be developing into an economic substitute for Texas ranchers who are accustomed to the variable nature of agricultural markets. To determine the economic impact of this market relative to its functional utilization by landowners, this research analyzed a large group of landowners in Central and South Texas. Information was collected through a personal interview process of 146 landowners. Data collected primarily related to the individual landowners' specific fee hunting operations and the economics associated with their enterprise operations. Response data was tabulated and examined through use of comparative analysis and bivariate methods when appropriate. Output yielded a descriptive demographic profile of landowners along with landowner opinion/attitude on ensuing constraints and values of enterprise operations. Additionally, costs and returns to operations were summarized through development of an enterprise budget by ecoregion. From this analysis, it became clear that many landowners possess strong 'feelings' about their lands and appear to share parallel ideologies relative to their properties as an earned entitlement and privilege to be passed along to their heirs. However, these Texas ranchers are well aware of the economic pressures under which they must operate and their commitment to

sound land management practices increasingly includes wildlife management. This, much in part, is due to the dramatic increase in revenues generated by fee hunting enterprises over the past decade. However, the budget analysis indicates possible constraints when landownership size becomes smaller such as through the sale of parcels for business purposes or through inheritance.

DEDICATION

My efforts through this work are dedicated to my dad and my mom, Lawrence and Laura Sultenfuss, who taught me the meaning of persistence, determination, and hard work; to my daughter, McKensey Lane, who taught me the meaning of unconditional love and patience; to my sisters Cynthia Sultenfuss, Karen Sultenfuss, my brother Larry Sultenfuss, and my sister-in-law, Sherry L. Sultenfuss, who taught me the value of family. I remain forever grateful to you all.

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Special appreciation goes to my committee, especially Dr. Richard Conner. Dr. Conner's professionalism, devotion to academic excellence, and his belief in my work, provided me the support, direction, and the belief in myself necessary to complete my work. I most sincerely thank my committee members, Dr. Scott Cummings, Dr. Neal Wilkins, and Dr. Ben Wu, for their encouragement, their patience and the time they invested in my research. I offer special thanks to Dr. Don Steinbach. It was his lead that I followed and I will forever be grateful to him for his knowledge and generosity.

I wish to extend special thanks to all those in the Ecosystem Science and Management Department at Texas A&M University, especially Dr. Wu and Dr. Fred Smeins whose commitment and dedication to the process of education provided me the example of academic and professional excellence which I, most humbly, will try to follow. In addition, I owe a debt of gratitude to Joanna Price. Her spirit and humor made everyday special.

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Sherry D. Sultenfuss

TABLE OF CONTENTS

	Page
ABSTRACT	iii
DEDICATION.....	v
ACKNOWLEDGMENTS	vi
TABLE OF CONTENTS.....	viii
LIST OF TABLES	x
LIST OF FIGURES	xi
CHAPTER	
I INTRODUCTION	1
Statement of Problem	2
Ecological and Economic Considerations	5
Study Objectives	8
II APPROACH AND METHODS	10
General Study Area	10
General Methodology	12
III A CURRENT APPRAISAL OF LANDOWNERS PREVIOUSLY INTERVIEWED IN CENTRAL AND SOUTH TEXAS: A CASE STUDY	16
Introduction	16
Methodology	18
Results of Case Studies	19
Summary and Conclusions	31
IV TEXAS FEE HUNTING ENTERPRISES: LANDOWNER CHARACTERISTICS AND ATTITUDES	34
Introduction	34
Study Area and Objectives	36
Methodology	37
Results	39
Summary and Conclusions	60

TABLE OF CONTENTS (Continued)

CHAPTER		Page
V	TEXAS FEE HUNTING ENTERPRISES: THE ECONOMIC AND OPERATIONAL CHARACTERISTICS OF THE BUSINESS.....	66
	Introduction	66
	Objectives.....	68
	Results	68
	Summary and Conclusions	82
VI	SUMMARY AND STUDY IMPLICATIONS	86
	LITERATURE CITED.....	90
	APPENDIX A.....	96
	VITA	120

LIST OF TABLES

TABLE		Page
1	Landowner Attitudes About Hunter Characteristics. Average Response Data	21
2	Methods Used to Attract “Desirable” Lessees. Average Response Data	23
3	Reasons a Landowner Would Lease Land for Fee Hunting. Percent Response Data.....	24
4	Factors a Landowner May Consider When Leasing Land for Fee Hunting. Average Response Data.....	25
5	Characteristics of Lease Types.....	27
6	Comparison of Lease Characteristics.	27
7	Leased “By” Characteristics.....	28
8	Gross Income Sampled by Region.	31
9	Landowners Interviewed by Region and County.	42
10	Land Ownership Size by Ecoregion.	43
11	Gross Income Levels.....	48
12	Gross Income From Hunting Enterprise by Ecoregion and Study Area.	50
13	Landowner Attitudes About Hunter Characteristics.	52
14	Why Landowners Might Choose to Lease Land for Hunting....	54
15	Landowner Attitude on Landownership... ..	58
16	Number of Landowners Who Offer Additional Services... ..	76
17	Management Implications... ..	77
18	Basic Costs Associated With Landowner Fee Hunting Enterprise.....	79

LIST OF FIGURES

FIGURE		Page
1	Texas Ecological Regions – Study Area Depicted by Ecoregion and County.....	11
2	Percent Family Income (by Respondent) From Fee Hunting – 2001.....	26
3	Land Ownership by Number Interviewed and Ecoregion.....	41
4	Years of Ownership by Ecoregion and Total Study Area	44
5	Reasons for Sale of Property.....	45
6	Reasons of Primary Ownership.....	46
7	Lease Type. Number of Landowners Employing Each Lease Type	71
8	Methods of Hunting Offered by Landowners.	72
9	Space Limitations Used for Lease Hunting Operations	72
10	Methods of Pricing Lease Operations for Hunting.....	73
11	Additional Recreational Prospects Offered.....	75
12	Enterprise Budget for Counties in the Edwards Plateau Study Area.....	80
13	Enterprise Budget for Counties in the South Texas Plains Study Area.....	81

CHAPTER I

INTRODUCTION

Management and sustainability of rangelands in Texas fall primarily to private land owners whose land holdings comprise 84% of the total rural acreage in the state. This is the largest percent of land owned by private entities of any state in the United States (Wilkins et al. 2003). The profound effect that these landowners have had and will continue to possess well into the future will determine, to a large extent, the integral value of these lands and their sustainable production capabilities both economically and ecologically.

Management practices and demands require that these land owners have or develop the skills and knowledge applicable to meet advancing situations such as: native vegetation management, endangered species habitat designation and management, tourism, and halting current land development practices that result in land fragmentation by continued construction of 'ranchettes' without regard to associated impacts to rangelands or fragile ecological systems. The traditional agricultural practices previously used by rural land owners are requiring an expansion of skills and "thinking outside the box". Some land owners are already doing this with examples such as ranchers who have entered niche markets in 'grass-fed' meat production (Moseley 2006). Others are attempting to restore native grasses to Texas rangelands desiring improved ecosystems that foster reduced production costs by planting native grass species, which are less labor intensive to maintain than non-native grasses while simultaneously providing choice wildlife habitat (Hays et al. 2004). Many Texas ranchers have already, or, are currently furthering their expertise in habitat management for wildlife viewing or harvesting, or for increased water retention characteristics to benefit livestock and wildlife (McClaran et al. 2001).

This dissertation follows the style of *Rangeland Ecology and Management*.

Wildlife management, particularly those practices which include fee hunting, is one market that has received considerable attention from Texas ranchers over many decades and continues to mature despite some troubling indicators on the horizon. Hunting in Texas has historically been a fundamental resource even from the early 1800's, first as a survival mechanism when Steven F. Austin's colony settled on the lower watersheds of the Colorado and Brazos rivers and later as a means of comradery, recreation and a way of dealing with the oppressive conditions of the Texas frontier. As word spread about the wildlife abundance, hunters from all over the world were lured to Texas, some even paying the local frontiersmen as guides to take them hunting (Doughty 1983, 1987). In the mid 1920's the state passed fairly restrictive "trespass" laws that conveyed control of access to game to the landowner (Hill 1976). In the United States, wildlife, generally speaking, is owned by society who has delegated the federal government guardianship. However, in a private lands state like Texas, the landowner has *de facto* control of the wildlife due to the legal control they have to land access (Huffman 1995; Lueck 1995; Benson 2001a). Thus, private landowners have the greatest impact potential on wildlife and wildlife habitat in Texas (Brown 1999). The implications for the role of the private land owner as an integral component in the strategic planning and management of the largest component of land area in Texas are tremendous.

STATEMENT OF PROBLEM

This study assumes the important role that private landowners in Texas have as managers of their lands and other natural resources including wildlife. As such, these landowners will be faced with significant challenges as they continue to conduct their operations which are becoming more at risk due to land fragmentation, destruction of habitat, suburbanization brought about by changes in population growth and preference, and hunter attrition. Specifically, this paper examines the economics and functional characteristics

of fee hunting as employed by these landowners in their overall resource management practices in the face of these risks.

Although Texas is still predominantly rural in its geographic composition, (86% of total state land area is rural and 84% is under private ownership), it is transitioning into a landscape that is increasingly more fragmented with lands being converted from larger native rangelands into smaller “improved pastures” (Wilkins et al. 2000, 2003). As acreages become smaller and more fragmented, loss of key wildlife habitat occurs due to losses of habitat and reduced landscape heterogeneity (Saunders et al. 1991; DeAngelis and White, 1994; Wilkins et al. 2000, 2003; McNeely and Scherr 2003). Changes in land market values are part of the reason that rural lands are becoming more fragmented. Differences between the low agricultural production values versus the high market values of land across the state are extreme. This large difference is a cause for many private landowners who are faced with low to negative income streams or changes in land ownership due to deceased family members, to consider selling all or part of their land. According to Wilkins et al. (2003), in 2001, the average agricultural value in Texas was \$80 per acre while the average market value was \$624 per acre. The rural land market values were determined to have risen in 2005 to between \$1 238 and \$1 379 per acre across the state (Gilliland and Klassen 2006) and in 2007 the price per acre topped at \$2 190 continuing a trend of brisk price appreciation since 2003. The number of large acreages sold (>5000 acres) fell by 36% across the state. In this same time period, the average size of properties per transaction fell to 80 acres which was an all time low value (Gilliland et al. 2008). When evaluating reasons for selling property, estate tax settlement was identified as the number one reason for a landowner to sell property in Texas. As many as 45% of Texas ranchers selling their property specified estate tax settlement as the primary reason for the sale of their property (Gilliland and Mays 2002).

Texas continues to experience changes in the state’s population with continued growth particularly in urban population numbers. Rural population

in Texas has increased a little more than 19% over the years from 1980 to 2007, while urban growth has escalated by approximately 78% for the same time period (Economic Research Service 2008).

Trends in exurban movement indicate that urban dwellers purchase small acreages to enjoy as second or country homes, retirement or for recreation. This process has encouraged the non-consumptive market price to increase (Pope 1985). The top motivation for land purchase in Texas has been for recreation purposes (Wilkins et al. 2000).

Changes in hunter demographics have also taken place over the past decades. A notable decline in the number of licenses sold in Texas has many landowners concerned. Dowd (1993), in his research indicated that the sale of resident hunting licenses sold during the period between 1982 and 1990 decreased by 12% using figures from Texas Parks and Wildlife Department. This decline was also apparent in information published by Responsive Management in an assessment of state hunters but, importantly, this study showed a marginal increase in recent years (Duda et al. 2003). Interestingly, Responsive Management distributed findings that indicate the numbers of hunting licenses sold in Texas are fewer than the total number of hunters in the state (Duda et al. 2003).

The concerns over declining number of hunters in Texas have been examined closely by numerous entities including Texas Parks and Wildlife, Texas Wildlife Association and Texas A&M University. Most appear to agree that the reduction in hunter participation can be contributed to higher lease cost, scarcity of game and fewer places to hunt (Adams and Thomas 1983; Dowd 1993; Adams et al. 2004).

As urban populations increase there appears to be a growing disapproval of consumptive types of recreation (Adams et al 2000; Duda and Brown 2001; Adams et al 2004). Studies have indicated that persons who have grown up in rural environments are more likely to approve of hunting than those who have not (Duda and Young 1998). As urban populations continue to flourish and without more education as to the value of outdoor recreation such as hunting

and without recruitment of the young hunter to this type of recreation, the decline in number of hunters may continue (Dowd 1993; Adams et al. 2000).

This industry appears to be experiencing growth but further studies would be needed to determine direction of trends in the use of fee hunting by landowners in the midst of declining numbers of hunters.

ECOLOGICAL AND ECONOMIC CONSIDERATIONS

From both an economic and an ecological perspective, agricultural production from rangelands in Texas has changed due to increasing variability in traditional agriculture markets, increasing production costs, fragmented rangelands, encroaching ex-urban development and changes in population demographics.

Beginning in the early 1800s many settlers were attracted to the Texas frontier by the lure of abundant and available land. The states' varied landscapes and ample natural resources were complemented by copious numbers and species of wildlife available for the taking. The early settlers in Texas used hunting not only for the sustenance they required, it also encouraged a sense of camaraderie and community that helped bind these pioneers together. During the mid to late 1800s the profusion of wildlife attracted European aristocrats and dignitaries to the Texas plains for recreational hunting opportunities and the desire to bag big game species like buffalo and white-tail deer and game fowl such as quail and pheasant. However, as early as the 1830s and 1840s declines in specific wildlife populations were noted due to human pressure from over hunting and habitat degradation. This resulted in the first game protection law being enacted in 1860 when the hunting of Bobwhite quail was prohibited for two years on Galveston Island. This set the stage for future game laws that were to follow and by 1903 the 'Act to Preserve and Protect the Wild Game, Wild Birds, and Wild Fowl of the State' became the basis for the operative game laws of today.

Hunting was then and is still today perceived by many Texas ranchers to be one of a number of activities that anchors and binds them to their land (Doughty 1983, 1987).

Texas is comprised of a total land and water area of approximately 69.5 million hectares (Texas Almanac 2008). Rural lands comprise about 86% of the state (Wilkins et al. 2000) with privately owned land areas encompassing approximately 58.3 million hectares or 84% of Texas (Wilkins et al. 2003).

Long-term demands on ranch income associated with rising economic pressures from increases in property and estate taxes, high variability in agricultural crop prices, fluctuating income from other ranch revenues such as oil and gas production and growing pressures from the encroachment of urban expansion are difficult for many rural landowners to absorb. Increasing demand for recreational properties has resulted in growing numbers of rural landowners willing to subdivide large ranch properties or to sell off small portions of ranch lands in attempts to maintain some level of land ownership and the associated life style they have chosen. Smaller parcel size means increased levels of land fragmentation which has been hypothesized to cause long-term depletion of wildlife resources due to losses of habitat and reduced landscape heterogeneity (DeAngelis and White, 1994; McNeely and Scherr 2003). As this shift continues towards decreased property size and increased land fragmentation, it will have a negative impact for landowners who incorporate recreational hunting as a part of their tenure practices.

The continued management and sustainability from both economic and ecological points of view for privately owned lands heavily depend upon the landowners and the tenure practices they choose to incorporate (Freese 1998; Knight and Clark 1998; Benson et al. 1999; Benson 2001a, 2001b). However, impacts from increases in human population and economic activities which are supported by land and other natural resources result in shifts in biotic communities and ecosystem processes (Knight and Clark 1998). The studies suggest that private landowners are in need of assistance in the form of technical support, ongoing collaboration in providing educational and incentive

programs, and even help in fostering alliances between landowners, environmentalists and urbanites allowing for continued sustainability in land use activities and practices (Benson et al. 1999; Lueck 1995; Huffman 1995; Huntsinger and Hopkinson 1996; Knight 1999; Benson 2001a, 2001b).

One study done in South Africa on wildlife ranching provided the insight that while landowner management practices were not necessarily sophisticated, they were intensive and specialized in the type of wildlife species that were being managed as a revenue resource on private lands (Benson 1991). This research also noted that landowners who sought income from wildlife (recreational hunting being one of a number of commodities resulting from wildlife management) appeared to value wildlife more than those who were not receiving income. Relevant to this, some U.S. researchers have presented evidence that fee-hunting enterprises tend to encourage better land management practices than non-fee-hunting enterprises through improved grazing practices, wildlife population control and habitat management (Butler and Workman 1991; Adams et al. 1992; McNeely and Scherr 2003).

A number of recent studies have focused on this premise of landowner support and yielded some insight about land owner characteristics such as, attitude and motivation, that most influence landowner preferences and choices in tenure and use patterns particularly with regard to rural lands (Steinbach D. 1988; Duda and Young 1998; Duda and Brown 2001; Steinbach M. 2001; Sanders 2005).

Recreational hunting provides landowners with additional income that is beneficial particularly as rural landowners deal with pressures from increasing rates of property tax and estate taxes. Estate tax settlement was identified as the number one reason for landowners to sell property in Texas. As many as 45% of Texas ranchers reported selling their property as a result of estate tax settlement (Gilliland and Mays 2002).

Fee hunting has been estimated to generate, in terms of its contributions to land values, over \$4 billion (Pope et al. 1984). In 2001 over 3 million hunting and fishing recreation participants contributed \$3.9 billion in

retail sales in Texas sustaining 73, 042 jobs and returning in excess of \$217 million in sales tax revenues back to the state. The total gain in monetary income from hunting and fishing participants for 2001 in Texas is estimated at nearly \$8.2 billion (Southwick 2003). Teer (1996) wrote that hunting, and specifically the white tailed deer (*Odocoileus virginianus*) is an important economic resource to landowners. Traditionally, Texas ranchers invested the bulk of their resources in conventional livestock and ag-producing endeavors and little in the direction of wildlife management. Wildlife was a resource that was naturally available and “existed for the taking.” with no specific management efforts (Doughty 1983). However, as livestock and ag-production values have declined, the interest in hunting has grown as a substitute. In recognition of the growing importance of wildlife as both a natural and economic resource, the State of Texas passed Proposition 11 in 1995 which resulted in a constitutional amendment that allows open-space land use for wildlife management to qualify for tax assessment in the same manner as open-space agriculture.

For those rural landowners who wish to either continue or begin a productive land use practice, recreational hunting may provide them a source of income that appears to be somewhat sustainable in the near term. This industry appears to be experiencing growth but further studies would be needed to determine direction of trends in the use of fee hunting by landowners in the midst of declining numbers of hunters.

STUDY OBJECTIVES

There are two primary purposes for this study. The first of these was to identify the current status of the operational characteristics and economics of fee-based hunting enterprises of landowners who were previously interviewed in Central and South Texas. This case study information was compared to data retrieved from previous research performed by Don Steinbach in 1988 (Steinbach 1988). The key goal here was to identify variations over time that occurred with regard to landowner attitude, basic operational characteristics,

and ascertain any central changes in economic profitability that has occurred since Steinbach's study of these ranchers.

The second goal involved obtaining detailed data from landowners who utilize fee hunting as an enterprise. Personal interviews were conducted with 146 landowners, located in Central and South Texas. Information concerning the functional characteristics and the economics of their fee hunting operations were collected including general information as to landowner attitudes of hunters and hunting.

Chapter I provides the basic information or backdrop against which this study was initiated. Chapter II details previous research, determinations and concept information available. The case study comparing 2002 data to 1988 information on previously interviewed is presented in Chapter III. Chapter VI presents details about landowner preferences, hunters and hunting as an enterprise and, finally, in Chapter V, explicit results of the operational characteristics and economic details are evaluated and presented.

CHAPTER II

APPROACH AND METHODS

GENERAL STUDY AREA

The study area for this research was selected in order to provide an in-depth assessment of landowners' attitudes and preferences about hunters, hunting and property rights such as property access or the right to control trespass when recreational fee hunting has been incorporated as part of the landowners' management practice. Data collection from ranchers in the Edwards Plateau and South Texas Plains assisted in meeting the objectives of this study which were to: (1) obtain detailed information from ranchers in relation to their attitudes and preferences about fee hunting and hunters including the operational and economic characteristics of these enterprises; and (2) provide a comparison of current information to information from studies which have been completed previously in attempts to ascertain changes of landowner's attitudes towards hunters and hunting which may reflect future industry direction.

The study area was limited to the Edwards Plateau and South Texas Plains ecological regions of Texas (Gould 1975). The selection of these two areas is the result of a long, documented history of fee-hunting operations located within these regions. In the Edwards Plateau eco-region these counties include Gillespie, Llano, Mason, Kimble and Sutton while in the South Texas Plains eco-region the counties are Brooks, Dimmit, Frio, LaSalle and Webb (Figure 1).

The Edwards Plateau encompasses 35 counties in Texas that cover 10.3 million hectares with elevations ranging from 1,200 to 3,000 feet. This region is composed of deeply dissected hilly, stony plain and thin soils. This land area is situated east of the Pecos River and west of the Colorado River and is bounded by the Balcones Escarpment at the southern edge. The precipitation levels are variable to low with average annual amounts ranging from 12 inches in the western areas to 32 inches in the eastern regions. The vegetation is

composed predominantly of woodland species in the eastern sections with woody plant cover and grassy prairies to the west (Gould 1975; Hatch et al. 1990; Hatch and Pluhar 1993).

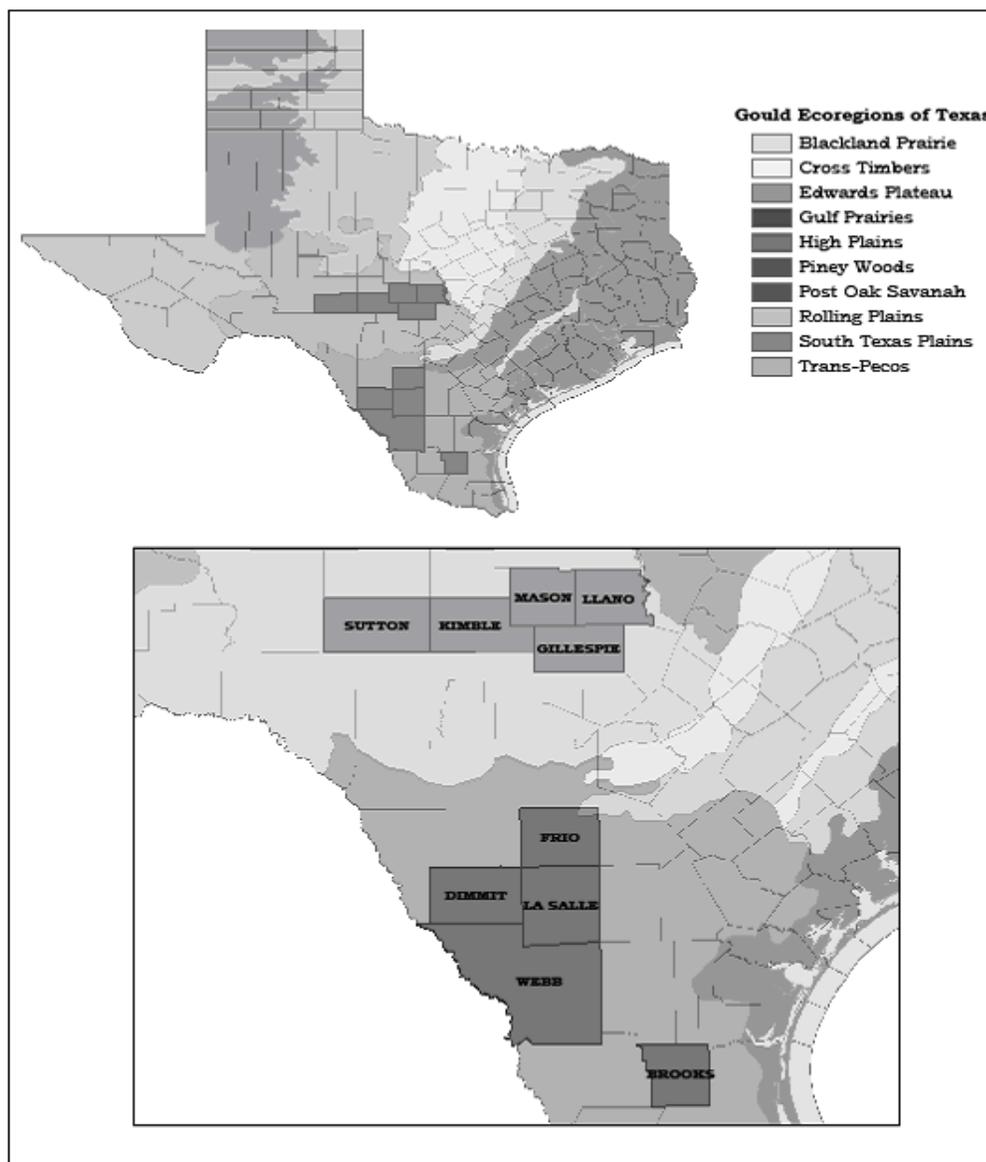


Figure 1. Texas Ecological Regions – Study Area Depicted by Ecoregion and County.

This region is 98% rangeland with arable lands found along divides and riparian corridors. The area supports cattle, sheep, goats and wildlife such as white tailed deer and wild turkey (*Meleagris gallopavo intermedia*). The region is also known for increasing populations of exotic wildlife including axis deer (*Antilope cervicapra*), sika deer (*Cervus nippon*), fallow deer (*Cervus dama*) and blackbuck antelope (*Antilope cervicapra*).

The South Texas Plains includes 27 counties and covers 8.5 million hectares. Located south of the Balcones Escarpment, in the lower regions of the state, this ecological area is bordered by the Rio Grande River to the west and south and lies adjacent to the Gulf Prairies and Marshes eco-region on its eastern boundary. Precipitation levels range from 18 to 30 inches annually. Elevations run from sea level to around 1 000 feet with even to rolling topography. Vegetation consists of small trees, shrubs, cactus and grasses but is considered subtropical with woody shrubs being the dominant species (Gould 1975; Hatch et al. 1990; Hatch and Pluhar 1993). Similar to the Edwards Plateau area, the South Texas Plains eco-region is utilized primarily for cattle production and for wildlife including white tailed deer, turkey, feral hogs (*Sus scrofa*) and quail (*C. virginianus spp.*). In the far southern reaches of this region some exotic species are free-ranging primarily nilgai antelope (*Boselaphus tragocamelus*).

GENERAL METHODOLOGY

A personal interview process was determined to be the best approach for this study due to the level of complexity of the questionnaire and the sensitive nature of information desired (Salant and Dillman 1994). A previously developed questionnaire (Steinbach 1988) was incorporated for use in the case study research as presented in Chapter III. For Chapters IV and V, a survey questionnaire was developed using a previous instrument as a basis (Steinbach 1988) with additional support from current research on survey instruments (Salant and Dillman 1994; Dillman 2000). A pilot test was conducted on the later questionnaire to determine if the instrument met with the desired

procedures of the study. This pilot study incorporated a selected group of landowners who did not own land in either of the ecoregions in this study but did include fee hunting as a part of their operations. Results of the pilot test led to minor adjustments in the questionnaire. The survey instrument consisted of 82 questions of which approximately one-half related to demographic and attitude characteristics of the landowner while the other one-half sought information on landowner's preferences relative the operational and economic features of their fee hunting business. Each questionnaire was administered to all the interviewees by the same interviewer.

Required approval was obtained to conduct research on human subjects through Texas A&M University Institutional Review Board and letters of introduction and explanation of the study were sent out to those landowners that were selected for participation (Appendix A). Steps were taken to guarantee landowner anonymity and confidentiality. Also, Texas A&M University, Department of Rangeland Ecology and Management letterhead was used to assure the landowner of the study's legitimacy. Landowners were contacted by telephone with a request for a personal interview and an appointment scheduled when appropriate. These techniques are suggested by Dillman (2000) with the use of mail surveys but were determined to be suitable for use in this study.

To facilitate the entry into each ecoregion, Texas Agrilife Extension agents were contacted and informed about the research and its goals. Acknowledgement by extension agents of the researcher's presence provided additional support for the study among landowners.

A database identifying landowners whose land is used in some capacity for fee hunting was developed. Landowner identification and establishment of parcel size groupings was constructed using two resources developed by Texas Parks and Wildlife. First, stratification of landowner information and landowner parcel size within each ecoregion was accomplished using the Hunting Lease License categories as developed by Texas Parks and Wildlife. This allowed all landowners in the database to fall into one of three groups by

landownership size; small – one to 202 hectares; medium – 203 to 405 hectares; large – greater than 405 hectares. A Hunting Lease License is required by the state from each landowner including land owned by an individual, a partnership, a firm, a corporation or their agent when recreational hunting takes place on the property in exchange for a fee.

A second resource used in database development was obtained from Hunting Cooperative Lease License holders. These Hunting Cooperatives, known as Wildlife Management Associations or Coops, are locally formed groups with membership coming from landowners who lease their land for hunting and are able to take advantage of benefits such as reduced fees for a Hunting Lease License through coop membership. These coops perform numerous and much needed services such as providing a platform for landowner members, especially those with smaller parcels, to collaborate on wildlife management practices and development of community involvement that provides long term benefits to its membership (Wagner et al. 2006). Some coops may have up to several hundred members and there may be one or more coops within a county area. A Wildlife Management Coop allows its membership to function in a similar manner to that of a single landowner who obtains a Hunting Lease License; allowing each member (landowner) to permit hunting on their property under the Hunting Cooperative Lease License. In this way many landowners who permit hunting on their lands would not show up on the Hunting Lease License list and could not be identified for this study.

The landowner database was divided into two groups corresponding to either the Edwards Plateau or the South Texas Plains ecoregion. Subsequently, landowners were put into one of three categories by landownership size; small – one to 202 hectares; medium – 203 to 405 hectares; large – greater than 405 hectares. Survey participants were selected at random. Over sampling was performed at about 30% due to expected nonresponse error (n=35 per parcel size; n=105 per ecoregion). Once the interviewing process began, a technique called snowball sampling was used to generate further subjects. This technique relied on referrals from interviewees.

These referral names were then added to the appropriate category forming a new pool from which random sampling was used to obtain additional subjects for interviewing (Neuman 2004).

CHAPTER III

A CURRENT APPRAISAL OF LANDOWNERS PREVIOUSLY INTERVIEWED IN CENTRAL AND SOUTH TEXAS: A CASE STUDY

INTRODUCTION

Over the past several decades recreational hunting in Texas has evolved from a loosely organized day or season lease style of enterprise to become highly developed enterprises generating substantial revenue (U. S. Fish and Wildlife 2002; Southwick 2003). For some landowners this interprets to consistent ranch income when other revenue streams fail to produce returns. In these cases, the fee hunting enterprise may become an economic substitute. In other instances fee hunting provides additional income which becomes beneficial particularly as rural landowners deal with demands such as increasing levels of property tax and estate taxes. Estate tax settlement has been identified as the number one reason for a landowner to sell property in Texas with as many as 45% of Texas ranchers selling their property specifying estate tax settlement as the primary reason for the sale (Gilliland and Mays 2002). Also, Texas ranching communities have been battered by steadily low or widely vacillating agricultural production markets. Recent markets for other types of ranch income such as oil and gas revenues often fluctuate so that these revenues become difficult to depend on for stable sustainable income and may be insufficient to offset the loss in agricultural proceeds.

To offset revenue deficits and counteract higher taxes, many ranchers are evaluating the advantages of participating in fee hunting ventures while utilizing the benefits of wildlife tax exemption for their property. Hunting is not a new market in Texas, but its' role as an income generating resource has become considerably more important to Texas ranchers. In 1984, recreational hunting was estimated by Pope to contribute over \$4 billion in terms of land values (Pope et al. 1984). As an industry over 4.9 million wildlife watchers, hunters and fishing participants contributed \$5.2 billion in retail sales in Texas. With an economic multiplier effect, it was estimated that the total value

of hunting and fishing activities for 2001 was nearly \$10.9 billion in Texas (Southwick 2003). At the national level, one 1996 publication stated that if hunting were “hypothetically ranked as a corporation” it would be placed thirty-fifth on the Fortune 500 list (U.S. Fish and Wildlife Service, 1996).

Relative to landowner attitude, evidence suggests that although fee hunting can provide landowners economic support, his or her perception of property rights and their basic belief system about values, control of access and ownership may all play a role that impact management practices of recreational hunting enterprises (Benson 2001b). The intricate weaving of these rights and belief systems are believed to be the reason for the great degree of similarity when comparing the 1986 and 2001 responses about desirable qualities of lessees in this study. A 2001 statewide survey of Texas landowners on land use activities reported that of the number of landowners who no longer allowed hunting on their property, the most frequent response as to reasons why included: stock quality, concern for wildlife and poor behavior of hunters. This was followed by damage to property, damage to livestock, no lease/permit and loss of privacy (Duda and Brown 2001). Additionally, state wildlife administrators believe that poor hunter behavior rather than lack of financial compensation was enough for landowners to deny access to their property (Benson 2001b).

For landowners who already used fee hunting as a part of their management program there is evidence to suggest that greater emphasis on wildlife-based enterprises has resulted in significant changes in land management. Proponents of wildlife commercialization have pointed out benefits of improved land and wildlife management practices associated with the inclusion of hunting and other recreational opportunities as part of their ranching operations (Conner and James 1996; Benson et al. 1999). For example, Butler and Workman (1993) presented data collected from a group of west Texas ranchers that suggests improved land management practices resulted from continued development of wildlife commercialization. In addition, management of wildlife habitat through the utilization of livestock is

the subject of several recent publications. Indications are that disturbance of habitat by livestock may benefit wildlife species due to changes in vegetation composition and structure (Rideout 1999; Lyons and Wright 2003).

As part of a larger research project, this study was initiated to provide a comparison of a specific group of landowners, monitoring their attitudes and preferences about hunters, hunting and ownership rights such as property access when recreational fee hunting has been incorporated as part of the landowners' management practice over a long period. Data collection from this selected group of ranchers in the Edwards Plateau and South Texas Plains, assisted in meeting the objectives of this study which were to: (1) obtain detailed information from ranchers previously interviewed by Don Steinbach in 1986-1988 study in relation to their attitudes and preferences about fee hunting and hunters; and (2) compare current (2001) information with that previously collected by Steinbach (1988) and assess any changes in interviewee attitude and preference.

METHODOLOGY

Surveys were conducted in Central and South Texas through personal interviews with ranchers who had participated in the 1986-88 study (Steinbach 1988) and who were part of a larger assembly of interviewees that included landowners, hunters and lease operators. The interviews were carried out using the same standardized questionnaire employed by Steinbach for his 1988 study. Landowners who were available and willing to participate in the new survey process were included in this study. Given that approximately 16 years had past, some of the original landowners were retired or deceased. In these cases the landowner's heirs were interviewed when possible. The personal interviews were carried out over a three month period, between January and March 2001. Of the estimated 43 landowners/operators originally interviewed by Steinbach, 19 still owned/operated their ranches in 2001. During the time period of this study, one rancher sold his property and three others declined to be interviewed. In addition, six landowners had

multiple fee hunting divisions. That is, designated hunting areas (divisions) which may have different management programs as well as leased access. Information was recorded for each division giving a total of 26 different fee hunting operations. Figure 1 (pg.11) locates the Texas counties where interview participants owned ranches.

Of the 15 interviewed landowners, 10 owned ranches in the Edwards Plateau while five were in the South Texas Plains area of Texas. Due to the small sample size comparative analysis was performed by combining responses from both regions and comparing the combined results with similar data from Steinbach's study. Obvious erroneous responses and non-responses or refused responses to specific questions were not included in the analysis. Therefore the sample size (n) varied slightly among questions. Because of the low number of responses, the comparative analysis was limited to simple descriptive statistics. This same method approach was used in the following section of this chapter on operational characteristics of fee hunting.

RESULTS OF CASE STUDIES

Demographic Characteristics

Landowners were ranchers who have lived on or near their ranch lands most all of their lives. Of the 15 landowners interviewed 13 were male and two were female. The overall average age of the survey participants was 62.3 years with South Texas ranchers being slightly younger (60.2 years) than those in Edwards Plateau (63.3 years).

Most of the ranchers (66.7%) had some college education while 33.3% held undergraduate, graduate or professional degrees. Relative to income, 40% of the ranchers indicated their gross family income in 2001 fell between \$40 000 and \$100 000, while 33.3% income exceeding \$500 000. Three landowners (26%) were evenly distributed in categories ranging between \$100 000 and \$500 000 and the remaining landowner (0.7%) refused to answer this question. The percent of income (before taxes) that came from fee hunting

operations varied from 20% to above 90% of total income without any identifiable distribution pattern.

Attitudes and Preferences

Using a 1-5 Likert rank scale landowner preferences and attitudes were recorded to compare shifts from 1986 to 2001. In the 1-5 rank scale, a response of 1 signifies the landowner feels the statement is not at all important while a response of 5 indicates the landowner perceives the statement to be very important. Tables 1, 2 and 3 provide the average response by percent along with the associated list of questions.

It is apparent from the data in Table 1 that while ranchers have altered their approach to hunters and hunting with regard to some preference characteristics, attitudes and preferences remain quite similar having changed little over time on a number of desired lessee qualities. For instance, landowners placed a high level of importance relative to the hunters' willingness to follow game laws and game management rules, and the issue of safety and responsibility. Table 1 shows a 1986 index value of 4.9 for these two statements and a value of 5.0 in 2001. Hunters who kept campsites clean (1986 - 4.9, 2001 - 5.0) and respected the landowner's requests such as the willingness to shoot both sexes of deer when requested (1986 - 4.0, 2001 - 3.9) were more likely to be invited back for repeat hunting opportunities. In contrast to the similarities mentioned, landowners' preference for local or Texas-based hunters has declined considerably. In 2001 landowners appeared less likely to desire lessees that originated from any defined local area or from the state than they were in 1986. In fact, the ranchers included in the study appeared to have proven methods for obtaining hunters. Many indicated they rarely had to actively solicit "good" lessees and indicated they had retained the same hunters for 20-30 or more years. Others indicated there was never a shortage of hunters waiting for a lease whenever it became available.

Table 1. Landowner Attitudes About Hunter Characteristics. Average Response Data.

Question Number ¹	Response 1986-1988 Study	Response 2001 Case Study
	Average Scaled Response (By %) ²	
Q1	3.2	1.8
Q2	4.1	2.6
Q3	3.0	2.2
Q4	3.1	2.8
Q5	4.9	5.0
Q6	3.1	2.5
Q7	4.8	4.5
Q8	3.0	1.0
Q9	2.0	1.1
Q10	4.1	4.0
Q11	4.9	5.0

Questions by Number¹

- Q1. Makes no more than two visits if season lease.
- Q2. Lives at least 185.3 Kilometers (115 miles) from lease.
- Q3. Usually hunts with son, daughter, wife or family.
- Q4. Hunts only trophy animals.
- Q5. Follows game laws and implements game management rules.
- Q6. Hunts for meat.
- Q7. Keeps the campsite clean.
- Q8. Is a native Texan.
- Q9. Is local.
- Q10. Will shoot both sexes of deer if asked to.
- Q11. Is responsible and safe.
-

¹ Questions are labeled in numerical order such that Question Number Q1 is the Question by Number Q1; Question Number Q2 is the Question by Number Q2, etc.

² Scaled Response is an averaged Likert scale value. Likert scale: 5 = Very Important, 4 = Fairly Important, 3 = Neither Important or Unimportant, 2 = Somewhat Unimportant, 1 = Not At All Important, N/A = Not Applicable.

For questions shown in Table 2, when asked what solicitation methods they used in the event they needed hunters, landowners stated they were most likely to take recommendations from other landowners (1986 – 40%, 2001– 73%), or referrals from other hunters (1986 – 54%, 2001 – 73%). Ranchers also appear to be increasing their use of the local chamber of commerce (1986 – 23%, 2001 – 53%), placing ads in major metropolitan papers (1986 – 18%, 2001 – 33%) or advertising in professional publications (1986 – 18%, 2001 – 33%) as means of obtaining hunters. In contrast, use of the local paper was the least likely method to be employed in obtaining hunters (1986 – 6%, 2001 – 0%).

The interviewed ranchers were also asked about the importance of alternative reasons for leasing their land for hunting (Table 3). Increasing income remains the most significant reason to lease land for hunting (1986 – 4.3, 2001 – 4.8), while providing a greater cooperation between hunters and ranchers in controlling activities such as road use, blind construction, and feeding has decreased in importance (1986 – 4.1, 2001 – 3.5). Ranchers also appear to perceive the non-leasing hunter as being slightly less of a “headache” than previously (1986 – 3.9 to 2001 – 3.5). Several respondents also indicated that personal involvement with hunters facilitated their decisions about inviting hunters back in the future (1986 – 3.1 to 2001 – 3.3).

Table 2. Methods Used to Attract “Desirable” Lessees. Average Response Data.

Question Number ¹	Response 1986-1988 Study	Response 2001 Case Study
Q12	40.0	73.0
Q13	17.0	47.0
Q14	6.0	0.0
Q15	23.0	53.0
Q16	54.0	73.0
Q17	18.0	33.0
Q18	6.0	33.0
Q19	8.0	13.0
Q20	2.0	7.0

Questions by Number¹

Q12. Take recommendations from neighboring landowners.

Q13. Spread the word in local community that lease is available.

Q14. Advertise in local paper.

Q15. Make the local chamber of commerce aware of the lease.

Q16. Take referrals from the other hunters.

Q17. Advertise in major metropolitan papers.

Q18. Advertise in trade magazines (National Rifleman, Outdoor Life).

Q19. Advertise in professional publications (Doctors Journals, Law Publications).

Q20. Make sales presentations to clubs, groups, and companies.

¹ Questions are labeled in numerical order such that Question Number Q12 is the Question by Number Q12; Question Number Q13 is the Question by Number Q13, etc.

² Scaled Response is an averaged Leikert scale value. Leikert scale: 5 = Very Important, 4 = Fairly Important, 3 = Neither Important or Unimportant, 2 = Somewhat Unimportant, 1 = Not At All Important, N/A = Not Applicable.

Table 3. Reasons a Landowner Would Lease Land for Fee Hunting. Percent Response Data.

Question Number ¹	Average Response (1986-1988 Study)	Average Response (2001 Case Study)
Average Scaled Response (By %)		
Q21	4.3	4.8
Q22	3.9	3.8
Q23	3.6	4.2
Q24	3.9	4.2
Q25	4.1	3.5
Q26	3.1	3.3

Questions by Number¹

Q21. Increases my income.

Q22. Decreases problems and “headaches” from non-leasing hunters.

Q23. Help control the kinds of species harvested.

Q24. Help control the number of species harvested.

Q25. Provide greater cooperation between landowner and hunters in controlling activities on the land (i.e. camping, blind construction, feeding, and road use.).

Q26. Provide opportunity to relate to persons from other walks of life.

¹ Questions are labeled in numerical order such that Question Number Q21 is the Question by Number Q21; Question Number Q22 is the Question by Number Q22, etc.

² Scaled Response is an averaged Leikert scale value. Leikert scale: 5 = Very Important, 4 = Fairly Important, 3 = Neither Important or Unimportant, 2 = Somewhat Unimportant, 1 = Not At All Important, N/A = Not Applicable.

Consistent with the earlier question relating to the motivation to lease land for hunting, Table 4 demonstrates further that a major consideration in making a decision to lease includes income resulting from this enterprise (1986 – 3.9, 2001 – 4.7). Substantially greater importance appears to be placed on the liability risks taken in making the decision to lease properties for hunting, (1986 – 2.5, 2001 – 4.5).

Table 4. Factors a Landowner May Consider When Leasing Land for Fee Hunting. Average Response Data.

Question Number ¹	Response 1986-1988 Study	Response 2001 Case Study
	Average Scaled Response (By %) ²	
Q27	3.2	1.8
Q28	4.1	2.6
Q29	3.0	2.2
Q30	3.1	2.8
Q31	4.9	5.0

Questions by Number¹

Q27. Certain ownership rights must be foregone by leasing such as giving up some privacy to others.

Q28. Income from leasing is very important.

Q29. Lease to anyone for the highest price.

Q30. Management costs that would not be incurred if hunting rights were not leased.

Q31. Liabilities in having hunters on the land that creates a risk in leasing.

¹ Questions are labeled in numerical order such that Question Number Q27 is the Question by Number Q27; Question Number Q28 is the Question by Number Q28, etc. ² Scaled Response is an averaged Leikert scale value. Leikert scale: 5 = Very Important, 4 = Fairly Important, 3 = Neither Important or Unimportant, 2 = Somewhat Unimportant, 1 = Not At All Important, N/A = Not Applicable.

Finally, for the landowners included in this study there is an apparent shift of attitude toward liability insurance. Steinbach indicated 53% of landowners had liability insurance coverage in 1986 while 93.3% of the landowners interviewed in 2001 had liability insurance either as a separate policy or through an ‘umbrella’ attachment to their farm land policy. This shift is even further accentuated by the observation that 37.5% of the 1986 interviewees thought liability insurance was important or mandatory to have while in 2001 this view was held by 86.7% of those interviewed. In contrast, 1986 survey data indicated that 2% of landowners were actually sued while 94% thought a lawsuit unlikely, compared to 2001 data showing 6.7%, (1

person in 15), having been sued in the course of fee hunting operations and 89% believing lawsuits never or rarely occurred.

Lease Characteristics

The study showed that in the ranchers interviewed exhibited similarities with regard to their leasing arrangements, but specific strategies were determined by landowner preference and constraints. Because the study included only 15 ranchers, it is difficult to make rigorous comparisons with Steinbach's 1988 study. In addition to having a larger sample size, Steinbach also utilized cluster analysis to provide divisions in land sizes and leasing arrangement types by size of hunting enterprise which is not feasible here. Figure 2 provides a look at the income generated by fee hunting as a percent of their total gross revenue for these 15 landowners. This is discussed in greater detail on page 30 of this chapter.

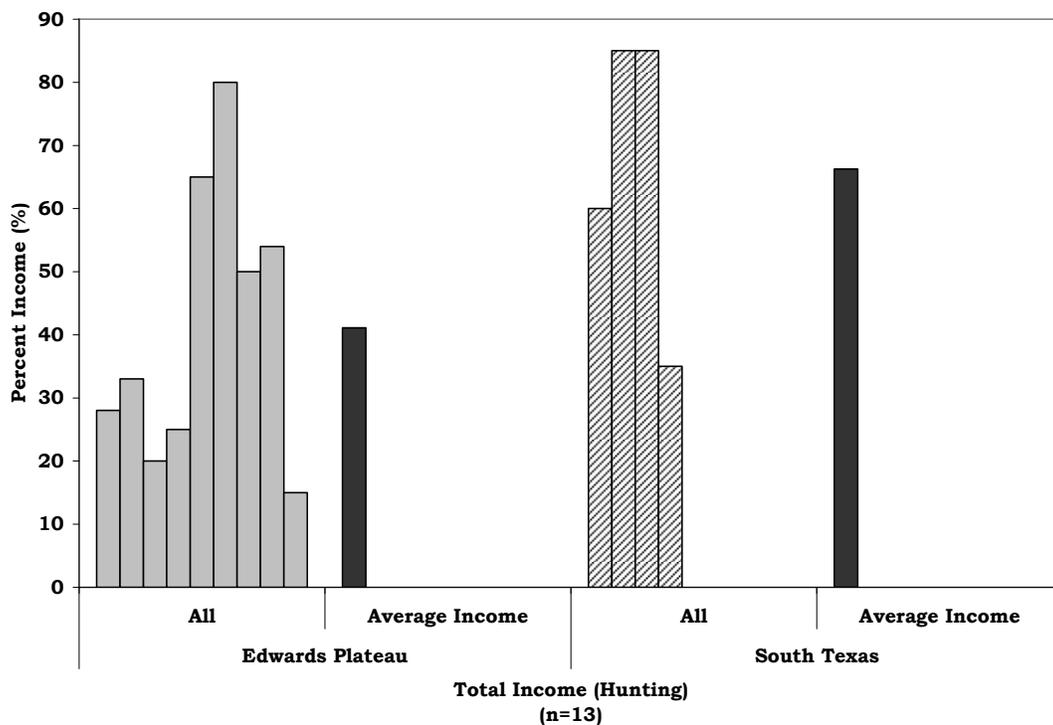


Figure 2. Percent Family Income (by Respondent) From Fee Hunting - 2001.

Table 5 summarizes the 2001 study's findings relation to characteristics of lease types.

Table 5. Characteristics of Lease Types.

Lease Type	Edwards Plateau n (%) ¹	South Texas n (%) ¹	Total n (%) ¹
Annual (Seasonal) Hunts	10 (58.8)	3 (33.3)	13 (50.0)
Corporate Lease Hunts	3 (17.7)	1 (11.1)	4 (15.4)
Day Lease Hunts	1 (5.8)	1 (11.1)	2 (7.7)
Package Hunts	3 (17.7)	3 (33.3)	6 (23.0)
Outfitter or Third Party	0	1 (11.1)	1 (3.9)

¹Applies to percent of total number of divisions (26) representing 15 landowners.

There appears to be a strong preference among the landowners included in the 2001 study for annual or season long leases (50%); this followed by package hunts (23%), while the least favored were day hunts (7.7%) and outfitters or third party leasing (3.9%). However, compared to 1986, landowners appear to be shifting towards greater use of short duration package hunts in both eco-regions, and away from annual or seasonal leases (Table 6).

Table 6. Comparison of Lease Characteristics.

Lease Type	Edwards Plateau 1985 (%)	Edwards Plateau 2001 (%)	South Texas Plains 1985 (%)	South Texas Plains 2001 (%)
Annual (Season)	68.2	58.8	60.7	33.3
Short Duration (Package and Day)	19.7	23.5	15.7	44.4
Multiple Year (Corporate)	12.1	17.7	23.6	22.2
Total	100	100	100	100

In both eco-regions, hunting leases that were defined or delineated as “by the acre” (42.3%) were found to be more desirable than those termed as “whole ranch” (26.9%) and “by the pasture” (30.8%). Any specification as “by the blind” (0%) was not reported by any landowner in this study (Table 7). Across the study period (1986–2001) there appears to be notable increases in leasing “by the acre” in both areas of Texas. Leasing the “whole ranch” has declined in use in both regions. The most significant change over the 15 year period was that in South Texas where there was an increase of almost 46% in leasing “by the acre” while the associated decrease occurred in “by the pasture” and “by the whole ranch”.

Table 7. Leased “By” Characteristics.

Leased Space	Edwards Plateau 1985 (%)	Edwards Plateau 2001 (%)	South Texas Plains 1985 (%)	South Texas Plains 2001 (%)	Both Ecoregions 2001 (%)
By the Acre	-	35.3	9.8	55.6	42.3
By the Pasture	36.4	35.3	35.3	22.2	30.8
Whole Ranch	63.4	29.4	52.9	22.2	26.9
By the Blind	-	-	2.0	-	-

Other characteristics of lease hunting identified in this study include a low number of female hunters, occurring in only 8% of all groups leasing in 2001. This statistic reflects state numbers which indicate that female hunters compose less than 10% of total hunters in Texas (Southwick 2003).

Steinbach’s study also returned the finding of low or no female hunters and confirmed that the largest participant group was male with nearly half the hunters in Edwards Plateau (47%) and a third in South Texas (33%) being groups of males. Steinbach did not identify the remaining makeup of hunter groups by gender but as individuals, individual with families or guests, mixed groups of individuals with other individuals with family or guests and finally, hunting clubs and companies.

Other shifts in lease characteristics that were identified between 1986 and 2001 included corporate leases. Of those interviewed in 2001, 48% indicated that they leased to companies/corporations compared to 1986 figures of 12% of Edwards Plateau ranchers and 25% of South Texas landowners. One landowner attested to the fact that he had been leasing to the same company for over 30 years.

The total number of whitetail deer taken from all study ranches in 2001 was 1,035 bucks and 878 does. By region, there were 759 bucks and 601 does taken from the ranches in the Edwards Plateau and 276 bucks and 277 does from South Texas. In his research, Steinbach captured percentages of landowners who allowed wildlife harvest by species such as dove, quail, and feral hogs and consequently there are no comparisons of actual wildlife harvest numbers available for 1986 other than whitetail deer.

A notable change with regard to available wildlife was the increase in exotic populations on the landowner's land or surrounding properties over the period between 1985 and 2001. Although ranchers were unable to provide any specific numbers, most all Edwards Plateau landowners indicated that where the exotics are found, they tend to present a nuisance through their ability to out compete native wildlife for forage and their potential for destroying property such as fences. However, ranchers' perception of exotics as a problem may be offset somewhat where they can offer exotic hunting packages year around, thus generating income during otherwise slow periods. In 1986 few, if any, exotics were harvested in any of the divisions studied. The Exotic Wildlife Association in Texas reports that approximately 200 000 exotics of various species such as Axis, Antelope, Black Buck, and Nilgai are held either in captive populations or are free ranging (Texas Fiscal Notes 1998).

For both regions, landowners included in the 2001 survey indicated that they tend to use oral agreements (56%) over written agreements (44%) for lease arrangements. The landowners that used written agreements also incorporated other types of forms with hunters, such as "Camp Rules" postings and "Hold Harmless Agreements".

In response a question regarding the use of consultants for developing their wildlife management programs, 48% indicated that they do employ consultants of some type but most utilized the free assistance provided by Texas Parks and Wildlife. In addition, most respondents conducted census of deer (84%), using spot light (40%) and helicopter (53%) methods. All respondents who answered that they did census wildlife populations indicated they performed the task annually but did not necessarily use the same method (helicopter) each year.

In responding to the question about the use of high fencing, 44% specified that they utilized this tool as part of their wildlife management program while 56% did not for the 2001 study. Additionally, of those who used high fencing, 12% had constructed the fence within the last five years while 32% had high fences in place for more than 10 years. Currently, the average cost of high fence is around \$12 500 per mile and this cost does not vary significantly from Steinbach's 1986 budget investment summary for 4 case study ranches which indicated high fencing costs to be between \$10 000 and \$12 000 per mile (Steinbach 1988).

In 2001 almost all ranchers (84%) had implemented grazing plans including rest-rotation (64%), class of livestock (48%), and/or number of animals used (64%) to benefit deer. In addition (12%) of the respondents had planted food plots to promote the wildlife population and 36% of the ranchers specified that they were involved in brush management programs. No comparable data were reported in the 1986 study.

Gross Incomes from Leasing

Income levels for the 2001 and 1986 study group are provided in Table 8. These figures indicate that the average gross income per hectare has showed to have a decrease of 18.4% since the 1986 in the Edwards Plateau when applying the inflationary factor for 2001 dollars. South Texas Plains experienced an increase of approximately 35% when adjusting for inflation.

Table 8. Gross Income Sampled by Region.

Lease Characteristics	Edwards Plateau 1986 ¹ (CPI)	Edwards Plateau 2001	South Texas 1986 ¹ (CPI)	South Texas 2001
Ave. Hectares Leased	657	2 882 ²	2 227	8 223 ²
Ave. Gross Income	\$5 373 (\$8 544)	\$30 361 ²	\$27 232 (\$43 305)	\$196 560 ²
Ave. Gross Income / Hectare	\$7.91 (\$12.58)	\$10.53	\$11.16 (\$17.75)	\$23.90

¹ CPI Adjustment for inflation to 2001 dollars.

² Outliers were deleted from income and acreage figures.

SUMMARY AND CONCLUSIONS

The respondents involved in the 2001 study are well educated, with about two-thirds having some level of college achievement, and they have accrued considerable agricultural and wildlife management experience. Many are long time residents living on the ranches they manage and have strong ties to their community as well as vested interest in the productivity of their resources. Comparative assessments between the 1986 and 2001 surveys provide a detailed examination of variations in landowner attitudes and preferences over this time span. Of particular interest are the shifts in attitude toward hunter origin and the methods employed by the landowner to obtain lessees. The study indicated that in 2001, landowners preferred to lease to hunters living outside of the local area or hunters from other states. Additionally, they were more likely to take referrals from other landowners or “good” hunters to obtain new lessees. In contrast, the 1986 study indicated that landowners preferred local Texans within an approximate 100 mile distance over any other hunter origin.

Landowners have become increasingly aware of the income potential that hunting enterprises are capable of producing particularly when coupled with sound wildlife management practices that produce results such as population control, and encouragement of diverse forage growth. However, all

respondents echoed a growing concern about liabilities associated with fee hunting enterprises. Accordingly, landowners have modified their policies over time with respect to landowner rules, landowner requests, camp housekeeping and in particular, safety issues. There appears to be little tolerance for hunter misbehaviour. The 2001 interviewees indicated if it was determined that any lessees break their rules; lessees (and guests) are requested to leave the property immediately.

The information derived from this study indicates that the interviewed landowners have approached their enterprise operations with a level of sophistication that is thoughtful as well as innovative. Management of private lands requires landowners to closely monitor resources and be able to apply adaptive management tools as needed. These landowners appeared to have appropriately adjusted their operational characteristics to accommodate the needs and desires of the hunter while at the same time attempting to meet management goals. The direct linkages of their operations to income generated appears to be well defined and further “tweaks” applied to augment their management efficiency. Particular evidence of this is recognized by the change in lease characteristics away from day hunts, which according to the landowners in this study, are time consuming and costly to manage, to seasonal, corporate, or package hunts which landowners feel require less management time and/or yield higher financial returns. The substantial growth in gross income per hectare over the time of this study (1986-2001) is particularly note worthy and potential for future increases in revenue streams by implementing changes to management practices are being explored by the landowners.

This study provided a comparative view on Texas landowner’s attitudes and their preferences when leasing their property for hunting. Discussions with the landowners in the 2001 study helped to provide a deeper understanding and appreciation of how passionately these ranchers interpret their right to ownership, as well as their responsibilities towards stewardship.

As one landowner in South Texas put it:

If something catastrophic happened and I lost all my land, I'd ask the new owner if I could just stay to work it...take care of it for the future...yeah...that's what I'd want to do. That's what is important...really.

Anonymous (Personal Communication)

CHAPTER IV
TEXAS FEE HUNTING ENTERPRISES: LANDOWNER CHARACTERISTICS
AND ATTITUDES

INTRODUCTION

Ranchers are many times described as being tough, hard working, persistent, self-reliant and independent and, many times, this appears to be the case. These character traits serve ranchers well as they endure the cyclic highs and lows of agricultural markets. As in other areas of the United States, ranchers in Texas are a resilient group of individuals possessing a profound commitment to the land that is only surpassed by their inspiring and enduring work ethic, characteristics that are not uncommon to these ‘ordinary’ people who approach life in ‘extraordinary’ ways.

These exhibited character qualities possessed by Texas ranchers may result, at least in part, from those original tough, committed settlers who ventured to Texas from the earliest of times. Native Americans, Spaniards, Mexicans and migrations of land-fever filled immigrants like those travelling with Stephan F. Austin moved and settled into all parts of Texas where land was an abundant and available resource. Austin’s personal commitment to settling the 1820 landscape of Texas was so fervent that he required each of his hand selected 300 families to present personal character references and possess abilities of being strong willed, tenacious, with the capacity to cooperate and in general be “farmers of good character or mechanics” (Doughty 1983, 1987). These independent frontiersmen form the backdrop against which many of today’s Texas landowners originate.

More or less similar to it’s 1820 geographic landscape, Texas is comprised of a total land and water area of approximately 69.5 million hectares (Texas Almanac 2008). Rural lands comprise about 86% of the state (Wilkins et al. 2000) with privately owned land areas encompassing approximately 58.3 million hectares or 84% of Texas (Wilkins et al. 2003). The continued management and sustainability from both economic and ecological

points of view for privately owned lands heavily depend upon the landowners and the tenure practices they choose to incorporate (Freese 1998; Knight and Clark 1998; Benson et al. 1999; Benson 2001a, 2001b). It becomes essential, then, for any agency or organization, whether it is governmental, non-profit or a for profit enterprise, to identify and appreciate the characteristics, traditions, regional environment and any other inherent qualities that affect how or why rural property owners select and implement specific land use practices. In support of this, researchers have provided data indicating that resource managers need to recognize the importance of privately owned lands and the pressures under which these areas are operating. These pressures are the result from increases in human population, increases in economic activities which are supported by land resources and, the shifts in biotic communities and ecosystem processes (Knight and Clark 1998). The studies suggest that private landowners are in need of assistance in the form of technical support, ongoing collaboration in providing educational and incentive programs, and even help in fostering alliances between landowners, environmentalists and urbanites allowing for continued sustainability in land use activities and practices (Lueck 1995; Huffman 1995; Huntsinger and Hopkinson 1996; Benson et al. 1999; Knight 1999; Benson 2001a, 2001b).

A number of recent studies have focused on this premise of landowner support and yielded some insight about land owner characteristics such as, attitude and motivation, that most influence landowner preferences and choices in tenure and use patterns particularly with regard to rural lands (Steinbach D. 1988; Duda and Young 1998; Duda and Brown 2001; Steinbach M. 2001; Sanders 2005).

In Texas, ranchers have integrated recreational hunting as a component of their resource and land use operation effort. Their choice to make this inclusion is based primarily on three things. First, there must exist a demand (or market) for the product, in this case hunters, willing to pay a fee for the opportunity to obtain the product (i.e. wildlife) which has availability (supply) at some level. Secondly, the landowner must perceive that there are generally

positive revenue returns back to their operations. However, the third, and perhaps the most important component of the landowner's decision to integrate fee hunting into their operations and management practice, is the basic tenet that wildlife and hunting are activities which anchors and binds them to their land historically and traditionally. Even in early times (mid 1800's to early 1900's), settlers in Texas used hunting not only for the sustenance it provided, but also for the encouraged sense of camaraderie, promotion of community and a large scale market for wild meat that it promoted (Doughty 1983, 1987; Adams et al. 2000).

In the United States, wildlife is owned by society who has delegated the state and federal governments guardianship and because Texas is a private lands state, the landowner's *de facto* control of the wildlife is the result of their legal control to land access (Huffman 1995; Lueck 1995; Benson 2001a). As a result, private landowners have the greatest impact potential on wildlife and wildlife habitat in Texas (Brown 1999). The implications for the role of the private land owner as an integral component in the strategic planning and management of the largest portion of land area are tremendous whether in Texas or across the United States. Therefore, the need to identify private landowners' attitudes toward hunters and hunting and the landowners' characteristic traits which influence their decision making processes will assist resources managers in distinguishing and recognizing how to best support landowners' land use and land management choices.

STUDY AREA AND OBJECTIVES

As part of a larger study, this research was initiated in order to provide an in-depth assessment of landowners' attitudes and preferences about hunters, hunting and ownership rights such as property access when recreational fee hunting has been incorporated as part of the landowners' management practice. Data collection from ranchers in the Edwards Plateau and South Texas Plains assisted in meeting the objectives of this study which were to: (1) obtain detailed information from ranchers in relation to their

attitudes and preferences about fee hunting and hunters; and (2) provide a comparison to current information and studies which have been completed previously in attempts to ascertain changes of landowner's attitudes towards hunters and hunting which may reflect future industry direction.

The study area is limited to the Edwards Plateau and South Texas Plains ecological regions of Texas (Gould, 1975). The selection of these two areas is the result of a long, documented history of fee-hunting operations located within these regions. In the Edwards Plateau eco-region these counties include Gillespie, Llano, Mason, Kimble and Sutton while in the South Texas Plains eco-region the counties are Brooks, Dimmit, Frio, LaSalle and Webb (Figure 1, pg. 13).

METHODOLOGY

It was determined that a personal interview process would provide the best approach for this study due to the level of complexity of the questionnaire and the sensitive nature of information desired (Salant and Dillman 1994). A survey questionnaire was developed using a previous instrument as a basis (Steinbach 1988) with additional support from current research on survey instruments (Salant and Dillman 1994; Dillman 2000). A pilot test was conducted on the questionnaire to determine if the instrument met with the desired procedures of the study. This pilot study incorporated a selected group of landowners who did not own land in either of the ecoregions in this study but did include fee hunting as a part of their operations. Results of the pilot test led to minor adjustments in the questionnaire. The survey instrument consisted of 82 questions of which approximately one-half of the questions related to demographic and attitude characteristics of the landowner while the other one-half called for the landowner's preferences relative the operational and economic features of their fee hunting business. Each questionnaire was administered to all the interviewees by the same interviewer.

Approval was obtained to conduct research on human subjects through Texas A&M University Institutional Review Board and letters of introduction

and explanation of the study were sent out to those landowners that were selected for participation (Appendix A). Steps were taken to guarantee landowner anonymity and confidentiality. Also, Texas A&M University, Department of Rangeland Ecology and Management letterhead was used to assure the landowner of the study's legitimacy. Landowners were contacted by telephone with a request for a personal interview and an appointment scheduled when appropriate. These techniques are suggested by Dillman (2000) with the use of mail surveys but were determined to be suitably applied for use in this study.

To facilitate the entry into each ecoregion, Texas Agrilife Extension agents were contacted and informed about the research and its goals. Acknowledgement by extension agents of the researcher's presence provided additional support for the study among landowners.

A database identifying landowners whose land is used in some capacity for fee hunting was developed. Landowner identification and establishment of parcel size groupings was constructed using two resources developed by Texas Parks and Wildlife. First, stratification of landowner information and landowner parcel size within each ecoregion was accomplished using the Hunting Lease License categories as developed by Texas Parks and Wildlife. This allowed all landowners in the database to fall into one of three groups by landownership size; small – one to 202 hectares; medium – 203 to 405 hectares; large – greater than 405 hectares. A Hunting Lease License is required by the state from each landowner including land owned by an individual, a partnership, a firm, a corporation or their agent when recreational hunting takes place on the property in exchange for a fee.

A second resource used in database development was obtained from Hunting Cooperative Lease License holders. These Hunting Cooperatives, known as Wildlife Management Associations or Coops, are locally formed groups with membership coming from landowners who lease their land for hunting and are able to take advantage of benefits such as reduced fees for a Hunting Lease License through coop membership. These coops perform

numerous and much needed services such as providing a platform for landowner members, especially those with smaller parcels, to collaborate on wildlife management practices and development of community involvement that provide long term benefits to its membership (Wagner et al. 2006). Some coops may have up to several hundred members and there may be one or more coops within a county area. A Wildlife Management Coop allows its membership to function in a similar manner to that of a single landowner who obtains a Hunting Lease License; allowing each member (landowner) to permit hunting on their property under the Hunting Cooperative Lease License. In this way many landowners who permit hunting on their lands would not show up on the Hunting Lease License list and could not be identified for this study.

The landowner database was divided into two groups corresponding to either the Edwards Plateau or the South Texas Plains ecoregion. Subsequently, landowners were put into one of three categories by landownership size; small – one to 202 hectares; medium – 203 to 405 hectares; large – greater than 405 hectares. Survey participants were selected at random. Over sampling was performed at about 30% due to expected nonresponse error (n=35 per parcel size; n=105 per ecoregion). Once the interviewing process began, a technique called snowball sampling was used to generate further subjects. This technique relied on referrals from interviewees. These referral names were then added to the appropriate category forming a new pool from which random sampling was used to obtain additional subjects for interviewing (Neuman 2004).

RESULTS

Land Ownership

The data obtained from the personal interview process yielded an in-depth profile of the landowners within the two ecoregions. Examination of the data produced specific demographic details on the landowners. The total land areas in hectares that were included in this study along with the number of interviewees which represent those areas are depicted in Figure 3. There was a

total of 227 441.8 hectares (562 021 acres) owned by the landowners who were interviewed for this study. The vast majority of their ownership which represented 159 943.9 hectares (395 230 acres) originated in the South Texas Plains ecoregion with data provided by 53 interviewees. The remaining 67 497.9 hectares (166 791 acres) was land owned by 93 interviewees from the Edwards Plateau ecoregion. These findings indicate that just slightly more than one-third of the landowners (36%) own 70% of the land (by ownership) included in this study.

In addition to Figure 3, Table 9 provides the number of interviewees by county and ecoregion. Reasons that more landowners were interviewed in the Edwards Plateau ecoregion than in South Texas Plains was most likely due to the technique called snowball sampling. Landowners who were interviewed in the Edwards Plateau area and who were asked for the names of other landowners who might be willing to participate were approximately two times more likely to provide names for the sampling than were those landowners in the South Texas Plains ecoregion. Additionally, according to the 2002 Census of Agriculture, there is approximately 1 800 more farms within those five counties located in Edwards Plateau than in the five South Texas Plains counties providing a larger pool of potential interviewees (USDA 2004).

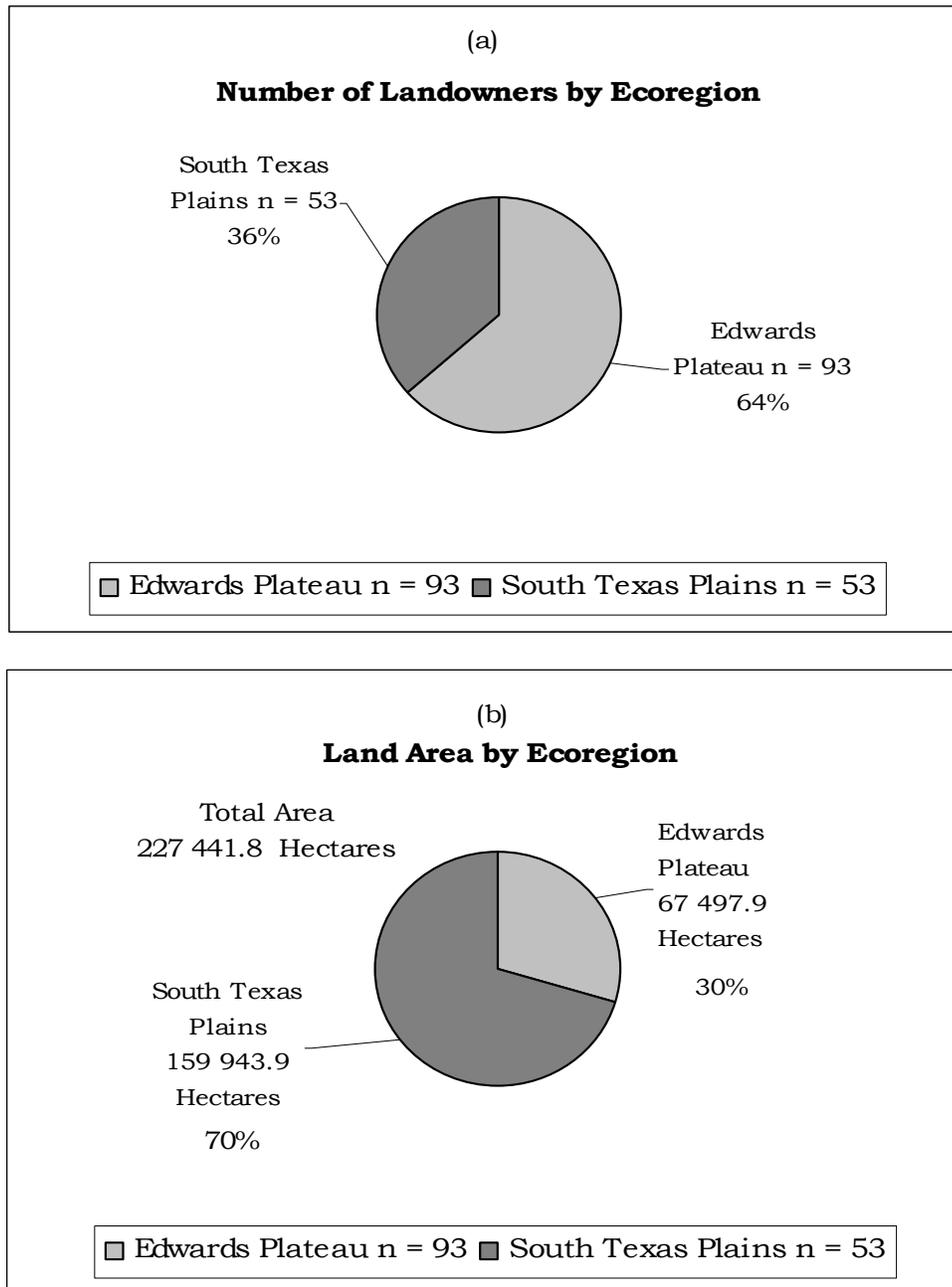


Figure 3. Land Ownership by Number Interviewed and Ecoregion. Figure 3 (a) depicts the number and percentage of landowners by ecoregion. Figure 3 (b) provides the land owned by these landowners.

Table 9. Landowners Interviewed by Region and County (n=146).

Ecoregion	County	Number of Landowners Interviewed	Percent (%) by Ecoregion	Percent (%) Total Study Area
Edwards Plateau	Gillespie	46	49.5	31.5
	Kimble	6	6.5	4.1
	Llano	15	16.1	10.3
	Mason	14	15.0	9.6
	Sutton	12	12.9	8.2
Total		93	100.0	-
South Texas Plains	Brooks	5	9.4	3.4
	Dimmit	13	24.5	8.9
	Frio	15	28.3	10.3
	LaSalle	11	20.8	7.5
	Webb	9	17.0	6.2
Total		53	100.0	-
Total Study Area		146		100.0

The average size of land ownership along with the maximum and minimum size of ownership within each ecoregion for each land category is shown in Table 10. Overall, the smallest parcel of land (12.14 hectares) where lease hunting occurred was in the South Texas Plains ecoregion along the Nueces River. The largest tract, also in South Texas and was 38 849.82 hectares. The average land ownership size across all categories was 1 557.82 hectares for the total study area, 725.78 hectares for the Edwards Plateau area and 3 017.80 hectares for South Texas Plains.

Table 10. Land Ownership Size by Ecoregion.

Ecoregion	Ownership Category (hectares)	Average Land Holding (hectares)	Smallest Land Holding (hectares)	Largest Land Holding (hectares)
	1-202	118.98	40.47	186.16
Edwards Plateau	203-405	291.37	207.60	411.10
	Greater than 405	1 356.10	445.15	13 354.63
South	1-202	123.43	12.14	189.39
Texas Plains	203-405	331.03	214.48	404.48
	Greater than 405	4 839.23	467.00	38 849.82

Time of land ownership for the interviewees who owned or whose property had remained in one family, revealed that ownership was many times a ‘family tradition’. The five county study area for the Edwards Plateau ecoregion reported 37.6% of those interviewed had possession of land which had been in their family’s name for 50-to-99 years while 43% reported family title of 100 years or more. The average length of ownership for the Edwards Plateau counties was 80 years with a span from least to most amount of time of ownership ranging from 2.5 years to 172 years (Figure 4).

In the five county South Texas Plains ecoregion, 39.6% of the interviewees owned their property for 50 years or less while 49.1% had possession of their lands for 50-to-99 years. The average length of time for ownership in the South Texas Plains region was 52 years with a span from least amount of time to most ranging from 3 years to 150 years (Figure 4).

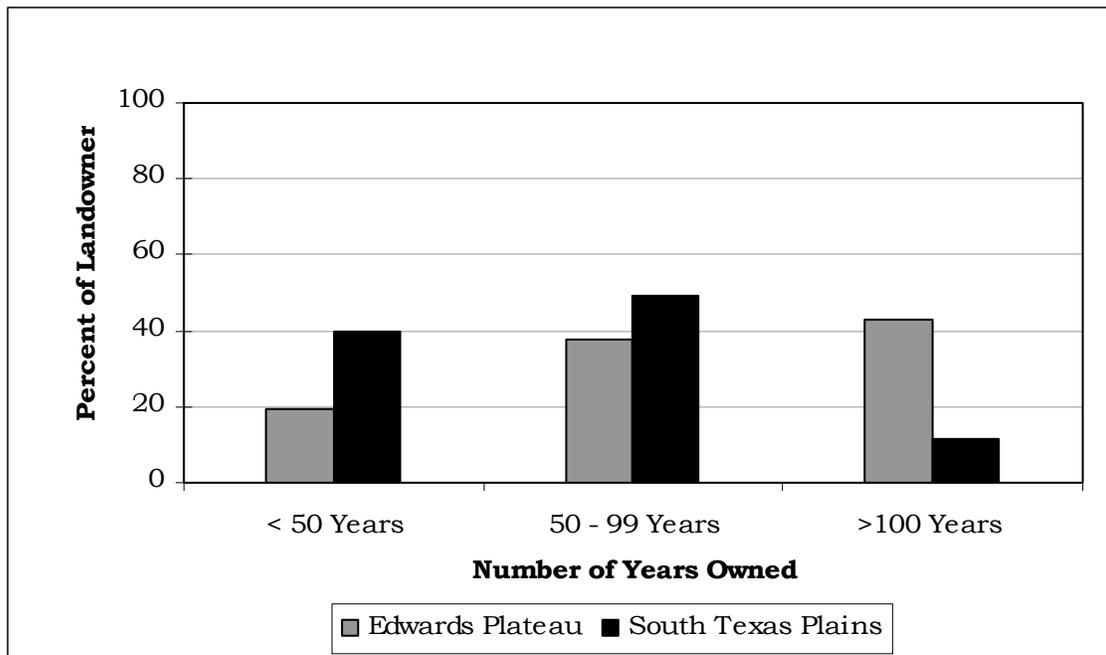


Figure 4. Years of Ownership by Ecoregion and Total Study Area.

Landowners from both ecoregions reported similar results when asked if they had sold any of their property over the previous 15 years (Figure 5). Landowners who reported selling some portion of their property indicated that the primary reason for selling was for business reasons. Landowners from the Edwards Plateau who had sold land (15.1%) sold on average 198 acres while landowners from the South Texas Plains (13.2%) sold, on average, 2 149 acres. Overall, landowners from the study area had maintained ownership of their property (85.6%). Landowners participating in this study did not report selling their property as a result of property tax increases. No interviewees from Edwards Plateau reported the sale of property as a result of estate taxes issues while no South Texas landowners reported selling property to settle inheritance matters. Because this response did not correlate well with other documented results from other studies (Wilkins et al. 2000) which indicated that estate settlement was the number one reason for selling property in Texas, it is believed that this question did not allowed for choices that would help delineate and identify the specific business reasons landowners sold their

property. Recommendations for future use of this question would include this delineated component.

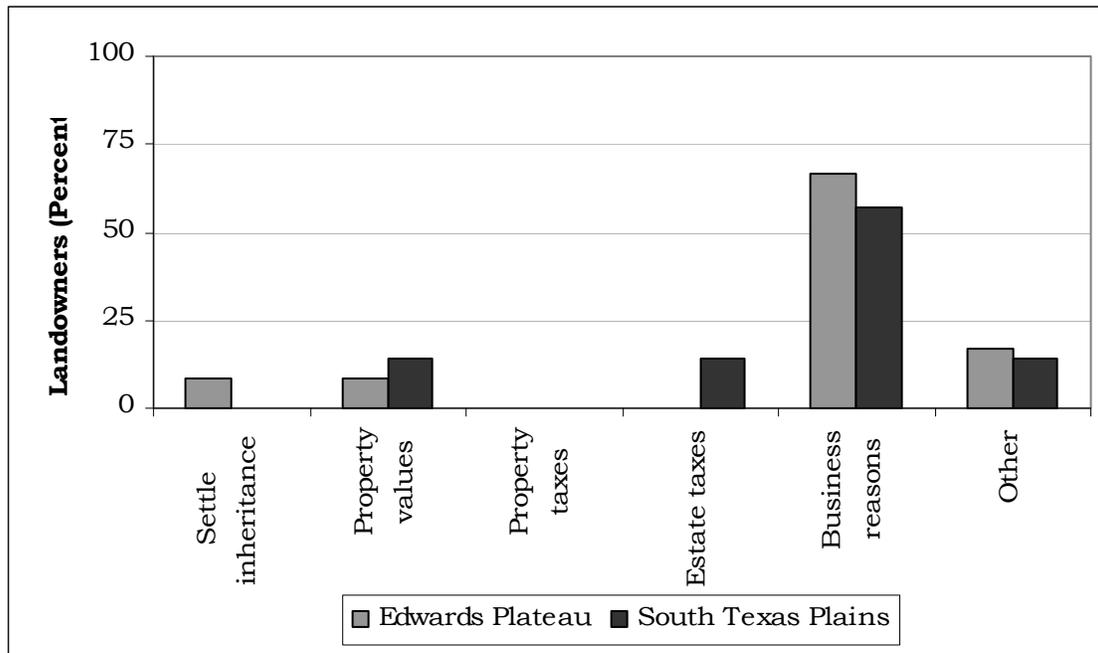


Figure 5. Reasons for Sale of Property.

Landowners were asked a question that was designed to provide insight as to the underlying motivation of property ownership. The question, “What is the primary purpose of ownership of your property that is used for fee hunting?” allowed landowners to present their feelings on land ownership. These responses related to land as, a source of income, a place to live, a place of recreation or a hideaway, land as an investment and any other reason they wanted to provide. The interviewees were asked to provide as many of the responses as they desired. Therefore the total number of responses for the Edwards Plateau were $n = 178$ while in South Texas Plains the number of responses were $n = 119$. The response levels, shown in Figure 6 indicate that a source of income was most frequently cited as the reason for ownership. Many landowners also responded with the category of other. During personal communications with interviewees providing this response, many statements

related to family, home, tradition, pride, part of self and land stewardship as the basis for ownership. Some specific answers provided to this question were:

- “I don’t want an ecological desert.”
- “I was born to it.”
- “The dirt is in my blood.”
- “God blessed me with this land and I am supposed to make it better for the future (generations).”
- “It is my way of life.”

Many landowners saw themselves as stewards of the land while at the same time they believed their lands would help secure their economic future and that of their children.

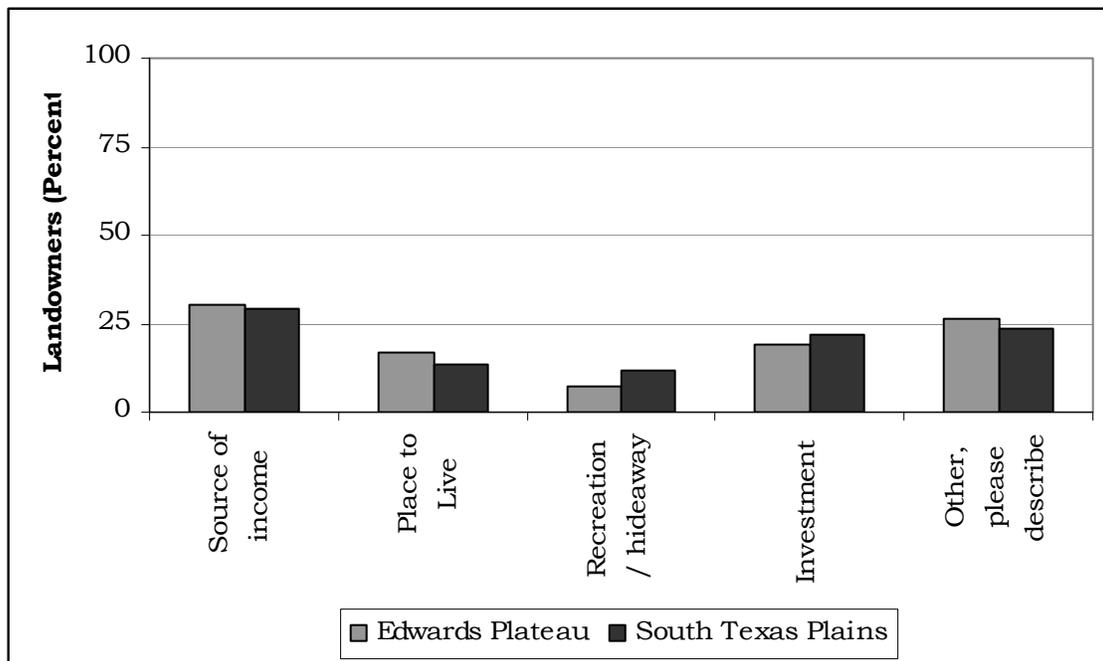


Figure 6. Reasons of Primary Ownership.

Economic and Demographic Analysis of Landowners

An analysis of the demographic data collected from the interview process revealed that most landowners were male and approximately 60 years of age. The breakdown by gender showed the Edwards Plateau interviewees to be 12.9% female and 87.1% male while the Texas South Texas Plains had a makeup of 13.2% female to 86.79% male. Looking at the study area as a whole, there was a small difference (0.19%) between the average ages reported with South Texas at 60.5 years of age to Edwards Plateau at 60.7 years of age. Landowners participating in this study were generally well educated with 32% reporting having attained an undergraduate degree and 23% having achieved a post-graduate degree. Those persons having a high school education was 18%. These reported figures were much the same for both ecoregions with little variance across all categories.

To better understand the revenue generated by landowners in this study, data was collected on annual gross family income and is depicted in Table 11 by percent of ecoregion and then as a percent of the total study area. This assessment of gross income levels was based on the landowner's estimate of the income generated on the land where fee hunting operations occurred. The total study area reported that the greatest percentage of those landowners providing this information fell into the \$75 000 to \$100 000 range. The South Texas Plains region, however, had a higher percentage of landowners (20.8%) who reported falling into the greater than \$500 000 then the Edwards Plateau area which reported a 3.2% for this same grouping.

Table 11. Gross Income Levels.

Ecoregion/Study Area	Category of Income (\$)	Number of Landowners (n)	Percent of Area (%)
Edwards Plateau	< 25 000	7	7.5
	25 000 – 50 000	18	19.4
	50 001 – 75 000	12	12.9
	75 001 – 100 000	28	30.1
	100 001 – 250 000	11	11.8
	250 001 – 500 000	5	5.4
	> 500 000	3	3.2
	Decline to Answer	9	9.7
	Total	93	100
South Texas Plains	< 25 000	1	1.9
	25 000 – 50 000	6	11.3
	50 001 – 75 000	2	3.8
	75 001 – 100 000	14	26.4
	100 001 – 250 000	9	16.9
	250 001 – 500 000	6	11.3
	> 500 000	11	20.8
	Decline to Answer	4	7.6
	Total	53	100
Total Study Area	< 25 000	8	5.5
	25 000 – 50 000	24	16.4
	50 001 – 75 000	14	9.6
	75 001 – 100 000	42	28.8
	100 001 – 250 000	20	13.7
	250 001 – 500 000	11	7.5
	> 500 000	14	9.6
	Decline to Answer	13	8.9
	Total	146	100

Obtaining information on the gross income from the hunting enterprise is important because it allows for a better understanding of the revenue being generated by landowners from these specific operations (Table 12). Cross referencing the average gross revenue data with the average size of land ownership yields the average gross revenue (\$) per unit land area (hectares) and can then be compared to data from earlier studies. Based on this, the total study area develops \$23.00 per hectare for gross revenue from fee hunting. A break down by ecoregion shows that the Edwards Plateau hunting enterprises generated gross average revenues of \$18.71 per hectare while the South Texas Plains ecoregion produced a higher figure of \$24.81 per hectare.

Attitudinal Data Analysis of Landowners

Landowners were surveyed to determine their attitudes toward hunters, specific aspects relative to their hunting enterprises and their outlook on property rights and stewardship of their lands. The survey questions in this section of the survey instrument were based on a 1-5 Likert rank scale with landowner preferences recorded. The Likert rank scales for this study provided that a response of 1 signified the landowner felt the statement was not at all important while a response of 5 indicated the landowner perceived the statement to be very important. In some instances a response of not applicable was given by the interviewee.

The questions in this segment of the survey were grouped into three categories which corresponded to:

1. Landowner attitudes about hunters and hunting.
2. Why landowners might choose to lease their property for hunting.
3. Landowner attitude on landownership.

Questions developed for this portion of the survey were specifically designed to gain insight into those personal preferences that influence landowners in choosing who to lease their land to for hunting, the basis

Table 12. Gross Income From Hunting Enterprise by Ecoregion and Study Area.

Ecoregion Study Area	Landowners Interviewed	Percent by Area	Total Gross Income of All Hunting Enterprise	Average Income of Hunting Enterprise	Lowest Value Income of Hunting Enterprise	Highest Value Income of Hunting Enterprise
Edwards Plateau n = 93						
Responding	88	94.6				
Declining to Respond	5	5.4	\$1 263 080	\$14 353.18	\$750	\$140 000
Zero Dollar Response ¹	2	2.2				
South Texas Plains n = 53						
Responding	50	94.3				
Declining to Respond	3	5.7	\$3 969 558	\$74 897.32	\$2 500	\$800 000
Zero Dollar Response ¹	4	7.6				
Total Study Area n = 146						
Responding	138	94.5				
Declining to Respond	8	5.5	\$5 232 638	\$35 839.98	\$750	\$800 000
Zero Dollar Response ¹	6	4.1				

¹The Zero Dollar Response number was included in the number of landowners responding and therefore the number of landowners will be greater than the total number of landowners and Percent by Area will be greater than 100%.

of their decision to use lease hunting as a part of their operations and what their sense of land stewardship versus land ownership is. Although all data collection is presented, only that information which is seen as having substantive value will be discussed here.

Interviewees were first asked a set of seven questions that allowed a response on the topic of landowner attitudes about hunters and hunting. These questions along with the associated scaled response by percent for each ecoregion are provided in Table 13. On questions related to hunter characteristics (question 1, 2 and 3), landowners presented average response levels ranging from 2.3 to 3.5. These questions involved the hunter's desire to hunt with family members, hunt trophy bucks only and hunts for meat and how important the landowner perceives these characteristics to be. Questions 4, 5, 6, and 7 resulted in a response from interviewees for 'very important' rating (Leikert scale of 5). While question 4 was applicable to the willingness of the hunter to kill both buck and does (white-tailed deer), questions 5, 6 and 7 applied to the hunter's willingness to show consideration for landowner facilities, respect the landowner's rules and act in a responsible and safe manner. These last three questions indicate that landowners place a high level of importance on hunter behavior.

A following set of nine questions were designed to offer insight as to why landowners might choose to lease their property for hunting. These questions and the scaled response data by percent for each ecoregion are presented in Table 14. The average response level for each ecoregion indicates that landowners have strong attitudes and preferences as to why they lease their land for hunting. Landowners from both ecoregions responded with a Leikert scale value of 4.6 to question 8, a statement that the landowners leased their property to increase their income. This suggests that hunting is perceived as a strong economic incentive for landowners utilizing fee hunting. This corresponded to 73.1% of landowners in the Edwards Plateau and 75.5% in South Texas Plains giving a 'very important' rating to this question (Table 14).

Table 13. Landowner Attitudes About Hunter Characteristics.

Question Number ¹	Edwards Plateau						South Texas Plains					
	Scaled Response (By %) ²											
	5	4	3	2	1	N/A	5	4	3	2	1	N/A
Q1	40.9	16.1	13.9	6.5	21.5	1.1	24.5	11.4	24.5	9.4	24.5	5.7
Q2	10.8	13.9	18.3	9.7	41.9	5.4	24.5	13.2	13.2	9.4	35.9	3.8
Q3	29.0	18.3	29.0	5.4	14.0	4.3	28.3	16.9	15.1	18.9	20.8	0.0
Q4	75.3	16.1	5.4	1.1	21.	0.0	58.5	11.3	11.3	1.9	7.6	9.4
Q5	78.5	9.7	7.5	4.3	0.0	0.0	88.7	5.7	3.7	0.0	0.0	1.9
Q6	96.8	3.2	0.0	0.0	0.0	0.0	96.2	3.8	0.0	0.0	0.0	0.0
Q7	93.6	6.4	0.0	0.0	0.0	0.0	96.2	3.8	0.0	0.0	0.0	0.0

Table 13. Continued.

Questions by Number¹

- Q1. The person hunts with family members (spouse/child/etc.).
 - Q2. The hunter hunts only trophy animals.
 - Q3. The hunter hunts for meat.
 - Q4. The hunter will shoot both sexes of deer if asked to.
 - Q5. The hunter keeps the campsite clean and litter free.
 - Q6. The hunter is responsible and safe.
 - Q7. The hunter follows game laws and implements landowner's game management rules.
-

¹ Questions are labeled in numerical order such that Question Number Q1 is the Question by Number Q1; Question Number Q2 is the Question by Number Q2, etc.

² Scaled Response is an averaged Leikert scale value. Leikert scale: 5 = Very Important, 4 = Fairly Important, 3 = Neither Important or Unimportant, 2 = Somewhat Unimportant, 1 = Not At All Important, N/A = Not Applicable

Table 14. Why Landowners Might Choose to Lease Land for Hunting.

Question Number ¹	Edwards Plateau						South Texas Plains					
	Scaled Response (By %) ²											
	5	4	3	2	1	N/A	5	4	3	2	1	N/A
Q8	73.1	14.0	11.8	0.0	1.1	0.0	75.5	17.0	1.9	0.0	0.0	73.1
Q9	51.6	28.0	11.8	3.2	5.4	0.0	56.6	22.6	3.8	1.9	0.0	51.6
Q10	43.0	20.4	17.2	6.5	11.8	1.1	43.4	11.3	26.4	9.4	1.9	7.6
Q11	47.3	19.4	6.5	3.2	20.4	3.2	45.3	15.1	11.3	9.4	11.3	7.6
Q12	39.8	19.3	9.7	1.1	11.8	18.3	37.7	9.4	20.7	5.7	5.7	20.8
Q13	68.8	14.0	9.7	1.1	5.3	1.1	71.7	16.9	5.7	0.0	0.0	5.7
Q14	2.1	1.1	6.5	9.7	78.5	2.1	1.9	0.0	3.8	9.4	77.4	7.5
Q15	23.7	19.4	19.4	15.0	18.2	4.3	35.8	9.4	28.3	5.7	18.9	1.9
Q16	43.0	34.4	15.1	3.2	3.2	1.1	64.1	13.2	11.3	0.0	3.8	7.6

Table 14. Continued.

Question by Number¹

- Q8. I offer my property for lease hunting to increase my income.
- Q9. Lease hunting allows me the opportunity to offset loss of income resulting from wildly fluctuating agricultural market values (i.e., livestock, crops).
- Q10. Lease hunting allows for trespass control.
- Q11. Leasing acreage for hunting prevents non-paying hunters from asking for permission to hunt.
- Q12. You allow family or friends to hunt at no charge.
- Q13. Leasing is important in the control and management of kind and number of species harvested.
- Q14. You lease to anyone for the highest price.
- Q15. By leasing your property for hunting you give up certain ownership rights such as privacy.
- Q16. There are certain liabilities in allowing hunters on your property that creates a risk in lease hunting which requires additional insurance protection.

¹ Questions are labeled in numerical order such that Question Number Q8 is the Question by Number Q8; Question Number Q9 is the Question by Number Q9, etc.

² Scaled Response is an averaged Leikert scale value. Leikert scale: 5 = Very Important, 4 = Fairly Important, 3 = Neither Important or Unimportant, 2 = Somewhat Unimportant, 1 = Not At All Important, N/A = Not Applicable

In contrast to question 8, landowners stated they would not lease their property to anyone for the highest lease price (question 14) (Table 14). The low average Leikert scale values (not at all important) for both Edwards Plateau (1.3) and South Texas Plains (1.2) to this question suggested that landowners in both ecoregions are not willing to lease lands for hunting for any price. The corresponding scaled percent response to this question of 'not at all important' was 78.6% in Edwards Plateau and 77.4% in South Texas Plains (Table 14).

Question 9, which refers to the use of lease hunting to offset loss of income from other traditional markets such as agricultural or energy, received a 4.2 (Edwards Plateau) and 4.0 (South Texas Plains) average response values (Table 14). The high level of importance placed on this question by the interviewees supports the landowner's response to question 8 (Table 14) that lease hunting is incorporated to increase their income.

A high average response value was given by interviewees on question 13, a statement that lease hunting is important to the control and management of harvested species. Landowners felt strongly about this statement with a 4.4 average response from the Edwards Plateau and a 4.5 average response from South Texas Plains (Table 14).

Question 16, a statement with regard to liabilities associated with allowing lease hunting to occur on owned properties and requiring additional insurance coverage, revealed that most landowners felt this was important. This statement resulted in an average response value of 4.1 from the Edwards Plateau and a 4.2 average response from South Texas Plains. Data collected from the survey instrument itself (survey question 51) indicated that 77% of those interviewed from the Edwards Plateau area carried some form of insurance either as a liability or general property insurance. Of those landowners interviewed in the South Texas Plains area, 58% carried some form of liability or general property insurance. Most landowners did not require the lease hunter to carry some form of insurance coverage while on their property (survey question 55). In the Edwards Plateau 7.5% of the interviewees answered that they require hunters to carry insurance while 89.3% did not

have this requirement. Three landowners (3.2%) said this question was not applicable to their lease hunting operations. Those landowners interviewed in South Texas Plains revealed that 22.6% required hunters to carry insurance while 66.0% did not and 11.3% felt that this question was not applicable.

When landowners from the Edwards Plateau were asked if they utilized a written or an oral form of lease agreement, 54.0% replied they used a written lease agreement while 46.0% said a handshake was all they required. In the South Texas Plains, the percentage of landowners using a written lease agreement was 56.6% while 43.4% said an oral agreement was all they used (Survey Question 15).

A final set of eight questions were used to determine landowners' attitudes about their property. Table 15 provides the scaled response data by percent for each ecoregion along with the list of questions.

Questions 17 and 18 (Table 15) were intended to aid in the determination of the level at which income from fee hunting operations played in the landowners' overall revenue stream. Question 17, a statement as to if the property (ies) where fee hunting occurred was a primary source of income provided an average response of 2.7 for both the Edwards Plateau and the South Texas Plains regions. When asked if this same property was a secondary source of income the average response increased to 3.2 (Edwards Plateau) and 3.1 (South Texas Plains) (Question 18).

Landowners felt strongly that their property maintained family traditions of having a working ranch. The Edwards Plateau recorded an average response value of 4.6 while the South Texas Plains was slightly lower at 4.0 (Question 19). Question 20 was a query as to whether landowners perceived their property as a means to a healthy rural environment and experience for their children. Landowners from the Edwards Plateau had an average response value of 4.6 while the South Texas Plains was slightly lower at 4.2.

Table 15. Landowner Attitude on Landownership.

Question Numbers ¹	Edwards Plateau						South Texas Plains					
	Scaled Response (By %) ²											
	5	4	3	2	1	N/A	5	4	3	2	1	N/A
Q17	29.0	12.9	5.4	4.3	41.9	6.5	26.4	11.3	13.2	5.6	36.9	7.6
Q18	35.5	20.4	8.6	1.1	10.8	23.6	28.3	17	18.9	3.8	9.4	22.6
Q19	78.5	7.5	10.8	1.1	2.1	0.0	62.3	9.4	11.3	1.9	11.3	3.8
Q20	76.3	8.6	11.8	1.1	1.1	1.1	66	13.2	9.4	0.0	5.7	5.7
Q21	77.4	15.0	6.5	0.0	1.1	0.0	79.3	7.5	1.9	0.0	9.4	1.9
Q22	58.1	31.2	10.7	0.0	0.0	0.0	66.0	20.8	9.4	1.9	0.0	1.9
Q23	15.0	23.7	20.4	9.7	31.2	0.0	18.9	18.9	26.4	9.4	17.0	9.4
Q24	47.3	9.7	10.7	8.6	19.4	4.3	58.5	9.4	15.1	19.	15.1	0.0

Table 15. Continued.

Questions by Number¹

- Q17. Property provides primary source of income for family.
 - Q18. Property provides secondary source of income for family.
 - Q19. Property maintains family traditions of having a working ranch.
 - Q20. Property provides my children a healthy rural environment and experience.
 - Q21. I want to maintain ownership for inheritance for my children.
 - Q22. Property provides a way to conserve and protect natural resources.
 - Q23. Property is for recreation/hideaway.
 - Q24. Property is for investment.
-

¹ Questions are labeled in numerical order such that Question Number Q17 is the Question by Number Q17; Question Number Q18 is the Question by Number Q18, etc.

² Scaled Response is an averaged Leikert scale value. Leikert scale: 5 = Very Important, 4 = Fairly Important, 3 = Neither Important or Unimportant, 2 = Somewhat Unimportant, 1 = Not At All Important, N/A = Not Applicable

Landowners from both ecoregions provided average response values reflecting a very important rating when asked to respond to a statement that indicated they wanted to maintain ownership for their children. The Edwards Plateau interviewees provided an average response of 4.7 while the South Texas Plains had a 4.4 average response (Table 15).

A similar response to a statement (Question 22) that property was a way to conserve and protect natural resources was given by landowners from both ecoregions. The Edwards Plateau and the South Texas Plains assigned average response values of 4.5 to this statement.

The final two questions (Question 23 and 24) yielded some insight as to how landowners viewed their property. When asked if they saw their property as being for recreation or a hideaway, interviewees from the Edwards Plateau recorded an average response value of 2.8 and in South Texas Plains, 2.9 which was is a level between somewhat unimportant and somewhat important. Many landowners provided a stronger average response value when replying to a statement that their property is for investment. The Edwards Plateau interviewees gave a value of 3.5 and the South Texas Plains, 3.9.

SUMMARY AND CONCLUSIONS

Understanding the attitudes and ideologies behind a landowner's decision making process particularly in regard to their rural land tenure practices, is important if agencies and organizations, governmental, non-profit and for profit enterprises, are to appropriately identify and support the needs of these landowners. This is especially true in Texas, in which approximately 84% of the land is held in privately owned farms, ranches and forestlands and where trends in landownership have shifted to smaller property ownership size with increased numbers of landowners (Wilkins et al. 2003). Long-term affects on ranch income associated with rising economic pressures such as that which results from increases in property and estate taxes, high variability in agricultural crop prices, fluctuation in oil and gas markets, growing pressure from the encroachment of urban expansion are difficult for many rural

landowners to absorb. Increasing demand for recreational properties has resulted in growing numbers of rural landowners willing to subdivide large ranch properties or to sell off small portions of ranch lands in attempts to maintain some level of land ownership and the associated life style they have chosen.

Smaller parcel size means increased levels of land fragmentation which has been hypothesized to cause long-term depletion of wildlife resources due to losses of habitat and reduced landscape heterogeneity (DeAngelis and White, 1994; McNeely and Scherr 2003). As this shift continues towards decreased property size and increased land fragmentation, it most certainly will have a negative impact on those landowners who use fee hunting as a part of their economic resource planning. A clear understanding of the challenges faced by landowners as well as their choices in land tenure practice is necessary if there is to be positive, widespread level of cooperation between governmental agencies, resource managers, and landowners.

The purpose of this study was to assist in this development of understanding of those attitudes and preferences of private landowners who have incorporated fee hunting as a part of their land use management practices in the Edwards Plateau and the South Texas Plains ecoregions. The findings herein explain, in part, landowners' viewpoint towards hunters, hunting, leasing land for hunting, and offer a better understanding of their attitudes toward property ownership.

In this study approximately one-third of the landowners owned two-thirds of the acreage in the study area indicating that the South Texas Plains landowners own larger parcels of land than in Edwards Plateau (Figure 3, pg. 41). The average size of landownership for the study area was slightly less than 1 558 hectares but South Texas Plains had a larger average size of ownership of 3 017.80 hectares while the Edwards Plateau had a smaller average landownership size of 725.78 hectares (Table 10). The landowners in the Edwards Plateau region owned their lands longer having a significant number of landowners (43%) holding property in their families for greater than 100

years. South Texas Plains recorded a smaller percentage of landowners (11.3%) who held their properties for more than 100 years (Figure 4). These results may indicate that at least, in part, smaller parcel sizes result in the Edwards Plateau area due to factors involving inheritance. Families in the Edwards Plateau own their lands longer by passing their property to their heirs. However, with each occurrence, the land holdings effectly become smaller and smaller.

Primary reasons of ownership appeared to be that landowners perceived their property to be a source of income and perhaps, by association, a feeling of wealth (Figure 6). However, landowners were quick to point out their beliefs that their property was an extension of 'self' to be passed to the future through their children.

The majority of those interviewed in this study were male; however, one interesting observation made by the interviewer was that female landowners were less likely to provide income data on their fee hunting leases than their male counterparts. A little more than 10.5% of those female landowners interviewed declined to provide economic revenue data for their operations while 1.5% of their male counterparts refused to provide this information. With regard to age, both ecoregions reported an average age of landowner to be approximately 60.6 years of age. This data compares favourably with research from recent studies where the average age was 60.1 years for landowners was reported by Sanders in a 2005 study on landowners in four counties in the Leon River Watershed (Sanders 2005). Duda and Brown in their 2001 study of 22 counties in Texas, indicated that largest percent of surveyed landowners (31%) fell into the age range of 55 to 64 (Duda and Brown 2001).

Data collected on gross income levels for interviewees indicated that the majority fell into the \$75 000 to \$100 000 range but that the South Texas Plains region had a higher percentage of landowners (20.8%) who were in the greater than \$500 000 range. The Edwards Plateau area reported a 3.2% for this same range (Table 11). This information may be substantiated by the earlier discussed findings that average landownership size in South Texas

Plains is a little more than four times the average ownership in Edwards Plateau.

Based on comparisons to earlier studies, income generated by fee hunting enterprises has increased over time. The total study area reported \$23.00 per hectare for gross revenue from fee hunting. South Texas Plains generated a gross average of \$24.81 per hectare while the Edwards Plateau produced \$18.71 per hectare (Table 12). Data from a 1988 study indicate that a considerable change in fee hunting with regard to the dollar value per hectare that is being provided to landowners for hunting trespass rights has occurred. Steinbach (1988) determined that the average gross income per hectare for the Edwards Plateau was \$7.91 but was \$12.88 when adjusted for 2002 dollars. In the Rio Grande Plains the figure provided in the study was \$11.16 but when adjusted to 2002 dollars this figure was \$18.17. This represents more than a 45% increase in the Edwards Plateau region and 37% rise in the South Texas Plains over an approximate 15 year period of time. Another study done in 1996 indicated that the state was generating on average \$9.88–12.20 per hectare (\$11.28–13.93 per hectare in 2002 dollars) (Teer 1996).

Landowners participating in the study provided beneficial insight as to their attitudes on hunters and hunting. Participants considered certain qualities of lease hunters to be desirable and in some cases, required, when leasing their property for fee hunting. These qualities heavily influenced the landowner's decision to allow hunters access to their property. Those characteristics determined by the landowner to be essential and important, related to hunter behavior and specifically to respect of landowner rules and landowner property including facilities. Many landowners indicated during the interview process that, a violation of either of these two points was reason for immediate expulsion of the hunters from the hunting lease. Poor hunter behavior has been cited by numerous sources as being grounds as to why landowners either ceased leasing their properties for fee hunting, or regarded poor hunter behavior as a basis for no longer leasing to a specific group

(Adams and Thomas 1983; Adams et al. 1992; Duda and Brown 2001). This appeared to be the case with the participants in this study.

Results from the data collected from landowners as to why they might choose to lease their property for hunting revealed that income was a strong incentive (Table 14). However, they are not willing to lease to just any hunter at any price. This response may corroborate the information from earlier questions suggesting hunter behavior is perceived by landowners to be important in fee hunting leases, perhaps more so than potential revenue generated.

The question as to liability insurance coverage for fee hunting operations provided results which seem to indicate that most landowners regarded insurance coverage as being important to protect their lands but saw this as their responsibility either by their own volition or perhaps a lack of trust that hunters would/could find adequate insurance coverage. A number of landowners reported requiring their hunters to carry insurance policies ranging anywhere from a more meagre \$500 000 upwards to \$2 000 000.

Data collected showed that landowners did not always require formal written contracts between themselves and their lease hunters, many times relying instead on oral agreements. These results pose a somewhat perplexing situation. While landowners strongly believed that carrying liability insurance was very important (Question 16, Table 14) and while the majority of them carried insurance, a lower than expected number, slightly more than half of those interviewed, actually used a written contract (Survey Question 15). Presumably a written contract would help further protect the landowner from issues arising which might require litigation and, or insurance coverage protection.

It was determined that landowners perceived their lands, hunting in particular, to provide their operations with a primary or secondary source of income. A higher response rate was received indicating that their hunting enterprise was a secondary source of income. These results demonstrate the

value placed on recreational hunting as a revenue generating resource by landowners.

Survey questions' referring to perceptions of land and landownership as a tradition to be passed along to heirs was perceived strongly by interviewees in this study to be a prominent ideology. Most responders provided statements which were indicative that their property was not only for the future (i.e. heirs) but a way to preserve and protect natural resources.

CHAPTER V

TEXAS FEE HUNTING ENTERPRISES: THE ECONOMIC AND OPERATIONAL CHARACTERISTICS OF THE BUSINESS

INTRODUCTION

According to a 1998 study by Curtis Freese, recreational hunting in North America has been cited as a functional means of habitat management. Similar determinations have been made through other research which presented evidence that fee-hunting enterprises tended to encourage better land management practices than non-fee-hunting enterprises through improved grazing practices, wildlife population control and habitat management (Butler and Workman 1991, Adams et al. 1992). The process of habitat conservation through improved land tenure practices and natural resource management is, at least in part, the result of the interrelationship of the entire ecosystem including the species of interest (Benson 2001b).

In Texas, it is not uncommon for ranchers to manage their lands for both livestock and wildlife simultaneously (Benson 2004). In discussions with participants of this study, landowners indicated they had decreased their livestock numbers to accommodate and better manage for wildlife species. While some landowners have properties of sufficient size for beneficial resource management, other landowners may not. In cases where land ownership is relatively small making it difficult to manage for wildlife, cooperative organizations such as the wildlife associations have formed. According to Texas Parks and Wildlife Department (TPWD), there are more than 250 of these organizations in the state (TPWD 2008). The purpose of these landowner-driven groups per TPWD is to support improved habitat management but it has been suggested that wildlife associations may facilitate the management of other natural resources as well (Wagner et al 2006).

In Texas, the right of providing egress as well as the management and sustainability of rangelands fall primarily to private land owners who own approximately 84% of the total rural acreage in the state (Wilkins et al. 2003).

The continued management and sustainability from both economic and ecological points of view for privately owned lands heavily depend upon the landowners and the tenure practices they choose to incorporate (Benson et al 1999; Freese 1998; Knight and Clark 1998; Benson 2001a; Benson 2001b).

Freese (1998) considers three quasi-markets present which promote the exchange of benefits resulting from fee hunting enterprises. These include, the fees and taxes levied on hunters and equipment (Dingell-Johnson Sport Fish Restoration Act and Pittman-Robertson Act); trespass fees; and contributions to non-profit organizations that lobby on behalf of hunters and hunting. The projected 2009 apportionments of the Dingell-Johnson Sport Fish Restoration Act will return more than \$13.5 million dollars to Texas while the Pittman-Robertson Act fund will return slightly less at \$11 million dollars (USFW 2008). These amounts are the highest received of any state. The trespass fees in Texas are based on a developed and seasoned consumptive market with regard to recreational hunting. As determined by this study (Chapter IV), the average fee charged by landowners in the Edwards Plateau region was \$18.71 per hectare whereas in South Texas Plains the fee charged was \$24.81 per hectare. In addition to fee hunting, growth in non-consumptive markets, such as wildlife watching, is anticipated and has already exhibited potential for generating revenue for rural landowners (Thomas and Adams 1982; Duda et al 1998). As a private lands state, Texas landowners have *de facto* control of the wildlife due to the legal control they have to land access (Huffman 1995; Lueck 1995; Benson 2001a) and thus have the greatest impact potential on wildlife and wildlife habitat in Texas (Brown 1999).

The contributions by hunters to non-profit organizations that lobby on behalf of hunters and hunting are believed to be substantial in Texas but are not a focus of this research and therefore will not be addressed herein.

In Texas, ranchers who have integrated recreational hunting as a component of their resource and land use operations have developed a variety of methods which they have chosen to incorporate. This study determined that landowners are quite individualistic in their approach to hunting enterprises.

They have established patterns of management that provide an efficient means of returning revenue back to their operations. These patterns of management were found to be generally unique to each landowner but from a broader perspective could be categorized by attributes such as lease method, services provided, facilities provided and other recreational opportunities that were made available.

OBJECTIVES

This research was initiated to allow for a comprehensive appraisal of landowners' approach to the operations and economic characteristics of recreational hunting as implemented by the landowner as a part of their management practice. Data collection from ranchers in the Edwards Plateau and South Texas Plains assisted in meeting the objectives of this study which were to: (1) obtain detailed information from ranchers in relation to the characteristics of their fee hunting operations; and (2) provide a comparison to available data and studies which have been completed previously in attempts to determine variations of landowner practices when conducting a fee hunting enterprise.

RESULTS

Land Ownership

Interviews were conducted using the database for landowners with land ownership in the counties shown in Figure 1 (pg.11). The total land area represented by the landowners who were interviewed for this study corresponded to 227 441.8 hectares (562 021 acres). The outcome indicated that just slightly more than one-third of the landowners (36%) own 70% of the land (by ownership) included in this study (Figure 3, pg 41).

The average land ownership size across all categories was 1 557.82 hectares for the total study area, 725.78 hectares for the Edwards Plateau area and 3 017.80 hectares for South Texas Plains. The smallest parcel of land (12.14 hectares) where lease hunting occurred was in the South Texas Plains

ecoregion along the Nueces River. The largest tract, also in South Texas and was 38 849.82 hectares.

Average time of property ownership was considerably greater in the Edwards Plateau counties was 80 years with a span from least to most amount of time of ownership ranging from 2.5 years to 172 years The average length of time for ownership in the South Texas Plains region was 52 years with a span from least amount of time to most ranging from 3 years to 150 years.

Operational Characteristics

Analysis of the data collected from the interview process revealed that landowners in Texas approach their fee hunting enterprises in varied ways. For this report the data is categorized into general divisions, but it should be noted that every landowner employed techniques that are peculiar to their specific operations and personal desired outcomes. This is expected due to the investment level and expected income by landowners. A distinction between a landowner's desire and ability to invest in their hunting enterprise was noted in interviewing landowners. Some landowners appeared to believe that conducting fee hunting on their lands was more or less supplemental income to their everyday operations. These landowners tended to invest less in their operations. Other landowners perceived their recreational hunting as a developing business enterprise and invested moderate to heavy amounts of capital.

The level of investment along with the expected return appeared to be one influencing factor on the type of leasing the landowner engaged in. Figure 7 shows the breakdown of these types. Both ecoregions used annual and seasonal leasing most often. The landowners in South Texas Plains incorporated short duration hunts (package or day lease) appreciably more (27%) than did those in Edwards Plateau (18%). Many landowners who employed multiple year leases indicated that they were used as incentives. From Chapter IV it was learned that landowners felt strongly about hunter behavior. The incentive for multiple year leases was based on positive hunter

behavior and respectable attitudes towards landowner facilities. Landowners disclosed they would, provide multi year contracts with set pricing structures, tolerate a level of leniency toward guests, children or animals being present and may even consent to visits to the lease at times other than that designated by contract based on the hunter's compliance and consideration for the landowner.

Landowner showed a strong preference toward leasing to groups of hunters. In the Edwards Plateau region groups were the overwhelming choice with leasing to individuals being the distant second preference. In South Texas Plains, landowners showed leasing preferences toward groups of hunters with package hunts second. Those landowners with substantial land ownership multiple means to hunt and may combine package hunts and season hunts (groups or corporations) on the same property (Figure 8). It should be noted that the number of landowners (n=163) indicated they offered a variety of methods to attract hunters is greater than the study group of n=146.

Participants in this study choose to use a variety of methods when leasing their property for hunting. The data retrieved from the landowners showed a strong preference for both ecoregions to lease their property based on area (acres). In the Edwards Plateau region where property ownership is smaller (see Chapter IV), landowners lease their whole ranch for hunting whereas in South Texas Plains whole ranch leases (n=13) and guided hunts (n=12) are approximately equal. Ranchers will sometimes use more than one means of leasing their areas and therefore the number of landowners (n=159) offering different methods is greater than the participant number of n=146.

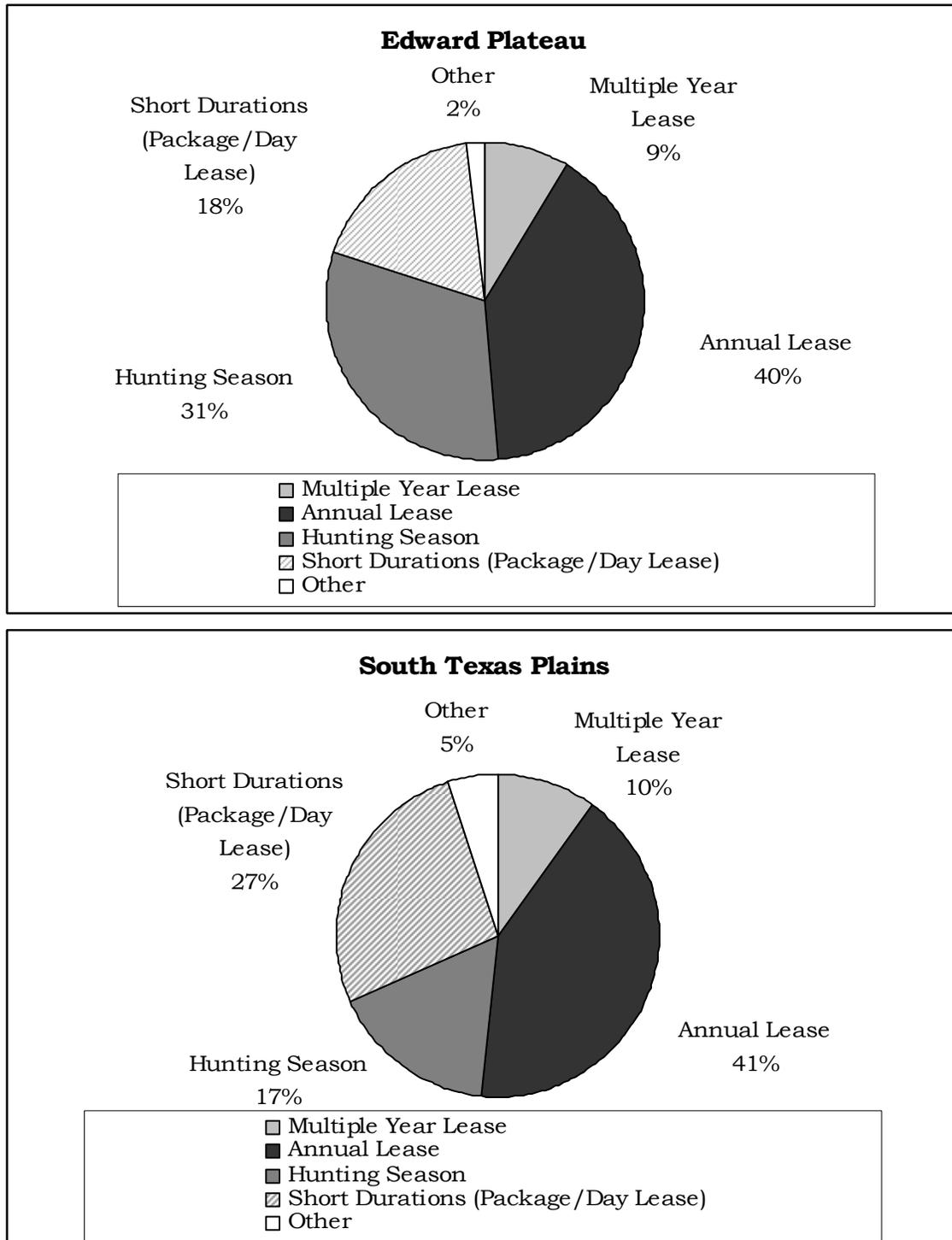


Figure 7. Lease Type. Number of Landowners Employing Each Lease Type.

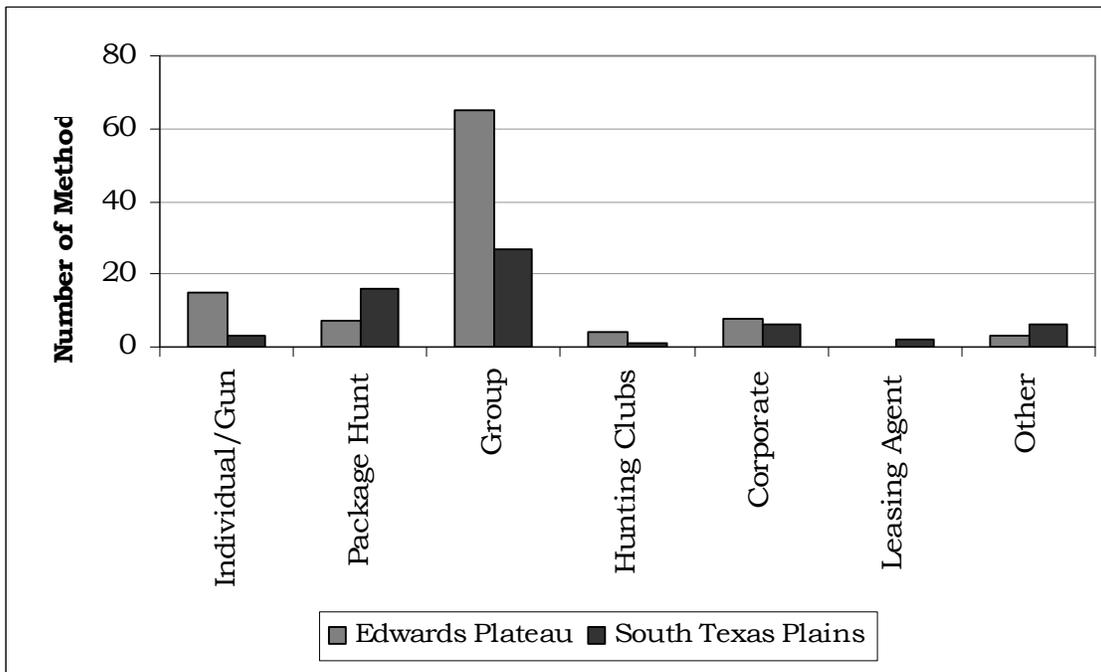


Figure 8. Methods of Hunting Offered by Landowners.

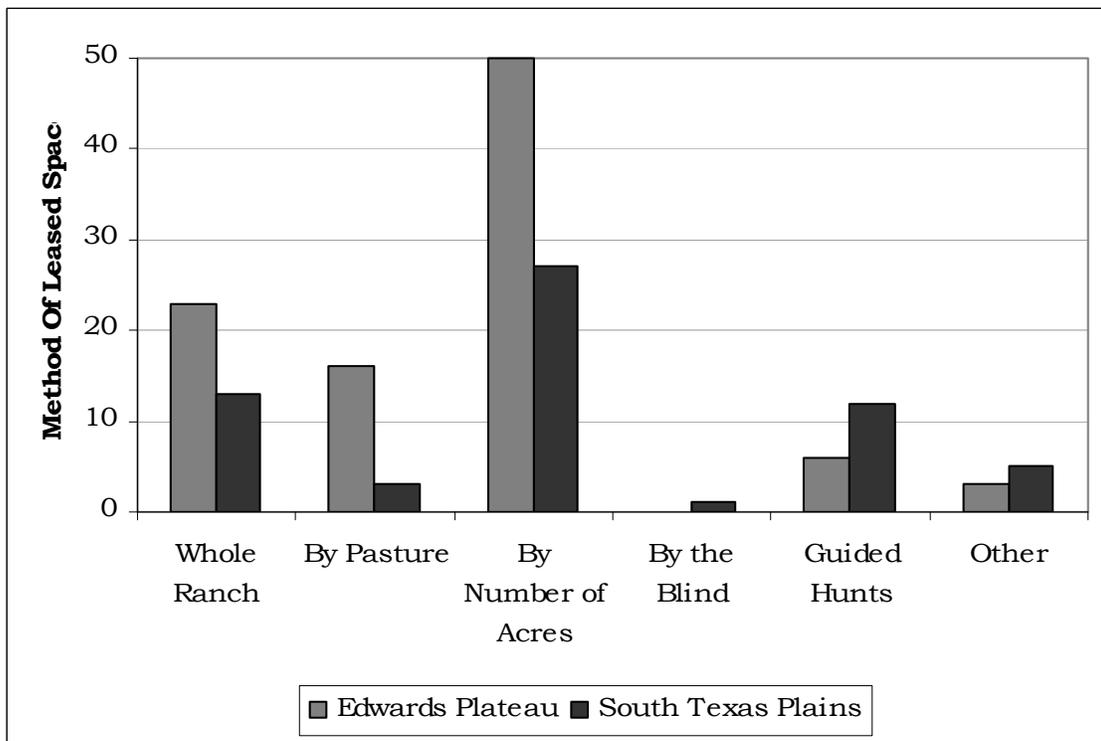


Figure 9. Space Limitations Used for Lease Hunting Operations.

Pricing structure for recreational hunting enterprises appears to be heavily dependent on the landowner's preferences, the location of the property, property size, and types of species hunted. In Figure 9 it is seen that preferred pricing structure for the Edwards Plateau counties is by the individual (per gun) (n=61). In South Texas, the landowners appear to lean toward pricing by the area (acres) (n=20) with package hunts a close second (n=17). However, in both regions it was discovered that pricing could be accomplished by any number of methods, anywhere from a set flat rate paid whether paid by one or more than one hunter to a price set by a specific location on the property. In some cases landowners became very sophisticated and tied their current and future pricing structure to the Consumer Price Index (CPI). As in previous instance, ranchers will incorporate more than one means of setting their lease pricing structure and the number of landowners (n=178) offering different pricing is greater than the participant number of n=146 (Figure 10).

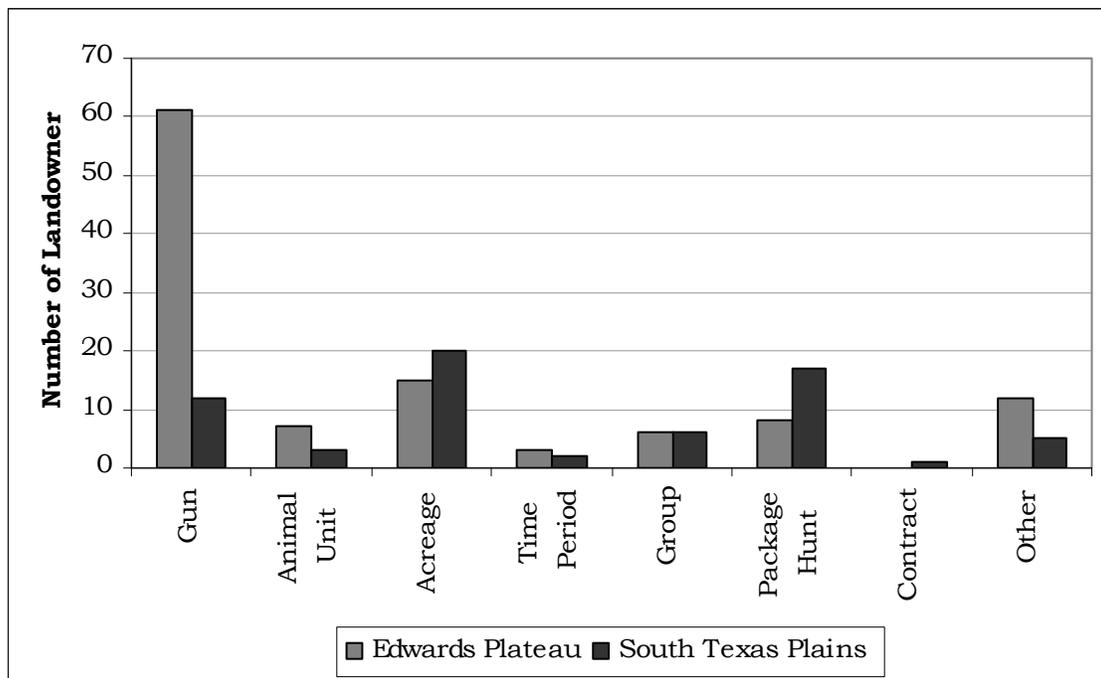


Figure 10. Methods of Pricing Lease Operations for Hunting.

Providing lease hunters with additional opportunities other than hunting was perceived by the respondents to be an available amenity. Of those landowners surveyed for the study, none reported charging an additional fee for the use of these (Figure 11).

Types of services offered by landowners varied with regard to the nature of lease hunting opportunity provided. Respondents who incorporated packaged hunts into their operations tended to offer a larger number of services while those who leased their property to groups or corporate type leases offered few or no services. Table 16 shows the list of services that participants indicated that they either directly provided or had some capability to provide through other means.

An example of the later was that several landowners had an on-call service which provided processing and packaging of the wildlife take for some pre-determined fee. The service would be paid directly by the hunter. The available costs associated with these services are provided the subsequent section with regard to analysis of the economic details. Table 16 provides a broad overview of the services provided by landowners and is cumulative response from three questions. Therefore, the 'No Services Provided' number is indicative that a number of landowners answered with this response to one, two or all three questions. Landowners selectively choose what service, if any, to offer as it fits within their business operations.

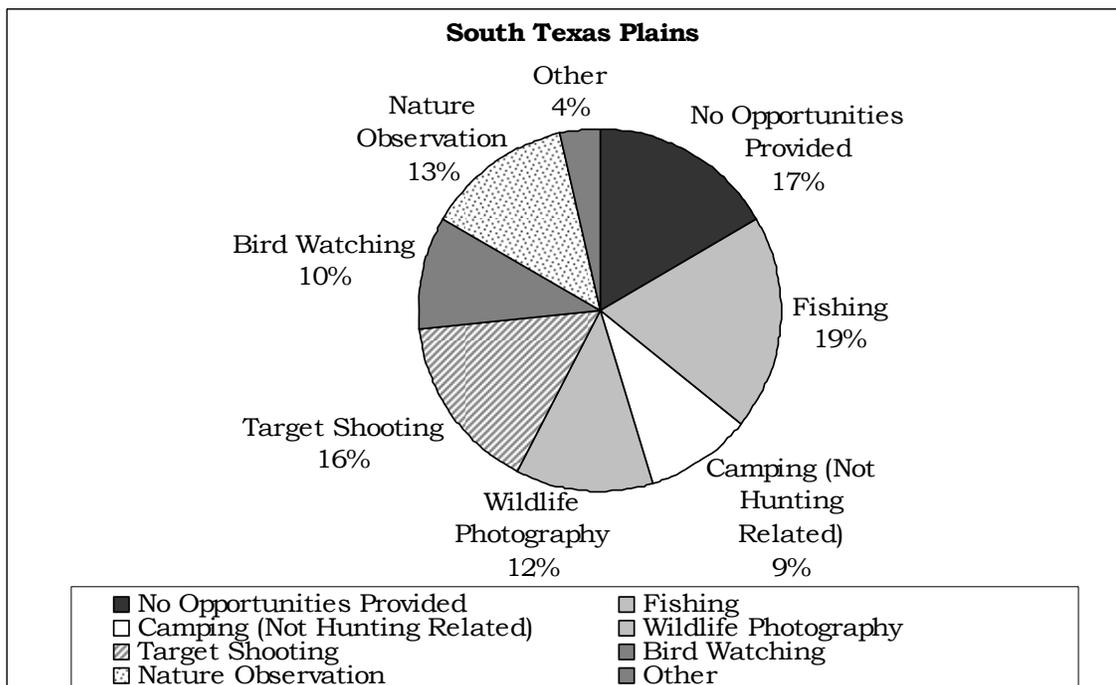
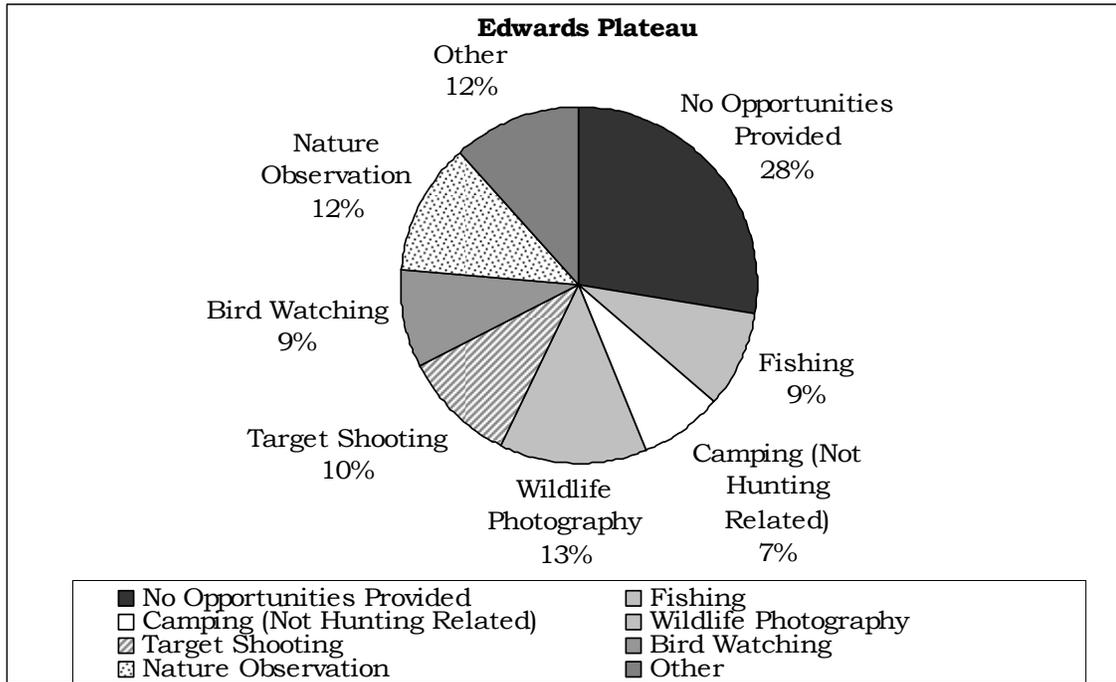


Figure 11. Additional Recreational Prospects Offered.

Table 16. Number of Landowners Who Offer Additional Services.

	Edwards Plateau (n¹)	South Texas Plains (n¹)
No Services Provided	39	33
Provided by Lessee	54	20
Guides	11	19
Feed Deer	17	22
Permission to Ride Hunt	14	9
Deliver Hunter to Blind	10	18
Field Dress Game	14	16
Package Game	10	14
Transportation Access	12	14
Lodging	68	34
Meals	3	7
Trailer Hook-ups	9	3
Walk-in Cooler	17	20
Processing Area	13	16
Hanging Equipment	15	18
Other	17	13

¹n = number of landowner responses.

Many landowners take in consideration the need to provide deer stands (blinds) and feeders for use by lessees, but some do not and allow the lessee to provide these items. This survey reported that In the Edwards Plateau 36.5% (n=34) of landowners provided feeders and 40.8% (n=38) equipped their lands with blinds for lessee use. In the South Texas Plains region these numbers were 45.3% (n=24) and 49.1% (n=26) respectively.

The number of landowners providing feed for the feeders was 31.2% (n=29) in the Edwards Plateau counties and 39.6% (n=21) in the South Texas Plains area. Supplemental feeding during the course of the year was starting to become more of an enhancement that either the landowner or the lessees desired to incorporate. Information gathered from the survey indicated that slightly fewer landowners 21.5% (n=20) in Edwards Plateau region perceived this as a cost they wished to assume in addition to that of feed for feeders. In the South Texas Plains area 39.6% (n=21) indicated they were supplemental feeding.

Looking at the various management techniques that study participants incorporated in their operations (Table 17), consideration was given by some

landowners in both regions to obtain assistance and support from outside resources such as TPWD, consultants and special permits such as the Trap, Transport, and Transplant Permit (Triple-T).

Table 17. Management Implications.

	Edwards Plateau (n¹)	South Texas Plains (n¹)
Do Not Use Consultants	49	26
Attempt Self Applied Techniques	1	2
Texas Parks and Wildlife Department	20	20
Texas AgriLife Extension Service	18	4
Natural Resources Conservation Service	6	2
Private Consultants	1	6
Do Not Perform Wildlife Censuses	50	23
Census by Owner	12	6
Census by Lessee	2	5
Use of TPWD Census Information (Published)	2	5
Casual Counts	10	12
Spotlight Census	20	5
Aerial Census	7	20
Use of TPWD Permits ²	12	5

¹ n = number of landowner responses.

² Permits are Trap, Transport, and Transplant Permit (Triple-T), Managed Lands Deer Permit (MLD), Antlerless and/or Spike Deer Control Permit (ADC), Deer Management Permit (DMP) and Scientific Breeders' Permit.

The number of landowners who belong to a Wildlife Management Association or Coop was substantially higher in the Edwards Plateau region with 45.2% (n=42) maintaining membership in one four coops operating in one of the counties of the study area. This number was considerably lower in the South Texas Plains area with slightly less than 10% (n=5) claiming membership in a coop.

With regard to high fencing, the percentage landowners in Edward Plateau that do not high fence their property is 82.8% (n=77). In South Texas this number is somewhat lower at 45.3% (n=24).

Economic Analysis

Trespass fee payments, or leasing, are benefits of a perceived value earned by a producer in exchange for a good or a service when some demand attached. For this study, this concept is important, particularly in Texas, a private lands state, where landowners receive a benefit, generally economic, for a good or service, here, recreational hunting.

The annual revenue generated by landowners in this study was assessed using gross income levels based on the landowner's estimate of the income generated on the land where fee hunting operations occurred. The average level of income for the total study area reportedly fell into the \$75 000 to \$100 000 range. The South Texas Plains region, however, had a higher percentage of landowners (20.8%) who reported falling into the greater than \$500 000 then the Edwards Plateau area which reported a 3.2% for this same grouping.

Gross income from the hunting enterprise is important because it allows for a better understanding of the revenue being generated by landowners from these specific operations (Table 12). Data analysis revealed that the study area developed \$23.00 per hectare for gross revenue from fee hunting while the Edwards Plateau hunting enterprises generated gross average revenues of \$18.71 per hectare. The South Texas Plains ecoregion produced a higher figure of \$24.81 per hectare. Based on this data average annual revenue generated by recreational hunting was determined to be approximately \$14 353.00 in the Edwards Plateau and a substantially higher annual average value of \$67 191.00 in the South Texas Plains region.

Analysis of the data obtained from the interviewees such as the basic cost associated with providing facilities including lodging, feeders, blinds, feed, transportation and utilities, assisted in the development of enterprise budgets.

These budgets were derived for each region in the study area. Table 18 provides some of the basic derived costs from the information obtained from the respondents and included in the budget makeup. The range of maximum, minimum and average investment values for lodging, feeders and blinds were included.

Table 18. Basic Costs Associated With Landowner Fee Hunting Enterprise.

	Edwards Plateau			South Texas Plains		
	Average (\$)	Min. (\$) ¹	Max. (\$) ¹	Average (\$)	Min. (\$) ¹	Max. (\$) ¹
Lodging	59 695	2 000	500 000	66 612	5 000	500 000
Feeders	2 481	250	7 500	5 618	700	22 000
Blinds	3 209	100	12 000	7 633	100	30 000
Feed ²	10 505	-	-	9 180	-	-

All values represent 2002 dollars.

¹ Dollar values represent the total amount invested by a landowner.

² Values include feed used in feeders (bait) and for supplement feeding costs.

Using the average fee hunting revenues from Table 12 and average costs associated with hunting operations (Table 18) for each ecoregion, enterprise budgets were developed. The budget for the Edwards Plateau shows an annual loss of 43% (\$6 114.00) while the enterprise budget derived from the South Texas Plains region indicates a 70% (\$46 998.00) annual profit (Figures 12 and 13). In the development of these budgets, two assumptions made were based on a 1988 study (Steinbach) in which budgets were derived. Due to the similarities of the study area, vehicle and owner's labor rate were used adjusting to 2002 dollars. Budget considerations made also include the depreciation of the lodging over a 20 year time frame and vehicle depreciation over a ten year period of time. Any other assumptions are listed in the budget.

Edwards Plateau

<u>Estimated Annual Income:</u>	\$14 353.00
Lodging (Cabins)	\$59 695.00
Blinds	3 209.00
Feeders	2 481.00
Lease Vehicle	<u>16,284.00</u>
	\$81 669.00
<u>Liabilities</u>	
License	\$50.00
Property Liability Insurance (1)	n/a
Fuel & Maintenance for Lease Vehicle	3 650.00
Land Taxes	383.00
Utilities	1 000.00
Animal Feed	10 505.00
Owner's Labor (20 hrs @ \$16 28/hr)	326.00
Equipment Depreciation (Feeders/Blinds)	569.00
Cabin Depreciation	2 985.00
Lease Vehicle Depreciation	<u>1 000.00</u>
Estimated Annual Expenses:	\$20 467.00
Est. Annual Profit/Loss:	(\$6 114.00)
Est. Annual Profit/Loss Percentage:	(43%)

(1) Property Liability Insurance is most commonly included under an umbrella policy.

Assumptions:

- All values are based on averaged data obtained from land owner interviews.
- All values are based on 2002 dollars.
- Land tax values are based on average property size and 2002 tax rate (Gillespie County tax rate).
- Utilities are based on a season of five (5) months.
- Feed cost is a sum of seasonal feed cost and annual supplemental feeding cost.
- Lease Vehicle depreciation is calculated for 10 years.
- Cabin depreciation is calculated for 20 years.
- Owner's labor rate is based on D. Steinbach 1988 study; labor rate of \$10.00 adjusted for 2002 dollars.
- Fuel & Maintenance based 2002 IRS rate of \$.365/mile for 10 000 miles

Figure 12. Enterprise Budget for Counties in the Edwards Plateau Study Area.

South Texas Plains

<u>Estimated Annual Income:</u>	\$67 191.00
Lodging (Cabins)	\$66 612.00
Blinds	7 600.00
Feeders	5 618.00
Lease Vehicle	<u>16 284.00</u>
	\$96 114.00
<u>Liabilities</u>	
License	\$100.00
Property Liability Insurance (1)	n/a
Fuel & Maintenance for Lease Vehicle	3 650.00
Land Taxes	285.00
Utilities	1 000.00
Animal Feed	9 180.00
Owner's Labor (20 hrs @ \$16.28/hr)	326.00
Equipment Depreciation (Feeders/Blinds)	1 322.00
Cabin Depreciation	3 331.00
Lease Vehicle Depreciation	<u>1 000.00</u>
Estimated Annual Expenses:	\$20 193.00
Est. Annual Profit/Loss:	\$46 998.00
Est. Annual Profit/Loss Percentage:	70%

(1) Property Liability Insurance is most commonly included under an umbrella policy.

Assumptions:

- All values are based on averaged data obtained from land owner interviews.
- All values are based on 2002 dollars.
- Land tax values are based on average property size and 2002 tax rate (Dimmit County tax rate).
- Utilities are based on a season of five (5) months.
- Feed cost is a sum of seasonal feed cost and annual supplemental feeding cost.
- Lease Vehicle depreciation is calculated for 10 years.
- Cabin depreciation is calculated for 20 years.
- Owner's labor rate is based on D. Steinbach 1988 study; labor rate of \$10.00 adjusted for 2002 dollars.
- Fuel & Maintenance based 2002 IRS rate of \$.365/mile for 10 000 miles

Figure 13. Enterprise Budget for Counties in the South Texas Plains Study Area.

SUMMARY AND CONCLUSIONS

The operational characteristics and the economic costs as part of a recreational hunting enterprise are important as contributing factors to a landowner's decision making process to conduct business. In a state which approximately 84% privately owned, trends are evident that ownership of farms, ranches and forestlands are moving toward smaller property sizes with increased numbers of landowners (Wilkins et al 2003). This shift towards decreased property size along with the associated increased land fragmentation levels have been correlated with increasing demand for recreational properties. To avert the impact of vacillating microeconomic components such rising taxes (property and estate), low agricultural crop markets and the ever fluctuating oil and gas market, rural landowners become willing to subdivide large ranch properties in attempts to maintain some level of land ownership and the associated life style they have chosen. It has been hypothesized that smaller land size results in increased levels of land fragmentation leading to long-term depletion of wildlife resources and losses of habitat and reduced landscape heterogeneity (DeAngelis and White, 1994). These losses may further impact landowners who use fee hunting as a part of their economic resource planning and it becomes important for property owners to make effective decisions which are sustainable in both an economic and ecologic sense.

The purpose of this study was to examine the operational and economic characteristics of fee hunting enterprises in Central and South Texas. The findings reported herein provide an in-depth look at a specific group of landowners who have incorporated recreational hunting into their resource planning practices. In order to form sound and sustainable market-based decisions, landowners require a clear understanding of the market mechanisms that are key to future planning and sustainability of their business and because landowners approach their hunting enterprise in sometime very different ways there is a no 'one size fits all' approach that will be effective. Providing landowners with detailed information and a better understanding of issues such as land fragmentation will ultimately give them

'tools' to make marketing based decisions which will be positive and sustainable.

The study area had an average size of landownership that was slightly less than 1 558 hectares. South Texas counties reported a larger average size of ownership of 3 017.80 hectares while the Edwards Plateau had a smaller average landownership size of 725.78 hectares. The Edwards Plateau landowner owned their lands longer with (43%) holding property in their families for greater than 100 years. South Texas Plains recorded a smaller percentage (11.3%) of property owners who held their properties for more than 100 years. Holding property in families for this length of time causes properties to become smaller over time due to inheritance. These results, when coupled with the sell off of portions of ranch lands for economic reasons, appear to play an important role in hunting operations. It may indicate that smaller parcel sizes in the Edwards Plateau area are linked to lower average revenues. Substantiation of this may be related to average landownership size in South Texas Plains which is a little more than four times the average ownership in Edwards Plateau and is generating higher revenue values.

Gross income levels indicated that the majority of the participants fell into the \$75 000 to \$100 000 range. South Texas Plains region had a higher percentage of landowners (20.8%) who were in the greater than \$500 000 range while Edwards Plateau reported 3.2% for this same range (Table 11).

The gross revenue from fee hunting for the total study area was \$23.00 per hectare. South Texas Plains generated a gross average of \$24.81 per hectare while the Edwards Plateau produced \$18.71 per hectare (Table 12). Steinbach (1988) determined that the average gross income per hectare for the Edwards Plateau was \$7.91 (\$12.88 when adjusted for 2002 dollars) and in the Rio Grande Plains this figure was \$11.16 (\$18.17 as adjusted for 2002 dollars). This represents more than a 45% increase in the Edwards Plateau region and 37% rise in the South Texas Plains over an approximate 15 year period of time. The average annual revenue generated by hunting operations was \$14 353.00

for the Edwards Plateau region while for South Texas this figure was \$67 191.00.

Enterprise budgets were prepared for each ecoregion based on averaged income and cost values. This method provides for an even platform from which to base a comparison of hunting enterprises in the two areas. The reported loss for the Edwards Plateau region is most likely the result the smaller properties developing lower dollar revenue figures than those in the South Texas region where the average revenue figure was more than four times greater. The ability of the landowners in the Edwards Plateau region to price their fee hunting operations appear to be affected by the smaller acreage hunting sites. Additionally, package hunts, which can generate considerable revenue, were not offered at the same level as in South Texas. Reasons for this difference may be attributed to the level of capital investment that would be necessary in packaged offerings. Such levels of investments might be more easily absorbed and amortized over a larger asset value if say, land, was used for collateral. However land values in the Edwards Plateau generally range from \$505.00 to \$4 040.00 per hectare while in South Texas these figures \$484.00 to \$1 151.00 per hectare (American Society of Farm Managers Rural Appraisers 2007). This study did not take into account the dollar value of land.

It should be noted that average values were used to derive these enterprise budgets and while this provides a valuable look at the hunting operations for each area, actual dollar figures will be different for each landowner.

Landowners used seasonal lease time period most often in both ecoregions when leasing their lands for hunting. South Texas landowner incorporated package hunts into their operations at a higher rate than those in the Edwards Plateau. Multi year lease were used as incentives for positive hunter behavior. Poor hunter behavior was given by numerous sources as a major reason as to why landowners either ceased leasing their properties for fee hunting, or regarded poor hunter behavior as a basis for no longer leasing

to a specific group (Adams and Thomas 1983; Adams et al 1992; Duda and Brown 2001).

A strong preference toward leasing to groups or to corporations was noted in ecoregions although property owner who owned large acreages pointed out that they combined multiple methods of leasing on the same lands including groups, and package hunts. South Texas Plains' landowners priced their hunting privileges by the acre or as a package hunt while in the Edwards Plateau, where the average land holding was smaller, they leased by the acre, whole ranch, and by pasture.

The pricing structure for the Edwards Plateau region was primarily by the gun or individual. The landowners in the South Texas Plains region priced their hunting operations most often by the acre or as a package hunt. It was learned that pricing structures were varied and based on specific landowner preference. Some pricing, particularly with regard to package hunts, could be quite detailed and may even include pricing components based on Boone and Crockett scores or animal weights.

The services provided by landowners, like the pricing structures, were based on landowner preference and could be fairly detailed. Some landowners even offered use of swimming pools for recreation during visits at warmer times of the year. Those property owners who offered package hunts generally had a larger list of available services to provide their clients. Lodging was considered to be an important service and was made available by 73.1% of landowners in the Edwards Plateau region and by 64.1% of the landowners in South Texas.

Approximately one half or fewer landowners in both ecoregions sought direct support from hunting consultants or agencies such as Texas AgriLife Extension Service or Natural Resources Conservation Service. It is believed however, that landowners were benefiting from the assistance of Wildlife Management Associations or Coops particularly in the Edwards Plateau region where slightly more than 45% of the landowners were members of one of four coops within this five county part of the study area.

CHAPTER VI

SUMMARY AND STUDY IMPLICATIONS

Private lands are important in Texas from both an ecological and economic point of view. However, economic pressures from increasing property and estate taxes, fluctuating agricultural markets and higher operation costs continue to force rural property owners in Texas to find alternative ways to maintain a way of life that either has been a family tradition or purposely chosen. Some have been successful at maintaining this life style but for many others it has been at the expense of selling off portions their lands. While these actions may save landowners from some immediate economic related issues, long term, these actions can lead to fragmentation of large areas of contiguous ownership resulting in increasingly smaller areas that are less ecologically resilient and are believed to lead to depletion of wildlife resources and losses of habitat through reduced landscape heterogeneity. This loss directly impacts landowners who use fee hunting as a part of their management plans for land use. Thus an ironic situation has evolved where large land areas, that are necessary to support ecologically sound habitat and by extension, support a preferred life style including viable recreational hunting enterprises, are being sold in order to keep the land which results in further fragmentation and loss of habitat. The driving economic factors behind this dilemma lie in the low agricultural value of land in association with the high market value. Other additional concerns that require address are declines in hunter populations, particularly in the youth sector, management of wildlife populations, issues arising from high fencing, urban encroachment and water availability.

To meet these challenges, it is important for rural land owners to make effective decisions which are sustainable both economically and ecologically. Preventing continued loss of valuable open space, past the threshold of ecological resiliency will require a partnership of all stakeholders including landowners, state agencies, natural resource managers and potential consumptive and non-consumptive users.

This study provides insight that will benefit all stakeholders but in particular landowners, state agencies and natural resource managers. The strategic planning and management of private lands for continued production is vital to hunting enterprise success.

This study indicates that landowners interviewed either are or want to become good land stewards. Many landowners indicated during the interview process that they have taken steps to improve their hunting enterprise. In some cases, landowners have made consider capital improvements with future investments pending. However, the disparity between the average values of revenue generated by landowners in the Edwards Plateau and that in the South Texas Plains is evidence that one or more inputs or some externality (ies) or combination have resulted in a less than effective market.

In addition, a possible disconnect between a landowners' access to or perceived availability of resources offered by state agencies was uncovered during this analysis. It was determined that only 10%-30% of those interviewed used the support offered by state agencies. However, Wildlife Management Associations or Coops are seen as beneficial by landowners, particularly in the Edwards Plateau region which had a high participation rate of 45%. Landowners interviewed provided positive input on these organizations and placed a high level of value on their participation in these organizations. This was much less the case in South Texas but a substantial difference between these two areas is the variation with regard to land ownership size.

It is apparent that landowners within this study believe fee hunting to be an important part of their land tenure practices. It is also just as evident that these landowners see their lands as securing not only their future but that of their heirs. Many have a deep appreciation for their lands and are willing to examine opportunities that support their efforts.

Therefore, outreach by state agencies and resources managers who are willing to distinguish and recognize how to best support and educate a landowners' land use, and land management choices is important. Wildlife

Management Associations appear to be one way to engage landowners to open communication, providing continued levels of support and education. Other tools that could be introduced to landowners are the benefits of land trust opportunities which could be utilized to conserve and protect open lands from urban encroachment.

This study has highlighted potential problem areas for landowners who utilize fee hunting as a part on their land management operations. The discussions have highlighted numerous challenges which will require attention from landowners and supporting agencies alike. Specifically study results show smaller parcels of landownership equal lower revenues from fee hunting. Therefore, land fragmentation will continue to be a threat to the sustainability of fee hunting. Possibilities of developing programs that may impede land fragmentation include a state Purchase of Development Rights (PDR) program. However, there has been no state funding committed to this program at this time. Organizations such as the Texas Agricultural Land Trust are providing alternatives to landowners who want to conserve their agricultural lands and certainly offer a possibility of offsetting the progression of fragmentation.

Education on the problems and issues that surround rural landownership is also an obstacle to fee hunting sustainability. As previously stated, wildlife management associations (Texas Parks and Wildlife Department) are offering one of the most direct approaches to improving, not only wildlife management practices but also land management practice. Additional alternatives for increased education might be to form a working constituency with organizations such as the Texas Farm Bureau, Texas Education Agency and state legislative representatives to get a component on land management practices, land conservation, and land use added to the state's science curriculum at all grade levels 1-12.

The decline in the youth hunter will also continue to be a challenge in the future if fee hunting is to be successful for landowners as an enterprise. Possible opportunities may evolve for organizations such as Texas Parks and

Wildlife Department to provide incentives to landowners for holding youth hunts or promoting educational programs in schools.

Future studies are needed if fee hunting is to be a sustainable resource for the landowner. More research is required to determine the link / trends in income versus the fragmented lands. Additionally, further work is needed to identify those operational characteristics or other alternatives that may provide improved in fee hunting operations.

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APPENDIX A



FYI Only

TEXAS A&M UNIVERSITY
Department of Rangeland Ecology and Management
 2126 TAMU; College Station, Texas 77843-2126
 (979) 845-5579 • FAX (979) 845-6430

June 14, 2002

PO Box 55287
 Houston, Texas 77255

Dear,

My name is Sherry Sultenfuss and I am a Research Assistant the Department of Rangeland Ecology and Management at Texas A&M University. I am conducting a study of the operational and economic characteristics of lease-hunting enterprises in South Texas and the Edwards Plateau. The study is designed to obtain information on the relative importance of lease hunting enterprises in the goals and objectives of landowners. Results of this study will be compared to a similar survey that was conducted in your county in the mid 1980's by Dr. Don Steinbach (Texas Cooperative Extension). My research will provide a follow up to his work, obtaining the same type of information and will help to determine the rate of change in the role of lease hunting over the past 15 years. In addition, the results will be used to ascertain the degree to which lease hunting enterprises may aid in retarding the rate of land fragmentation in the two regions. These developments could have long-term consequences that Texas landowners need to be aware of.

The study requires that we obtain information from a representative sample of approximately 200 to 250 landowners throughout both regions in the study area. Since your name was randomly selected from a list of landowners in your area, we are respectfully requesting your participation in an interview. The interview will focus on your activities and management related to lease hunting. Within the next few weeks, I will call and request a time (about 1-2 hours) that would be convenient for you. If you agree, I will ask for directions to the location where you would like to meet at that time.

We can assure you that all information you provide will be held in strictest confidence and will only be used in statistical analyses with the information obtained from other survey participants. Under no circumstances will the identity of any participant's operations be disclosed to any business, agency or other persons.

I have included a page containing contact information for myself and the other members of the research team. Please feel free to contact any of us if you have questions. I look forward to meeting and working with you in the near future.

Sincerely,

Sherry Sultenfuss, Research Assistant
 Department of Rangeland and Ecology Management
 Texas A&M University
 2126 TAMU
 College Station, Texas 77843-2126
 (979) 845-1388

This research study has been reviewed and approved by the Institutional Review Board-Human Subjects in Research, Texas A&M University. For research related problems or questions regarding subjects' rights, contact the Institutional Review Board through Dr. Michael W. Buckley, Director of Support Services, Office of Vice President for Research at (979) 458-4067.

December 12, 2001
Texas Cooperative Extension Agent-Agriculture
303 S 5th ST
Carrizo Springs, Texas 78834-3801

Dear

As a follow-up to our phone conversation, I want to thank you for your assistance relative to my study. I also want to provide you with more detail about my research itself along with contact information.

As I indicated, I am conducting a study of the operational and economic characteristics of lease-hunting enterprises in South Texas and the Edwards Plateau. The study is designed to obtain information on the relative importance of lease hunting enterprises in the goals and objectives of landowners. Results of this study will be compared to a similar survey that was conducted in your county in the mid 1980's by Dr. Don Steinbach (Texas Cooperative Extension). My research will provide a follow up to his work, obtaining the same type of information and will help to determine the rate of change in the role of lease hunting over the past 15 years. In addition, the results will be used to ascertain the degree to which lease hunting enterprises may aid in retarding the rate of land fragmentation in the two regions. These developments could have long-term consequences that Texas landowners need to be aware.

The study requires that we obtain information from a representative sample of landowners in each region. Contact with the participants that have been selected at random and have agreed to be interviewed will be necessary. I would like to solicit your assistance to initiate this part of the study as it applies to your county area. I may require some advice or guidance in accomplishing such tasks as locating ranchers or ranches or finding a convenient location to meet and interview participants. In addition, if you prefer that I make contact with you prior to meeting with any landowner/land operator or if you wish to accompany me to the ranch location, just let me know.

As promised, I have included a page containing contact information for myself and the other members of the research team. Please contact any of us if you have questions. I look forward to meeting and working with you in the near future and offer my sincere appreciation for your time spent in helping on this project.

Sincerely,

Sherry Sultenfuss, Research Assistant
Department of Rangeland and Ecology Management
Texas A&M University
2126 TAMU
College Station, Texas 77843-2126
(979) 845-1388

Interview Questionnaire

Participant No.

Contact Name: _____

Phone Number: _____

Date Contacted: _____

County (Primary): _____

Consent to Interview: **a. Yes** **b. No**

Are you the property owner/hunting lease operator/hunting lessee?

Owner:

Is any part of your property used for any type of hunting activities?

- a. Yes b. No

If YES, do you charge a fee to allow hunters to come onto your property to hunt?

- a. Yes b. No

Is this property part of a Wildlife Management Cooperative or a Wildlife Management Association?

- a. Yes b. No

If YES, what is the name of the coop or association?

Do you manage the hunting enterprise on your property?

- a. Yes b. No

If NO, do you contract the management of the hunting enterprise to an operator?

- a. Yes b. No

Would you please supply the name and contact information for the operator(s)?

Hunting Lease Operator _____

Hunting Lease Operator _____

Hunting Lease Operator:

If you are the hunting enterprise operator, would you please supply the name and contact information for the landowner(s) on whose property you manage the hunting enterprise.

Landowner _____

Landowner _____

Landowner _____

Landowner _____

Hunting Lessee:

If you are the hunting lessee, would you please supply the name and contact information for the owner(s) or hunting lease operator for whose land you lease.

Landowner _____

Landowner _____

Hunting Lease Operator _____

Hunting Lease Operator _____

Appointment Date: _____ Time: _____

Mailing Address: _____

Residing Address: _____

Directions: _____

Hunting Enterprise Questionnaire

Participant Type _____ Participant No. _____

(Owner/Hunting Lease Operator/Hunting Lessee)

Survey Date: _____

1. In what Texas County is your property primarily located?

Edwards Plateau

South Texas Plains

- a. Gillespie
- b. Kimble
- c. Llano
- d. Mason
- e. Sutton

- f. Brooks
- g. Dimmit
- h. Frio
- i. La Salle
- j. Webb

2. How many acres do you own, (operate, lease)?

_____ Acres

3. How long have you owned, (operated, leased) this property?

_____ Years

4. Of the total acreage that you own, how many acres do you lease out specifically for fee hunting purposes?

_____ Acres

5. Do you lease property from other landowners specifically for the purpose of hunting?

- a. Yes
- b. No

6. If your answer to number 5 is YES, approximately how many acres do you lease from other landowners for your hunting enterprise purposes?

_____ # of other landowners _____ Acres

7. When leasing your land to hunters for hunting, what time periods do you offer?

- a. Multiple years
- b. Year
- c. Hunting season
- d. Short durations
- e. Other, Please describe

8. When leasing your land to hunters for hunting, what methods do you generally use?

(Circle all that apply)

- a. An individual/gun
- b. Package hunt# of hunts per year_____
- c. Group# of groups_____.....# persons per group_____
- d. Hunting clubs.....# of clubs_____.....# persons per club_____
- e. Company/Corporation # of companies_____ # persons per company_____
- f. Leasing agent or outfitter
- g. Other, Please describe

9. When leasing your land to hunters, what acreage amounts or space limitations do you use?

(Circle all that apply)

- a. Whole ranch
- b. By a pasture
- c. By number of acres
- d. By the blind
- e. Lease as Guided Hunts
- f. Other, Please describe

10. When leasing your land to hunters for hunting, how do you price your lease?
(Circle all that apply)

- a. By the gun/person
- b. By the animal
- c. By acreage amounts
- d. By time periods
 - 1. Year
 - 2. Month
 - 3. Day
- e. By the group
- f. By the hunt (package hunts)
- g. Contract to leasing agent or outfitter for set price
 - 1. Year
 - 2. Season
 - 3. Other Duration _____
- h. Other, Please describe _____

11. What types of wildlife do fee paying hunters harvest on your land last year?
(Circle all that apply)

Deer

- a. Bucks.....# of animals per season _____
- b. Does# of animals per season _____

Turkey

- c. Spring/Fall# of birds: _____

Other

- d. Quail (Scaled/Bobwhites) # of birds per season _____
- e. Dove # of birds per season _____
- f. Wild Hogs # of animals per year _____
- g. Exotics # of animals per year _____
- h. Javelina # of animals per year _____
- i. Other # of animals per year _____
- Please describe _____

12. What additional prospects for recreation do you provide/allow on your land?
(Circle all that apply)

- a. No additional opportunities provided
- b. Fishing
- c. Camping (other than hunting)
- d. Wildlife photography
- e. Target shooting
- g. Bird Watching
- h. Nature Observation
- i. Other, Please describe

13. Considering your land used for hunting, how many acres are needed to support one deer?

_____Acres/deer

14. Do you allow family and/or friends to hunt on the same land used for fee hunting at no charge?

- a. Yes
- b. No

15. Do you use an oral or written lease agreement form?

- a. Oral
- b. Written

16. If written, does the agreement form describe what the hunters can and cannot do?

- a. Yes
- b. No

17. What types of services do you provide?

(Circle all that apply)

- a. No services provided
- b. Provided by operator
- c. Provided by lessee
- d. Guide
- e. Feed deer (Place feeders or feed on ground)
- f. Permission to ride hunt
- g. Deliver hunter to blind
- h. Field dressing game
- i. Package game
- j. Other, Please describe

18. Do you provide transportation for hunters to and from hunting locations or provide vehicles for their use while on your property?

- a. **Yes**, transportation is provided by **landowner**
- b. **No**, transportation is not provided by **landowner**
- c. **Yes**, transportation is provided by **operator**
- d. **No**, transportation is not provided by **operator**
- e. **Yes**, transportation is provided by **lessee**
- f. **No**, transportation is not provided by **lessee**

19. If your answer is 18a, 18c or 18e, how many vehicles are used for this purpose?

(If vehicles are not used solely for hunting, provide estimated time used on an annual basis.)

Of vehicles _____

% Allocated for hunting _____

20. In running a leasing operation, certain facilities/services are provided specifically for hunters. Of the following, which do you provide and what are the estimated costs to you.

(Where appropriate, please provide an estimate of replacement cost)

- a. None of the following are provided
- b. Provided by the operator
- c. Provided by the lessee
- d. Luxury cabin Number of units _____ \$ _____ Per unit
- e. Basic cabin Number of units _____ \$ _____ Per unit
- f. Meals/Food (Estimate yearly cost) \$ _____ Per year
- g. Trailer hookups..... Number of units _____ \$ _____ Per unit
- h. Other, Please describe

21. Which of the following facilities do you provide for hunter use?

(Circle all that apply)

- a. Don't supply any facilities
- b. Provided by operator
- c. Provided by lessee
- d. Walk-in cooler
- e. Processing area
- f. Hanging equipment
- g. Other, Please describe

22. Some landowners/operators provide feeders, if you provide deer feeders, what type do you use and what is the estimated cost?

- a. Do not provide deer feeders
- b. Deer feeders are provided by operator
- c. Deer feeders are provided by lessee
- d. Automatic Total number used _____ \$ _____ Per feeder
- e. Demand Total number used _____ \$ _____ Per feeder

23. Do you provide feed for wildlife (deer, fowl, etc.) for baiting purposes?*(Please estimate yearly use)*

- a. Do not feed for baiting purposes
- b. Feed for baiting is provided by operator
- c. Feed for baiting is provided by lessee
- d. Corn _____ lbs.
- e. Milo _____ lbs.
- f. Deer feed _____ lbs.
- g. Other, Please describe

24. Do you provide feed for wildlife (deer, fowl, etc.) for supplemental feeding purposes (for quality improvement)?*(Please estimate yearly use)*

- a. Do not supplement feed for quality purposes
- b. Supplemental feed for quality improvement is provided by operator
- c. Supplemental feed for quality improvement is provided by lessee
- d. Corn _____ lbs.
- e. Milo _____ lbs.
- f. Deer feed _____ lbs.
- g. Hay _____ lbs.
- h. Custom mix feed _____ lbs.
- i. Other, Please describe

25. If you plant food plots for your hunting operations, about how many acres do you plant annually?

- a. Do **not** plant food plots
- b. _____Acres

What do you generally plant? _____

26. What is the estimated cost of seed/seedlings you plant in the food plots annually?

_____ \$ per acre

27. If you provide deer blinds, what type of blind do you use and what is the estimated cost per blind?

- a. Do not provide deer blinds
- b. Deer blinds are provided by operator
- c. Deer blinds are provided by lessee
- d. Tower blinds Total Number Used _____ \$ _____ Per stand
- e. Ground blinds Total Number Used _____ \$ _____ Per stand
- f. Tree Blinds Total Number Used _____ \$ _____ Per stand
- g. Other, _____ Total Number Used _____ \$ _____ Per stand

28. On a yearly basis, how many *total* hours would you estimate are spent providing and maintaining deer feeders, deer stands food plots and feed?
(Please include time for all persons who perform these tasks. Please circle source providing this labor)

- a. Owner _____ Hour per year
- b. Hunting Lease Operator _____ Hour per year
- c. Hunting Lessee _____ Hour per year

Comments: _____

29. If you use a consultant to conduct your management program for wildlife, which of the following type of consultant(s) do you utilized.

(Please circle all that apply)

- a. Do **not** use any type of consultants.
- b. Do **not** use any type of outside consultants but do attempt to incorporate self-applied techniques.
- c. Texas Parks and Wildlife
- d. Texas Agriculture Extension Service
- e. Natural Resource Conservation Service
- f. Private Consulting Firm
- g. Other, Please Describe

30. Do you utilize any special permits to assist you in the management of your wildlife enterprise?

(Please circle all that apply)

- a. Trap, Transport, and Transplant Permit (Triple-T)
- b. Management Lands Deer Permit (MLD)
- c. Antlerless and/or Spike Deer Control Permit (ADC)
- d. Deer Management Permit (DMP)
- e. Scientific Breeders' Permit

31. If you census deer in your hunting operation, what methods apply to your operation?

(Please circle all that apply)

- a. Do not census deer
- b. Deer census is preformed by owner
- c. Deer census is preformed by operator
- d. Deer census is preformed by lessee
- e. Use Texas Parks & Wildlife Department census
- f. Casual counts of deer throughout the year
- g. Spotlight census shortly before hunting season
- h. Aerial census shortly before hunting season
- i. Other; Please describe

32. Do you keep records of your deer hunting operation?

- a. Yes
- b. No
- c. Yes, records are kept by operator
- d. Yes, records are kept by lessee

33. On a yearly basis, how many *total* hours would you estimate are spent on wildlife management, including animal census and record keeping?

(Include time for all persons who perform these tasks)

_____ Hours per year

Comments _____

34. If you have high fences for deer management, how many miles of high fence do you have?

- a. Do not high fence
- b. Land had high fence when purchased _____ Miles
- c. _____ Miles

35. Approximately when was the fence erected?

(If at different times, please estimate these)

_____ Year	_____ Approximate length constructed at that time
_____ Year	_____ Approximate length constructed at that time
_____ Year	_____ Approximate length constructed at that time

What is the estimated replacement cost per mile of the fence?

_____ \$ per miles

36. On a yearly basis, how many *total* hours would you estimate are spent building and/or maintaining your high fencing?

(Please include time for all persons who perform these tasks)

- a. Owner _____ Hour per year
- b. Hunting Lease Operator _____ Hour per year
- c. Hunting Lessee _____ Hour per year

Comments _____

37. If you utilize any type of brush management plan for wildlife management purposes, what methods do you use for brush control?

(Please circle all that apply)

- a. Do not use any type of brush management plan
- b. Herbicide
- c. Mechanical
- d. Prescribed burning
- e. Livestock (goats)
- f. Other; Please describe

38. On a yearly basis, how many *total* hours would you estimate are spent implementing any brush management programs for wildlife?

(Please include time for all persons who perform these tasks)

- a. Owner _____ Hour per year
- b. Hunting Lease Operator _____ Hour per year
- c. Hunting Lessee _____ Hour per year

Demographic & Financial Overview

Please be assured that all of your response will be kept strictly confidential and will not under any circumstances be released to any individual, business or government agency. All of your input will be averaged in with other ranchers' input and become a part of a statistical summary. At no time will your operation or identity be disclosed.

38. In what year were you born?

39. What is your gender?

- a. Female
- b. Male

40. What is the highest level of education that you have completed?

- a. Some high school or less
- b. High school or GED
- c. Some college
- d. Bachelor's degree
- e. Post-graduate degree(s)

41. Please select the category that best represents your family's total gross income.

- a. Less than \$25,000
- b. \$25,000 - \$50,000
- c. \$50,001 - \$75,000
- d. \$75,001 - \$100,000
- e. \$100,001 - \$250,000
- f. \$250,001 - \$500,000
- g. Greater than \$500,000

42. Please provide an annual estimate of the total gross income resulting from your lease hunting operations.

\$ _____

43. Have you sold any portion of your property since 1985?

- a. Yes
- b. No

44. If YES, how many acres/parcels total have you sold since 1985?

_____ Acres

_____ Parcels

45. If you have sold property, what would you indicate is the most important reason for selling your property?

- a. Settle inheritance
- b. Property values
- c. Property taxes
- d. Estate taxes
- e. Business reasons
- f. Other, Please specify

46. What is the primary purpose of ownership of your property that is used for fee hunting?

- a. Source of income
- b. Place to live
- c. Recreation/Hideaway
- d. Investment
- e. Other, Please specify

47. In addition to hunting operations, what kinds of livestock do you run on your property for the purpose of income?

- a. Cows _____
- b. Stocker steers/heifers _____
- c. Goats _____
- d. Sheep _____
- e. Horses _____
- f. Other, Please describe

48. If you have owned your property for 15 years or longer and have conducted a fee hunting operation during that time, how has the proportion of your family's income as indicated in #42 changed during the past 15 years.

- a. Increased
- b. Decreased
- c. No change

49. If you incorporate a public relations program for your fee hunting business, Please indicate which of the following you utilize and give an estimated yearly cost.

(Please circle all that apply)

- a. Do not conduct any activities of this type
- b. Advertising \$ _____
- c. Correspondence with hunters \$ _____
- d. Entertainment \$ _____
- e. Other; Please describe

50. Which of the following services do you utilize for your hunting enterprise and what are the estimated yearly costs to you?

- a. Lawyer Retained \$ _____
- b. Lease Preparation \$ _____
- c. Bookkeeping \$ _____
- d. License \$ _____

51. Do you carry liability insurance for your hunting lease operations?

- a. Yes
- b. No

52. If yes, what is the yearly cost to you?

\$ _____ Per year

Owner

53. If no, are you, to your knowledge, otherwise covered through an umbrella attached to your general property insurance?

- a. Yes
- b. No

54. Do you require the operator to carry insurance coverage?

- a. Yes
- b. No

Landowner Attitudes About Hunters

56. Please look over the following statements. These relate to characteristics of potential hunters that you may consider as desirable qualities when leasing land for hunting. Rate each of the following statements at the level of importance that you place on each.

(Please circle one number for each statement)

- | Very
Important | —————→ | Not at all
Important | DK/
NA |
|---|--------------------------------|---------------------------------|-------------------|
| A. The person hunts with family members
(spouse/child/etc.). | 5.....4.....3.....2.....1..... | 9 | |
| B. The hunter hunts only trophy animals. | 5.....4.....3.....2.....1..... | 9 | |
| C. The hunter hunts for meat. | 5.....4.....3.....2.....1..... | 9 | |
| D. The hunter will shoot both sexes of deer
if asked to. | 5.....4.....3.....2.....1..... | 9 | |
| E. The hunter keeps the campsite clean
and litter free. | 5.....4.....3.....2.....1..... | 9 | |
| F. The hunter is responsible and safe. | 5.....4.....3.....2.....1..... | 9 | |
| G. The hunter follows game laws and
implements landowner's game and
management rules. | 5.....4.....3.....2.....1..... | 9 | |

Landowner Attitudes

- 57. The following statements relate to why a landowner might choose to lease their property for hunting or are problems that might result from fee hunting business. Please indicate how important or unimportant these reasons are to you in making your decision to lease your land for hunting.**
(Please circle one number for each statement)

Very Important	→	Not at all Important	DK/ NA
A. I offer my property for lease hunting to increase my income	5.....4.....3.....2.....1.....9		
B. Lease hunting allows me the opportunity to offset loss of income resulting from widely fluctuating agricultural market values (i.e. livestock, oil, crops)	5.....4.....3.....2.....1.....9		
C. Lease hunting allows for trespass control	5.....4.....3.....2.....1.....9		
D. Leasing acreage for hunting prevents non-paying hunters from asking for permission to hunt.	5.....4.....3.....2.....1.....9		
E. You allow family or friends to hunt at no charge	5.....4.....3.....2.....1.....9		
F. Leasing is important in the control and management of kind and number of species harvested	5.....4.....3.....2.....1.....9		
G. You lease to anyone for the highest price	5.....4.....3.....2.....1.....9		
H. By leasing your property for hunting, you give up certain ownership rights such as privacy	5.....4.....3.....2.....1.....9		
I. There are certain liabilities in allowing hunters on your property that creates a risk in lease hunting which requires additional insurance protection	5.....4.....3.....2.....1.....9		

Landowner Attitudes

58. As a landowner, please indicate the level of importance you place on each of the following statements as it concerns your property.

(Please circle one number for each statement)

Very Important	—————→	Not at all Important	DK/ NA
A. Property provides primary source of income for family	5.....4.....3.....2.....1.....	9	
B. Property provide Secondary source of income for family	5.....4.....3.....2.....1.....	9	
C. Property maintains family traditions of having a working ranch	5.....4.....3.....2.....1.....	9	
D. Property provides my children a healthy rural environment and experience	5.....4.....3.....2.....1.....	9	
E. I want to maintain ownership for inheritance for my children	5.....4.....3.....2.....1.....	9	
F. Property provides a way to conserve and protect natural resources	5.....4.....3.....2.....1.....	9	
G. Property is for recreation/hideaway	5.....4.....3.....2.....1.....	9	
H. Property is for investment	5.....4.....3.....2.....1.....	9	

Landowner Attitudes

59. In order to be able to perform the most accurate analysis possible it is necessary to interview as many ranchers as possible. In this light, could you supply five names, addresses, and phone numbers, of landowners that operate fee hunting operations within one of the ten following counties?

1. _____
2. _____
3. _____
4. _____
5. _____

Edwards Plateau

Gillespie
Kimble
Llano
Mason
Sutton

South Texas Plains

Brooks
Dimmit
La Salle
Frio
Webb

Thank you for your time and participation in this survey. Please feel free to add any comments or to contact me with any questions about this survey.

VITA

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M.B.A. Degree in Business Administration, Midwestern State University, Wichita Falls, Texas, 1997
Ph.D. Degree in Rangeland Ecology and Management, Texas A&M University, College Station, Texas, 2009

Professional Experience:

Academic: Texas A&M University, College Station, Texas
Department of Rangeland Ecology and Management:
Ecological Restoration – Assistant Lecturer, Spring 2005
Fundamentals of Ecology – Instructor, Summer 2004

Midwestern State University, Wichita Falls Texas
Department of Economics
General Economics – Instructor, Spring 1997

Private Industry: HDR Engineering Inc., Dallas, Texas 2007 to Present
Environmental Scientist

Board of Commerce and Industry, Wichita Falls, Texas
Vice President of Economic Development, 1990-1993

Howmet Corporation, Wichita Falls, Texas, 1984-1990
Quality Engineer
Product Engineer

Related Experience:
President - *Good Luck Wildlife Management and Education Association* in Dimmit County, Texas 2004-2006
Founding member
Life long experience and extensive background and knowledge of ranching, livestock and wildlife management operations for family owned business enterprise in South Texas