AN ABSTRACT OF THE THESIS OF

Jennifer Halstead Jensen for the degree of Master of Science in Biological Sciences presented on March 9, 2001.

Title: Landowner attitudes toward pronghorn in western Kansas

Abstract approved: Elmer J. Finck

In an effort to restore pronghorn (Antilocapra americana) to portions of their native ranges in western Kansas, the Kansas Department of Wildlife and Parks initiated a pronghorn restoration program in 1964 that continued throughout 1991. Landowners originally supported the restoration program, but conflicts between landowners and pronghorn have increased in recent years, hindering the maintenance of a pronghorn population in western Kansas. Many landowners blame pronghorn for spreading bindweed (Convolvulus arvensis), damaging crops, competing with livestock for forage, and damaging fences. The conflicts between pronghorn and landowners have caused many landowners to develop negative attitudes toward pronghorn, and as a result many pronghorn are being shot illegally. In an effort to stop the illegal killing of pronghorn and increase landowner tolerance, the Kansas Department of Wildlife and Parks initiated a Pronghorn Education Project in 1998. The first step of the project involved a landowner survey, which entailed the research for my thesis. Information gained from the survey will be used to tailor the education project to address major landowner concerns and to determine how to best convey information to landowners.

Survey results indicated that most respondents thought pronghorn spread

bindweed, damage fences, and cause both forage and crop yield reductions. Respondents felt that the pronghorn population increased during the last five years and tended to overestimate the pronghorn population in Kansas. Most respondents wanted no pronghorn on their land and approximately 20% of respondents indicated nothing would change their attitude or tolerance toward pronghorn. Even though most respondents wanted no pronghorn on their land, many respondents indicated that they enjoyed seeing pronghorn. Major dislikes of pronghorn included that there were too many or that they represented a time or financial burden. Many respondents indicated that information about pronghorn behavior and the impact of pronghorn on farming and ranching operations could potentially increase their tolerance of pronghorn.

Associations existed between opinions about pronghorn and variables such as zone of residence, farm income, farm size, age, organizational affiliation, and whether or not the respondent allowed pronghorn hunting on his/her land. Generally, those respondents who lived within the pronghorn zone, received greater than 50% of their income from farming, owned large amounts of cropland or rangeland, and allowed pronghorn hunting on their land, were more negative toward pronghorn.

LANDOWNER ATTITUDES TOWARD PRONGHORN IN WESTERN KANSAS

A Thesis

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Master of Science

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by

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Preface

My thesis consists of one chapter and was written in the style appropriate for publication in the Wildlife Society Bulletin. General survey results were presented together, followed by comparisons of zone, farm income, acres of cropland owned, acres of rangeland owned, respondent age, organizational affiliation, and whether or not respondents allowed pronghorn hunting on their land, for questions relative to opinions about pronghorn.

Results of all comparisons, regardless of significance, were presented in the thesis to make all of the information available. Summary survey results and non-significant comparisons were presented as appendices. However, if Likert scale sections had both significant and non-significant results, all statements for that section were presented together within the text. Selected summary results that were considered most noteworthy were presented separately within the text. Otherwise, all general survey results were summarized in Appendix 7, in the order survey items were presented.

Key words: attitude survey, bindweed, fence damage, landowners, Kansas, pronghorn (Antilocapra americana), winter wheat

Running heading: Landowner attitudes about pronghorn

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Landowner attitudes toward pronghorn in western Kansas

In an effort to restore pronghorn (Antilocapra americana) to portions of their native ranges in western Kansas, the Kansas Department of Wildlife and Parks initiated a Pronghorn Restoration Program in 1964 that continued throughout 1991. Landowner attitudes and cooperation were major components in the successful initiation of the restoration program and continue to be crucial in the management of the current pronghorn population. Landowners play an important role in providing resources for many wildlife species (Sheriff et al. 1981) and few groups have as large an effect on wildlife as farmers (Conover 1994, Messmer et al. 1998). Almost 90% of the land in Kansas is privately owned (Bill Scott, Kansas Department of Agriculture, pers. commun.), thus landowner attitudes and activities can greatly affect wildlife in the state. Many landowners actively manage for wildlife and enjoy the presence of wildlife on their land, but when populations are perceived as too high, or intolerable levels of damage occur, tolerance for wildlife may decrease. Conover and Decker (1991) found that agricultural producers believe that wildlife damage problems have increased in the last thirty years, and such beliefs may be leading to an increase in the incidence of conflicts between wildlife and farmers. The perception that problems with wildlife are becoming more frequent may cause landowners to have less tolerance of wildlife on their land. Although landowners in western Kansas originally supported the Pronghorn Restoration Program, conflicts between landowners and pronghorn have increased in recent years, hindering the continued maintenance of a pronghorn population in western Kansas (Lloyd Fox, KDWP, pers. commun.). Many landowners in western Kansas associate pronghorn

with problems that negatively impact farming or ranching operations, such as the spread of bindweed (Convolvulus arvensis), damage to winter wheat crops, competition with livestock for forage, and fence damage. Much of the blame placed upon pronghorn is unfounded and may be a result of misinformation. Perceived problems associated with the presence of pronghorn have caused many landowners to develop negative attitudes toward them and as a result many pronghorn are being shot illegally. Over the last three years there were over 100 documented cases of pronghorn being killed illegally and it is likely that many more were killed and not reported (Lloyd Fox, KDWP, pers. commun.).

The successful management of the pronghorn population in western Kansas will depend on the ability of wildlife managers to educate landowners relative to the actual impact of pronghorn on farming and ranching operations. However, many landowners are skeptical of the information they are given about pronghorn and feel that little consideration is given to their concerns. Disputes often arise because stakeholder groups (landowners in this case) feel that managers are unaware of or are insensitive to problems caused by wildlife (Craven et al. 1992). Attempts at communication with stakeholders are often unsuccessfully received, and Myers (1985) suggested that presenting accurate information does not always alter subsequent behavior because there are many factors that may override the influence of any given information. Behavior is influenced by many personal, social, and political variables, and if these variables are not taken into account when presenting information to a group, misunderstanding, argumentation, and rejection will likely occur (Myers 1985).

Wildlife management programs on private lands are most successful when

landowner attitudes toward wildlife are considered and accounted for in designing management plans and communication strategies (Sheriff et al. 1981, Craven et al. 1992). Surveys are a useful method to gain such information and can provide wildlife managers with a way to identify stakeholder tolerance levels, knowledge, and wildlife attitudes (Craven et al. 1992, Swensson 1996). Surveys of stakeholders are becoming an increasingly important management tool because information provided by survey data allows for identification of major stakeholder concerns and may provide insight concerning how to best rectify conflicts. A survey of landowners in western Kansas was considered to be the appropriate method to identify factors contributing to conflicts and to determine how increased landowner appreciation of pronghorn might be achieved.

The Kansas Department of Wildlife and Parks developed a Pronghorn Education Project in 1998 in an effort to stop the illegal killing of pronghorn in western Kansas and increase landowner tolerance of pronghorn. The project is supported by the Pronghorn Committee, comprised of members from the Kansas Livestock Association, the K-State Research and Extension Service, the Kansas Wheat Growers Association, the United States Department of Agriculture, the Natural Resources Conservation Service, the Kansas Department of Wildlife and Parks, the Kansas Farm Bureau, and the Kansas Department of Agriculture Plant Protection and Weed Control Division. The first phase of the project involved a landowner survey, which entailed the research for my thesis. The ultimate goal of the education project as a whole is to foster harmony between landowners and pronghorn and thus increase landowner tolerance and appreciation of pronghorn. The goals of the survey were to provide information that would allow the

Pronghorn Education Project to be tailored to address major landowner concerns about pronghorn, identify factors that could help ensure the successful reception of pronghorn information, and determine what might increase landowner tolerance of pronghorn. The objectives of the survey were to: 1) identify the variables that influenced attitudes and behavior toward pronghorn; 2) determine how landowners were obtaining their information concerning pronghorn and identify types and sources of information trusted by landowners; 3) determine how much landowners knew about pronghorn; and 4) determine the strength of landowner opinions toward pronghorn. The survey was analyzed to determine if landowner attitudes were associated with the following variables: whether or not respondents resided inside or outside of the pronghorn zone, income from farming, amount of cropland owned, amount of rangeland owned, age group, membership in a farming or sporting organization, and whether or not landowners allowed hunting on their land.

Methods

Study area

The study involved landowners in Gove, Greeley, Hamilton, Logan, Sherman, Thomas, Wallace, and Wichita counties of Kansas (Fig. 1). These counties comprise much of the current and potential range of pronghorn in western Kansas. Selected landowners who resided within any of the eight counties were designated as being "inside" the pronghorn zone and landowners who did not reside in any of the eight counties were designated as being "outside" the pronghorn zone.

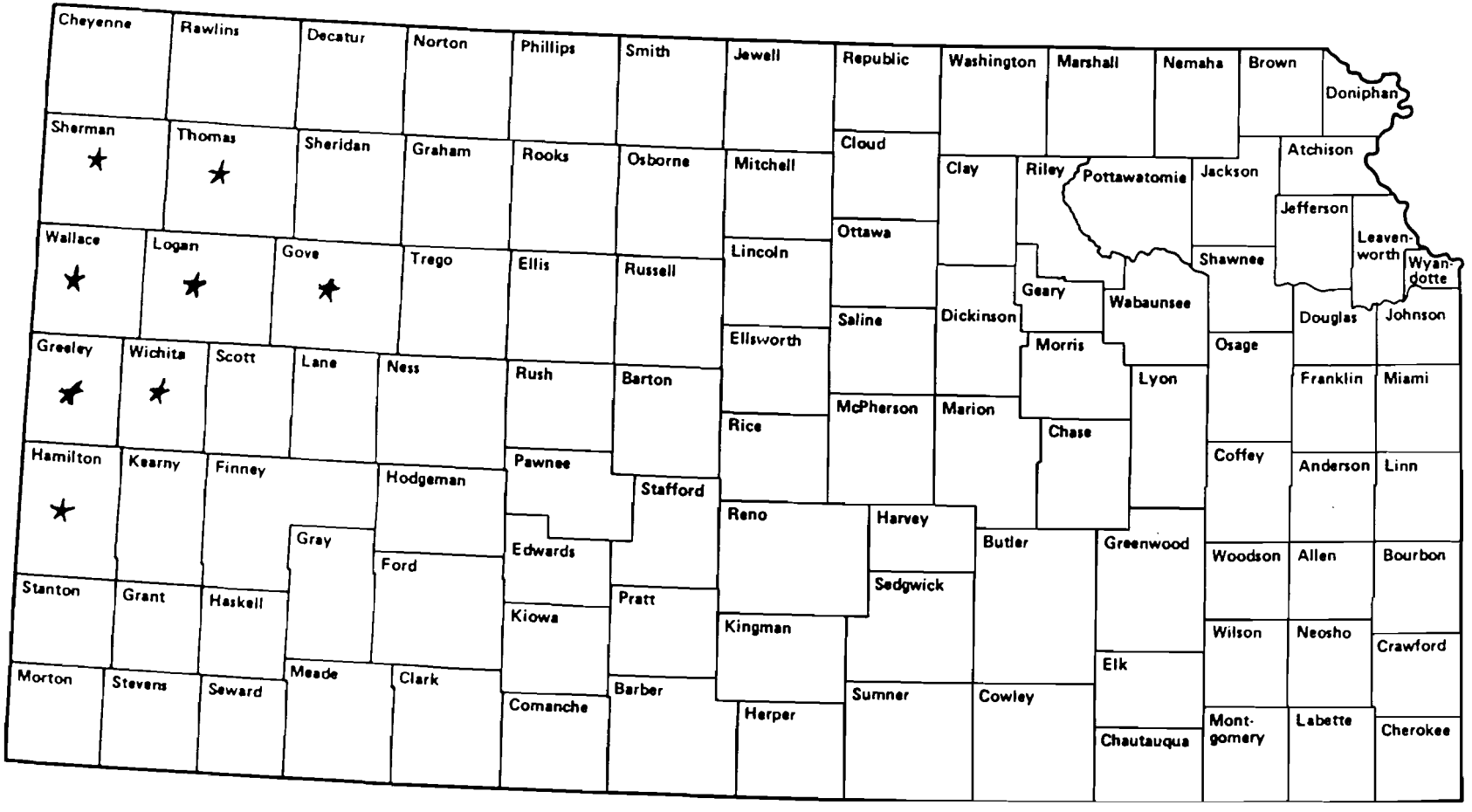
Selection of respondents

A sample of landowners was obtained from a mailing list compiled by Norma Van Nostrand, Western Prairie Resource Conservation and Development Coordinator. A total of 800 landowners was chosen to be involved in the survey, 100 from each of the eight counties included in the study. Individuals with land in any of the eight counties comprising the study area were selected regardless of whether or not they actually lived on or worked the land they owned.

Survey format

The landowner survey was implemented by using mail survey techniques outlined by Dillman (1978), Salant and Dillman (1994), and Alreck and Settle (1995). Benefits of mail surveys include that they can reach widely dispersed respondents rather inexpensively (Alreck and Settle 1995) and they are less sensitive to interviewer biases. Interviewer biases are eliminated with mail surveys because there is no direct interaction between the respondents and the interviewers conducting the survey. In

Figure 1. Map of counties included as the focus area for my study. A "★" denotes each county of interest.


Cheyenne
Rawlins
Decatur
Norton
Phillips
Smith
Jewell
Republic
Washington
Marshall
Nemaha
Brown
Doniphan
Sherman
Thomas
Sheridan
Graham
Rooks
Osborne
Mitchell
Cloud
Clay
Riley
Pottawatomie
Jackson
Atchison
Jefferson
Leaven-worth
Wyan-dotte
Wallace
Logan
Gove
Trego
Ellis
Russell
Lincoln
Ottawa
Geary
Shawnee
Douglas
Johnson
Wabaunsee
Saline
Dickinson
Osage
Greeley
Wichita
Scott
Lane
Ness
Rush
Barton
Ellsworth
Morris
Franklin
Miami
Lyon
McPherson
Marion
Rice
Chase
Hamilton
Kearny
Finney
Hodgeman
Pawnee
Stafford
Coffey
Anderson
Linn
Gray
Reno
Harvey
Butler
Greenwood
Edwards
Ford
Sedgwick
Woodson
Allen
Bourbon
Stanton
Grant
Haskell
Pratt
Kiowa
Kingman
Wilson
Neosho
Crawford
Meade
Elk
Morton
Stevens
Seward
Clark
Barber
Sumner
Cowley
Comanche
Harper
Mont-gomery
Labette
Cherokee
Chautauqua

telephone or face to face surveys, different interviewers may ask questions to each survey respondent in a different manner and get inaccurate results. A respondent is also more likely to give an interviewer the answers he or she thought are wanted when interviewed over the phone or face to face (Salant and Dillman 1994, Alreck and Settle 1995). Mail surveys allow a sense of privacy and put relatively little pressure upon the respondent.

Such qualities of mail surveys were considered beneficial in designing the landowner survey because of the volatile nature of the problems between farmers and ranchers, and pronghorn in western Kansas. Some ranchers and farmers in western Kansas are distrustful and belligerent toward the KDWP (Lloyd Fox, pers. commun.) and any direct contact would have likely resulted in failure to obtain information. A mail survey allowed a sense of confidentiality and hopefully made those individuals who received the survey more comfortable with thinking critically about the questions and completing the survey.

Question type

The survey primarily involved close-ended questions with both ordered and unordered responses because they are less demanding for respondents to answer and they are much easier to code and analyze (Salant and Dillman 1994). Close-ended questions with ordered responses are the most specific and ask for an answer that is most or least important to the respondent. Close-ended questions with unordered responses require respondents to make choices from discrete categories in which there is no difference in the value of the responses (Salant and Dillman 1994).

Questions were presented in multiple-choice, rank, and Likert scale formats.

Landowners were asked to check one or several listed choices and to numerically rank a list of choices in order of importance. Rank questions were useful in determining items that were most and least important to respondents (Alreck and Settle 1995). Section five of the survey presented statements and response categories in a Likert scale format and landowners were asked to respond how they felt about a particular statement. Likert scales were used to measure the strength of a response and required respondents to pick a number from a scale that corresponded with "strongly agree" to "strongly disagree" to reply to a statement (Alreck and Settle 1995). A particular statement was presented in a variety of ways to examine the consistency of responses.

Survey validation

Once a draft of the survey was completed, it was sent to Dr. Donna Minnis at Mississippi State University and Dr. Ted Cable at Kansas State University for review. Dr. Minnis and Dr. Cable specialize in survey development and each provided useful suggestions for improving the survey. Once appropriate changes were made, the survey was then sent to members of the Pronghorn Committee to obtain their comments and suggestions for improvement. The Pronghorn Committee was also asked to provide names of landowners that might be willing to be included as members of a pilot group to test the survey.

The survey was sent to a pilot group of thirty landowners to ensure that the survey was answerable and unambiguous. The pilot group members were first asked to answer the survey as if they were actual respondents, and were then urged to review the survey and make any comments they might have concerning wording, difficulty, or pertinence of

various questions. After considering comments and suggestions made by the Pronghorn Committee and the pilot group, a final draft of the survey was completed.

Survey instrument

The thirteen page questionnaire contained a total of sixty questions divided into seven sections (Appendix 1). The first section, addressing the first survey objective, asked for general demographic information that may influence opinions about pronghorn. Sections two and three of the survey addressed objective two, and presented questions designed to determine who landowners trusted to provide information and what types of information interested and influenced landowners the most. Such information was useful in determining how to best present information to landowners. The fourth section, addressing the third survey objective, was designed to determine landowner knowledge about pronghorn. Questions concerning pronghorn behavior, diet, territory size, and population size were asked to get a general indication of how much landowners knew about pronghorn. The fifth section of the survey focused on the fourth objective of the survey. Statements about perceived problems with pronghorn were presented and the strength of opinions relative to those statements was assessed by using a five-point Likert scale ranging from strongly agree to strongly disagree. The sixth section of the survey involved objectives one and four, and asked questions designed to determine general attitudes toward pronghorn and what landowners liked and disliked about pronghorn. Respondents were also asked to indicate what might improve their tolerance of pronghorn. The last section of the survey thanked respondents for their time and input and included a space for comments.

Survey protocol

Implementation of the survey followed methods outlined by Dillman (1978), Salant and Dillman (1994), and Alreck and Settle (1995). A letter of notice was sent to landowners on 24 August 1998 (Appendix 2). The letter of notice informed survey recipients that they had been randomly chosen to participate in the survey and stated the purpose of the study. Recipients were assured of confidentiality and informed of the importance of their time and input to the success of the study.

The first mailing of the survey was sent to landowners on 31 August 1998, one week after sending the letter of notice. The survey was accompanied by a cover letter (Appendix 3). The cover letter introduced the survey to the respondents and included information about the content and purpose of the survey. The cover letter also addressed approximately how long it would take to complete the survey and again ensured confidentiality.

A reminder postcard was sent to non-respondents on 22 September 1998, two weeks after the first mailing of the survey (Appendix 4). The postcard urged survey recipients to please fill out the survey and return it as soon as possible. On 29 September 1998, a reminder letter (Appendix 5) and a new survey were sent to those landowners, who still had not responded. The reminder letter again urged landowners to respond to the survey and stressed how important their input was to the success of the study. A new survey was included in case the first had been misplaced.

A third mailing of the survey, along with a new cover letter (Appendix 6), was sent to non-respondents on 4 December 1998. This last mailing of the survey deviated

from traditional survey protocol, but was done in an attempt to increase the survey response rate. The cover letter stressed to recipients the importance of their response and again assured confidentiality. The letter also stated how the survey results would be used to develop the Pronghorn Education Project. Returned surveys were collected for analysis until 15 January 1999.

Data collection

Each outgoing survey was coded by zone and number. Those surveys going to landowners, who resided inside the pronghorn zone, were coded with an "I" and surveys going to landowners, who resided outside the pronghorn zone, were coded with an "O". Each survey was also numbered to keep track of respondents and non-respondents. As surveys were returned, the corresponding number assigned to each survey was recorded. Survey returns were categorized as being usable, unusable, or undeliverable. The questions on the survey were coded to facilitate entry into a Questionnaire Programming Language (QPL) database. As usable survey returns were received, responses were recorded into the QPL spreadsheet.

Data analysis

All statistical analyses were performed by using PC SAS (SAS Institute 1990). Data analyses included descriptive statistics such as frequency distributions and reporting of means and standard errors. Chi-square tests were also performed to determine differences between selected groups (Cody and Smith 1991, Zar 1996). Differences were considered statistically significant if $P \leq 0.05$. Likert-scale responses of "strongly agree" and "agree" were consolidated, as were "strongly disagree" and "disagree" in section five

and question ten in section six. The "no opinion" response was not included for analysis in section five, nor was it considered for question five in section six. The "other" response category was not included in Chi-square analyses because emphasis was placed upon the categories given to respondents. Respondents were given the option to answer "other", "no opinion" or "do not know" to certain questions so that they would not feel forced to answer questions for which they were uncomfortable or knew little about. Following Cody and Smith (1991), questions 11 and 12 in section six were treated as "yes"/ "no" questions to allow comparisons between different groups for those responses. However, small sample sizes resulted and many respondents may have failed to completely answer questions toward the end of the survey, which necessitated caution in interpreting comparisons made for questions 11 and 12 in section six. Only questions answered by respondents were considered for analysis, thus the sample size differed among survey items.

Assessment of non-response bias

The greatest disadvantage associated with mail surveys is non-response bias (Kalton 1983). Some people who receive surveys will be more likely to answer than others (Salant and Dillman 1994, Alreck and Settle 1995), and a high level of non-response may invalidate surveys. Survey non-response can be alleviated by sending reminder notes and additional surveys, but such actions do not motivate all receivers of surveys to respond (Kalton 1983). Non-response bias may also occur if people fail to answer particular questions (Kalton 1983). To minimize the effects of non-response in the landowner survey, a reminder postcard and a second and third

mailing of the survey were sent to landowners. Landowners were also frequently urged to answer each question to alleviate item non-response.

To detect possible non-response bias in the landowner survey, all survey returns were divided into three response waves according to the date they were returned. The first wave of survey returns was comprised of surveys returned before the second mailing of the survey, and the second wave was comprised of surveys received after the second mailing. The third response wave corresponded to returns received after the third and last mailing of the survey. Responses among the three waves were compared for selected survey items such as educational level, farming income, and zone of residence. Responses to the Likert-scale section (section 5) relative to bindweed spread, disease transmission, fence damage, forage reduction, and reduction of crop yields caused by pronghorn were also compared among the three response waves. Lastly, responses to whether or not respondents liked pronghorn and whether or not they could distinguish between pronghorn and white-tailed deer damage were also compared.

A sample of non-respondents was not interviewed by phone for comparison to respondents because of the likelihood of not being able to contact non-respondents. After having many undeliverable surveys returned and a large proportion of surveys unaccounted for, it became evident that the mailing list used to choose landowners for the study was dated. Many survey recipients may not have responded because they no longer owned land in the study area, were unable to respond, or were deceased.

Results

Response rate

Of the 800 surveys that were mailed to landowners, 386 usable and 77 unusable returns were received. There were 252 surveys unaccounted for and 85 surveys returned as undeliverable. Following Adams et al. (1997), undeliverable returns were removed from consideration, making the effective response rate 54.0%. A summary of survey returns is presented in Table 1.

Non-response bias

There were no significant differences between respondents from different mailing waves for the selected questions. Based upon the assumption that as many people who were able to reply to the survey had done so, and the apparent lack of differences among the three mailing waves, non-response bias was deemed minimal.

Descriptive summary of survey results

A complete summary of general survey results following the order of presentation of survey items is presented in Appendix 7. A summary of comments made by respondents is presented in Appendix 8. Unless otherwise noted, tables of descriptive results for survey sections one through six are located in Appendix 7. Selected results that were considered most noteworthy are presented again separately within the text.

Section 1 - demographic characteristics

A majority of respondents (82%) lived in Kansas, and 60% of respondents lived within the pronghorn zone (resided within one of the eight counties included as the focus area of the survey) (Table 2). The average age of respondents was 58.0 years

Table 1. Summary of Survey Returns

Category	**n**	**%**
Usable	386	48
Unusable	77	10
Undeliverable	85	11
Unaccounted	252	32
Total	800	100

Table 2. Proportion of landowners, who resided inside and outside of the pronghorn zone.

Zone	**n**	**%**
Inside	230	60
Outside	156	40
Total	386	100

(SE = 0.8). Respondents tended to be male (70%) and were well educated, with 32% having a college degree.

Most respondents (63%) indicated their occupation as being a farmer or both a farmer and rancher. Few respondents (1%) were solely ranchers and 36% of respondents indicated an occupation other than farmer or rancher. Almost half of the respondents (48%) replied that they farm in western Kansas because of family tradition. Only 16% of respondents indicated that they farmed because of income potential. Fifty-three percent of respondents gained more than 50% of their total income from farming, and 30% of respondents indicated that they received more than 90% of their income from farming.

The average amount of land used for crop production by respondents was 641 ha (SE = 73.6). Major crops planted by respondents included wheat (82%), milo (45%), and corn (36%). The average amount of land used as range for livestock was 406 ha (SE = 116.9), and respondents owned an average of 138 cattle (SE = 26.8). A majority of respondents (57%) owned no cattle.

Most respondents (65%) replied that they had no organizational affiliations. Of the 129 respondents who replied that they did belong to an organization, most belonged to a farm or livestock organization. Fifty percent of respondents who belonged to any organization, belonged to the Kansas Farm Bureau and 26% belonged to the Kansas Livestock Association.

Section 2 - information sources

Respondents ranked personal experience as being the most important source of information concerning crop and livestock management ($\bar{x}$ rank = 2.20, SE = 0.10) and

ranked the internet lowest ($\bar{x}$ rank = 7.04, SE = 0.10). Only 5% of respondents indicated that they would refer to the Kansas Department of Wildlife and Parks for assistance with wildlife damage problems (Table 3). However, respondents ranked the KDWP the highest as a source of information about pronghorn ($\bar{x}$ rank 3.01, SE = 0.14). Data provided by universities ranked last as a source of information about pronghorn ($\bar{x}$ rank = 5.40, SE = 0.12) (Table 4).

Section 3 - informational influences

When asked what types of information influenced opinions about wildlife, a majority of respondents (87%) indicated personal experience. Newspapers (64%) and television (50%) were also major influences on respondent wildlife opinions. Fewer respondents replied that public presentations (19%) and scientific papers (15%) influenced their opinions about wildlife. Educational videos did not seem to be a medium that interested or influenced respondents, as evidenced by only 9% of respondents choosing videos as an informational influence (Figure 2).

Although respondents did not rank educational videos highly as a source of information that could influence their wildlife opinions, 37% of respondents indicated they would be very likely to watch a 30 minute video that provided details on the effects of pronghorn on farming and ranching operations. Forty percent of respondents also indicated they would be very likely to read information about pronghorn. Only 15% of respondents replied they would be very likely to attend a public presentation about the impact of pronghorn on farming and ranching operations (Figure 3).

Table 3. Sources of help respondents sought for assistance with wildlife damage problems.

Source	**n**	**%**
No problem	137	39
Myself	104	29
Friends/relatives	24	7
Trappers	24	7
KDWP[a]	16	5
Extension service	9	3
ADC agents[b]	5	1
Other	37	10

[a]Kansas Department of Wildlife and Parks

[b]Animal Damage Control agents

Table 4. Average ranks of sources of pronghorn information.[a]

Source	n	rank	SE[b]
KDWP[c]	305	3.0	0.1
Extension service	280	3.8	0.1
Relatives/friends	301	4.0	0.2
Farm organizations	278	4.3	0.1
NRCS[d]	277	4.5	0.1
ADC agents[e]	271	4.9	0.1
Hunting organizations	278	5.2	0.1
Universities	280	5.4	0.1

[a]Respondents were asked to rank items from 1 to 8, with 1 being most important, thus the lower the rank, the more important the information source.

[b]Standard error of the mean rank for each information source.

[c]Kansas Department of Wildlife and Parks

[d]Natural Resource Conservation Service.

[e]Animal Damage Control agents.

Figure 2. Types of information that influenced respondent opinions about wildlife.

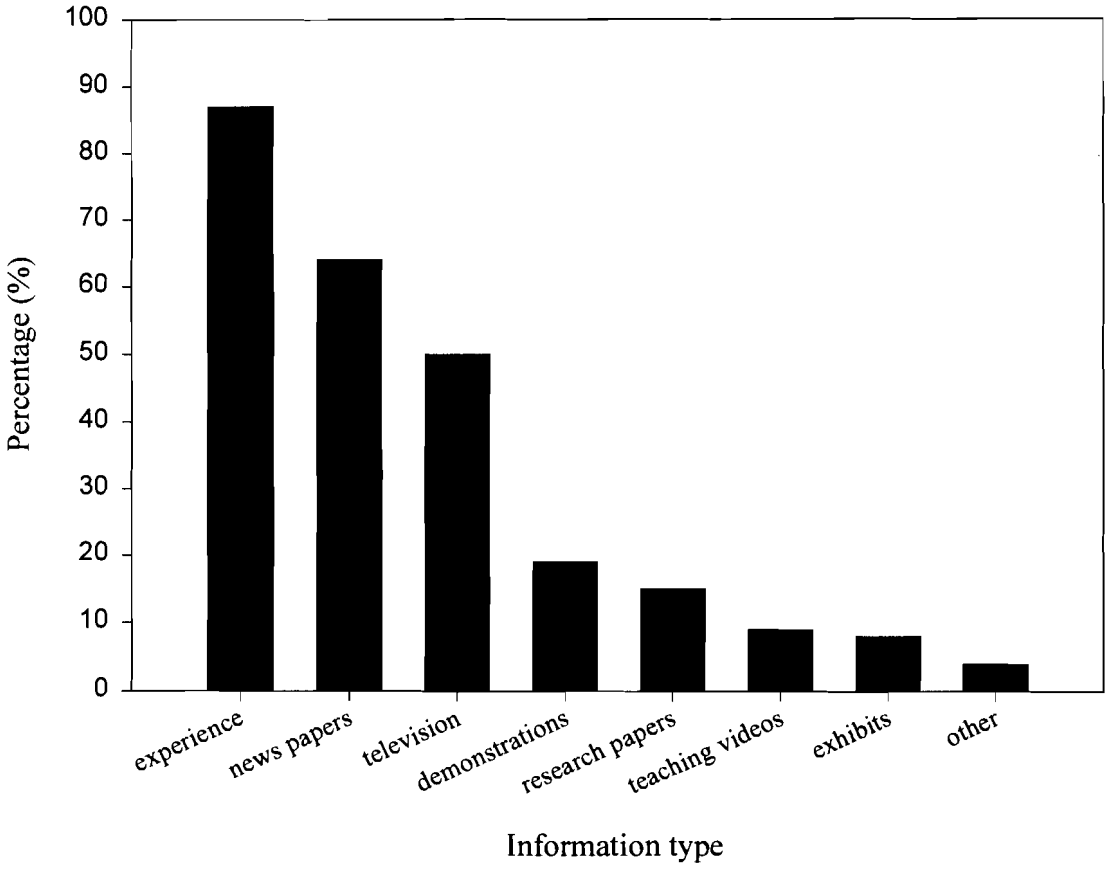
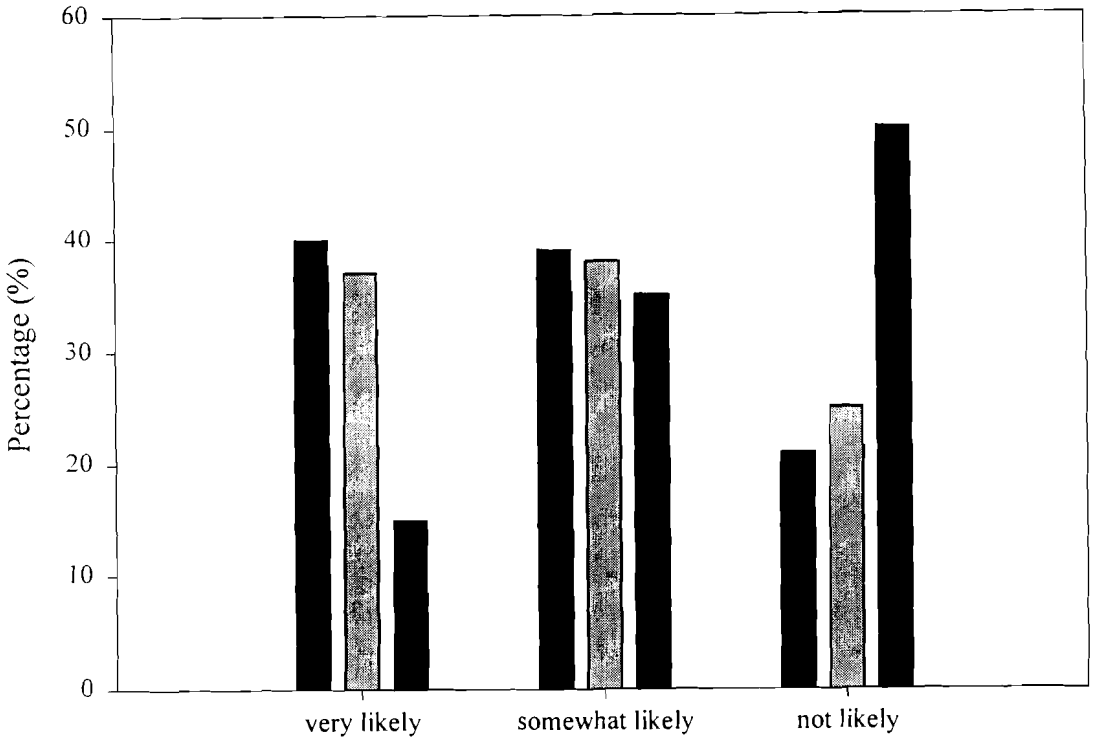
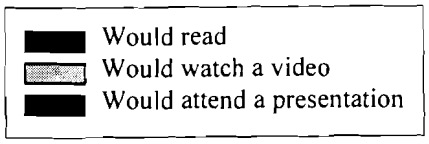

100
90
80
70
60
50
40
30
20
10
0
Percentage (%)
experience
news papers
television
demonstrations
research papers
teaching videos
exhibits
other
Information type

Figure 3. Likelihood of respondents to read, watch an educational video, or attend a public presentation about pronghorn.



Likelihood of respondents to read, watch a video, or attend a presentation about pronghorn



Section 4 - General knowledge

Most respondents had limited knowledge of pronghorn habits, behavior, and population size. When asked in which season pronghorn herds were the largest, most respondents (42%) replied that they did not know. Almost half of respondents (46%) also indicated that they did not know what time period pronghorn were most active, and 37% of respondents did not know the primary food item of pronghorn. Only 19% of respondents correctly indicated forbs as the primary food of pronghorn.

When asked if pronghorn spread bindweed, a large proportion of respondents (42%) again indicated that they did not know, but over half (54%) of respondents replied yes (Table 5). Of the respondents who indicated that pronghorn do spread bindweed, most (85%) believed pronghorn spread bindweed through feces.

Over half (53%) of respondents did not know how many pronghorn were in Kansas, and of the respondents, who gave an estimate of pronghorn population size, most (31%) believed there were more than 5,000 pronghorn in Kansas. Only 4% of respondents replied there were less than 1,000 pronghorn in Kansas (Table 6).

Section 5 - Pronghorn impact on farming and ranching in western Kansas.

Bindweed appeared to be a major problem associated with pronghorn, evidenced by 75% of respondents disagreeing that pronghorn did not spread bindweed. Most respondents (84%) agreed that pronghorn were one of many factors involved in bindweed spread, and 68% believed pronghorn were an important factor in the spread of bindweed. Only 35% believed that pronghorn were the primary cause for the spread of bindweed (Table 7). The transmission of disease to livestock by pronghorn was of little

Table 5. Respondent answers to whether or not pronghorn spread bindweed.

Do pronghorn spread bindweed?	**n**	**%**
Yes	204	54
No	13	4
Did not know	159	42

Table 6. Respondent estimation of how many pronghorn were in Kansas.

Number of pronghorn	**n**	**%**
≤1,000	16	4
1,001-5,000	41	11
>5,000	116	31
Did not know	205	54

Table 7. Respondent opinions relative to pronghorn and the spread of bindweed.

	Agreed		Neutral		Disagreed	
Statement	**n**	**%**	**n**	**%**	**n**	**%**
Pronghorn do not spread bindweed.	36	13	35	13	209	75
Pronghorn are important in the spread of bindweed.	186	68	48	18	38	14
Pronghorn are one of many factors in bindweed spread.	243	84	30	10	17	6
Pronghorn are a minor factor in the spread of bindweed.	55	20	50	18	177	63
Pronghorn are the primary cause for the spread of bindweed.	96	35	71	26	106	39

concern to respondents. Nearly half of respondents (48%) agreed that pronghorn were a minor factor in the spread of diseases to livestock.

Respondents associated pronghorn with damage to fences, as shown by a majority of respondents agreeing with statements implicating pronghorn with fence damage and disagreeing to statements that indicated minimal or no damage caused by pronghorn. Forty-seven percent of respondents agreed that pronghorn caused excessive damage to fences and 66% disagreed that pronghorn did not damage fences (Table 8).

In response to statements relative to forage reduction, 54% of respondents agreed that grazing by pronghorn reduced forage for livestock. However, only 28% of respondents agreed that pronghorn caused severe forage reductions (Table 9). A majority of respondents (62%) also agreed that pronghorn reduced wheat yields due to trampling and feeding, but only 29% agreed that pronghorn caused severe reductions in wheat yields (Table 10).

Section 6 - Landowner opinions about pronghorn.

Half of respondents (51%) indicated that they did have pronghorn on their land and most respondents (68%) indicated that they did not want any pronghorn on their land (Table 11). Sixty percent of respondents who gave an estimation of pronghorn population trends believed that the pronghorn population in Kansas had increased during the last five years (Table 12). Pronghorn may be implicated with damage caused by white-tailed deer (Odocoileus virginianus), as implied by 46% of respondents who indicated that they did not know if damage caused by deer could be differentiated from that caused by pronghorn. Hunting may be a method used by landowners to control

Table 8. Respondent opinions relative to pronghorn and fence damage.

	Agreed		Neutral		Disagreed	
Statement	**n**	**%**	**n**	**%**	**n**	**%**
Pronghorn cause excessive fence damage.	133	47	61	22	89	31
Pronghorn frequently damage fences.	158	55	59	21	69	24
Pronghorn cause very little fence damage.	98	35	51	18	133	47
Pronghorn do not damage fences.	39	14	58	20	187	66

Table 9. Respondent opinions relative to forage reduction caused by pronghorn grazing.

	Agreed		Neutral		Disagreed	
Statement	**n**	**%**	**n**	**%**	**n**	**%**
Pronghorn grazing causes severe forage reductions.	79	28	83	30	119	42
Pronghorn grazing reduces forage.	156	54	72	25	60	21
Pronghorn grazing causes minor forage reductions.	158	54	63	22	71	24
Pronghorn grazing does not reduce forage.	45	16	78	27	163	57

Table 10. Respondent opinions relative to wheat yield reductions caused by pronghorn.

	Agreed		Neutral		Disagreed	
Statement	**n**	**%**	**n**	**%**	**n**	**%**
Pronghorn do not reduce crop yields.	61	21	60	20	175	59
Pronghorn reduce crop yields.	183	62	59	20	55	19
Pronghorn cause severe crop yield reductions.	84	29	83	29	122	42

Table 11. Number of pronghorn wanted by respondents.

Number of pronghorn	**n**	**%**
0	202	68
1-50	87	29
51-100	7	2
>100	2	1

Table 12. Respondent estimation of pronghorn population trends over the last five years.

Population has:	**n**	**%**
Increased	114	60
Stayed the same	39	21
Decreased	18	10
Did not know	18	10

wildlife damage problems, and 56% of respondents indicated that they did allow pronghorn hunting on their land.

Respondents were mostly non-committal in their response to whether or not they thought farmers or ranchers shot pronghorn that caused problems, with most (48%) answering "no opinion". Few respondents (6%) indicated that they would inform authorities about pronghorn being shot and 24% replied that they would support such actions. However, a nearly equal proportion (25%) of respondents replied that they would question the judgement of individuals who shot pronghorn, even if the pronghorn were considered to be causing problems.

Even though most respondents indicated that they wanted no pronghorn on their land, 42% replied that they neither liked or disliked pronghorn. Thirty-three percent of respondents agreed that they liked pronghorn (Table 13). Many respondents (51%) liked seeing pronghorn and 42% liked pronghorn because they considered pronghorn to be unique. Few respondents (10%) indicated that they liked pronghorn because of hunting opportunities (Figure 4). Thirty-one percent of respondents disliked pronghorn because they might cause future problems and pronghorn damage was a financial burden. Other major dislikes of pronghorn included that there were too many (25%) and that they were of no value (26%). Only 11% of respondents felt that pronghorn did not belong in Kansas and few respondents (11%) disliked pronghorn because of problems with pronghorn hunters (Figure 5).

If landowners were provided with reliable and accurate information contrary to what they currently believe, they might be persuaded to become more tolerant of

Table 13. Response of landowners when asked if they liked pronghorn.

Response	**n**	**%**
Agreed	123	33
Neutral	157	42
Disagreed	92	25

Figure 4. Reasons respondents liked pronghorn.

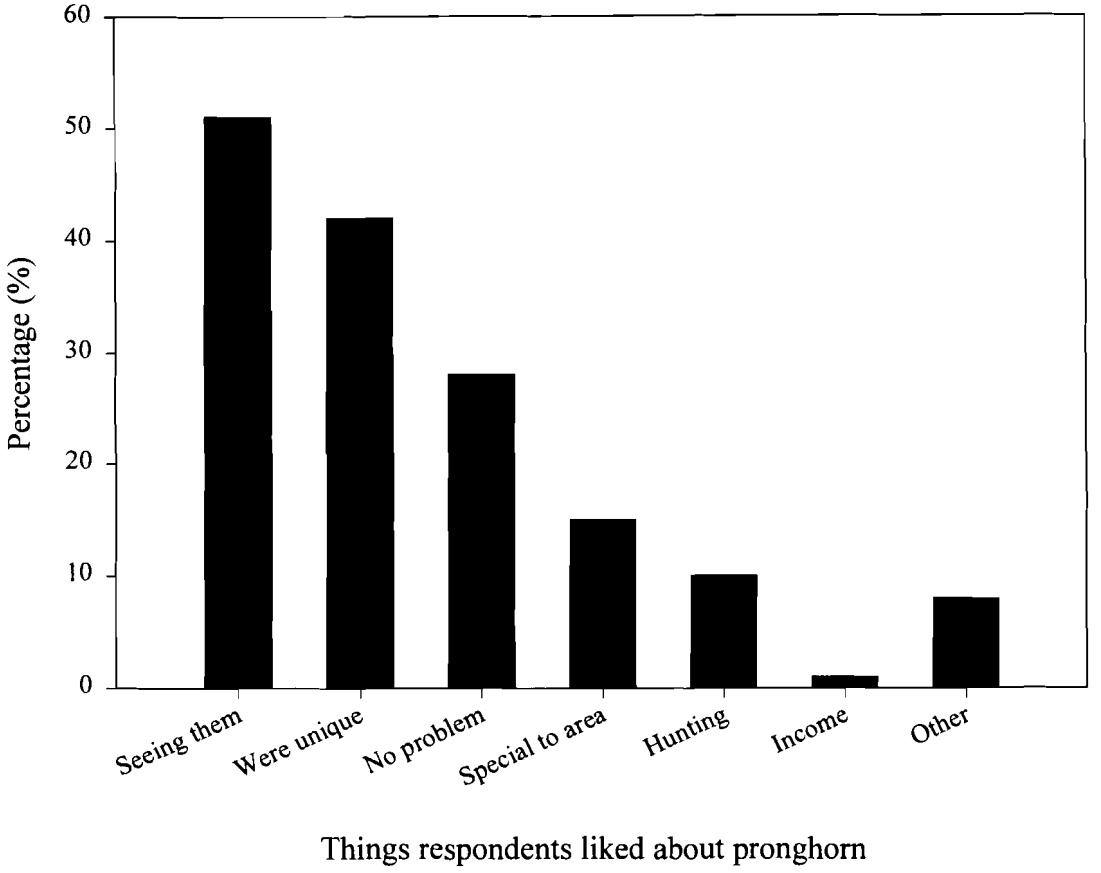
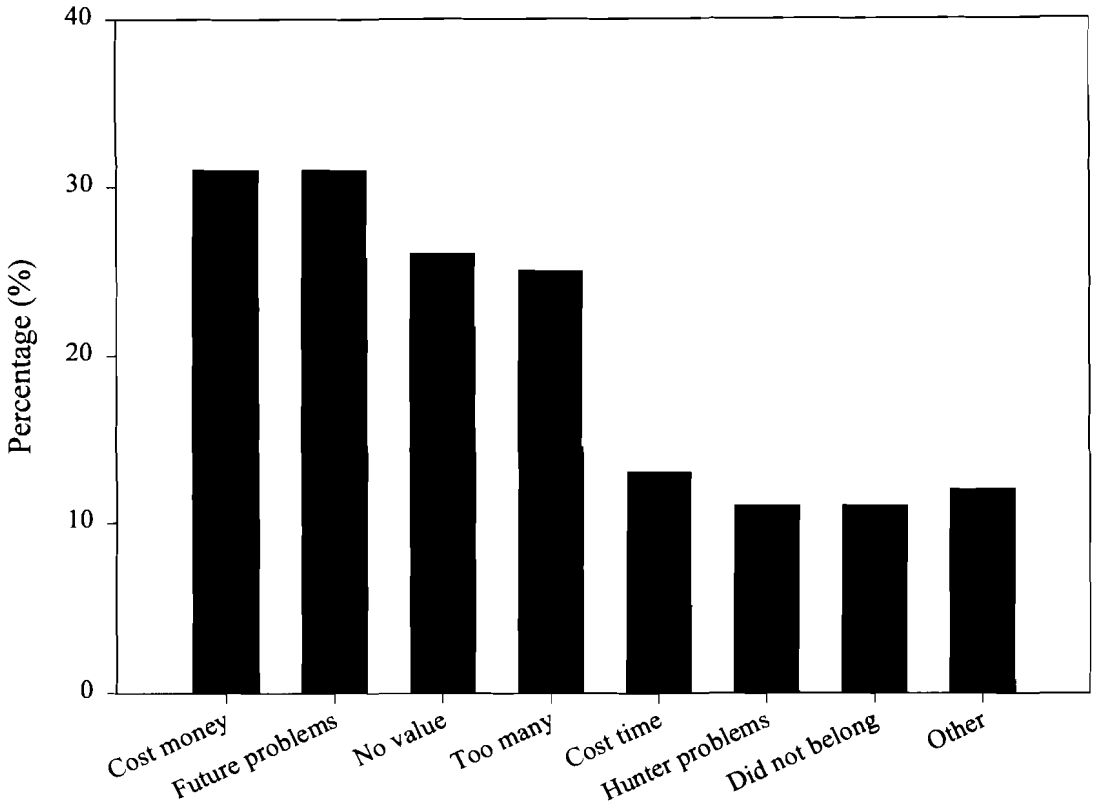

60
50
40
30
20
10
0
Percentage (%)
Seeing them
Were unique
No problem
Special to area
Hunting
Income
Other
Things respondents liked about pronghorn

Figure 5. Reasons respondents disliked pronghorn.



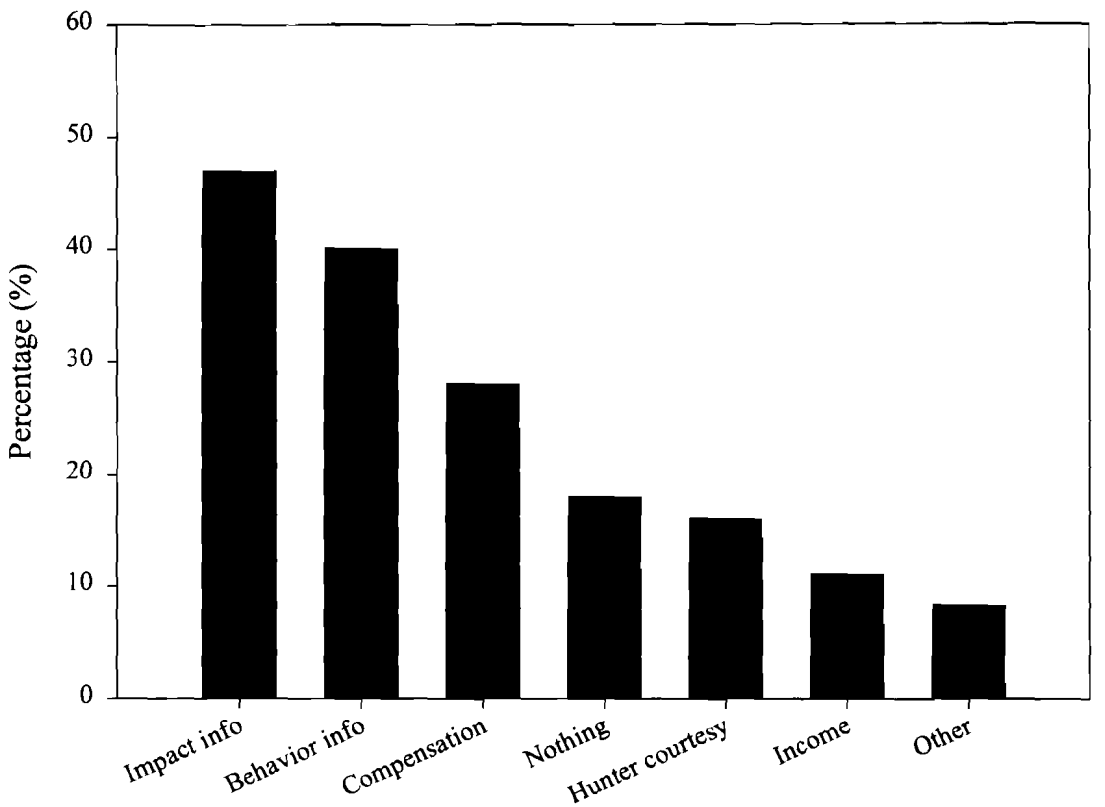
Things respondents disliked about pronghorn

pronghorn. Forty-seven percent of respondents indicated that information about the impact of pronghorn on farming operations could increase their tolerance and enjoyment of pronghorn, and 40% of respondents indicated that information about the behavior and habits of pronghorn could also increase their tolerance. Compensation for damage caused by pronghorn would increase the tolerance of 28% of respondents. Income gained from leasing land for pronghorn hunting did not seem to be a major factor that could lead to increased tolerance of pronghorn, as shown by only 11% of respondents indicating monetary gain as a means of increasing tolerance. Eighteen percent of respondents indicated that nothing would increase their tolerance or appreciation of pronghorn (Figure 6).

Zone comparisons

There was no association of zone with how many pronghorn respondents wanted on their land or how they felt the pronghorn population had changed in the last five years. A majority of respondents who resided inside (69%) and outside (65%) of the pronghorn zone wanted no pronghorn on their land (Appendix 9), and a majority of respondents in both zones thought the pronghorn population had increased over the last five years (Appendix 10). Although respondents in both zones felt similarly relative to pronghorn population trends, there was a significant difference between zones and estimates of the number of pronghorn in Kansas ($\chi^2 = 40.8$, 3 df, $P < 0.05$, Table 14). Outside zone respondents were more likely to not know how many pronghorn were in Kansas and 39% of inside zone respondents indicated that there were more than 5,000 pronghorn in Kansas.

Figure 6. Items respondents indicated might increase their tolerance and/or enjoyment of pronghorn.



Factors which might lead to increased pronghorn tolerance

Table 14. Comparison of answers given by respondents who resided inside and outside of the pronghorn zone relative to the number of pronghorn in Kansas.[a, b]

	Percent responding	
Number of pronghorn	**Inside**	**Outside**
<1,000	1	9
1,001 - 5,000	15	5
>5,000	39	19
Did not know	45	68

[a]A χ^2 test of the distribution of responses between respondents who resided inside and outside of the pronghorn zone showed significant differences ($\chi^2 = 40.8$, 3 df, $P < 0.05$).

[b]Total number of responses: inside, n = 225; and outside, n = 153.

Sixty-seven percent of inside zone respondents replied that pronghorn spread bindweed, compared to 35% of outside zone respondents ($\chi^2 = 39.4$, 2 df, $P < 0.05$, Table 15). Respondents in both zones made similar responses to most Likert scale statements relative to pronghorn and the spread of bindweed, but there was a significant difference between zone and responses to the statement, "Pronghorn do not spread bindweed." ($\chi^2 = 6.9$, 2 df, $P < 0.05$, Table 16). Seventy-nine percent of inside zone respondents disagreed, compared to 65% of outside zone respondents, reiterating the greater likelihood of inside zone respondents to believe that pronghorn spread bindweed.

Opinions about disease transmission by pronghorn were similar in both zones, with respondents indicating no great concern. Most respondents in each zone disagreed to statements that implicated pronghorn as a major factor in disease transmission (Appendix 11). Responses to statements about fence damage caused by pronghorn were also similar between inside and outside zone respondents, with a majority of respondents agreeing to statements linking pronghorn with fence damage (Appendix 12). Opinions concerning forage reduction by pronghorn were also similar between zones. Respondents in both zones tended to agree that pronghorn grazing did reduce forage availability for cattle, but not severely (Appendix 13). Most respondents, regardless of zone of residence, agreed that pronghorn reduced wheat yields, but did not cause severe yield reductions (Appendix 14).

Inside zone respondents were more likely than outside zone respondents to think pronghorn and white-tailed deer damage ($\chi^2 = 16.0$, 2 df, $P < 0.05$, Table 17) could be distinguished. Over half (58%) of outside respondents indicated that they did not know

Table 15. Comparison of answers given by respondents who resided inside and outside of the pronghorn zone relative to whether or not pronghorn spread bindweed.[a, b]

	Percent responding	
Do pronghorn spread bindweed?	**Inside**	**Outside**
Yes	67	35
No	3	4
Did not know	29	61

[a]A χ^2 test of the distribution of responses between respondents who resided inside and outside of the pronghorn zone showed significant differences ($\chi^2 = 39.4$, 2 df, $P < 0.05$).

[b]Total number of responses: inside, n = 224 and outside, n = 152.

Table 16. Opinions of respondents who resided inside and outside of the pronghorn zone relative to the spread of bindweed by pronghorn.

Opinions about pronghorn and the spread of bindweed	**Percent responding**	
	Inside	**Outside**
Pronghorn do not spread bindweed.[a, b]		
Agreed	11	18
Neutral	10	18
Disagreed	79	65
Pronghorn are important in the spread of bindweed.[c]		
Agreed	71	63
Neutral	16	21
Disagreed	13	16
Pronghorn are one of many causes of bindweed spread.[d]		
Agreed	86	80
Neutral	10	12
Disagreed	4	8

Table 16 (Continued).

Opinions about pronghorn and the spread of bindweed	**Percent responding**	
	Inside	**Outside**
Pronghorn are a minor factor in bindweed spread.[e]		
Agreed	18	22
Neutral	17	20
Disagreed	65	58
Pronghorn are the primary cause of bindweed spread.[f]		
Agreed	39	28
Neutral	26	25
Disagreed	35	47

[a]Total number of responses: inside, n = 189; and outside, n = 91.

[b]A χ^2 test of the distribution of responses between respondents who resided inside and outside of the pronghorn zone showed significant differences ($\chi^2 = 6.9$, 2 df, $P < 0.05$).

[c]Total number of responses: inside, n = 185; and outside, n = 87.

[d]Total number of responses: inside, n = 194; and outside, n = 96.

[e]Total number of responses: inside, n = 188; and outside, n = 94.

[f]Total number of responses: inside, n = 186; and outside, n = 87.

Table 17. Comparison of answers given by respondents who resided inside and outside of the pronghorn zone relative to whether or not they thought pronghorn and white-tailed deer damage could be distinguished.[a,b]

	Percent responding	
Is damage distinguishable?	**Inside**	**Outside**
Yes	38	22
No	24	20
Did not know	38	58

[a]A χ^2 test of the distribution of responses between respondents who resided inside and outside of the pronghorn zone showed significant differences ($\chi^2 = 16.0$, 2 df, $P < 0.05$).

[b]Total number of responses: inside, n = 226; and outside, n = 152.

if damage could be differentiated between pronghorn and white-tailed deer and 38% of inside zone respondents replied that they could distinguish such damage. A comparable proportion of respondents in both zones indicated that problem pronghorn were shot (Appendix 15) and there was also no difference between zones in reactions relative to farmers/ranchers who shot pronghorn that caused damage (Appendix 16). However, there was a difference between zones in reactions toward people who shot pronghorn on a respondent's land without a permit. Inside zone respondents were more likely to do nothing about pronghorn being shot without a permit, and outside zone respondents were more likely to inform authorities ($\chi^2 = 12.1$, 4 df, $P < 0.05$, Table 18).

Inside zone respondents disliked pronghorn more so than outside zone respondents ($\chi^2 = 8.4$, 2 df, $P < 0.05$, Table 19). Thirty percent of inside zone respondents disagreed with the statement "I like pronghorn", compared to 17% of outside zone respondents. Significantly more inside zone respondents disliked pronghorn because they felt that there were too many ($\chi^2 = 19.7$, 1 df, $P < 0.05$), they have had problems with hunters ($\chi^2 = 4.0$, 1 df, $P < 0.05$), and pronghorn damage cost them time ($\chi^2 = 8.1$, 1 df, $P < 0.05$) and money ($\chi^2 = 11.5$, 1 df, $P < 0.05$) (Figure 7). Inside and outside zone respondents liked pronghorn for similar reasons, although a greater proportion of outside zone respondents indicated that they liked pronghorn because they have had no problem with them ($\chi^2 = 6.7$, 1 df, $P < 0.05$, Figure 8).

Farming income comparisons

There was no difference in the number of pronghorn wanted by respondents in each income group (Appendix 17). Most respondents wanted no pronghorn on their land,

Table 18. Reactions of respondents who resided inside and outside of the pronghorn zone relative to individuals who shot pronghorn on their land without a permit.[a, b]

	Percent responding	
Reaction	**Inside**	**Outside**
Supportive	9	7
Asked them to leave	20	24
Did nothing	20	8
Informed authorities	32	42
No opinion	19	20

[a]A χ^2 test of the distribution of responses between respondents who resided inside and outside of the pronghorn zone showed significant differences ($\chi^2 = 12.1$, 4 df, $P < 0.05$).

[b]Total number of responses: inside, n = 212; and outside, n = 147.

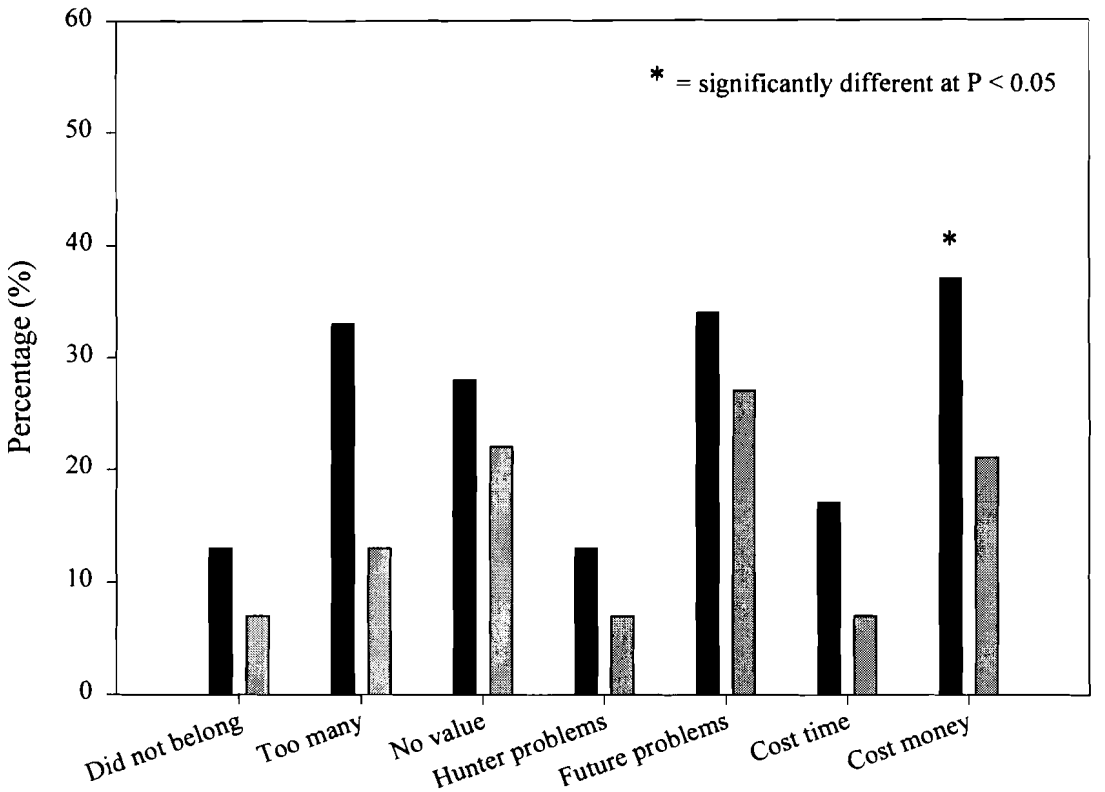
Table 19. Opinions of respondents who resided inside and outside of the pronghorn zone relative to whether or not they liked pronghorn. [a, b]

I like pronghorn.	**Inside**		**Outside**	
Response:	**n**	**%**	**n**	**%**
Agreed	67	31	56	37
Neutral	86	39	71	46
Disagreed	66	30	26	17

[a]A χ^2 test of the distribution of responses between respondents who resided inside and outside of the pronghorn zone showed significant differences ($\chi^2 = 8.4$, 2 df, $P < 0.05$.).

[b]Total number of responses: inside, n = 219; and outside, n = 153.

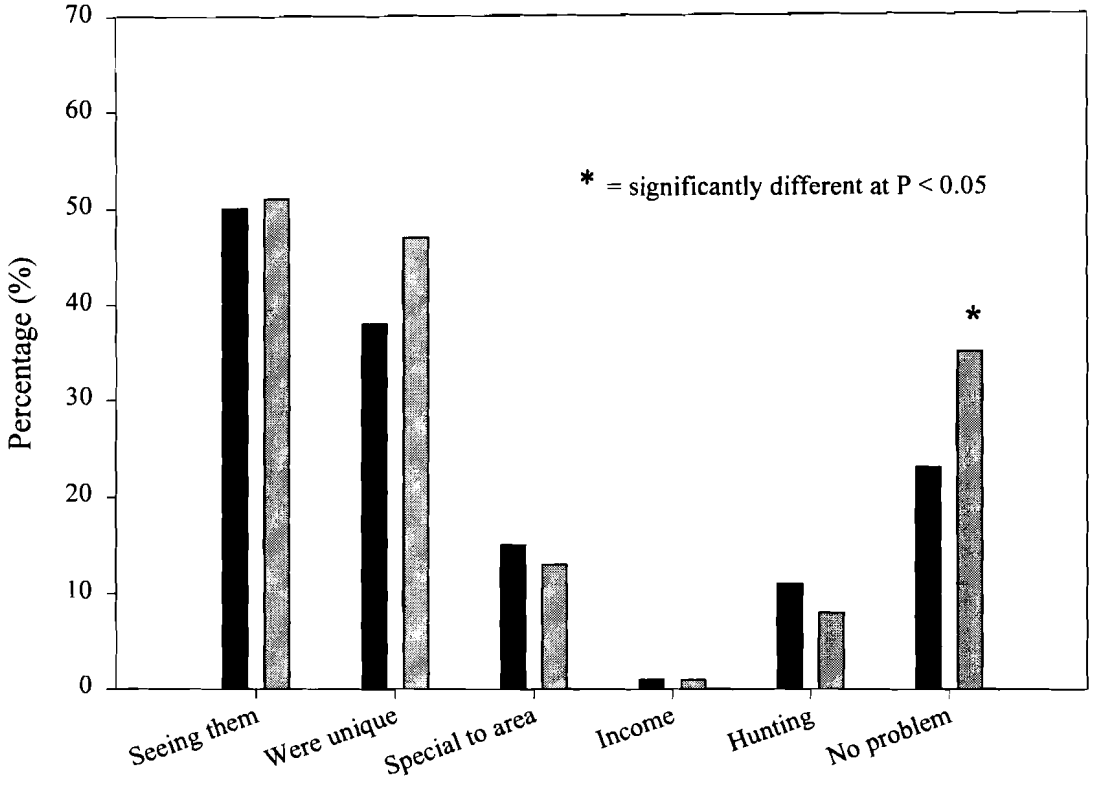
Figure 7. Comparisons of respondents who resided inside and outside of the pronghorn zone relative to reasons to dislike pronghorn.



Things respondents who resided inside and outside of the pronghorn zone disliked about pronghorn

Inside zone respondents
Outside zone respondents

Figure 8. Comparisons of respondents who resided inside and outside of the pronghorn zone relative to reasons to like pronghorn.



Things respondents who resided inside and outside of the pronghorn zone liked about pronghorn

Inside zone respondents
Outside zone respondents

and both groups also indicated that the pronghorn population had increased during the last five years (Appendix 18). Respondents who gained less than or equal to 50% of their total income from farming were more likely to not know how many pronghorn were in Kansas and 39% of respondents with a greater than 50% farm income indicated that there were more than 5,000 pronghorn in Kansas ($\chi^2 = 23.5$, 3 df, $P < 0.05$, Table 20).

Seventy-two percent of respondents with a greater than 50% farm income replied that pronghorn spread bindweed, while respondents with lower farm incomes were more likely to not know if pronghorn spread bindweed ($\chi^2 = 49.1$, 2 df, $P < 0.05$, Table 21). Respondents in both income categories agreed that pronghorn may be one of many factors involved in bindweed spread, but respondents with larger farm incomes were more inclined to think pronghorn were important in spreading bindweed ($\chi^2 = 7.6$, 2 df, $P < 0.05$) and may be the primary cause for bindweed spread ($\chi^2 = 7.8$, 2 df, $P < 0.05$) (Table 22).

Most respondents in both income groups were neutral in their response to a statement indicating that pronghorn did not spread disease, but differences among responses for both income groups did exist for other Likert scale statements concerning the role of pronghorn in disease transmission (Table 23). Respondents with lower farm incomes were more likely to agree that pronghorn were a minor factor in the spread of disease ($\chi^2 = 8.0$, 2 df, $P < 0.05$) and were more likely to disagree that pronghorn were an important ($\chi^2 = 7.2$, 2 df, $P < 0.05$) or severe ($\chi^2 = 10.8$, 2 df, $P < 0.05$) problem in the spread of disease to livestock. Over half of respondents with a greater than 50% farm income agreed pronghorn caused excessive fence damage, while 40% of respondents

Table 20. Comparison of answers given by respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to how many pronghorn were in Kansas. [a, b]

	Percent responding	
Number of pronghorn	**≤50%**	**>50%**
<1,000	7	1
1,001-5,000	9	13
>5,000	22	39
Did not know	63	46

[a]A χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 23.5$, 3 df, $P < 0.05$).

[b]Total number of responses: less than or equal to 50% farm income, n = 176; and greater than 50% farm income, n = 193.

Table 21. Comparison of answers given by respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to whether or not pronghorn spread bindweed.[a, b]

	Percent responding	
Do pronghorn spread bindweed?	**≤50%**	**>50%**
Yes	36	72
No	3	4
Did not know	61	25

[a]A χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 49.1$, 2 df, $P < 0.05$).

[b]Total number of responses: less than or equal to 50% farm income, n = 173; and greater than 50%farm income, n = 194.

Table 22. Opinions of respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to the spread of bindweed by pronghorn.

Opinions about pronghorn and the spread of bindweed	**Percent responding**	
	≤50%	**>50%**
Pronghorn do not spread bindweed.[a, b]		
Agreed	19	9
Neutral	15	11
Disagreed	66	80
Pronghorn are important in the spread of bindweed.[c, d]		
Agreed	59	75
Neutral	22	14
Disagreed	20	11
Pronghorn are one of many causes of bindweed spread.[e]		
Agreed	78	88
Neutral	15	7
Disagreed	7	5

Table 22. (Continued).

Opinions about pronghorn and the spread of bindweed	Percent responding	
	≤50%	>50%
Pronghorn are a minor factor in bindweed spread.[f, g]		
Agreed	27	15
Neutral	21	16
Disagreed	52	69
Pronghorn are the primary cause of bindweed spread.[h, i]		
Agreed	27	40
Neutral	24	28
Disagreed	49	33

[a]A χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 8.2$, 2 df, $P < 0.05$).

[b]Total number of responses: less than or equal to 50% farm income, n = 103; and greater than 50% farm income, n = 194.

[c]A χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 7.6$, 2 df, $P < 0.05$).

[d]Total number of responses: less than or equal to 50% farm income, n = 102; and

Table 22. (Continued).

greater than 50% farm income, n = 166.

[e]Total number of responses: less than or equal to 50% farm income, n = 113; and greater than 50% farm income, n = 172.

[f]A χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 9.1$, 2 df, $P < 0.05$).

[g]Total number of responses: less than or equal to 50% farm income, n = 111; and greater than 50% farm income, n = 167.

[h]A χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 7.8$, 2 df, $P < 0.05$).

[i]Total number of responses: less than or equal to 50% farm income, n = 106; and greater than 50% farm income, n = 163.

Table 23. Opinions of respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to the spread of disease to livestock by pronghorn.

Opinions about pronghorn and the spread of disease	**Percent responding**	
	≤50%	**>50%**
Pronghorn are a minor factor in the spread of disease.[a, b]		
Agreed	59	41
Neutral	29	38
Disagreed	12	22
Pronghorn are important in the spread of disease.[c, d]		
Agreed	14	22
Neutral	31	42
Disagreed	55	36
Pronghorn are a severe problem in the spread of disease.[e, f]		
Agreed	7	12
Neutral	26	44
Disagreed	67	43

Table 23 (Continued).

Opinions about pronghorn and the spread of disease	Percent responding ≤50%	>50%
Pronghorn do not spread disease.[g]		
Agreed	37	25
Neutral	44	48
Disagreed	20	28

[a]A χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 8.0$, 2 df, $P < 0.05$).

[b]Total number of responses: less than or equal to 50% farm income, n = 86; and greater than 50% farm income, n = 133.

[c]A χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 7.2$, 2 df, $P < 0.05$).

[d]Total number of responses: less than or equal to 50% farm income, n = 84; and greater than 50% farm income, n = 127.

[e]A χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 10.8$, 2 df, $P < 0.05$).

Table 23 (Continued).

[f]Total number of responses: less than or equal to 50% farm income, n = 81; and greater than 50% farm income, n = 129.

[g]Total number of responses: less than or equal to 50% farm income, n = 82; and greater than 50% farm income, n = 126.

with a less than or equal to 50% farm income did not feel that fence damage caused by pronghorn was excessive ($\chi^2 = 11.4$, 2 df, $P < 0.05$). Respondents with lower farm incomes were more likely to think pronghorn caused little damage to fences ($\chi^2 = 10.8$, 2 df, $P < 0.05$) (Table 24).

Respondents in both income groups felt that pronghorn grazing reduced forage for livestock, but respondents with lower farm incomes were more likely to agree that pronghorn caused only minor reductions in forage ($\chi^2 = 6.6$, 2 df, $P < 0.05$, Table 25). Respondents with a less than or equal to 50% farm income tended to agree that pronghorn did not reduce crop yields ($\chi^2 = 14.6$, 2 df, $P < 0.05$) and disagreed that pronghorn caused severe wheat yield reductions ($\chi^2 = 11.4$, 2 df, $P < 0.05$) (Table 26).

Most respondents in both income groups did not know if damage caused by white-tailed deer and pronghorn could be distinguished (Appendix 19). Approximately 50% of respondents in both income groups believed pronghorn were shot if they were considered to be a problem (Appendix 20). However, reactions toward individuals who shot pronghorn did differ among income groups ($\chi^2 = 12.1$, 5 df, $P < 0.05$, Table 27). Respondents with greater farm incomes were more likely to support shooting problem pronghorn, and those respondents with lower farm incomes were more likely to question the judgement of individuals who shot pronghorn. Respondents with lower farm incomes were also more likely to inform authorities about individuals who shot pronghorn without a permit ($\chi^2 = 17.5$, 3 df, $P < 0.05$, Table 28).

Most respondents in both income groups replied that they were neutral to whether or not they liked pronghorn, but respondents with lower farm incomes were more

Table 24. Opinions of respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to fence damage caused by pronghorn.

Opinions about pronghorn and fence damage	**Percent responding**	
	≤50%	**>50%**
Pronghorn cause excessive damage to fences.[a, b]		
Agreed	35	55
Neutral	25	19
Disagreed	40	25
Pronghorn frequently damage fences.[c]		
Agreed	49	60
Neutral	21	20
Disagreed	30	20
Pronghorn cause very little fence damage.[d, e]		
Agreed	43	28
Neutral	21	16
Disagreed	36	56

Table 24 (Continued).

Opinions about pronghorn and fence damage	Percent responding	
	≤50%	>50%
Pronghorn do not damage fences.[f, g]		
Agreed	19	9
Neutral	20	21
Disagreed	61	70

[a]A χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 11.4$, 2 df, $P < 0.05$).

[b]Total number of responses: less than or equal to 50% farm income, n = 114; and greater than 50% farm income, n = 165.

[c]Total number of responses: less than or equal to 50% farm income, n = 115; and greater than 50% farm income, n = 166.

[d]A χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 10.8$, 2 df, $P < 0.05$).

[e]Total number of responses: less than or equal to 50% farm income, n = 114; and greater than 50% farm income, n = 163.

Table 24 (Continued).

[f] χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 6.0$, 2 df, $P < 0.05$).

[g]Total number of responses: less than or equal to 50% farm income, n = 115; and greater than 50% farm income, n = 164.

Table 25. Opinions of respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to pronghorn competition with cattle for forage.

Opinions about pronghorn competition with cattle	**Percent responding**	
	≤50%	**>50%**
Pronghorn grazing causes severe forage reductions for cattle.[a]		
Agreed	27	28
Neutral	24	33
Disagreed	49	38
Pronghorn grazing reduces forage for cattle.[b]		
Agreed	54	54
Neutral	21	28
Disagreed	25	18
Pronghorn grazing causes minor forage reductions for cattle.[c, d]		
Agreed	63	48
Neutral	17	25
Disagreed	20	27

Table 25 (Continued).

Opinions about pronghorn competition with cattle	Percent responding	
	≤50%	>50%
Pronghorn grazing does not reduce cattle forage.[e]		
Agreed	21	12
Neutral	26	28
Disagreed	54	59

[a]Total number of responses: less than or equal to 50% farm income, n = 114; and greater than 50% farm income, n = 162.

[b]Total number of responses: less than or equal to 50% farm income, n = 114; and greater than 50% farm income, n = 169.

[c] χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 6.6$, 2 df, $P < 0.05$).

[d]Total number of responses: less than or equal to 50% farm income, n = 117; and greater than 50% farm income, n = 169.

[e]Total number of responses: less than or equal to 50% farm income, n = 112; and greater than 50% farm income, n = 169.

Table 26. Opinions of respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to the impact of pronghorn grazing on wheat yields.

Opinions about pronghorn grazing on wheat yields	**Percent responding**	
	≤50%	**>50%**
Pronghorn do not reduce wheat yields.[a, b]		
Agreed	32	13
Neutral	16	22
Disagreed	52	64
Pronghorn reduce wheat yields.[c, d]		
Agreed	56	66
Neutral	18	21
Disagreed	26	13
Pronghorn cause severe wheat yield reductions.[e, f]		
Agreed	26	31
Neutral	20	34
Disagreed	54	35

[a] χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 14.6$, 2 df, $P < 0.05$).

Table 26 (Continued).

[b]Total number of responses: less than or equal to 50% farm income, n = 117; and greater than 50% farm income, n = 174.

[c] χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 7.8$, 2 df, $P < 0.05$).

[d]Total number of responses: less than or equal to 50% farm income, n = 118; and greater than 50% farm income, n = 173.

[e]χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 11.4$, 2 df, $P < 0.05$).

[f]Total number of responses: less than or equal to 50% farm income, n = 115; and greater than 50% farm income, n = 170.

Table 27. Comparison of reactions of respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to individuals who shot problem-causing pronghorn on their own property.[a, b]

	Percent responding	
Reaction	**≤50%**	**>50%**
Supportive	20	29
Avoided those individuals	0	1
None of my business	18	24
Informed authorities	7	5
Questioned judgement	32	20
No opinion	23	20

[a]χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 12.1$, 5 df, $P < 0.05$).

[b]Total number of responses: less than or equal to 50% farm income, n = 165; and greater than 50% farm income, n = 190.

Table 28. Reactions of respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to individuals who shot pronghorn on their land without a permit.[a, b]

	Percent responding	
Reaction	**≤50%**	**>50%**
Supportive	5	11
Asked them to leave	22	20
Did nothing	13	20
Informed authorities	44	27
No opinion	16	21

[a]χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 15.7$, 4 df, $P < 0.05$).

[b]Total number of responses: less than or equal to 50% farm income, n = 171; and greater than 50% farm income, n = 184.

inclined to like pronghorn (41%) than respondents with larger farm incomes (27%) (χ^2 = 23.5, 2 df, P < 0.05, Table 29). Respondents with higher farming incomes were more likely to dislike pronghorn because there were too many (χ^2 = 30.6, 1 df, P < 0.05), they did not belong in Kansas (χ^2 = 17.1, 1 df, P < 0.05), they had no value (χ^2 = 4.5, 1 df, P < 0.05), and pronghorn damage cost them time (χ^2 = 29.1, 1 df, P < 0.05) and money (χ^2 = 27.2, 1 df, P < 0.05) (Figure 9). Respondents with lower farming incomes were more likely to enjoy seeing pronghorn (χ^2 = 7.0, 1 df, P < 0.05) and thought of pronghorn as unique wildlife (χ^2 = 4.4, 1 df, P < 0.05). Respondents with lower farming incomes were also more apt to like pronghorn because they have had no problems with them (χ^2 = 10.6, 1 df, P < 0.05) (Figure 10).

Comparisons of respondents owning different amounts of cropland

There was an association between number of pronghorn wanted and amount of cropland owned (χ^2 = 10.0, 3 df, P < 0.05, Table 30). A greater proportion of respondents owning more than 778 ha (3 sections) of cropland (43%) indicated that they wanted pronghorn on their land and 84% of respondents owning between 389 and 778 ha (1 ½ -3 sections) indicated they wanted no pronghorn. Respondents who owned different amounts of cropland similarly felt that the pronghorn population had increased during the last five years (Appendix 21), but respondents owning smaller amounts of cropland were less likely to know how many pronghorn were in Kansas (χ^2 = 33.8, 9 df, P < 0.05, Table 31). Forty-seven percent of respondents who owned more than three sections of cropland indicated there were more than 5,000 pronghorn in Kansas.

Respondents who owned more than 389 ha (1½ sections) of cropland replied

Table 29. Opinions of respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to whether or not they liked pronghorn. [a, b]

I like pronghorn.	**≤50%**		**>50%**	
Response:	**n**	**%**	**n**	**%**
Agreed	71	41	52	27
Neutral	78	45	71	37
Disagreed	24	14	68	36

[a] χ^2 test of the distribution of responses between respondents who derived less than or equal to 50% and greater than 50% of their total income from farming showed significant differences ($\chi^2 = 23.5$, 2 df, $P < 0.05$).

[b] Total number of responses: less than or equal to 50% farm income, n = 173; and greater than 50% farm income, n = 191.

Figure 9. Comparison of respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to reasons to dislike pronghorn.

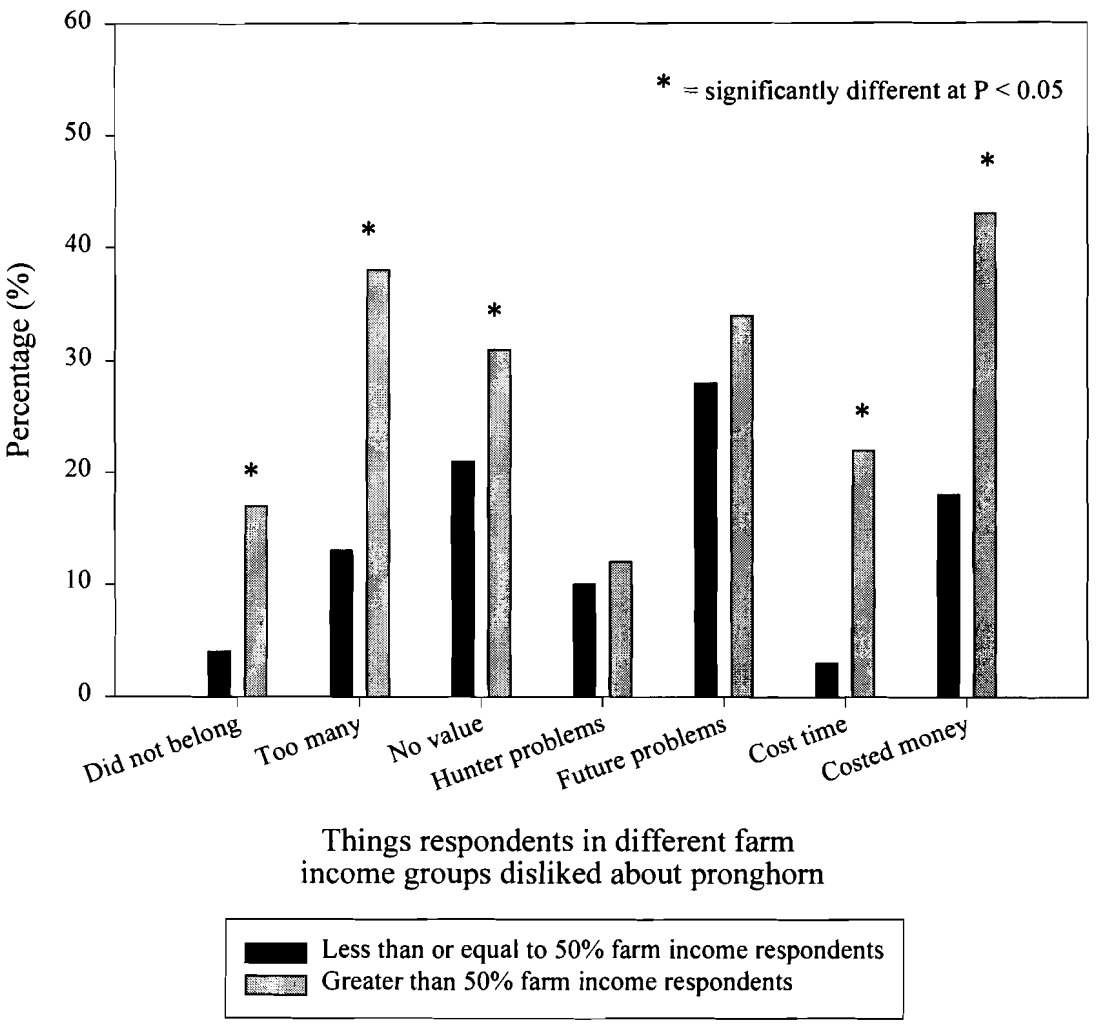

60
50
40
30
20
10
0
Percentage (%)
* = significantly different at P < 0.05
*
*
*
*
*
*
Did not belong
Too many
No value
Hunter problems
Future problems
Cost time
Costed money
Things respondents in different farm income groups disliked about pronghorn
Less than or equal to 50% farm income respondents
Greater than 50% farm income respondents

Figure 10. Comparison of respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to reasons to like pronghorn.

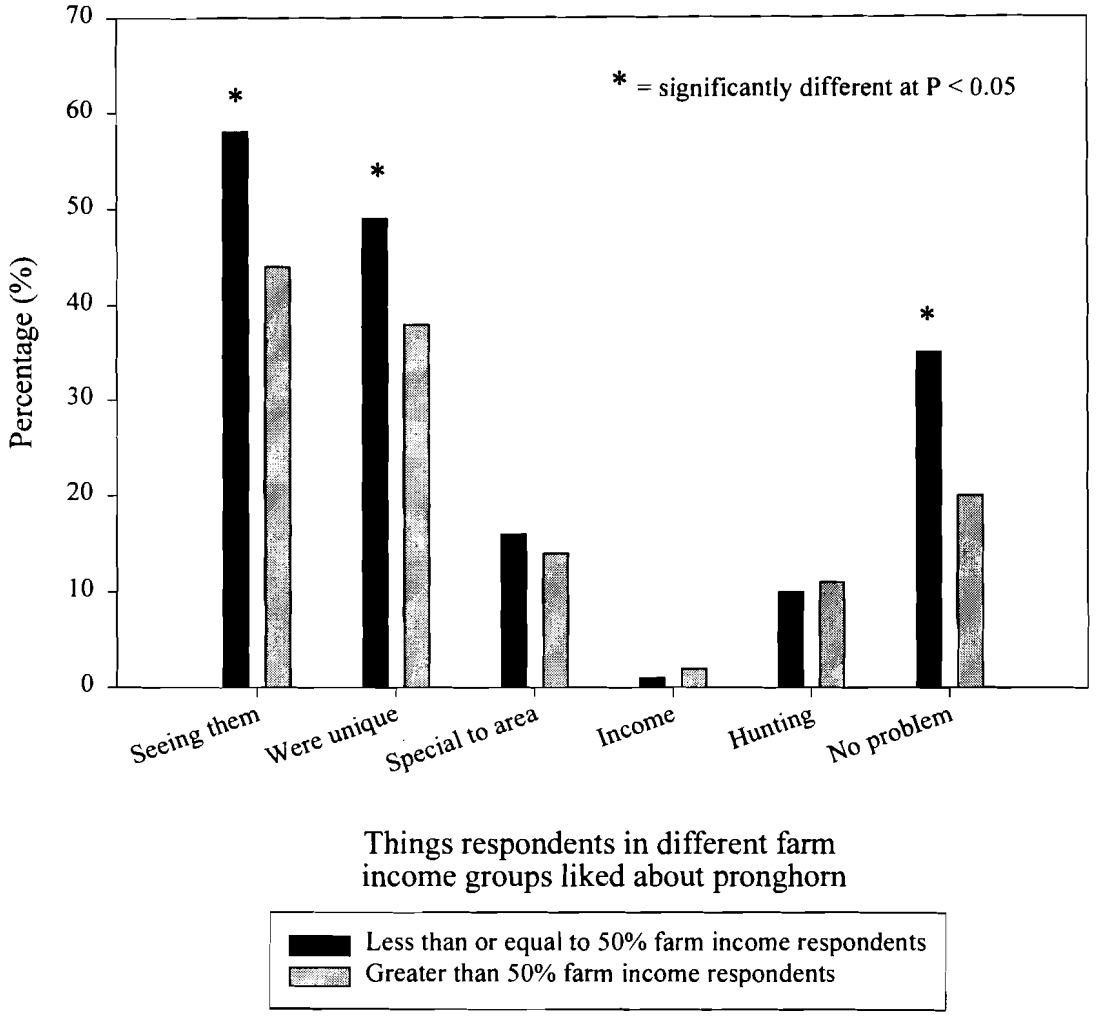

70
60
50
40
30
20
10
0
Percentage (%)
* = significantly different at P < 0.05
*
*
*
Seeing them
Were unique
Special to area
Income
Hunting
No problem
Things respondents in different farm income groups liked about pronghorn
Less than or equal to 50% farm income respondents
Greater than 50% farm income respondents

Table 30. Number of pronghorn wanted by respondents who owned different amounts of cropland.[a]

Number of pronghorn respondents wanted on their land	Hectares of cropland: Percent responding in each group[b, c]			
	1	2	3	4
0	69	64	84	57
> 0	31	36	16	43

[a]A χ^2 of the distribution of responses between respondents who owned different amounts of cropland showed significant differences ($\chi^2 = 10.0$, 3 df, $P < 0.05$).

[b]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[c]Total responses in each group: 1, n = 67; 2, n = 70; 3, n = 50; and 4, n = 75.

Table 31. Comparison of answers given by respondents who owned different amounts of cropland relative to the number of pronghorn in Kansas.[a]

Number of pronghorn	Hectares of cropland Percent responding in each group[b, c]			
	1	2	3	4
<1,000	6	5	0	1
1,001 - 5,000	6	10	11	19
>5,000	21	32	25	47
Did not know	66	54	65	33

[a]A χ^2 of the distribution of responses between respondents who owned different amounts of cropland showed significant differences ($\chi^2 = 33.8$, 9 df, $P < 0.05$).

[b]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[c]Total responses in each group: 1, n = 94; 2, n = 82; 3, n = 57; and 4, n = 85.

that pronghorn spread bindweed and over half (63%) of respondents who owned less than 130 ha (½ section) answered that they did not know if pronghorn spread bindweed ($\chi^2 = 45.9$, 6 df, $P < 0.05$, Table 32). Respondents who owned different amounts of cropland had similar opinions relative to Likert scale statements regarding pronghorn and the spread of bindweed (Appendix 22). Most respondents, regardless of how much cropland they owned, believed that pronghorn may be one of many factors involved in the spread of bindweed, but were an important factor nonetheless. Few respondents in all cropland ownership categories indicated that pronghorn were the primary cause of the spread of bindweed. There were also no associations among amount of cropland owned by respondents and opinions relative to the spread of disease to livestock by pronghorn (Appendix 23). Most respondents in all cropland ownership categories agreed that pronghorn were only a minor factor in disease transmission to livestock. Respondents in all cropland ownership categories similarly agreed that pronghorn damaged fences. However, respondents who owned more than 130 ha of cropland were more inclined to believe fence damage caused by pronghorn was excessive ($\chi^2 = 17.7$, 6 df, $P < 0.05$, Table 33).

Respondents who owned less than 130 ha of cropland were more likely to agree that pronghorn grazing reduced forage availability for cattle than respondents who owned more than 778 ha ($\chi^2 = 14.2$, 6 df, $P < 0.05$, Table 34). Respondents in all cropland ownership categories agreed that pronghorn grazing and trampling reduced wheat yields, but did not result in severe losses (Appendix 24).

There was no association between amount of cropland owned and ability to

Table 32. Opinions of respondents who owned different amounts of cropland relative to whether or not pronghorn spread bindweed.[a]

Do pronghorn spread bindweed?	Hectares of cropland Percent responding in each group[b, c]			
	1	2	3	4
Yes	34	53	72	70
No	2	0	2	8
Did not know	63	47	26	22

[a]A χ^2 of the distribution of responses between respondents who owned different amounts of cropland showed significant differences ($\chi^2 = 45.9$, 6 df, $P < 0.05$).

[b]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[c]Total responses in each group: 1, n = 93; 2, n = 81; 3, n = 57; and 4, n = 86.

Table 33. Opinions of respondents who owned different amounts of cropland relative to fence damage caused by pronghorn.

Opinions about pronghorn and fence damage	Hectares of cropland: Percent responding in each group[a]			
	1	2	3	4
Pronghorn cause excessive damage to fences.[b, c]				
Agreed	30	59	50	47
Neutral	30	15	33	17
Disagreed	41	25	17	36
Pronghorn frequently damage fences.[d]				
Agreed	44	59	57	57
Neutral	27	23	22	17
Disagreed	29	18	22	26
Pronghorn cause very little fence damage.[e]				
Agreed	39	33	30	34
Neutral	27	18	23	9
Disagreed	34	48	48	57

Table 33 (Continued).

Opinions about pronghorn and fence damage	Hectares of cropland Percent responding in each group[a]			
	1	2	3	4
Pronghorn do not damage fences.[f]				
Agreed	19	11	2	16
Neutral	28	20	24	16
Disagreed	53	69	74	68

[a]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[b]A χ^2 of the distribution of responses between respondents who owned different amounts of cropland showed significant differences ($\chi^2 = 17.7$, 6 df, $P < 0.05$).

[c]Total responses in each group: 1, n = 64; 2, n = 59; 3, n = 46; and 4, n = 76.

[d]Total responses in each group: 1, n = 63; 2, n = 61; 3, n = 46; and 4, n = 76.

[e]Total responses in each group: 1, n = 64; 2, n = 60; 3, n = 44; and 4, n = 76.

[f]Total responses in each group: 1, n = 64; 2, n = 61; 3, n = 46; and 4, n = 76.

Table 34. Opinions of respondents who owned different amounts of cropland relative to pronghorn competition with cattle for forage.

Opinions about pronghorn competition with cattle	Hectares of cropland: Percent responding in each group[a]			
	1	2	3	4
Pronghorn grazing causes severe forage reductions for cattle.[b]				
Agreed	31	29	30	22
Neutral	25	32	34	32
Disagreed	44	39	36	46
Pronghorn grazing reduces forage for cattle.[c, d]				
Agreed	62	46	65	51
Neutral	20	41	18	26
Disagreed	18	13	18	26
Pronghorn grazing causes minor forage reductions for cattle.[e]				
Agreed	51	61	47	55
Neutral	21	23	25	20
Disagreed	28	16	27	25

Table 34 (Continued).

Opinions about pronghorn competition with cattle	Hectares of cropland Percent responding in each group[a]			
	1	2	3	4
Pronghorn grazing does not reduce cattle forage.[f]				
Agreed	15	10	12	20
Neutral	26	36	20	25
Disagreed	58	54	69	55

[a]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[b]Total responses in each group: 1, n = 64; 2, n = 59; 3, n = 50; and 4, n = 72.

[c]A χ^2 of the distribution of responses between respondents who owned different amounts of cropland showed significant differences ($\chi^2 = 14.2$, 6 df, $P < 0.05$).

[d]Total responses in each group: 1, n = 66; 2, n = 63; 3, n = 51; and 4, n = 73.

[e]Total responses in each group: 1, n = 67; 2, n = 62; 3, n = 51; and 4, n = 75.

[f]Total responses in each group: 1, n = 65; 2, n = 61; 3, n = 51; and 4, n = 75.

distinguish between damage caused by pronghorn and white-tailed deer (Appendix 25). Approximately half of respondents in all cropland ownership categories indicated that they thought problem pronghorn were shot (Appendix 26), and there were no differences in respondent reactions toward individuals who shot pronghorn that caused damage (Appendix 27). However, respondents with smaller farms were more likely to inform authorities about individuals who shot pronghorn on their land without a permit ($\chi^2 = 24.2$, 12 df, $P < 0.05$, Table 35).

Respondents who owned more than 389 ha of cropland tended to dislike pronghorn more than respondents with smaller farms ($\chi^2 = 20.5$, 6 df, $P < 0.05$, Table 36). Only 13% of respondents who owned less than 130 ha indicated that they disliked pronghorn. Respondents who owned more than 389 ha of cropland were more likely than respondents with smaller farms to dislike pronghorn because they felt there were too many ($\chi^2 = 10.9$, 1 df, $P < 0.05$), pronghorn did not belong in Kansas ($\chi^2 = 7.7$, 1 df, $P < 0.05$), they have had problems with pronghorn hunters ($\chi^2 = 6.8$, 1 df, $P < 0.05$), and pronghorn damage cost them time ($\chi^2 = 9.9$, 1 df, $P < 0.05$) and money ($\chi^2 = 14.8$, 1 df, $P < 0.05$) (Figure 11). Respondents who owned less than 389 ha of cropland were more inclined to like pronghorn than respondents with larger farms because they enjoyed seeing them ($\chi^2 = 5.3$, 1 df, $P < 0.05$) (Figure 12).

Comparisons of respondents owning different amounts of rangeland

Respondents who owned different amounts of rangeland all similarly indicated that they wanted no pronghorn on their land (Appendix 28) and felt that the pronghorn population had increased during the last five years (Appendix 29). There were also no

Table 35. Reactions of respondents who owned different amounts of cropland relative to individuals who shot pronghorn on their land without a permit.[a]

	Hectares of cropland			
	Percent responding in each group[b, c]			
Reaction	**1**	**2**	**3**	**4**
Supportive	3	6	16	11
Asked them to leave	18	27	16	21
Did nothing	10	14	28	21
Informed authorities	47	34	24	32
No opinion	22	19	16	16

[a]A χ^2 of the distribution of responses between respondents who owned different amounts of cropland showed significant differences ($\chi^2 = 24.2$, 12 df, $P < 0.05$).

[b]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[c]Total responses in each group: 1, n = 93; 2, n = 79; 3, n = 50; and 4, n = 82.

Table 36. Opinions of respondents who owned different amounts of cropland relative to whether or not they liked pronghorn. [a]

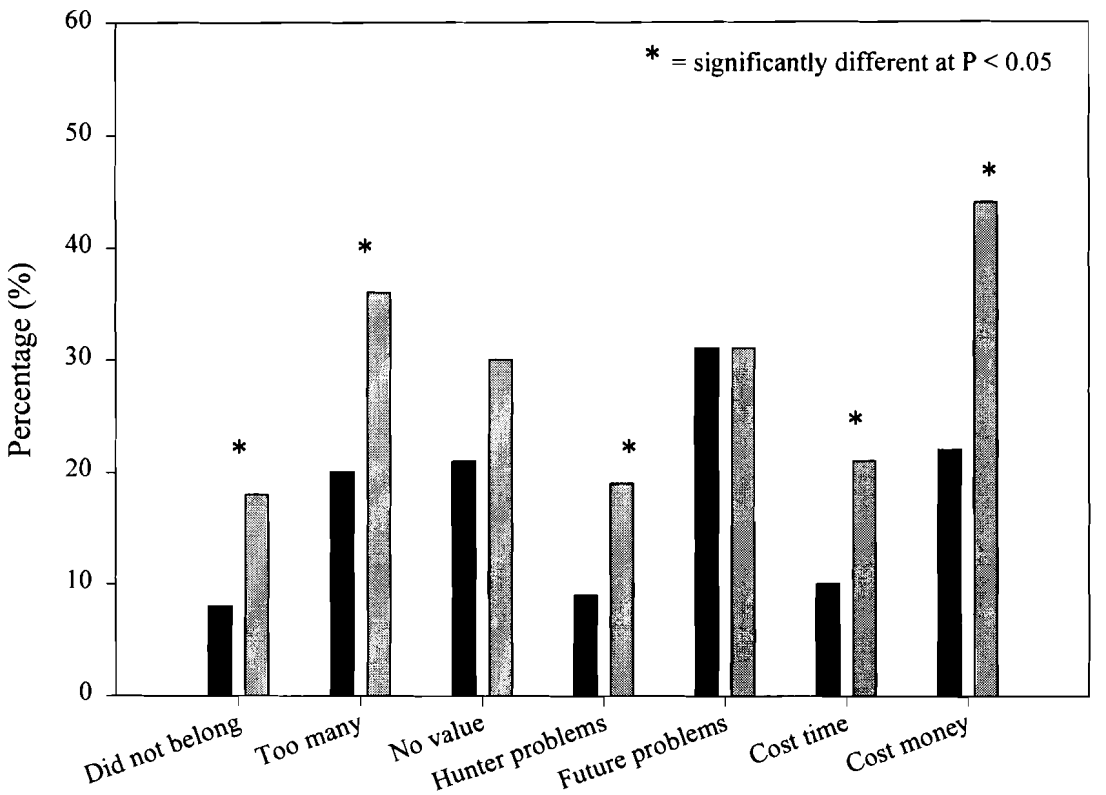
	Hectares of cropland			
I like pronghorn.	**Percent responding in each group** [b, c]			
Response:	**1**	**2**	**3**	**4**
Agreed	40	31	24	38
Neutral	47	44	37	27
Disagreed	13	25	39	35

[a]A χ^2 of the distribution of responses between respondents who owned different amounts of cropland showed significant differences (χ^2 = 20.5, 6 df, $P < 0.05$).

[b]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[c]Total responses in each group: 1, n = 93; 2, n = 80; 3, n = 54; and 4, n = 86.

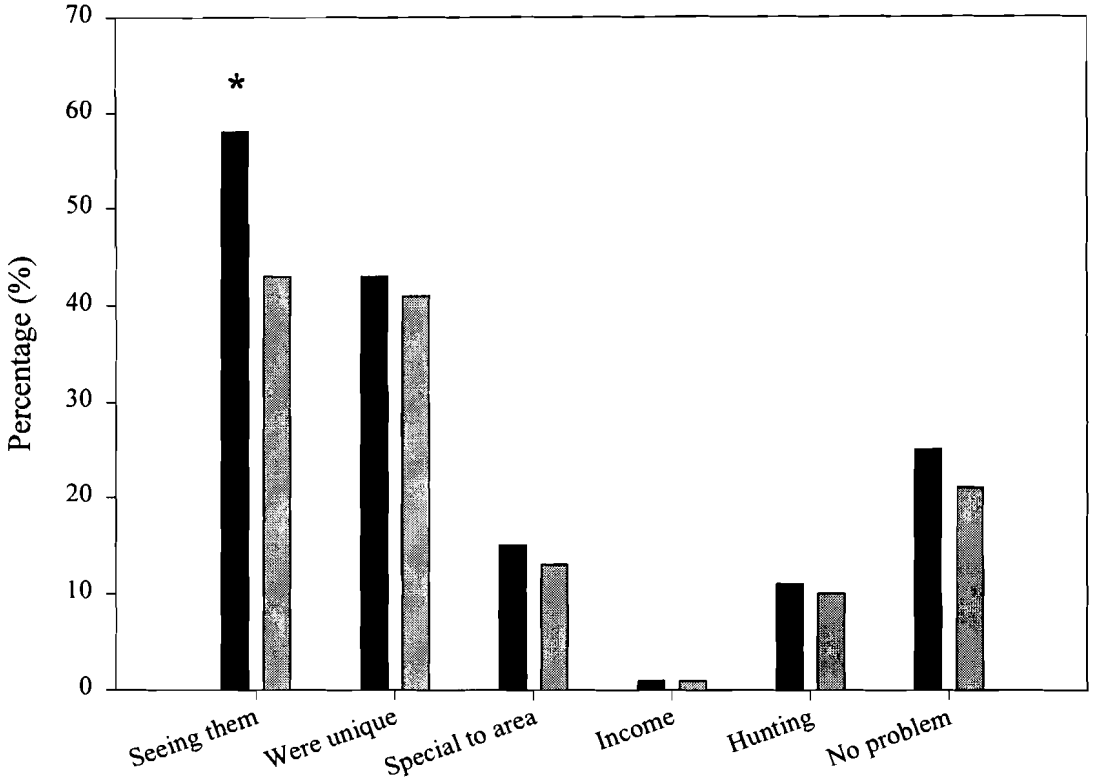
Figure 11. Comparison of respondents who owned different amounts of cropland relative to reasons to dislike pronghorn.



Things respondents who owned different amounts of cropland disliked about pronghorn

Respondents owning less than or equal to 389 ha of cropland
Respondents owning greater than 389 ha of cropland

Figure 12. Comparison of respondents who owned different amounts of cropland relative to reasons to like pronghorn.



Things respondents who owned different amounts of cropland liked about pronghorn

Respondents owning less than or equal to 389 ha of cropland
Respondents owning greater than 389 ha of cropland

associations between amount of rangeland owned and estimates of the pronghorn population in Kansas; most respondents believed there were more than 5,000 pronghorn in Kansas (Appendix 30).

There was a consensus among respondents who owned different amounts of rangeland that pronghorn did spread bindweed (Appendix 31). Responses to Likert scale statements relative to bindweed were also similar among respondents in different rangeland ownership groups, with most respondents agreeing that pronghorn were an important factor in bindweed spread (Appendix 32).

No differences existed among respondents who owned different amounts of rangeland for responses to Likert scale statements relative to pronghorn and the spread of disease (Appendix 33), fence damage (Appendix 34), forage reductions (Appendix 35), and wheat yield reductions (Appendix 36). Few respondents indicated that pronghorn were important in the spread of disease to livestock, but most agreed that pronghorn frequently damaged fences and may cause excessive fence damage. Forage reductions for cattle caused by pronghorn grazing did not seem to be a major concern to rangeland owners. Most agreed that pronghorn grazing did reduce forage, but not severely. Respondents similarly agreed that pronghorn did cause wheat yield reductions, but disagreed that such reductions were severe.

Sixty-one percent of respondents who owned more than 518 ha (2 sections) of rangeland replied that pronghorn and white-tailed deer damage was distinguishable, compared to only 24% of respondents, owning 65 ha (1/4 section) or less, who indicated that such damage could be differentiated ($\chi^2 = 13.9$, 6 df, $P < 0.05$, Table 37). Most

Table 37. Comparison of answers given by respondents who owned different amounts of rangeland relative to whether or not they thought pronghorn and white-tailed deer damage could be distinguished.[a]

	Hectares of rangeland			
	Percent responding in each group[b, c]			
Is damage distinguishable?	**1**	**2**	**3**	**4**
Yes	24	36	41	61
No	31	24	19	13
Did not know	44	39	41	26

[a]A χ^2 of the distribution of responses between respondents who owned different amounts of rangeland showed significant differences ($\chi^2 = 13.9$, 6 df, $P < 0.05$).

[b]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[c]Total responses in each group: 1, n = 45; 2, n = 66; 3, n = 37; and 4, n = 46.

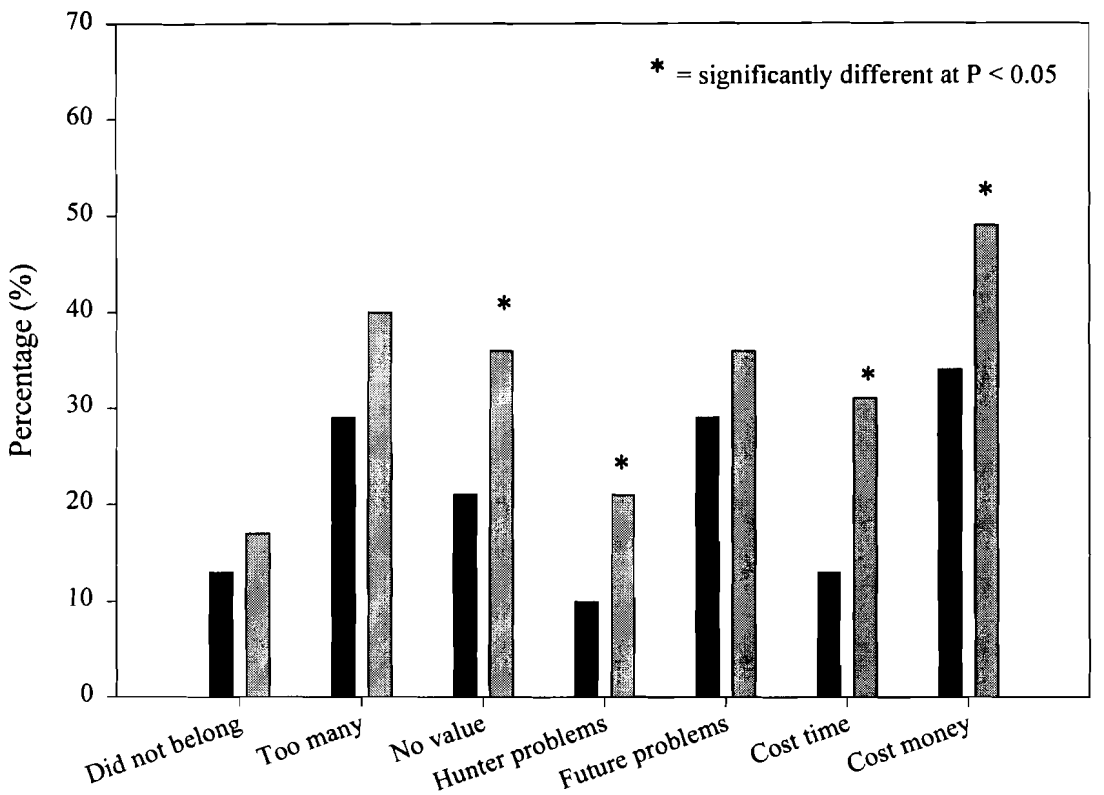
respondents, regardless of amount of rangeland owned, indicated that pronghorn were shot if they were considered to be causing damage (Appendix 37). Respondents who owned different amounts of rangeland also implied similar reactions toward individuals who shot problem pronghorn (Appendix 38) or shot pronghorn without a permit (Appendix 39). Very few respondents indicated that they would inform authorities about pronghorn being shot if those pronghorn were causing damage, but a greater proportion of respondents would inform authorities if pronghorn were being shot without a permit on their land.

There was no association between amount of rangeland owned and whether or not respondents liked pronghorn. Respondents who owned different amounts of rangeland were fairly evenly split relative to whether they liked, disliked, or were neutral toward pronghorn (Appendix 40). Respondents who owned more than 260 ha (1 section) of rangeland were more likely to dislike pronghorn because they felt pronghorn have no value ($\chi^2 = 5.9$, 1 df, $P < 0.05$), they have had problems with pronghorn hunters ($\chi^2 = 4.56$, 1 df, $P < 0.05$), and pronghorn damage cost them time ($\chi^2 = 9.2$, 1 df, $P < 0.05$) and money ($\chi^2 = 4.7$, 1 df, $P < 0.05$) (Figure 13). Respondents who owned different amounts of rangeland tended to like pronghorn for similar reasons, with most indicating that they liked seeing pronghorn (Appendix 41).

Age group comparisons

A majority of respondents in all age groups wanted no pronghorn on their land (Appendix 42). Most respondents in each age group responded that they did not know how many pronghorn were in Kansas (Appendix 43), but most believed that the

Figure 13. Comparison of respondents who owned different amounts of rangeland relative to reasons to dislike pronghorn.



Things respondents who owned different amounts of rangeland disliked about pronghorn

Respondents owning less than or equal to 259 ha of rangeland
Respondents owning greater than 259 ha of rangeland

pronghorn population increased during the last five years. However, respondents 45 years old or younger were more likely than older respondents to think that the pronghorn population has remained the same during the last five years, ($\chi^2 = 13.4$, 6 df $P < 0.05$, Table 38).

A majority of respondents in each age group indicated that pronghorn spread bindweed (Appendix 44) and made similar responses to most Likert scale statements relative to the spread of bindweed by pronghorn. However, 21% of respondents older than 65 years disagreed that pronghorn were important in the spread of bindweed, compared to only 5% of respondents 45 years old or younger who disagreed ($\chi^2 = 10.8$, 4 df, $P < 0.05$, Table 39).

Respondents in all age groups made similar responses to statements relative to pronghorn and disease transmission, with most indicating that pronghorn were not a major problem in spreading disease to livestock (Appendix 45). Sixty-three percent of respondents 45 years old or younger disagreed that pronghorn cause little damage to fences, compared to 35% of respondents older than 65 years who disagreed ($\chi^2 = 12.2$, 4 df, $P < 0.05$). Younger respondents (75%) were also more likely to disagree that pronghorn do not damage fences than respondents older than 65 years (55%) ($\chi^2 = 10.4$, 4 df, $P < 0.05$) (Table 40). Most respondents similarly agreed that pronghorn grazing causes forage reductions for cattle (Appendix 46) and reduces wheat yields (Appendix 47). However, respondents in all age groups indicated that pronghorn grazing and trampling does not cause severe wheat yield losses.

Most respondents, regardless of age, did not know if pronghorn and white-tailed

Table 38. Comparison of answers given by respondents in different age groups relative to pronghorn population trends in Kansas during the last five years.[a]

	Age group[b]		
	Percent responding		
Pronghorn population has:	**≤45**	**46-65**	**>65**
Increased	53	62	63
Stayed the same	33	16	19
Decreased	14	11	4
Did not know	0	11	14

[a]A χ^2 test of the distribution of responses from respondents in different age groups showed significant differences ($\chi^2 = 13.4$, 6 df, $P < 0.05$).

[b]Total number of responses in each group: less than or equal to 45 years, n = 43; 46-65 years, n = 89; and greater than 65 years, n = 57.

Table 39. Opinions of respondents in different age groups relative to the spread of bindweed by pronghorn.

Opinions about pronghorn and the spread of bindweed	Age group Percent responding ≤45	46-65	>65
Pronghorn do not spread bindweed.[a]			
Agreed	13	12	14
Neutral	18	9	14
Disagreed	69	79	73
Pronghorn are important in the spread of bindweed.[b, c]			
Agreed	69	71	64
Neutral	26	16	15
Disagreed	5	13	21
Pronghorn are one of many causes of bindweed spread.[d]			
Agreed	85	86	80
Neutral	12	7	14
Disagreed	3	7	6

Table 39 (Continued).

Opinions about pronghorn and the spread of bindweed	Age group Percent responding <45	46-65	>65
Pronghorn are a minor factor in bindweed spread.[e]			
Agreed	16	16	26
Neutral	24	15	16
Disagreed	60	68	58
Pronghorn are the primary cause of bindweed spread.[f]			
Agreed	35	35	35
Neutral	27	30	20
Disagreed	38	35	45

[a]Total responses in each age group: less than or equal to 45 years, n = 62; 46-65 years, n = 123; and greater than 65 years, n = 95.

[b]A χ^2 test of the distribution of responses from respondents in different age groups showed significant differences ($\chi^2 = 10.8$, 4 df, $P < 0.05$).

[c]Total responses in each age group: less than or equal to 45 years, n = 61; 46-65 years, n = 122; and greater than 65 years, n = 89.

Table 39 (Continued).

[d]Total responses in each age group: less than or equal to 45 years, n = 66; 46-65 years, n = 129; and greater than 65 years, n = 95.

[e]Total responses in each age group: less than or equal to 45 years, n = 62; 46-65 years, n = 123; and greater than 65 years, n = 97.

[f]Total responses in each age group: less than or equal to 45 years, n = 63; 46-65 years, n = 125; and greater than 65 years, n = 85.

Table 40. Opinions of respondents in different age groups relative to fence damage caused by pronghorn.

Opinions about pronghorn and fence damage	Age group Percent responding ≤45	46-65	>65
Pronghorn cause excessive damage to fences.[a]			
Agreed	55	47	42
Neutral	19	24	20
Disagreed	27	29	38
Pronghorn frequently damage fences.[b]			
Agreed	69	53	48
Neutral	15	23	21
Disagreed	15	24	31
Pronghorn cause very little fence damage.[c, d]			
Agreed	23	35	43
Neutral	14	17	22
Disagreed	63	48	35

Table 40 (Continued).

Opinions about pronghorn and fence damage	Age group Percent responding ≤45	46-65	>65
Pronghorn do not damage fences.[e, f]			
Agreed	12	9	21
Neutral	12	22	24
Disagreed	75	69	55

[a]Total responses in each age group: less than or equal to 45 years, n = 64; 46-65 years, n = 129; and greater than 65 years, n = 90.

[b]Total responses in each age group: less than or equal to 45 years, n = 65; 46-65 years, n = 131; and greater than 65 years, n = 90.

[c]A χ^2 test of the distribution of responses from respondents in different age groups showed significant differences ($\chi^2 = 12.2$, 4 df, $P < 0.05$).

[d]Total responses in each age group: less than or equal to 45 years, n = 65; 46-65 years, n = 128; and greater than 65 years, n = 89.

[e]A χ^2 test of the distribution of responses from respondents in different age groups showed significant differences ($\chi^2 = 10.4$, 4 df, $P < 0.05$).

[f]Total responses in each age group: less than or equal to 45 years, n = 65; 46-65 years, n = 127; and greater than 65 years, n = 92.

deer damage could be distinguished (Appendix 48). Approximately half of all respondents in each age group indicated that pronghorn were commonly shot if they were causing problems (Appendix 49). Respondents older than 65 years were more likely to have no opinion (33%) relative to how they would react toward individuals who shot problem pronghorn ($\chi^2 = 24.9$, 10 df, $P < 0.05$, Table 41), and few respondents in all age groups indicated they would inform the authorities. However, most respondents in all age groups would inform the authorities of individuals who shot pronghorn without a permit on their land (Appendix 50).

There was no association between respondent age and whether or not a respondent liked pronghorn (Appendix 51). Most respondents in all age groups replied that they were neutral relative to whether or not they liked pronghorn, but more respondents, regardless of age, agreed that they liked than disliked pronghorn. Respondents 65 years old and younger were more likely to dislike pronghorn because they thought there were too many ($\chi^2 = 12.5$, 2 df, $P < 0.05$), and pronghorn damage cost them time ($\chi^2 = 22.7$, 2 df, $P < 0.05$) and money ($\chi^2 = 17.9$, 2 df, $P < 0.05$) (Figure 14). Respondents in all age groups tended to like pronghorn for similar reasons, but respondents 65 years old or younger were more likely to like pronghorn because they enjoyed hunting them ($\chi^2 = 6.2$, 2 df, $P < 0.05$, Fig 15).

Organizational affiliation comparisons

Regardless of organizational affiliation, a majority of respondents wanted no pronghorn on their land (Appendix 52) and indicated that the pronghorn population increased during the last five years (Appendix 53). Respondents belonging to an

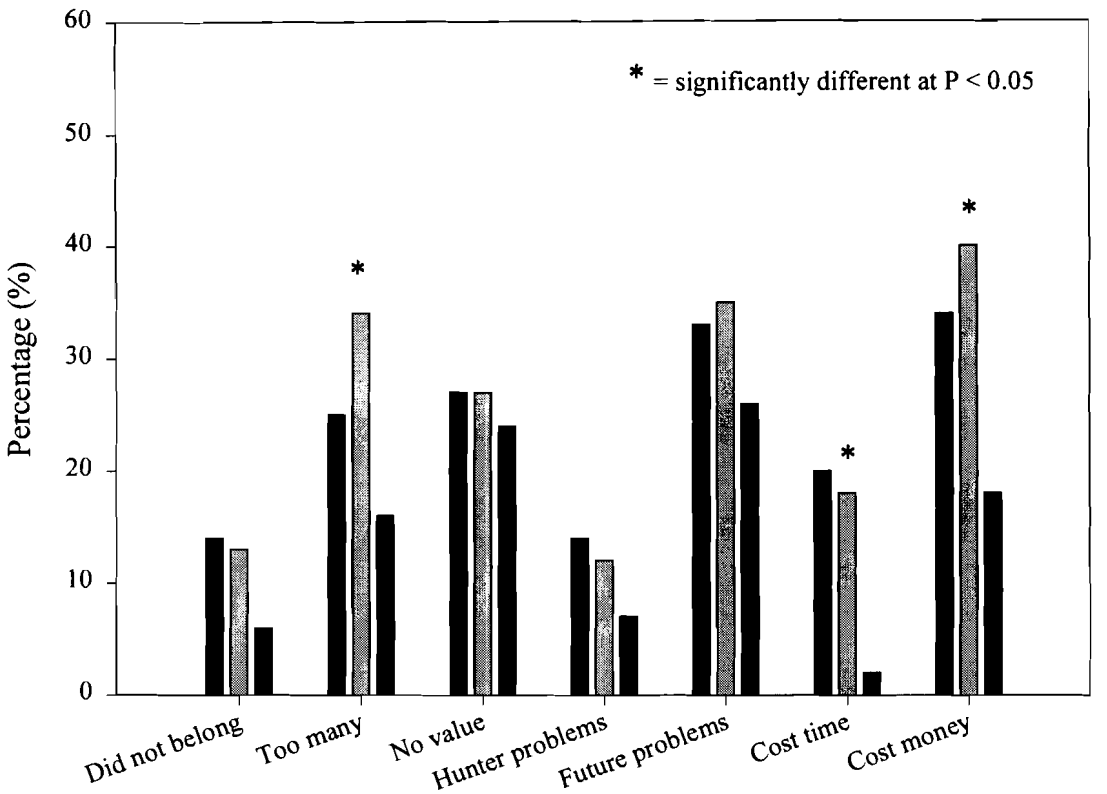
Table 41. Comparison of reactions of respondents in different age groups relative to individuals who shot problem-causing pronghorn on their own property.[a]

Reaction	Age group[b] Percent responding		
	≤45	46-65	>65
Supportive	20	28	23
Avoided those individuals	1	0	1
None of my business	26	20	19
Informed authorities	8	4	7
Questioned judgement	28	32	17
No opinion	18	15	33

[a]A χ^2 test of the distribution of responses from respondents in different age groups showed significant differences ($\chi^2 = 24.9$, 10 df, $P < 0.05$).

[b]Total number of responses in each age group: less than or equal to 45 years, n = 80; 46-65 years, n = 158; and greater than 65 years, n = 126.

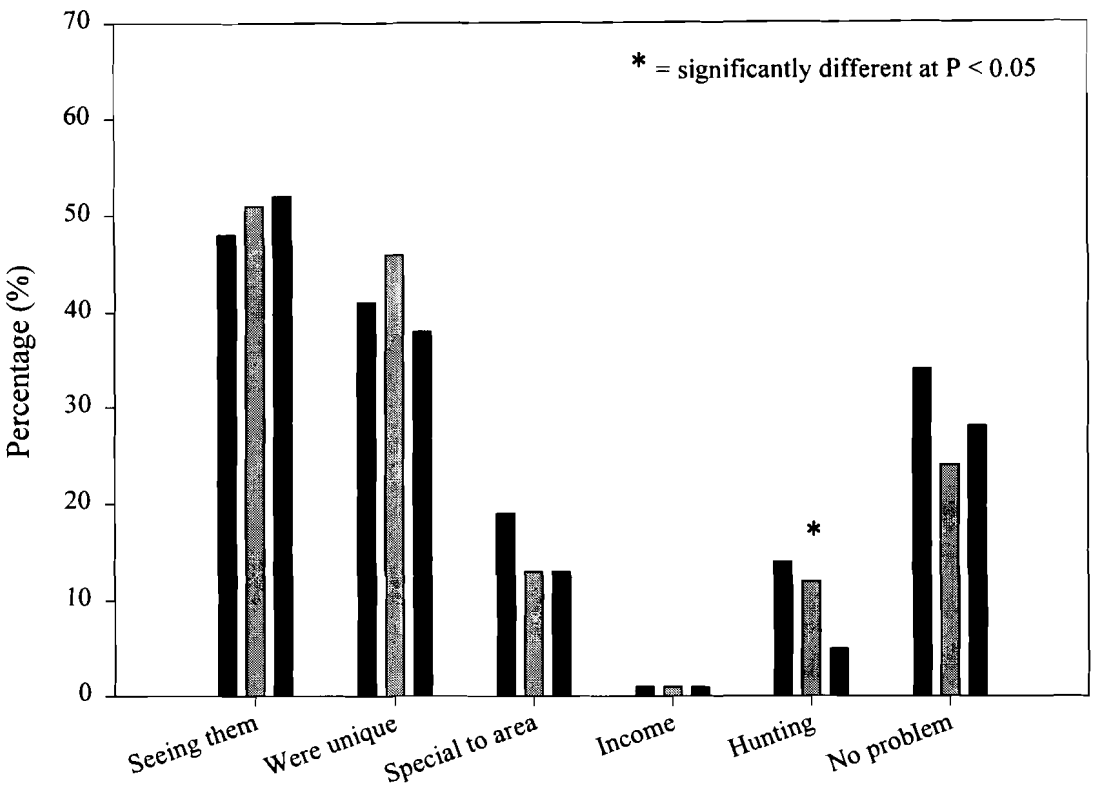
Figure 14. Comparison of respondents in different age groups relative to reasons to dislike pronghorn.



Things respondents in different age groups disliked about pronghorn

Less than or equal to 45 years
46-65 years
Greater than 65 years

Figure 15. Comparison of respondents in different age groups relative to reasons to like pronghorn.



Things respondents in different age groups liked about pronghorn

Less than or equal to 45 years
46-65 years
Greater than 65 years

organization were more likely to believe that there were more than 5,000 pronghorn in Kansas and 62% of respondents with no organizational ties indicated that they did not know how many pronghorn were in Kansas ($\chi^2 = 19.5$, 3 df $P < 0.05$, Table 42).

A greater proportion (65%) of respondents who belonged to an organization replied that pronghorn spread bindweed, whereas 50% of respondents not belonging to an organization did not know if pronghorn spread bindweed ($\chi^2 = 13.7$, 2 df $P < 0.05$, Table 43). There were no differences in opinion between respondents who did and did not belong to an organization relative to Likert scale statements about the involvement of pronghorn in bindweed spread (Appendix 54), disease transmission (Appendix 55), fence damage (Appendix 56), forage reductions (Appendix 57), and wheat yield reductions (Appendix 58). Most respondents, regardless of organizational affiliation, agreed to statements implicating pronghorn with bindweed spread, fence damage, forage reductions, and wheat yield reductions.

A majority of respondents, regardless of organizational affiliation, replied that they did not know if pronghorn and white-tailed deer damage could be distinguished (Appendix 59). There were also no differences between respondents who did and did not belong to an organization relative to whether or not they thought pronghorn that were causing damage were commonly shot. A little over half of respondents in both groups indicated that problem pronghorn were shot (Appendix 60). Respondents with and without organizational affiliations responded similarly in regards to their reactions toward people who shot problem pronghorn (Appendix 61), with few indicating that they

Table 42. Comparison of answers given by respondents who did and did not belong to a farm or sporting organization relative to the number of pronghorn in Kansas.[a]

	Affiliated with an organization?	
	Percent responding	
Number of pronghorn	**Yes**	**No**
<1,000	2	5
1,001-5,000	14	10
>5,000	42	23
Did not know	42	62

[a]A χ^2 test of the distribution of responses between respondents who did and did not belong to a farm or sporting organization showed significant differences ($\chi^2 = 19.5$, 3 df, $P < 0.05$).

[b]Total number of responses: yes, n = 127; and no, n = 229.

Table 43. Comparison of answers given by respondents who did and did not belong to a farm or sporting organization relative to whether or not pronghorn spread bindweed.[a, b]

	Affiliated with an organization?	
	Percent responding	
Do pronghorn spread bindweed?	**Yes**	**No**
Yes	65	48
No	6	3
Did not know	30	50

[a]A χ^2 test of the distribution of responses between respondents who did and did not belong to a farm or sporting organization showed significant differences ($\chi^2 = 13.7$, 2 df, $P < 0.05$).

[b]Total number of responses: yes, n = 127; and no, n = 227.

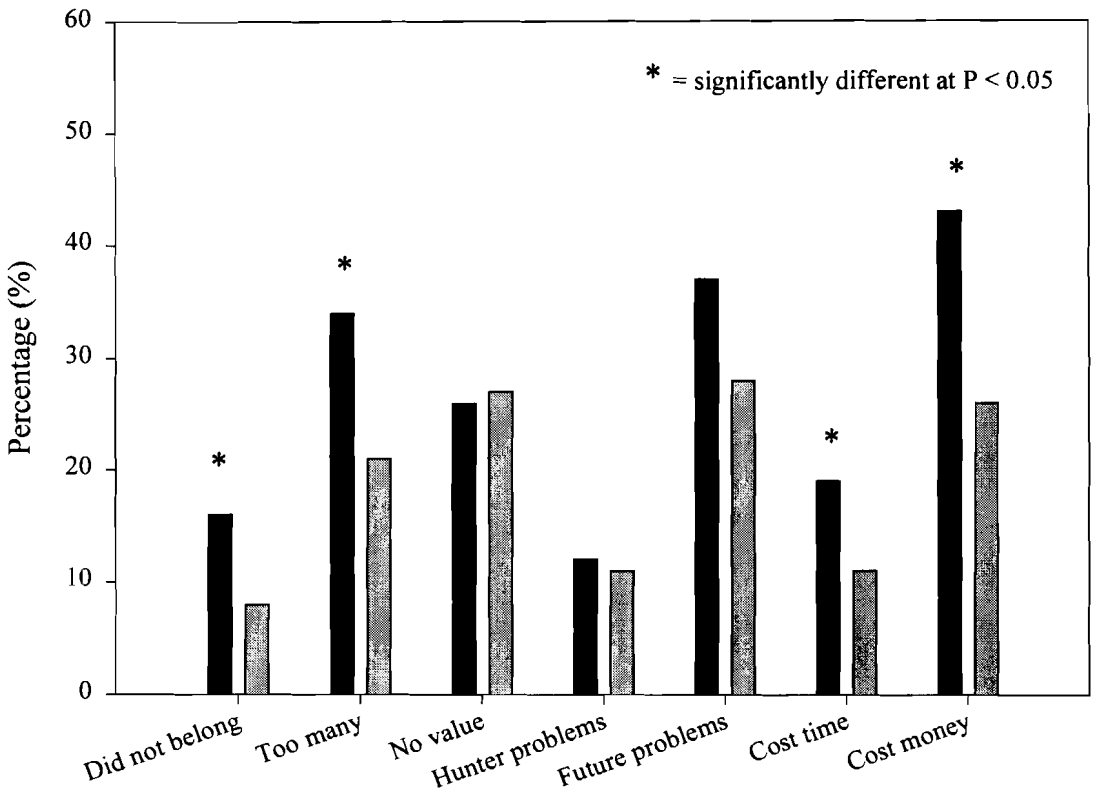
would inform authorities and over 20% of respondents in each group indicated that they would support such actions. However, approximately 30% of respondents, regardless of organizational membership, would inform authorities of pronghorn being shot on their land without a permit (Appendix 62).

Organizational membership had no bearing on whether or not respondents liked pronghorn (Appendix 63). Thirty-eight percent of respondents who belonged to an organization liked pronghorn, as did 30% of respondents who did not belong to an organization. Respondents who belonged to an organization tended to dislike pronghorn more than respondents without organizational ties because they felt that pronghorn did not belong in Kansas ($\chi^2 = 4.7$, 1 df $P < 0.05$), there were too many pronghorn in Kansas ($\chi^2 = 7.6$, 1 df $P < 0.05$), and pronghorn damaged cost them time ($\chi^2 = 5.3$, 1 df $P < 0.05$) and money ($\chi^2 = 10.5$, 1 df $P < 0.05$) (Figure 16). Respondents who belonged to an organization tended to like pronghorn because of hunting opportunities ($\chi^2 = 4.3$, 1 df $P < 0.05$) more than respondents who did not belong to an organization. Otherwise, respondents tended to like pronghorn for similar reasons (Figure 17).

Comparisons of respondents who did and did not allow pronghorn hunting on their land

There was no association between the number of pronghorn wanted and whether or not respondents allowed pronghorn hunting on their land; a majority of respondents in each group wanted no pronghorn on their land (Appendix 64). Respondents who allowed pronghorn hunting on their land were more likely to think that the

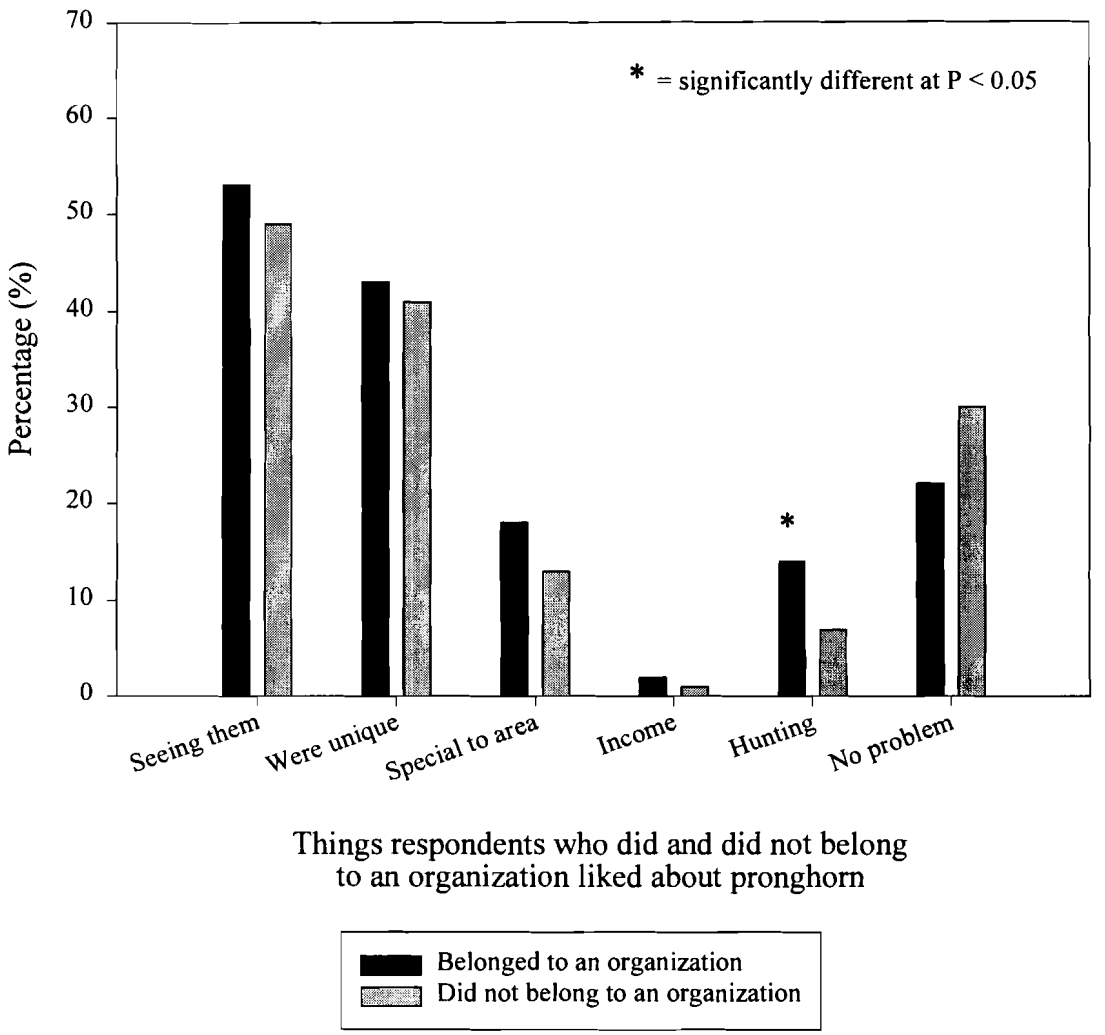
Figure 16. Comparison of respondents who did and did not belong to a farm or sporting organization relative to reasons to dislike pronghorn.



Things respondents who did and did not belong to a farm or sporting organization disliked about pronghorn

Belonged to an organization
Did not belong to an organization

Figure 17. Comparison of respondents who did and did not belong to a farm or sporting organization relative to reasons to like pronghorn.


70
60
50
40
30
20
10
0
Percentage (%)
* = significantly different at P < 0.05
*
Seeing them
Were unique
Special to area
Income
Hunting
No problem
Things respondents who did and did not belong to an organization liked about pronghorn
Belonged to an organization
Did not belong to an organization

pronghorn population in Kansas increased during the last five years ($\chi^2 = 14.0$, 3 df $P < 0.05$, Table 44). Almost half of respondents who allowed pronghorn hunting on their land indicated that there were more than 5,000 pronghorn in Kansas, but only 17% of respondents who did not allow pronghorn hunting on their land answered similarly ($\chi^2 = 48.6$, 3 df $P < 0.05$, Table 45).

Respondents who allowed pronghorn hunting on their land were much more likely (77%) to indicate that pronghorn spread bindweed than respondents who did not allow pronghorn hunting (39%) ($\chi^2 = 43.8$, 2 df $P < 0.05$, Table 46). Respondents who allowed pronghorn hunting were more likely to disagree that pronghorn were a minor factor in bindweed spread ($\chi^2 = 13.3$, 2 df, $P < 0.05$) and 42% indicated that pronghorn were the primary cause of bindweed spread ($\chi^2 = 10.6$, 2 df, $P < 0.05$) (Table 47). Respondents who allowed pronghorn hunting made similar responses to statements relative to disease transmission as respondents who did not allow pronghorn hunting, with most disagreeing that pronghorn were an important factor in disease transmission (Appendix 65).

There were significant differences between whether or not respondents allowed pronghorn hunting on their land and responses to all Likert scale statements relative to pronghorn and fence damage. Seventy-four percent of respondents who allowed pronghorn hunting on their land disagreed that pronghorn did not damage fences, compared to 54% of respondents who did not allow pronghorn hunting on their land ($\chi^2 = 9.5$, 2 df, $P < 0.05$). A greater proportion of respondents who allowed pronghorn hunting their land agreed that pronghorn frequently damaged fences ($\chi^2 = 19.2$, 2 df,

Table 44. Comparison of answers given by respondents who did and did not allow pronghorn hunting on their land relative to pronghorn population trends in Kansas during the last five years.[a]

	Allow pronghorn hunting?[b]	
	Percent responding	
Pronghorn population has:	**Yes**	**No**
Increased	62	50
Stayed the same	24	18
Decreased	10	8
Did not know	5	25

[a]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 14.0$, 3 df, $P < 0.05$).

[b]Total number of responses: yes, n = 146; and no, n = 40.

Table 45. Comparison of answers given by respondents who did and did not allow pronghorn hunting on their land relative to the number of pronghorn in Kansas.[a]

	Allow pronghorn hunting?[b]	
	Percent responding	
Number of pronghorn	**Yes**	**No**
<1,000	1	9
1,001-5,000	15	9
>5,000	49	17
Did not know	35	65

[a]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 48.6$, 3 df, $P < 0.05$).

[b]Total number of responses: yes, n = 158; and no, n = 127.

Table 46. Comparison of answers given by respondents who did and did not allow pronghorn hunting on their land relative to whether or not pronghorn spread bindweed.[a]

	Allow pronghorn hunting?[b]	
	Percent responding	
Do pronghorn spread bindweed?	**Yes**	**No**
Yes	77	39
No	3	4
Did not know	20	57

[a]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 43.8$, 2 df, $P < 0.05$).

[b]Total number of responses: yes, n = 160; and no, n = 126.

Table 47. Opinions of respondents who did and did not allow pronghorn on their land relative to the spread of bindweed by pronghorn.

Opinions about pronghorn and the spread of bindweed	Allow pronghorn hunting? Percent responding	
	Yes	**No**
Pronghorn do not spread bindweed.[a]		
Agreed	9	18
Neutral	10	15
Disagreed	68	81
Pronghorn are important in the spread of bindweed.[b]		
Agreed	73	61
Neutral	16	19
Disagreed	10	20
Pronghorn are one of many causes of bindweed spread.[c]		
Agreed	87	77
Neutral	8	14
Disagreed	5	8

Table 47 (Continued).

Opinions about pronghorn and the spread of bindweed	Allow pronghorn hunting? Percent responding	
	Yes	**No**
Pronghorn are a minor factor in bindweed spread.[d, e]		
Agreed	12	31
Neutral	17	16
Disagreed	71	53
Pronghorn are the primary cause of bindweed spread.[f, g]		
Agreed	42	21
Neutral	25	30
Disagreed	32	49

[a]Total number of responses: yes, n = 147; and no, n = 80.

[b]Total number of responses: yes, n = 147; and no, n = 74.

[c]Total number of responses: yes, n = 151; and no, n = 84.

[d]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 13.3$, 2 df, $P < 0.05$).

[e]Total number of responses: yes, n = 145; and no, n = 80.

Table 47 (Continued).

[f]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences (χ^2 = 10.6, 2 df, $P < 0.05$).

[g]Total number of responses: yes, n = 146; and no, n = 76.

$P < 0.05$) and caused excessive damage to fences ($\chi^2 = 18.7$, 2 df, $P < 0.05$) (Table 48).

Respondents who did and did not allow pronghorn hunting on their land agreed that pronghorn grazing reduces forage for cattle. However respondents who did not allow pronghorn hunting on their land were more likely to agree that pronghorn only cause minor forage reductions ($\chi^2 = 12.4$, 2 df, $P < 0.05$). Thirty-five percent of respondents who allowed pronghorn hunting on their land indicated pronghorn grazing results in severe forage reductions, compared to 17% of respondents who did not allow pronghorn hunting ($\chi^2 = 8.0$, 2 df, $P < 0.05$) (Table 49). Respondents who allowed pronghorn hunting on their land also felt more strongly about wheat yield reductions caused by pronghorn. Sixty-seven percent of respondents who allowed pronghorn hunting agreed that pronghorn reduce wheat yields, compared to 48% of respondents who did not allow pronghorn hunting ($\chi^2 = 9.6$, 2 df, $P < 0.05$). Respondents who allowed pronghorn hunting were also more likely to believe pronghorn cause severe wheat yield reductions ($\chi^2 = 10.1$, 2 df, $P < 0.05$) (Table 50).

Fifty-eight percent of respondents who did not allow pronghorn hunting on their land replied that they did not know if pronghorn and white-tailed deer damage could be differentiated, whereas most (49%) respondents who allowed pronghorn hunting indicated they could distinguish such damage ($\chi^2 = 35.6$, 2 df, $P < 0.05$, Table 51). Over half of respondents, regardless of whether or not they allowed pronghorn hunting on their land, indicated that they thought pronghorn that caused problems were commonly shot (Appendix 66), but respondents who allowed pronghorn hunting on their land were more likely to support such actions (32%) than respondents who did not allow hunting

Table 48. Opinions of respondents who did and did not allow pronghorn hunting on their land relative to fence damage caused by pronghorn.

Opinions about pronghorn and fence damage	Allow pronghorn hunting? Percent responding	
	Yes	**No**
Pronghorn cause excessive damage to fences.[a, b]		
Agreed	57	28
Neutral	18	24
Disagreed	25	48
Pronghorn frequently damage fences.[c, d]		
Agreed	66	36
Neutral	15	26
Disagreed	19	38
Pronghorn cause very little fence damage.[e, f]		
Agreed	29	47
Neutral	12	28
Disagreed	60	25

Table 48 (Continued).

Opinions about pronghorn and fence damage	Allow pronghorn hunting? Percent responding	
	Yes	No
Pronghorn do not damage fences.[g, h]		
Agreed	12	19
Neutral	14	28
Disagreed	74	54

[a]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 18.7$, 2 df, $P < 0.05$).

[b]Total number of responses: yes, n = 147; and no, n = 82.

[c]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 19.1$, 2 df, $P < 0.05$).

[d]Total number of responses: yes, n = 149; and no, n = 81.

[e]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 25.6$, 2 df, $P < 0.05$).

[f]Total number of responses: yes, n = 147; and no, n = 79.

Table 48 (Continued).

[g]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 9.5$, 2 df, $P < 0.05$).

[h]Total number of responses: yes, n = 148; and no, n = 80.

Table 49. Opinions of respondents who did and did not allow pronghorn hunting on their land relative to pronghorn competition with cattle for forage.

Opinions about pronghorn competition with cattle	Allow pronghorn hunting? Percent responding	
	Yes	**No**
Pronghorn grazing causes severe forage reductions for cattle.[a, b]		
Agreed	35	17
Neutral	27	30
Disagreed	39	53
Pronghorn grazing reduces forage for cattle.[c]		
Agreed	56	52
Neutral	25	22
Disagreed	19	26
Pronghorn grazing causes minor forage reductions for cattle.[d, e]		
Agreed	51	62
Neutral	18	27
Disagreed	31	11

Table 49 (Continued).

Opinions about pronghorn competition with cattle	Allow pronghorn hunting? Percent responding	
	Yes	**No**
Pronghorn grazing does not reduce cattle forage.[f]		
Agreed	15	21
Neutral	26	24
Disagreed	59	55

[a]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 8.0$, 2 df, $P < 0.05$).

[b]Total number of responses: yes, n = 142; and no, n = 81.

[c]Total number of responses: yes, n = 143; and no, n = 86.

[d]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 12.3$, 2 df, $P < 0.05$).

[e]Total number of responses: yes, n = 146; and no, n = 84.

[f]Total number of responses: yes, n = 143; and no, n = 84.

Table 50. Opinions of respondents who did and did not allow pronghorn hunting on their land relative to the impact of pronghorn grazing on wheat yields.

Opinions about impact of pronghorn on wheat yields	Allow pronghorn hunting? Percent responding	
	Yes	**No**
Pronghorn do not reduce wheat yields.[a, b]		
Agreed	19	33
Neutral	15	28
Disagreed	66	40
Pronghorn reduce wheat yields.[c, d]		
Agreed	67	48
Neutral	14	28
Disagreed	19	24
Pronghorn cause severe wheat yield reductions.[e, f]		
Agreed	34	16
Neutral	28	28
Disagreed	38	56

[a]A χ^2 test of the distribution of responses between respondents, who did and did not allow pronghorn hunting on their land, showed significant

Table 50 (Continued).

differences ($\chi^2 = 15.3$, 2 df, $P < 0.05$).

[b]Total number of responses: yes, n = 151; and no, n = 83.

[c]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 9.6$, 2 df, $P < 0.05$).

[d]Total number of responses: yes, n = 153; and no, n = 83.

[e]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 10.1.3$, 2 df, $P < 0.05$).

[f]Total number of responses: yes, n = 149; and no, n = 81.

Table 51. Comparison of answers given by respondents who did and did not allow pronghorn hunting on their land relative to whether or not they thought pronghorn and white-tailed deer damage can be distinguished.[a]

	Allow pronghorn hunting?[b]	
	Percent responding	
Is damage distinguishable?	**Yes**	**No**
Yes	49	17
No	22	24
Did not know	29	58

[a]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 35.6$, 2 df, $P < 0.05$).

[b]Total number of responses: yes, n = 161; and no, n = 127.

(11%) ($\chi^2 = 22.2$, 5 df, $P < 0.05$, Table 52). Half of respondents who did not allow pronghorn hunting replied that they would inform the authorities if pronghorn were shot without a permit on their land, while respondents who allowed pronghorn hunting were more likely to do nothing or support shooting pronghorn without a permit ($\chi^2 = 37.6$, 4 df, $P < 0.05$, Table 53).

Forty-one percent of respondents who allowed pronghorn hunting on their land replied that they disliked pronghorn, compared to only 10% of respondents who did not allow pronghorn hunting ($\chi^2 = 38.2$, 2 df, $P < 0.05$, Table 54). Respondents who allowed pronghorn hunting on their land were more likely to dislike pronghorn because they felt that pronghorn did not belong in Kansas ($\chi^2 = 3.7$, 1 df, $P < 0.05$), there were too many pronghorn in Kansas ($\chi^2 = 22.5$, 1 df, $P < 0.05$), and because damage caused by pronghorn cost them time ($\chi^2 = 24.8$, 1 df, $P < 0.05$) and money ($\chi^2 = 44.1$, 1 df, $P < 0.05$) (Figure 18). Respondents, regardless of whether or not they allowed pronghorn hunting on their land, tended to like pronghorn for similar reasons. However, those respondents who allowed pronghorn hunting on their land were more inclined to like pronghorn because of hunting opportunities ($\chi^2 = 11.0$, 1 df, $P < 0.05$). Respondents who did not allow pronghorn hunting on their land were more likely to like pronghorn because they have had no problems with them ($\chi^2 = 14.2$, 1 df, $P < 0.05$) (Figure 19).

Table 52. Comparison of reactions of respondents who did and did not allow pronghorn hunting on their land relative to individuals who shot problem-causing pronghorn on their own property.[a]

	Allow pronghorn hunting?[b]	
	Percent responding	
Reaction	**Yes**	**No**
Supportive	32	1
Avoided those individuals	1	0
None of my business	22	22
Informed authorities	5	9
Questioned judgement	25	31
No opinion	15	26

[a]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 22.2$, 5 df, $P < 0.05$).

[b]Total number of responses: yes, n = 157; and no, n = 121.

Table 53. Comparison of reactions of respondents who did and did not allow pronghorn hunting on their land relative to individuals who shot pronghorn on their land without a permit.[a]

	Allow pronghorn hunting?[b]	
	Percent responding	
Reaction	**Yes**	**No**
Supportive	13	2
Asked them to leave	19	25
Did nothing	25	6
Informed authorities	25	50
No opinion	18	17

[a]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 37.6$, 4 df, $P < 0.05$).

[b]Total number of responses: yes, n = 150; and no, n = 124.

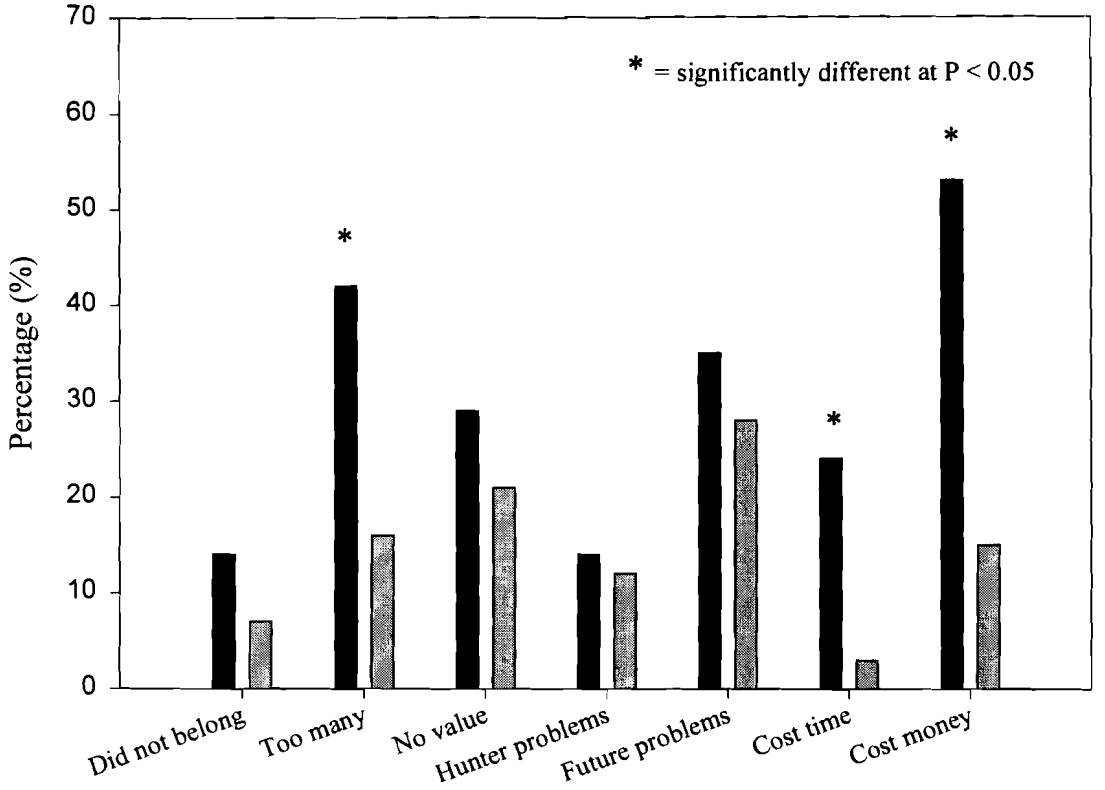
Table 54. Opinions of respondents who did and did not allow pronghorn hunting on their land relative to whether or not they liked pronghorn.[a, b]

	Allow pronghorn hunting?	
I like pronghorn.	**Percent responding**	
Response:	**Yes**	**No**
Agreed	33	39
Neutral	26	52
Disagreed	41	10

[a]A χ^2 test of the distribution of responses between respondents who did and did not allow pronghorn hunting on their land showed significant differences ($\chi^2 = 38.1$, 2 df, $P < 0.05$).

[b]Total number of responses: yes, n = 156; and no, n = 125.

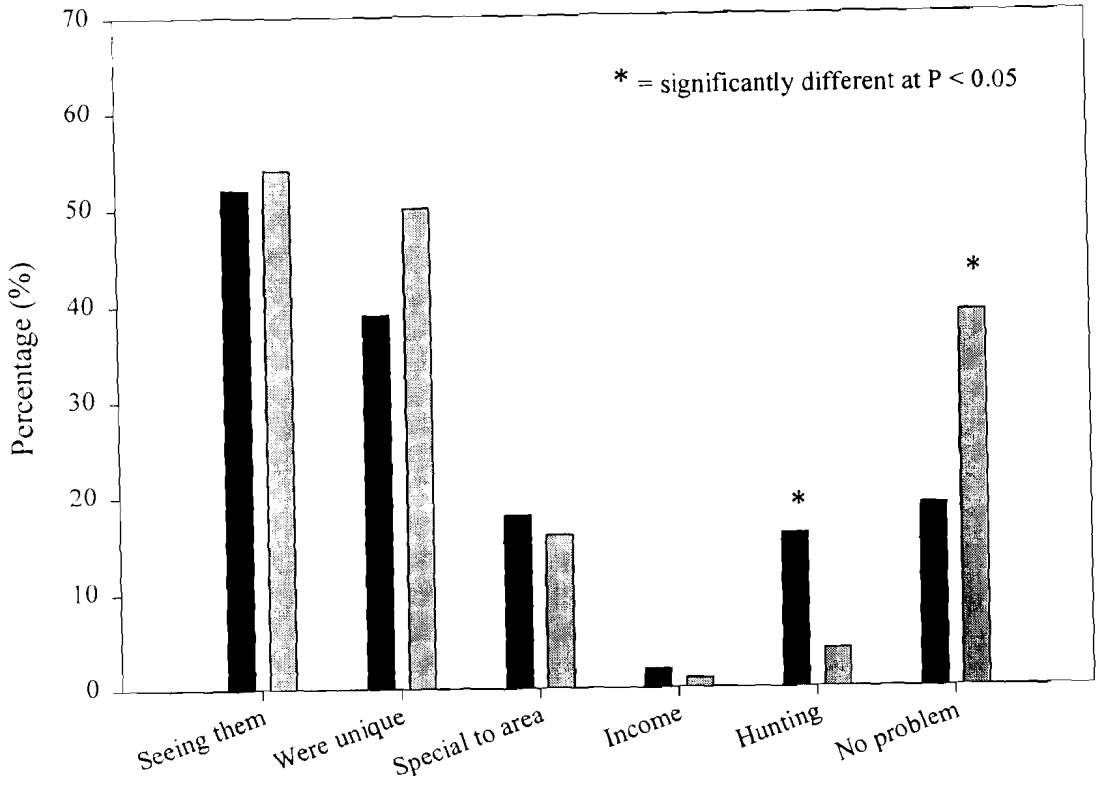
Figure 18. Comparison of respondents who did and did not allow pronghorn hunting on their land relative to reasons to dislike pronghorn.



Things respondents who did and did not allow pronghorn hunting on their land disliked about pronghorn

Allowed pronghorn hunting
Did not allow pronghorn hunting

Figure 19. Comparison of respondents who did and did not allow pronghorn hunting on their land relative to reasons to like pronghorn.



Things respondents who did and did not allow pronghorn hunting on their land liked about pronghorn

Allowed pronghorn hunting
Did not allow pronghorn hunting

Discussion

Attitudes toward wildlife are often based upon myth rather than knowledge and informed opinion (Kellert and Brown 1985). Several studies (Dahlgren et al. 1977, Kellert and Brown 1985) have found that people often have little factual knowledge about wildlife or wildlife management and may act emotionally to wildlife issues. Local traditions may also shape values and attitudes, especially in the absence of accurate knowledge (Reading and Kellert 1993). Respondents to my survey generally knew little factual information about pronghorn, but readily implicated pronghorn with problems that had negative impacts upon their farming or ranching operations. According to Van Tassell et al. (1999), farmers who were already experiencing difficulties, financial or otherwise, considered one deer to be too many due to the potential damage they can cause. Landowners in western Kansas may be sharing this sentiment, viewing pronghorn as yet another threat to their livelihood, regardless of what actual impact pronghorn may have on their farming or ranching operations.

Most respondents were very concerned about bindweed and thought pronghorn were an important means by which it is spread. Bindweed is considered to be a very aggressive and damaging weed that is difficult to control (Philips 1967). Grain and forage yields can be reduced 20% to 80% by bindweed (Philips 1961, Philips 1967), thus giving landowners justifiable cause for concern. However, bindweed is found throughout Kansas (Bill Scott, Kansas Dept. of Agriculture, pers. commun.) and pronghorn are only potentially found in seventeen counties in Kansas. The limited range and population size

of pronghorn in Kansas makes them an unlikely culprit for spreading bindweed. In addition, bindweed is not an important component of the pronghorn diet and even if seeds are ingested, only approximately 20% are viable after passing through the pronghorn digestive system (Ryan et al. 1984, Pojar 1996). The most likely modes of bindweed transmission include failure to clean harvesting and tillage equipment, as well as the feeding of contaminated hay to livestock (Peterson and Stahlman 1989, Pojar 1996).

Respondents also blamed pronghorn for fence damage and many believed that pronghorn caused excessive damage. Fence repair represented a time and financial cost to respondents, but blame placed upon pronghorn for fence damage may be unwarranted. Different ungulate species cross fences in different ways (Knight et al. 1997), and Mackie (1981) found that mule deer (Odocoileus hemionus) choose to go under a fence if not bothered, but jump over fences when startled. Pronghorn act in much the same way, usually going under fences rather than jumping over or going through them (Yoakum 1978, Lloyd Fox, pers. commun.). Pronghorn often have difficulty crossing fences due to an apparent reluctance to jump over fences (Yoakum 1978, Scott 1992), and rarely jump fences over 32" (81 cm) unless being actively pursued (Spillet et al. 1967). Yoakum (1980) suggested that the lowest strand of wire should be raised to allow pronghorn to travel under a fence unimpeded. If the bottom wire of a fence is raised about 16" to 18" (41 cm to 46 cm) from the ground, pronghorn can go under the fence without causing any damage to themselves or the fence.

Many landowners also argued that pronghorn physically damaged crops and reduced yields as a result of foraging and trampling. Wheat growers in Colorado believed

pronghorn grazing reduced crop yields, but a study by Torbit et al. (1993) showed that damage to winter wheat due to trampling and foraging by pronghorn was negligible and did not result in lower yields. Gibbs et al. (1993) also found that comparisons of grain yields between fields frequented by pronghorn and those without pronghorn revealed no differences. Pronghorn do feed in winter wheat fields, but switch to feeding on native forages before wheat crops become vulnerable to pronghorn grazing (Torbit et al. 1993).

Competition between cattle and pronghorn for forage is also minimal (Yoakum and O'Gara 1990, Gibbs et al. 1993, Selting and Irby 1997). According to Beasom (1982), pronghorn diets are dominated by forbs and cattle primarily feed on grasses. Ganey (1997) similarly found that the diet of pronghorn consists mainly of shrubs and forbs. Pronghorn evolved along with bison (Bos bison) on prairies and the two species show niche separation (Leftwich 1977, Krueger 1986, Pojar 1996). Cattle have replaced the grazing role of bison in the prairies, thus competition for forage between pronghorn and cattle should be minimal (Leftwich 1977, Pojar 1996).

Although most respondents believed pronghorn were involved in bindweed spread, fence damage, forage reduction, and crop yield reduction, some respondents were more vehement than others. Respondents who lived within the pronghorn zone were more likely to implicate pronghorn with bindweed spread than respondents who lived outside of the pronghorn zone. Respondents who lived within the pronghorn zone may have been more likely to see pronghorn in their fields, which lead to an association of pronghorn with bindweed. Respondents who gained more than 50% of their total income from farming were also more likely to implicate pronghorn with bindweed spread, as well

as disease transmission, fence damage, and wheat yield reductions. According to Wywialowski (1994) and Adkins and Irby (1992), farmers who have more at stake may be more concerned about wildlife damage. Respondents who relied on farming for a major portion of their income, may have been more sensitive to crop yield losses and land value reductions resulting from bindweed invasion, thus making them more concerned about the presence of pronghorn on their land. Respondents who gained most of their income from farming may also have been more concerned about the transmission of disease to livestock by pronghorn because of the cost involved with treatment and prevention. Money spent vaccinating or medicating livestock against diseases carried by pronghorn may be considered a financial burden by landowners who depend more on their farm income. Repairing damage to fences may also be more of a financial burden to landowners who are greatly dependent on farm income. Tanner and Dimmick (1983) found that farmers with larger farm incomes were more likely to complain about deer damaging crops. Similarly, respondents to this survey who had larger farm incomes were more concerned about wheat yield reductions than respondents who received less than or equal to 50% of their income from farming.

Amount of cropland or rangeland owned by respondents was also associated with opinions about problems attributed to pronghorn. According to Van Tassell et al. (1999), larger agricultural operations tend to register more complaints about wildlife damage. Larger farms and ranches generally support more wildlife, and as a result, perceived losses are often greater (Irby et al. 1996). Respondents who owned more than 389 ha (1½ sections) of cropland and more than 260 ha (1 section) of rangeland were more likely

to respond that pronghorn spread bindweed. Respondents with more land may be more affected by the cost of controlling bindweed than respondents with less land. Respondents with more land also likely have more pronghorn and may have associated the presence of pronghorn with any bindweed problems that they might have had. Respondents who owned more than 130 ha (½ section) of cropland may have been more likely to think pronghorn caused excessive fence damage than respondents with smaller farms because they simply had more fences to repair and probably had more pronghorn. Farmers often feed cattle on waste grain after harvest and may erect temporary fencing around crop fields to contain their cattle. Such fencing may not be sturdy and could be easily damaged. Pronghorn may be a convenient source of blame for respondents with more miles of fencing to maintain.

Respondents, regardless of how much land they owned, were concerned about forage reduction caused by pronghorn, but respondents who owned less than 130 ha (½ section) of cropland were more likely to agree that pronghorn grazing reduced forage for cattle than respondents who owned more than 778 ha (3 sections) of cropland. Respondents with very large amounts of land may not notice or worry about a decrease in forage caused by pronghorn, whereas respondents with smaller holdings may be more concerned about any forage reductions that occurred on their land.

Respondent age did not overly influence respondent opinions relative to problems associated with pronghorn, but respondents older than 65 years tended to disagree more than younger respondents that pronghorn were important in the spread of bindweed. Older respondents (greater than 65 years) were also more likely to agree that pronghorn

caused only minor fence damage. Younger respondents may be out on their land more than older respondents, which may allow them to witness damage and associate it with the presence of pronghorn. Organizational membership often provides individuals with information that affects or influences them in some way (Myers 1985, Swensson 1996), but little influence from organizations was apparent in opinions about problems associated with pronghorn. Respondents who belonged to an organization were more likely to indicate that pronghorn spread bindweed, but that was the only difference noted between respondents who did and did not belong to an organization, relative to problems associated with pronghorn.

Farmers may employ hunting as a means of controlling wildlife damage (Stoll and Mountz 1983, Siemer and Decker 1991) and Conover (1998) found that farmers who allowed hunting on their property were more likely to think wildlife caused intolerable levels of damage. Respondents to my survey who allowed pronghorn hunting on their land were more likely to think pronghorn were the primary cause for the spread of bindweed. Respondents who allowed pronghorn hunting also believed pronghorn caused excessive fence damage and severe forage and wheat yield reductions. The view of pronghorn as a major problem to farming and ranching operations by respondents who allowed pronghorn hunting on their land indicates that they may well be using hunting as a means of controlling a species they consider to be a threat to their livelihood.

Pronghorn may be blamed for damage caused by other wildlife species, such as white-tailed deer. Almost half of all respondents indicated that they did not know if damage caused by pronghorn could be distinguished from damage caused by white-tailed

deer. Such damage is not easily differentiated, yet some respondents indicated that damage could be distinguished between pronghorn and white-tailed deer. Respondents who lived inside the pronghorn zone and allowed pronghorn hunting on their land were more likely to think they could distinguish between pronghorn and white-tailed deer damage. These respondents were more negative toward pronghorn and were probably more certain that pronghorn were responsible for damage occurring on their land.

Likelihood of seeing a species may implicate it with potential damage. Conover (1998) found that farmers often overestimate damage caused by sandhill cranes (Grus canadensis) because the birds tend to feed along the edges of fields where damage is more obvious. Similarly, pronghorn may be associated with damage more than white-tailed deer because they feed during the day and are thus more obvious to landowners (Saltiel and Irby 1998).

Respondents were generally non-committal as to whether or not pronghorn that were considered to be damaging were commonly shot. Respondents who owned land inside and outside the pronghorn zone were evenly split in responses relative to whether or not problem pronghorn were shot, as were respondents with different farm incomes, farm sizes, ages, and organizational affiliations. Respondents who did and did not allow pronghorn hunting on their land also equally felt problem pronghorn were shot. Few respondents indicated they would inform the authorities about problem pronghorn being shot and approximately a quarter of respondents would even support such an action. According to Wywialowski (1994), if farmers think wildlife are causing them losses, they are more likely to take whatever actions they feel are necessary to alleviate those losses.

Those respondents who were more reliant on farm income were more likely to support shooting problem pronghorn than respondents less dependent on farming. Respondents with greater farm incomes may have felt that shooting pronghorn was justified if pronghorn were causing damage that may have resulted in financial losses. Respondents who allowed pronghorn hunting on their land were also more likely to support shooting pronghorn that were causing problems. Respondents who lived outside of the pronghorn zone, had a less than or equal to 50% farm income, and who did not allow pronghorn hunting on their land, were more likely to inform authorities about pronghorn being shot on their land without a permit. However, respondents who lived outside of the pronghorn zone may not have been aware of pronghorn being shot on their land. Respondents with lower farm incomes were generally less concerned about pronghorn damage and thus may have been less supportive of shooting pronghorn even if they were causing damage. Respondents who did not allow pronghorn hunting on their land may be ethically opposed to shooting pronghorn regardless of whether or not they were causing problems. Also, some landowners may have been reluctant to allow hunting on their land because of past problems with hunters, as suggested by Siemer and Decker (1991) and Swensson (1996).

The status of the pronghorn population in western Kansas was a point of contention among most respondents. Most respondents did not know how many pronghorn were in Kansas, but were certain that the pronghorn population had increased during the last five years. Many respondents indicated in the comments section that there were more pronghorn in Kansas than the Kansas Department of Wildlife and Parks

admitted. Approximately a third of respondents thought there were more than 5,000 pronghorn in Kansas, but aerial surveys done by the KDWP in 1999 revealed only approximately 1,500 pronghorn in Kansas (Lloyd Fox, pers. commun.). Saltiel and Irby (1998) similarly found that agricultural producers in Montana were more likely than agency personnel to claim that pronghorn populations were too high. According to Lacey et al. (1993), landowners who own more land are more likely to indicate larger wildlife populations, possibly just reflecting more animals on a larger land area. Data from my study also showed that respondents who owned more land reported larger wildlife populations. Respondents who owned land inside the pronghorn zone and had larger farm incomes were also more likely to think there were currently more than 5,000 pronghorn in Kansas, as did respondents who belonged to an organization or allowed pronghorn hunting on their land. Respondents with larger farm incomes, more rangeland, and those who allowed pronghorn on their land, were also more likely to think the pronghorn population increased during the past five years.

Respondents overwhelmingly indicated that they wanted no pronghorn on their land. According to Wywialowski (1994), farmers who think wildlife are causing problems are more likely to want lower wildlife populations and Lacey et al. (1993) found that as dependency on farm income increases, farmers desire lower wildlife populations. However, my results indicated that respondents, regardless of farm income, wanted no pronghorn on their land. A study by Irby et al. (1997) also found that even though pronghorn are not widely distributed, they are not tolerated when present. According to Saltiel and Irby (1998), many ranchers simply do not like pronghorn,

perhaps because they are more obvious to landowners or because they are culturally associated as signs of poor quality land.

Even though most respondents indicated that they wanted no pronghorn on their land, most were neutral to whether or not they liked pronghorn, and 33% of respondents indicated that they liked pronghorn. Many respondents indicated that they liked seeing pronghorn and considered them to be unique. Siemer and Decker (1991) found that many farmers are willing to tolerate some damage to be able to see deer. Some respondents to my survey may also have felt that viewing opportunities were important and might have been willing to tolerate a certain amount of damage in exchange for seeing pronghorn.

Respondents who owned land outside of the pronghorn zone and those with lower farm incomes were more likely to enjoy seeing pronghorn and tended to like pronghorn more because they have had no problems with them. Respondents who did not allow pronghorn hunting on their land also tended to like pronghorn more because they have had no problem with them. Respondents who owned land outside of the pronghorn zone may not have seen pronghorn as much and thus might have valued viewing opportunities more than respondents who owned land inside the pronghorn zone. Respondents with lower farm incomes and those who did not allow pronghorn hunting on their land were less likely to associate pronghorn with problems negatively affecting their livelihood, and thus may have made them more likely to tolerate and enjoy pronghorn.

Even though respondents who allowed pronghorn hunting on their land tended to dislike pronghorn, they indicated hunting opportunity as a reason to like pronghorn. According to Siemer and Decker (1991), landowners who hunt are usually more tolerant

of deer damage. However, my results did not indicate that landowners who liked hunting pronghorn were more tolerant of pronghorn damage. Respondents who allowed pronghorn hunting on their land may have liked hunting pronghorn, but they also were very adamant about the negative impact of pronghorn on farming and ranching operations. Siemer and Decker (1991) found that individuals who enjoy hunting also often desire larger wildlife populations, but a majority of respondents in my survey indicated that they wanted no pronghorn on their land, even if they enjoyed hunting. Respondents who were 65 years old or less and those who belonged to a farming or sporting organization also tended to like pronghorn hunting. Information from a sporting organization may have piqued interest in pronghorn hunting and younger respondents may have been more inclined to hunt than older respondents.

Respondents generally disliked pronghorn because they felt pronghorn damage was a time and financial burden and pronghorn may have caused future problems. Many respondents also disliked pronghorn because they felt there were too many or because pronghorn had no value to them. Respondents with more at stake (larger farms and greater farming income) were less tolerant of pronghorn and tended to have a greater dislike for them because of time and money costs associated with damage and the perception that there were too many in Kansas. Younger respondents (less than or equal to 65 years), respondents who belonged to a farm or sporting organization, and respondents who allowed pronghorn hunting on their land, were also more likely to dislike pronghorn for the same reasons.

Respondents who owned land inside the pronghorn zone and those with larger

amounts of cropland or rangeland were more likely than outside zone respondents and respondents who owned less land, to dislike pronghorn because of problems with pronghorn hunters. Inside zone respondents were more likely to have pronghorn on their land than outside zone respondents, thus potentially accounting for inside zone respondents having more trouble with pronghorn hunters. Respondents who owned larger amounts of land may have been more likely to experience problems with pronghorn hunters because of the increased area available to both pronghorn and hunters. Swensson (1996) found that larger properties are more difficult to monitor and thus may experience more vandalism or other hunter problems.

A group of respondents (18%) indicated that nothing would increase their tolerance of pronghorn. However, many respondents indicated that accurate and reliable information about the behavior and impact of pronghorn could potentially increase their tolerance and appreciation of pronghorn. Twenty-eight percent of respondents also indicated that compensation would increase their tolerance of pronghorn. However, much of the blame placed upon pronghorn is unfounded, making payment for perceived pronghorn damage unlikely. According to Wagner et al. (1997), compensation programs may be inappropriate and vulnerable to abuse. Budget constraints may also make compensation for damage an impossibility. The most favorable method to potentially increase landowner tolerance of pronghorn involves providing landowners with information about pronghorn in a manner that they are likely to accept.

Management Implications

According to Reading and Kellert (1993), it is difficult to change stakeholder attitudes or convince them of information they may not believe, especially if their knowledge is formed from personal experience. My survey results indicated that respondents were most likely to form their opinions based on personal experience, highlighting the potential difficulty of changing attitudes toward pronghorn. The indication by many respondents that information about pronghorn would increase their tolerance shows that some success might be achieved. Respondents generally knew little about the natural history of pronghorn and providing such information might cause some landowners to become more interested in pronghorn. Providing information to landowners about the actual impact of pronghorn on farming and ranching operations might also increase landowner tolerance. However, simply providing facts will not necessarily result in positive attitudes because knowledge may be only one of several factors that influence attitudes (Brown and Manfredo 1987, Reading and Kellert 1993). Support should by developed among those respondents who were neutral toward pronghorn, or who had more mild opinions concerning problems caused by pronghorn. Respondents who had stronger negative sentiments about pronghorn, may be swayed toward moderation if their peers remained neutral or became more tolerant of pronghorn. Areas of emphasis for the education project should include information on bindweed spread, pronghorn behavior regarding fences, and forage and crop use by pronghorn. The cultural myth of pronghorn being indicators of poor quality land should also be

addressed. If landowners could be convinced that agriculture and pronghorn restoration are not competitive enterprises, they might become more supportive of efforts to increase pronghorn populations.

Most respondents indicated that income from hunting leases was not important to them. However, if landowners could be encouraged to tolerate a growing pronghorn population on their land, they might eventually receive a monetary benefit from hunting leases. Income gained from fees paid by pronghorn hunters might offset some negative impacts associated with the presence of pronghorn. Craven et al. (1992) found that landowners are generally more tolerant if they can profit from the presence of wildlife. If landowners could be convinced that a pronghorn population of sufficient size to be hunted could be of benefit to them, they might be willing to encourage the presence of pronghorn on their land.

Many landowners also made comments which indicated that they felt they had been given no say as to whether or not they wanted pronghorn and that they were being forced to support wildlife. Landowners also commented that little attention had been paid to their complaints. If landowners could be made to feel more a part of successful pronghorn management, they may become more tolerant and interested in pronghorn. Achieving greater landowner tolerance may also involve placating stakeholders by investigating complaints and impartially providing information or evidence that minimizes complaints. According to Wywialowski (1994), if stakeholders perceive that a problem exists, it does exist and the resolution may simply lie in sharing information. More contact between landowners and KDWP personnel may benefit

efforts to increase tolerance of pronghorn by making landowners feel that they are an important component in pronghorn restoration and that their input is valuable. Direct conversation may also help dispel unfounded complaints against pronghorn.

Reading and Kellert (1993), found that stakeholder receptivity is dependent on factors such as social setting, relevance, presentation style, sources of information, and strength of the argument. Few respondents in my survey indicated they would seek assistance from the KDWP regarding wildlife damage problems, perhaps reflecting the general mistrust many respondents indicated they had toward the KDWP. However, respondents ranked the KDWP highest as a source of pronghorn information. Extension service personnel also ranked high as a source of pronghorn information, indicating the potential role the Extension Service could fulfill in disseminating accurate pronghorn information to landowners. Information is most likely to be accepted by landowners if presented via newspapers and television. Several studies indicate that the media may have considerable influence regarding attitudes toward wildlife (McIvor and Conover 1994). Shay (1980), found the media to be a useful method to gain public acceptance of wildlife management. According to my survey results, the Pronghorn Education Project would be most successful if it incorporated the Extension Service and media support in disseminating pronghorn information. Getting a newspaper, television, or radio station to do a story about the history of pronghorn in Kansas, which highlighted interesting facts and discounted misbeliefs, may help foster greater landowner interest in pronghorn. The education project could supplement media influences by developing easily read materials, such as brochures and newsletters about pronghorn. Many respondents (40%) indicated

that they would likely read information about pronghorn, thus printing information about pronghorn in Extension Service newsletters may be an effective way to get information to landowners.

Even though only 9% of respondents indicated that educational videos influenced their wildlife opinions, 37% of respondents replied they would likely watch a 30 minute video about pronghorn. Distributing educational videos to landowners may influence some landowners' attitudes, but considering the small proportion of respondents who indicated that educational videos influenced them, many landowners may view an educational video as patronizing or biased. A video produced in cooperation with many of the entities comprising the Pronghorn Committee may help minimize perceived bias. A video showing pronghorn crossing fences might help convince landowners of typical pronghorn behavior relative to fences. Landowners might be convinced that when not harassed, pronghorn usually do little or no damage to fences.

Further Study

A follow-up survey of respondents after implementation of the Pronghorn Education Project will show if methods used to deliver information to landowners were effective in influencing landowner attitudes. Targeting individuals who actually manage the land occupied by pronghorn might also prove insightful as those are the individuals who will most likely be influenced by the presence of pronghorn. A survey including landowners in states that have stable pronghorn populations would show if the complaints Kansas landowners have against pronghorn are common elsewhere. If landowners in states where pronghorn are numerous have little against pronghorn, more emphasis could be directed toward trying to find out why Kansas landowners in particular are so negative toward pronghorn. If landowners in other states are found to be generally tolerant of pronghorn, such information might convince landowners in Kansas that the smaller number of pronghorn in Kansas represents no real threat to their livelihood.

More definitive studies on the involvement of pronghorn in spreading bindweed are also needed. Few studies have been done on the viability of bindweed seeds after ingestion by pronghorn. If more unrefutable information were available concerning pronghorn and bindweed, landowners might be more easily convinced that pronghorn are not a major factor in bindweed spread, and thus increase their tolerance of pronghorn.

Literature Cited

Adams, C. E., Leifester, J. A., and J. S. C. Herron. 1997. Understanding wildlife constituents: birders and waterfowl hunters. Wildlife Society Bulletin 25: 653-660.

Adkins, R. J., and L. R. Irby. 1992. Factors influencing game damage complaints in Montana. Transactions of the North American Wildlife and Natural Resource Conference 57: 96-103.

Alreck, P.L., and R. B. Settle. 1995. The survey research handbook. Irwin Publishing. New York, New York.

Beasom, S. C. 1982. Similarity of pronghorn, cattle, and sheep diets in South Eastern New Mexico. Pages 565-572 *in* Peek, J. M. and P. D. Dalke, eds. Wildlife-livestock relationships symposium: proceedings 10. University of Idaho, Forest, Wildlife, and Range Experiment Station, Moscow, Idaho.

Brown, P. J., and M. J. Manfredo. 1987. Social values defined. Pages 12-13 *in* B. J. Decker and G. R. Goff, eds. Valuing wildlife: economic and social perspectives. Westview Press, Boulder, Colorado.

Cody, R. P., and J. K. Smith. 1991. Applied statistics and the SAS programming language. Prentice Hall. Englewood Cliffs, New Jersey.

Craven, S. R., D. J. Decker, S. E. Hygnstrom, and W. F. Siemer. 1992. Survey use and landowner tolerance in wildlife damage management. Transactions of the North American Wildlife and Natural Resources Conference 57: 75-87.

Conover, M. R. 1994. Perceptions of grass-roots leaders of the agricultural community

about wildlife damage on their farms and ranches. Wildlife Society Bulletin 22: 94-100.

Conover, M. R. 1998. Perceptions of American agricultural producers about wildlife on their farms and ranches. Wildlife Society Bulletin 26: 597-604.

Conover, M. R. and D. J. Decker. 1991. Wildlife damage to crops: perceptions of agricultural and wildlife professionals in 1957 and 1987. Wildlife Society Bulletin 19: 46-52.

Dahlgren, R. B., A. Wywialowski, T. A. Bubolz, and V. L. Wright. 1977. Influence of knowledge of wildlife management principles on behavior and attitudes toward resource issues. Transactions of the North American Wildlife and Natural Resources Conference 42: 145-155.

Dillman, D.A. 1978. Mail and telephone surveys : the total design method. Wiley and Sons, New York, New York.

Ganey, D. T. 1997. The diet of pronghorn (Antilocapra americana) in the tallgrass prairie. M. S. Thesis, Emporia State University, Emporia, Kansas. 93 pp.

Gibbs, M. C., Jenks, A. J., and B. F. Sowell. 1993. Pronghorn and agriculture: maintaining a balance. Cooperative Extension Service, South Dakota State University. FS886. Brookings, South Dakota.

Irby, L. R., J. Saltiel, W. E. Zidack, and J. B. Johnson. 1997. Wild ungulate damage: perceptions of farmers and ranchers in Montana. Wildlife Society Bulletin 25: 320-329.

Irby, L. R., Zidack, W. E., Johnson, J. B., and J. Saltiel. 1996. Economic damage to

forage crops by native ungulates as perceived by farmers and ranchers in Montana. Journal of Range Management 49: 375-380.

Kalton, G. 1983. Introduction to survey sampling. Sage Publications, London.

Kellert, S. R., and P. J. Brown. 1985. Human dimensions information in wildlife management, policy, and planning. Journal of Leisure Sciences 7: 269-280.

Knight, J. E., E. J. Swensson, and H. Sherwood. 1997. Elk use of modified fence-crossing designs. Wildlife Society Bulletin 25: 819-822.

Krueger, K. 1986. Feeding relationships among bison, pronghorn, and prairie dogs: an experimental analysis. Ecology 67: 760-770.

Lacey, J. R., Jamtgaard, K., Riggle, L., and T. Hayes. 1993. Impacts of big game on private land in south-western Montana: landowner perceptions. Journal of Range Management 46: 31-36.

Leftwich, T. J. 1977. Man's past and present impact on the status and distribution of the Texas pronghorn. M. S. Thesis, Texas Tech University, Lubbock. 132 pp.

McIvor, D. E., and M. R. Conover. 1994. Perceptions of farmers and non-farmers toward management of problem wildlife. Wildlife Society Bulletin 22: 212-219.

Messmer, T. A., C. E. Dixon, W. Shields, S. C. Barras, and S. A. Schroeder. 1998. Cooperative wildlife management units: achieving hunter, landowner, and wildlife management objectives. Wildlife Society Bulletin 26: 325-332.

Myers, C.G. 1985. Factors influencing waterfowl hunter attitude and behavior toward steel shot. M.S. Thesis, Dep. Fisheries and Wildlife, Michigan State University, East Lansing. 105 pp.

Peterson, D., and P. W. Stahlman. 1989. Field bindweed control in field crops and fallow. Cooperative Extension Service, Manhattan, Kansas. Publication MF-913. 6 pp.

Philips, W. M. 1961. Control of field bindweed by cultural and chemical methods. U.S. Department of Agriculture Technical Bulletin 1249: 1-30.

Philips, W. M. 1967. Field bindweed and its control. U. S. Department of Agriculture Leaflet 496: 1-8.

Pojar, T. M. 1996. Colorado pronghorn compatibility and conflicts with agriculture. Outdoor Facts 116: 1-7.

Reading, R. P., and S. R. Kellert. 1993. Attitudes toward a proposed reintroduction of black-footed ferrets (Mustela nigripes). Conservation Biology 7: 569-579.

Ryan, L. A., T. M. Pojar, and C. E. Townsend. 1984. Viability of bindweed seeds after passage through a pronghorn digestive system. Pronghorn Antelope Workshop 11: 225-232.

Salant, P., and D. A. Dillman. 1994. How to conduct your own survey. John Wiley & Sons, Inc. New York, New York.

Saltiel, J., and L. R. Irby. 1998. Perceptions of game damage in Montana by resource agency personnel and agricultural producers. Wildlife Society Bulletin 26: 84-91.

SAS Institute. 1990. SAS/STAT User's guide 1990, Vol. 2. Cary, North Carolina.

Scott, M. D. 1992. Buck-and-pole fence crossings by 4 ungulate species. Wildlife Society Bulletin 20: 204-210.

Siemer, W. F., and D. J. Decker. 1991. Human tolerance of wildlife damage: synthesis of research and management implications. Human Dimensions Research Unit Publication 91-7. Department of Natural Resources, New York State College of Agriculture and Life Sciences, Cornell University, Ithaca, New York. 24 pp.

Selting, J. P., and L. R. Irby. 1997. Agricultural land use patterns of native ungulates in south-eastern Montana. Journal of Range Management 50: 338-345.

Shay, R.E. 1980. Gaining public acceptance of wildlife management. Pages 495-497 in Wildlife management techniques manual, 4th edition (revised). The Wildlife Society, Washington, DC.

Sheriff, S. L., Witter, D. J., Kirby, S. B., and K. M. Babcock. 1981. Missouri's landowners: how they perceive the importance of wildlife. Transactions of the North American Wildlife Conference 46: 119-124.

Spillett, J. J., J. B. Low, and D. Sill. 1967. Livestock fences-how they influence pronghorn antelope movements. Utah State University Agricultural Experimental Station Bulletin 470: 4-72.

Stoll, R. J. and G. L. Mountz. 1983. Rural landowner attitudes toward deer and deer populations in Ohio. Ohio Fish and Wildlife Report 10. Ohio Department of Natural Resources, Columbus, Ohio. 18pp.

Swensson, E.J. 1996. A survey of Montana hunter/rancher problems and solutions. M.S. thesis, Montana State University, Bozeman, Montana. 66pp.

Tanner, G., and R. W. Dimmick. 1983. An assessment of farmers' attitudes towards deer and deer damage in west Tennessee. Proceedings of the Eastern Wildlife

Damage Control Conference 1: 195-199.

Torbit, S. C., R. B. Gill, A. W. Alldredge, and J. C. Liewer. 1993. Impact of pronghorn grazing on winter wheat in Colorado. Journal of Wildlife Management. 57: 173-181.

Van Tassell, L. W., Phillips, C., and B. Yang. 1999. Depredation claim settlements in Wyoming. Wildlife Society Bulletin 27: 479-487.

Wywialowski, A. P. 1994. Agricultural producer's perceptions of wildlife-caused losses. Wildlife Society Bulletin 22: 370-382.

Yoakum, J. D. 1978. Pronghorn. Pages 102-122 *in* J. L. Schmidt and D. L. Gilbert, eds. Big Game of North America. Stackpole Books, Harrisburg, Pennsylvania. 494 pp.

Yoakum, J. D. 1980. Habitat management guides for the American pronghorn antelope. U. S. Department of the Interior, Bureau of Land Management Technical Note No. 347. 77 pp.

Yoakum, J. D., and B. W. O'Gara. 1990. Pronghorn/livestock relationships. Transactions of the North American Wildlife and Natural Resources Conference 55: 475-485.

Zar, J. H. 1996. Biostatistical Analysis. Prentice Hall. Upper Saddle River, New Jersey.

Appendix 1. Survey sent to selected landowners.

Survey of Landowner Attitudes Toward Pronghorn in Western Kansas

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Survey of Landowner Attitudes Toward Pronghorn in Western Kansas

ABOUT THE QUESTIONNAIRE:

This survey is being conducted as a Master's thesis project by a student at Emporia State University. Information from the study will be used to gain a better understanding of attitudes and beliefs about pronghorn. The survey is sponsored by the Pronghorn Committee, comprised of members from the Kansas Livestock Association, the K-State Research and Extension Service, the Kansas Wheat Growers Association, the USDA Natural Resources Conservation Service, Kansas Wildlife and Parks, the Kansas Farm Bureau, and the Kansas Department of Agriculture Plant Protection and Weed Control Division.

You were selected as part of a randomly drawn sample of western Kansas landowners and farm or ranch operators. Your response is very important to the success of the study and your opinion is highly valued. Please take about 10 to 15 minutes to fill out the survey, and **PLEASE be sure to answer every question**. Your responses, identity, and address will remain confidential. **Do not write your name on the questionnaire.**

When finished, fold the questionnaire and put it in the enclosed envelope and drop it in the mail; return postage has already been paid.

If you have any questions or comments, please call Jenny Halstead (316) 341-5339 or Dr. Elmer Finck (316) 341-5623 at Emporia State University.

THANK YOU FOR YOUR COOPERATION!

SECTION 1. Background information

The purpose of this section is to collect general information about you.

1) I own/lease land in _____ county (or counties).

2) I operate/work land in _____ county (or counties).

3) I live in _____ _____ _____

City State County

4) My age is:_____

5) My gender is: ☐Male ☐Female

6) Please check your highest level of education.

☐Graduate degree (Master's or Ph.D.)

☐Bachelor's or Associate's degree from a college or university

☐ Degree from a trade school or technical college

☐Attended trade school or technical college, but did not graduate

☐Attended college or university, but did not graduate

☐High school graduate (or GED)

☐Attended high school, but did not graduate

7) My occupation is :

☐Farmer ☐Rancher ☐Farmer and Rancher ☐Other:_____

___ Full time? ___ Part time?

8) Which statement **best describes** why you farm or ranch in western Kansas? * **(check only one box)**

☐Family tradition ☐Income potential

☐Lifestyle commitment ☐Other:_____

9) What portion of your total income is from farming or ranching?

☐Less than 10% ☐51 to 75%

☐10 to 25% ☐76 to 90%

☐26 to 50% ☐More than 90%

10) How many acres do you use for crop production? _____

If you raise crops, what kind(s) do you plant?_____

11) How many acres do you use as range land for cattle?_____

If you have cattle, how many do you have?_____

12) Do you belong to any sportsmen's, farm, or livestock organizations? ____

If yes, which one(s)? **(Please write out names of organizations, don't abbreviate)**

_____

SECTION 2. Sources of information

The aim of this section is to determine where you go to obtain information and who you trust to deliver that information.

PLEASE READ ALL QUESTIONS AND ANSWERS

1) How important are each of the following to you as sources of information about crop or livestock production and management?

*** number *ALL* of the following choices from 1 to 8 in order of importance to you, with # 1 being most important. *Use each number only once.***

_____ Internet

_____ Relatives, friends

_____ Formal education (college, technical school, etc.)

_____ Personal experience

_____ Magazines and newsletters

_____ KSU Research and Extension Service

_____ USDA Natural Resources Conservation Service

_____ Farm organizations (Farm Bureau, KS Livestock Assoc., etc.)

2) Who has helped you **the most** with wildlife damage problems in the past? ***(check only one box)**

☐KS Dept. of Wildlife and Parks ☐Relatives, friends

☐Trappers, hunters ☐KSU Extension Service

☐Animal damage control ☐I have had no problems.

☐I took care of the problem myself. ☐Other:_____

3) Who would you turn to in order to obtain reliable information concerning pronghorn?

***number *ALL* of the following choices from 1 to 8 in order of importance to you, with # 1 being most important. *Use each number only once*.**

_____ Relatives, friends _____ KSU Extension Service

_____ University researchers _____ Animal damage control agents

_____ Hunting organizations _____ Farm or ranch organizations

_____ KS Dept. of Wildlife and Parks _____ USDA Natural Resources Conservation Service (NRCS)

SECTION 3. Informational influences

In this section, you will be asked about what types of information help you form your ideas and what types of information interest and influence you most.

PLEASE READ ALL QUESTIONS AND ANSWERS

1) What kind of information influences your opinions about wildlife?

***check ALL that apply AND *CIRCLE the most important*.**

☐ Personal experience ☐ Demonstrations ☐ Farm Day exhibits

☐ Teaching videos ☐Newspapers/magazines ☐ Scientific papers

☐ Public presentations ☐ TV programs ☐ Other : _____

2) How important are the following types of information to you concerning agricultural practices?

*** number *ALL* of the following choices from 1 to 5 in order of importance to you, with # 1 being most important. *Use each number only once*.**

____ Financial benefits ____ Increasing production

____ Quality of life issues ____ Increasing efficiency

____ Public acceptance of farming/ranching techniques

3) How likely would you be to read information sent to you that provided details on the effects of pronghorn on farming and ranching?

☐Very likely ☐Somewhat likely ☐Not likely

4) How likely would you be to watch a 30 minute video that provided details on the effects of pronghorn on farming and ranching?

☐Very likely ☐Somewhat likely ☐Not likely

5) How likely would you be to attend a free, local public presentation where experts provided details on the effects of pronghorn on farming and ranching?

☐Very likely ☐Somewhat likely ☐Not likely

SECTION 4. General knowledge

In this section, we want to know your beliefs and opinions about pronghorn.

1) During which season do pronghorn tend to live in the largest herds?

☐Spring ☐Summer ☐Fall ☐Winter ☐Don't know

2) Are pronghorn most active during the day or night?

☐Day ☐Night ☐Don't know

3) What is the **primary** food item of pronghorn year-round?

☐Browse (woody vegetation) ☐Forbs (broadleaf plants and weeds)

☐Grass ☐Crops ☐Don't know

4) Do pronghorn spread bindweed?

☐Yes **(go to # 5)** ☐No **(skip to # 6)** ☐Don't know **(skip to # 6)**

5) How do pronghorn spread bindweed?

***check ALL that apply AND *CIRCLE* the most important.**

☐Hair ☐Hooves ☐Feces ☐Don't know ☐Other:_____

6) How large of a territory do you think a single pronghorn uses?

☐ Less than 100 acres

☐ 101 - 1000 acres

☐ 1,001 - 5,000 acres

☐ 5,001 - 10,000 acres

☐ more than 10,000 acres

☐Don't know

7) How many pronghorn do you think live in Kansas?

☐ Less than 100

☐ 101 - 1,000

☐ 1,001 - 5,000

☐ 5,001 - 10,000

☐10,001 - 50,000

☐More than 50,000

☐Don't know

SECTION 5. Effect of pronghorn on farming and ranching in western Kansas

This section will determine what you feel are the main problems associated with the presence of pronghorn.

For each of the following statements, please circle the number that most closely relates to how you feel about each statement. 1=strongly agree, 2=agree, 3=neutral (do not agree or disagree), 4=disagree, 5= strongly disagree, NO=no opinion or not applicable

PLEASE READ ALL QUESTIONS AND ANSWERS

A. Pronghorn and the spread of bindweed

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	No Opinion
1) Pronghorn do not spread bindweed.	1	2	3	4	5	NO
2) Pronghorn are important in the spread of bindweed.	1	2	3	4	5	NO
3) Pronghorn are just one of many factors involved in the spread of bindweed. ...	1	2	3	4	5	NO
4) Pronghorn are not important (they are a minor factor) in the spread of bindweed.	1	2	3	4	5	NO
5) Pronghorn are the primary cause for the spread of bindweed.	1	2	3	4	5	NO

B. Pronghorn and the spread of disease to livestock

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	No Opinion
1) Pronghorn are a minor factor involved in the spread of disease to livestock.	1	2	3	4	5	NO
2) Pronghorn are important in the spread of disease to livestock...	1	2	3	4	5	NO
3) Pronghorn are a severe problem in the spread of disease to livestock.	1	2	3	4	5	NO
4) Pronghorn do not spread disease to livestock.	1	2	3	4	5	NO

C. Pronghorn damage to fences

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	No Opinion
1) Pronghorn cause excessive damage to fences. ...	1	2	3	4	5	NO
2) Pronghorn frequently damage fences.	1	2	3	4	5	NO
3) Pronghorn cause very little damage to fences.	1	2	3	4	5	NO
4) Pronghorn do not damage fences.	1	2	3	4	5	NO

D. Competition between pronghorn and cattle for forage

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	No Opinion
1) Grazing by pronghorn causes severe forage reductions for cattle.	1	2	3	4	5	NO
2) Grazing by pronghorn reduces forage for cattle.	1	2	3	4	5	NO
3) Grazing by pronghorn causes minor reductions in the amount of forage for cattle.	1	2	3	4	5	NO
4) Grazing by pronghorn does not reduce the amount of forage for cattle.	1	2	3	4	5	NO

E. Effect of pronghorn grazing on winter wheat crop yields

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	No Opinion
1) Grazing by pronghorn does not reduce crop yields. ...	1	2	3	4	5	NO
2) Grazing by pronghorn reduces crop yields.	1	2	3	4	5	NO
3) Grazing by pronghorn causes severe reductions in crop yields.	1	2	3	4	5	NO

SECTION 6. Insight into landowner opinions about pronghorn

This section is dedicated to collecting information about how you feel about pronghorn.

REMEMBER, ALL ANSWERS ARE CONFIDENTIAL, NO NAMES WILL BE ASSOCIATED WITH THE QUESTIONNAIRE.

PLEASE READ ALL QUESTIONS AND ANSWERS.
YOUR RESPONSES ARE VERY IMPORTANT.

1) Are pronghorn present on the property that you own or manage?

☐Yes **(go to # 2)** ☐No **(skip to # 4)** ☐Don't know **(skip to # 4)**

2) How many pronghorn do you think there are during the winter and spring/summer months on the land that you own or operate?

Number of acres:_____ Number of pronghorn:_____(winter)

_____(spring/summer)

3) How has the population of pronghorn on your property changed over the last five years? * **(check only one box)**

☐Increased ☐Stayed the same ☐Decreased ☐Don't know

4) How many pronghorn would you like to have on your land?

Number of acres:_____ Number of pronghorn:_____

5) Do you think farmers or ranchers commonly shoot pronghorn that they feel are causing problems for their farming or ranching operation?

☐Yes ☐No ☐No opinion

6) Do you think it is possible to distinguish between damage done by pronghorn and damage done by other wildlife, such as white-tailed deer?

☐Yes ☐No ☐Don't know

7) How would you describe your feelings toward somebody who shot pronghorn that they thought were causing problems on his/her property?

*** (check only one box)**

☐I would support them.
☐I would inform authorities.
☐I would avoid those people.
☐No Opinion
☐It is none of my business.
☐Other:_____
☐I would question their judgement

8) What would you do if someone without a permit shot a pronghorn on your land? ***(check only one box)**

☐I would support their actions.
☐I would ask them to leave.
☐I would inform the authorities.
☐I would do nothing.
☐No opinion.
☐Other:_____

9) Do you give permission to hunt pronghorn on your land during hunting season?

☐Yes ☐No ☐No opinion

10) **Please circle the number that most closely relates to how you feel about the following statement. 1=strongly agree, 2=agree, 3=neutral (do not agree or disagree), 4=disagree, 5= strongly disagree.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I like pronghorn.	1	2	3	4	5

11) What do you **LIKE** about pronghorn?

***check ALL that apply AND *CIRCLE the most important*.**

- ☐ I enjoy seeing them.
- ☐ I enjoy hunting them.
- ☐ They are unique wildlife.
- ☐ They do not cause me trouble.
- ☐ They make this area special.
- ☐ I do not like them.
- ☐ I receive income from leasing land for hunting.
- ☐ Other:_____

12) What do you **NOT LIKE** about pronghorn?

***check ALL that apply AND *CIRCLE the most important*.**

- ☐ They don't belong here.
- ☐ They cost me time.
- ☐ There are too many of them.
- ☐ They cost me money.
- ☐ They are of no value to me.
- ☐ I like everything about them.
- ☐ Problems with pronghorn hunters.
- ☐ Other:_____
- ☐ They may cause future problems.

13) Which of the following would increase your tolerance and/or enjoyment of pronghorn?

***check ALL that apply AND *CIRCLE the most important*.**

- ☐ Reliable information about the impact of pronghorn on farming/ranching.
- ☐ Accurate information about the behavior/activities of pronghorn.
- ☐ Income from leasing land to pronghorn hunters.
- ☐ Financial compensation for crop/fence damage.
- ☐ Increased hunter courtesy.
- ☐ Nothing will change how I feel toward pronghorn.
- ☐ Other:_____

You have now completed the survey. Thank you again for your time and input. Please remember to put the survey into the return envelope and put it in the mail. The information you have provided is confidential and will not be associated with your name or address.

COMMENTS:

Appendix 2. Letter of notice sent to survey recipients.

Division of Biological Sciences
Box 4050
Emporia State University
Emporia, KS 66801

August 24, 1998

Dear Landowner/Operator :

You will be receiving a survey by mail within the next week. The survey involves a study investigating landowner attitudes toward pronghorn in western Kansas. The study is being conducted as a Master's thesis project by a graduate student at Emporia State University and is sponsored by the Pronghorn Committee. The Pronghorn Committee is comprised of members of the Kansas Livestock Association, the K-State Research and Extension Service, the Kansas Wheat Growers Association, the Natural Resources Conservation Service, Kansas Wildlife and Parks, the Kansas Farm Bureau, and the Kansas Department of Agriculture Plant Protection and Weed Control Division.

You were randomly chosen to participate in this scientific study concerning attitudes and beliefs about pronghorn. Your input will be critical to the success of the study.

Please be expecting the survey and take the time to fill it out. Completion of the survey will only take 10 to 15 minutes and it will provide you with an opportunity to state your opinions. Information in the survey is strictly confidential and none of the information will be associated with your name or address, except for county. Thank you for your time and cooperation.

Sincerely,

Jenny Halstead
Graduate Student
(316) 341-5339

Elmer J. Finck
Associate Professor
(316) 341-5623

Appendix 3. Cover letter sent to recipients

Division of Biological Sciences
Box 4050
Emporia State University
Emporia, KS 66801

August 31, 1998

Dear landowner/operator:

As the activities of humans and wildlife come into contact, conflicts often arise. Sometimes the activities and needs of wildlife can be compatible with the activities of humans, but more often than not, problems arise. It is becoming ever more important to find out why conflicts arise between wildlife and humans and determine how these conflicts might be alleviated. Due to an apparent increase in the amount of negative attitudes toward pronghorn in western Kansas, this survey was designed to identify perceived problem areas between pronghorn and landowners. The goal of the survey is not to offer a solution to the problems between pronghorn and people, but simply to determine the factors leading to the conflict.

You were randomly chosen to take part in a scientific study that will be investigating views concerning pronghorn in western Kansas. The study is being conducted as a Master's thesis project by a graduate student at Emporia State University and is sponsored by members of the Kansas Livestock Association, the Kansas Wheat Growers Association, the K-State Research and Extension Service, the Natural Resources Conservation Service, Kansas Wildlife and Parks, the Kansas Farm Bureau, and the Kansas Department of Agriculture Plant Protection and Weed Control Division.

Your input and time is highly valued. Your assistance is critical to the success of this survey. Information in the survey is confidential and will not be associated with your name or address. The survey will only take 10 to 15 minutes to complete. Participation in this study will provide you with the opportunity to express your views.

Please complete the enclosed questionnaire and return it in the self-addressed, stamped envelope. Thank you for your time and cooperation.

Sincerely,

Jenny Halstead
Graduate Student
(316) 341-5339

Elmer J. Finck
Associate Professor
(316) 341-5623

Appendix 4. Reminder post-card sent to survey recipients.

September 22, 1998

Dear Landowner/Operator :

About two weeks ago, you were sent a survey concerning landowner attitudes toward pronghorn in western Kansas. Please try to find time to fill out the survey. Your time and help is greatly appreciated.

Sincerely,

Jenny Halstead
Graduate Student
(316) 341-5339

Elmer J. Finck
Associate Professor
(316) 341-5623

Appendix 5. Reminder letter sent to survey recipients.

Division of Biological Sciences
Box 4050
Emporia State University
Emporia, KS 66801

September 29, 1998

Dear Landowner/Operator :

About three weeks ago, you were sent a survey concerning landowner attitudes toward pronghorn in western Kansas. As of yet, your completed survey has not been received. Your input is highly valued and critical to the success of the study. Your views will help determine what landowners feel and believe about pronghorn in western Kansas.

You are encouraged to complete and return the survey because it will allow you to voice your opinions. The information in the survey is strictly confidential and no names are associated with the survey.

If you have already returned your completed questionnaire, thank you. In case your first questionnaire was misplaced, a replacement has been enclosed.

Thank you for your time and assistance. Your cooperation is greatly appreciated.

Sincerely,

Jenny Halstead
Graduate Student
(316) 341-5339

Elmer J. Finck
Associate Professor
(316) 341-5623

Appendix 6. New cover letter sent to non-respondents.

Division of Biological Sciences
Emporia State University
Emporia, KS 66801

December 4, 1998

Dear Landowner:

You were first sent a survey concerning landowner attitudes toward pronghorn antelope in September. As of yet, we have not received your response. If you have already sent the survey back, please ignore this letter and thank you for your time and response. If you have not yet had time to fill out the survey, please try to do so. **Your input is critical to the success of this survey and your opinions are greatly valued. Even if you are an absentee-owner or have no pronghorn on your land, the information you can provide is useful and important**. You were randomly chosen from a list of individuals who own land in areas of western Kansas that are, or once were, considered part of the range of pronghorn.

Another survey has been enclosed in case the previous ones were misplaced. The survey will only take about fifteen minutes to fill out and it will allow you to voice your opinion concerning the issue of pronghorn in western Kansas. The information you provide will be used in a scientific study and the results will be used to initiate a program aimed at addressing landowner concerns about pronghorn. **Information you provide will remain confidential and will not be associated with your name. The surveys have been numbered only for the purpose of data entry.**

This survey is being conducted as a thesis project by a student at Emporia State University and is sponsored by the Kansas Livestock Association, the Kansas Farm Bureau, the Kansas Wheat Growers Association, the K-State Research and Extension Service, the Natural Resources Conservation Service, Kansas Wildlife and Parks, and the Kansas Department of Agriculture Plant Protection and Weed Control Division.

Please complete the enclosed questionnaire and return it in the self-addressed envelope that has been provided. Postage has already been paid. Your input will be greatly appreciated. **Thank you for your time and cooperation.**

Sincerely,

Jenny Halstead
Graduate Student
(316)341-5339

Elmer J. Finck
Associate Professor
(316)341-5623

Appendix 7. Summary of general survey results.

Survey items 1-1 and 1-2. Counties in which respondents owned/leased and worked/operated land.[a, b]

	own/lease		work/operate	
County	**n**	**%**	**n**	**%**
Gove	51	13	27	7
Greeley	48	12	22	6
Hamilton	42	11	23	6
Logan	69	18	62	16
Sherman	49	13	32	8
Thomas	55	14	42	1
Wallace	58	15	35	9
Wichita	52	13	32	8

[a] Only counties included in the study area were listed.

[b] Respondents could chose more than one county in which they owned/leased or worked/operated land, or may have chosen none, therefore total sample size did not equal 386 and total percentage did not equal 100.

Survey item 1-3. State of residence of respondents.

State	n	%
Kansas	300	82
Other	68	19

Survey item 1-4. Age of respondents.

Age group	n	%
≤45	83	22
46-65	130	43
>65	165	36

Survey item 1-5. Respondent gender.

Gender	n	%
Male	266	70
Female	116	30

Survey item 1-6. Education level of respondents.

Education level	**n**	**%**
Graduate Degree	37	10
College Degree	117	32
Trade School Degree	22	6
Attended College / Trade School	76	21
High School Graduate	97	26
Attended High School	22	6

Survey item 1-7a. Respondent occupation.

Occupation	**n**	**%**
Farmer	123	32
Rancher	4	1
Farmer and Rancher	116	31
Other	138	36

Survey item 1-7b. Time spent farming by respondents.

Time	n	%
Full time	206	64
Part time	116	36

Survey item 1-8. Why respondents farmed in western Kansas.

Reason:	n	%
Family tradition	177	48
Income potential	59	16
Lifestyle commitment	89	24
Other	48	13

Survey item 1-9. Respondent income from farming or ranching.

% income from farming/ranching	n	%
<10	83	22
10-25	61	16
26-50	35	9
51-75	49	13
76-90	34	9
>90	115	31

Survey item 1-10a. Amount of cropland owned by respondents.

Hectares	n	%
≤130	95	29
131-338	84	26
389-778	58	18
>778	87	27

Survey item 1-10b. Types of crops planted by respondents.[a]

Crop type	n	%
Wheat	318	82
Milo	173	45
Corn	137	36
Sunflowers	50	13
Alfalfa	33	9
Sorghum	19	5
Soybeans	18	5
Other	69	18

[a]Respondents could choose more than one crop type, thus percent totals did not equal 100. Percentages were determined from the proportion of individuals, out of a total of 386 respondents, who indicated they planted a particular crop.

Survey item 1-11a. Amount of rangeland owned by respondents.

Hectares	n	%
≤64	45	23
65-259	67	34
260-518	37	19
>518	46	24

Survey item 1-11b. Number of cattle owned / leased by respondents.

No. of cattle	**n**	**%**
0	141	57
1-100	52	21
101-500	37	15
>500	17	7

Survey item 1-12a. Respondent membership in farm, livestock, or sporting organizations.

Do you belong to any organizations?	**n**	**%**
Yes	129	36
No	234	64

Survey item 1-12b. Respondent organizational affiliations.[a]

Organization	**n**	**%**
Kansas Farm Bureau	65	50
Kansas Livestock Association	33	26
Kansas Wheat Growers	14	11
Pheasants Forever	13	10
National Rifle Association	7	5
Ducks Unlimited	6	5
Other	46	36

[a]Respondents could indicate more than one organization, thus percent totals did not equal 100. Percentages were determined from the proportion of individuals, out of a total of 386 respondents, who indicated they belonged to a particular organization.

Survey item 2-1. Average ranks of sources of livestock production and management information.[a]

Information source	**n**	**rank**	**SE**[b]
Personal experience	329	2.2	0.1
Relatives / friends	318	3.3	0.1
Magazines / newsletters	312	3.5	0.1
KSU Extension Service[c]	303	4.1	0.1
NRCS[d]	301	4.6	0.1
Farm organizations	299	5.2	0.1
Formal education	295	5.3	0.1
Internet	295	7.0	0.1

[a]Respondents were asked to rank items from 1 to 8, with 1 being most important, thus the lower the rank, the more important the information source.

[b]Standard error of the mean rank for each information source.

[c]Kansas State University Extension Service.

[d]Natural Resources Conservation Service.

Survey item 2-2. Sources of help respondents sought for assistance with wildlife damage problems.

Source	n	%
No problem	137	39
Myself	104	29
Friends/relatives	24	7
Trappers	24	7
KDWP[a]	16	5
Extension service	9	3
ADC agents[b]	5	1
Other	37	10

[a]Kansas Department of Wildlife and Parks

[b]Animal Damage Control agents

Survey item 2-3. Average ranks of sources of pronghorn information.[a]

Source	n	rank	SE[b]
KDWP[c]	305	3.0	0.1
KSU Extension service	280	3.8	0.1
Relatives/friends	301	4.0	0.2
Farm organizations	278	4.3	0.1
NRCS[d]	277	4.5	0.1
ADC agents[e]	271	4.9	0.1
Hunting organizations	278	5.2	0.1
Universities	280	5.4	0.1

[a]Respondents were asked to rank items from 1 to 8, with 1 being most important, thus the lower the rank, the more important the information source.

[b]Standard error of the mean rank for each information source.

[c]Kansas Department of Wildlife and Parks

[d]Natural Resource Conservation Service.

[e]Animal Damage Control agents.

Survey item 3-1. Types of information that influenced respondent wildlife opinions.

Information type	**n**	**%**
Personal experience	334	87
Newspapers	246	64
Television	194	50
Public presentations	73	19
Scientific papers	57	15
Instructional videos	34	9
Other	16	4

Survey item 3-2. Average ranks of types of information concerning agricultural practices.[a]

Information about:	**n**	**rank**	**SE** [b]
Financial benefits	340	2.2	0.1
Increasing efficiency	320	2.5	0.1
Quality of life issues	325	2.9	0.1
Increasing production	316	3.0	0.1
Public acceptance	321	4.2	0.1

[a]Respondents ranked items from 1 to 8, with 1 being most important, thus lower ranked items were more important.

[b]Standard error of the mean rank for each information source.

Survey items 3-3, 3-4, and 3-5. Likelihood of respondents to read, watch a video, or attend a presentation about pronghorn.

	Read		Watch video		Attend presentation	
Likelihood	**n**	**%**	**n**	**%**	**n**	**%**
Very likely	151	40	140	37	57	15
Somewhat likely	145	39	143	38	131	35
Not likely	80	21	92	25	187	50

Survey item 4-1. Season of largest pronghorn herds as indicated by respondents.

Season	**n**	**%**
Spring	21	6
Summer	8	2
Fall	48	13
Winter	142	38
Did not know	157	42

Survey item 4-2. Time when pronghorn were most active as indicated by respondents.

Time period	**n**	**%**
Day	142	38
Night	59	16
Did not know	174	46

Survey item 4-3. Primary food of pronghorn as indicated by respondents.

Forage type	**n**	**%**
Browse	11	3
Grass	93	25
Crops	60	16
Forbs	69	19
Did not know	135	37

Survey item 4-4. Respondent answers to whether or not pronghorn spread bindweed.

Do pronghorn spread bindweed?	**n**	**%**
Yes	204	54
No	13	4
Did not know	159	42

Survey item 4-5. Modes by which pronghorn spread bindweed as indicated by respondents.[a]

Mode	**n**	**%**
Feces	173	85
Hooves	115	56
Hair	39	19
Other	2	1
Did not know	6	3

[a]Respondents could choose more than one mode, thus percent totals did not equal 100. A total of 204 respondents replied to this question.

Survey item 4-6. Respondent estimation of pronghorn territory size.

Territory size (ha)	**n**	**%**
<41	29	8
41-405	92	24
406-2,025	47	13
>2,025	39	10
Did not know	169	50

Survey item 4-7. Respondent estimation of how many pronghorn are in Kansas.

Number of pronghorn	**n**	**%**
<1,000	16	4
1,001-5,000	41	11
>5,000	116	31
Did not know	205	54

Survey item 5-A. Respondent opinions relative to pronghorn and the spread of bindweed.

	Agreed		Neutral		Disagreed	
Statement	**n**	**%**	**n**	**%**	**n**	**%**
Pronghorn do not spread bindweed.	36	13	35	13	209	75
Pronghorn are important in the spread of bindweed.	186	68	48	18	38	14
Pronghorn are one of many factors in bindweed spread.	243	84	30	10	17	6
Pronghorn are a minor factor in the spread of bindweed.	55	20	50	18	177	63
Pronghorn are the primary cause for the spread of bindweed.	96	35	71	26	106	39

Survey item 5-B. Respondent opinions relative to pronghorn and the spread of disease to livestock by pronghorn.

	Agreed		Neutral		Disagreed	
Statement	**n**	**%**	**n**	**%**	**n**	**%**
Pronghorn are a minor factor in the spread of disease.	108	48	76	34	39	17
Pronghorn are important in the spread of disease.	41	19	80	37	93	43
Pronghorn are a severe problem in the spread of disease.	23	11	79	37	111	52
Pronghorn do not spread disease.	61	29	97	46	53	25

Survey item 5-C. Respondent opinions relative to fence damage caused by pronghorn.

	Agreed		Neutral		Disagreed	
Statement	**n**	**%**	**n**	**%**	**n**	**%**
Pronghorn cause excessive fence damage.	133	47	61	22	89	31
Pronghorn frequently damage fences.	158	55	59	21	69	24
Pronghorn cause very little fence damage.	98	35	51	18	133	47
Pronghorn do not damage fences.	39	14	58	20	187	66

Survey item 5-D. Respondent opinions relative to forage reduction caused by pronghorn grazing.

	Agreed		Neutral		Disagreed	
Statement	**n**	**%**	**n**	**%**	**n**	**%**
Pronghorn grazing causes severe forage reductions.	79	28	83	30	119	42
Pronghorn grazing reduces forage.	156	54	72	25	60	21
Pronghorn grazing causes minor forage reductions.	158	54	63	22	71	24
Pronghorn grazing does not reduce forage.	45	16	78	27	163	57

Survey item 5-E. Respondent opinions relative to the impact of pronghorn grazing on wheat yields.

	Agreed		Neutral		Disagreed	
Statement	**n**	**%**	**n**	**%**	**n**	**%**
Pronghorn do not reduce crop yields.	61	21	60	20	175	59
Pronghorn reduce crop yields.	183	62	59	20	55	19
Pronghorn cause severe crop yield reductions.	84	29	83	29	122	42

Survey item 6-1. Response to whether or not pronghorn were on a respondent's property.

Are pronghorn on your land?	**n**	**%**
Yes	191	51
No	87	23
Did not know	99	26

Survey item 6-2a. Respondent estimation of the number of pronghorn on their land during winter.

Number of pronghorn	n	%
≤100	132	85
101-200	15	10
>200	9	6

Survey item 6-2b. Respondent estimation of the number of pronghorn on their land during spring/summer.

Number of pronghorn	n	%
≤100	130	90
101-200	10	7
>200	5	3

Survey item 6-3. Respondent estimation of pronghorn population trends in Kansas during the last five years.

Population has:	**n**	**%**
Increased	114	60
Stayed the same	39	21
Decreased	18	10
Did not know	18	10

Survey item 6-4. Number of pronghorn wanted by respondents.

Number of pronghorn	**n**	**%**
0	202	68
1-50	87	29
51-100	7	2
>100	2	1

Survey item 6-5. Response to whether or not farmers or ranchers shot pronghorn that were causing problems.

Response	**n**	**%**
Yes	108	29
No	89	24
No opinion	181	48

Survey item 6-6. Response to whether or not respondents thought pronghorn and white-tailed deer damage could be distinguished.

Response	**n**	**%**
Yes	119	31
No	85	22
Did not know	174	46

Survey item 6-7. Reaction of respondents toward individuals who shot problem-causing pronghorn on their own property.

Reaction	**n**	**%**
Supportive	90	24
Avoided those individuals	2	1
None of my business	77	20
Informed authorities	22	6
Questioned judgement	94	25
No opinion	80	21
Other	12	4

Survey item 6-8. Table 28. Reactions of respondents relative to individuals who shot pronghorn on their land without a permit.

Reaction	**n**	**%**
Supportive	30	8
Asked them to leave	77	21
Did nothing	55	15
Informed authorities	128	34
No opinion	69	19
Other	13	4

Survey item 6-9. Response to whether or not respondent gave permission to hunt pronghorn on his/her land.

Response	**n**	**%**
Yes	161	56
No	127	44

Survey item 6-10. Response of landowners when asked if they liked pronghorn.

Response	n	%
Agreed	123	33
Neutral	157	42
Disagreed	92	25

Survey item 6-11. Reasons respondents liked pronghorn.[a]

Reason	n	%
Enjoy seeing them	195	51
They were unique	162	42
They made the area special	56	15
Income from hunting leases	5	1
Enjoyed hunting them	38	10
No trouble with them	106	28
Other	32	8

[a]Respondents could indicate more than one reason, thus percent totals did not equal 100. Percents were determined from the proportion of individuals who replied to this question out of 386 possible respondents.

Survey item 6-12. Reasons respondents disliked pronghorn.[a]

Reason	**n**	**%**
They did not belong	41	11
There were too many	98	25
They were of no value	99	26
Hunter problems	42	11
May cause future problems	120	31
Cost time	50	13
Cost money	119	31
Other	47	12

[a]Respondents could indicate more than one reason, thus percent totals did not equal 100. Percents were determined from the proportion of individuals who replied to this question out of 386 possible respondents.

Survey item 6-13. Items respondents indicated that might increase their tolerance and/or enjoyment of pronghorn.[a]

Items	n	%
Reliable information about impact of pronghorn	183	47
Information about pronghorn behavior	155	40
Income from leasing land for pronghorn hunting	43	11
Compensation for damage	109	28
Increased hunter courtesy	62	16
Nothing	70	18
Other	32	8

[a]Respondents could indicate more than one item, thus percent totals did not equal 100. Percents were determined from the proportion of individuals who replied to this question out of 386 possible respondents.

Appendix 8. General comments made by respondents.

...not familiar with pronghorn.

Pronghorn are hard on winter wheat.

Contrary to Fish and Game, pronghorn spread bindweed.

Like wildlife.

Don't want problems they (pronghorn) can cause... farming is already tough.

Need to balance between wildlife and people.

Wildlife is put out for others to get jobs and get licenses.

Too many "deer".

Now there are pronghorn and now there is bindweed.

Pronghorn pull out fence staples when they go under the fence.

Wildlife and Parks has no regard for problems... it is their responsibility to control or pay for damage... but don't agree with shooting.

Wildlife and Parks dumped pronghorn out and landowners were never asked.

Pronghorn cause crop damage.

Give landowners free hunting permits for compensation since feeding pronghorn year round is money out of our (landowners) pockets.

If farmers got free permits, it would increase good will and ease feelings.

Don't want to be told what to do concerning pronghorn.

There are too many pronghorn... Wildlife and Parks undercounts.

Compensation would make pronghorn okay.

Appendix 8 (Continued).

Pronghorn have a place, but its not right for Wildlife and Parks to dump them without permission.

Wildlife and Parks needs to believe there is a bindweed problem.

Whoever brought them (pronghorn) should pay for damage... there should be a bounty.

Remove them (pronghorn) or pay for bindweed control.

Farmers need to have financial support for having pronghorn on their land.

Wildlife and Parks needs to control the pronghorn population.

Don't want any more (pronghorn) because they will become like deer.

Need more native wildlife in Kansas.

Wildlife and Parks brings in pronghorn regularly.

Having pronghorn on my land infringes on my rights.

Get rid of them.

Where pronghorn are, there is now thistle.

Don't want pronghorn because of car collisions.

Farmers should believe Wildlife and Parks about bindweed.

I like pronghorn.

Pronghorn cause too much fence damage.

Control numbers... maybe increase attraction for hunting.

I like pronghorn, but am disappointed with Wildlife and Parks because of bindweed problems... need help with bindweed.

Fewer pronghorn means less bindweed.

Appendix 8 (Continued).

There needs to be a longer hunting season for landowners.

I enjoy hunting them.

There are more pronghorn than Wildlife and Parks admits.

I like seeing pronghorn.

I like pronghorn, but there are too many.

Small numbers of pronghorn are okay.

Issue hunt on land permits as compensation.

People are the problem with bindweed.

I would like pronghorn if they did not damage fences and spread bindweed.

Too many pronghorn on the roads.

Don't need pronghorn here... the government should move them out.

Pronghorn would be okay if they tasted less "goaty".

Fences would not get damaged if the bottom wire was raised.

Appendix 9. Number of pronghorn wanted by respondents who resided inside and outside of the pronghorn zone.

Number of pronghorn respondents wanted on their land	Percent responding[a]	
	Inside	Outside
0	69	65
>0	31	35

[a]Total number of responses: inside, n = 193; and outside, n = 105.

Appendix 10. Comparison of answers given by respondents who resided inside and outside of the pronghorn zone relative to pronghorn population trends in Kansas during the last five years.

	Percent responding[a]	
Pronghorn population has:	**Inside**	**Outside**
Increased	61	58
Stayed the same	21	20
Decreased	10	8
Did not know	8	15

[a]Total number of responses: inside, n = 149; and outside, n = 40.

Appendix 11. Opinions of respondents who resided inside and outside of the pronghorn zone relative to the spread of disease to livestock by pronghorn.

Opinions about pronghorn and the spread of disease	**Percent responding**	
	Inside	**Outside**
Pronghorn are a minor factor in the spread of disease.[a]		
Agreed	49	47
Neutral	35	33
Disagreed	16	20
Pronghorn are important in the spread of disease.[b]		
Agreed	21	15
Neutral	38	36
Disagreed	41	49
Pronghorn are a severe problem in the spread of disease.[c]		
Agreed	12	8
Neutral	37	37
Disagreed	51	55

Appendix 11 (Continued).

Opinions about pronghorn and the spread of disease	Percent responding	
	Inside	Outside
Pronghorn do not spread disease.[d]		
Agreed	30	27
Neutral	46	46
Disagreed	24	27

[a]Total number of responses: inside, n = 153; and outside, n = 70.

[b]Total number of responses: inside, n = 147; and outside, n = 67.

[c]Total number of responses: inside, n = 148; and outside, n = 65.

[d]Total number of responses: inside, n = 144; and outside, n = 67.

Appendix 12. Opinions of respondents who resided inside and outside of the pronghorn zone relative to fence damage caused by pronghorn.

Opinions about pronghorn and fence damage	**Percent responding**	
	Inside	**Outside**
Pronghorn cause excessive damage to fences.[a]		
Agreed	52	38
Neutral	19	26
Disagreed	29	37
Pronghorn frequently damage fences.[b]		
Agreed	57	52
Neutral	20	22
Disagreed	23	26
Pronghorn cause very little fence damage.[c]		
Agreed	31	43
Neutral	18	20
Disagreed	52	38

Appendix 12 (Continued).

Opinions about pronghorn and fence damage	Percent responding	
	Inside	Outside
Pronghorn do not damage fences.[d]		
Agreed	12	18
Neutral	19	23
Disagreed	69	59

[a]Total number of responses: inside, n = 190; and outside, n = 93.

[b]Total number of responses: inside, n = 191; and outside, n = 95.

[c]Total number of responses: inside, n = 188; and outside, n = 94.

[d]Total number of responses: inside, n = 189; and outside, n = 95.

Appendix 13. Opinions of respondents who resided inside and outside of the pronghorn zone relative to pronghorn competition with cattle for forage.

Opinions about pronghorn competition with cattle	**Percent responding**	
	Inside	**Outside**
Pronghorn grazing causes severe forage reductions for cattle.[a]		
Agreed	29	26
Neutral	27	34
Disagreed	44	40
Pronghorn grazing reduces forage for cattle.[b]		
Agreed	51	61
Neutral	27	21
Disagreed	22	18
Pronghorn grazing causes minor forage reductions for cattle.[c]		
Agreed	51	61
Neutral	24	16
Disagreed	25	23

Appendix 13 (Continued).

Opinions about pronghorn competition with cattle	Percent responding	
	Inside	Outside
Pronghorn grazing does not reduce cattle forage.[d]		
Agreed	17	13
Neutral	28	25
Disagreed	55	62

[a]Total number of responses: inside, n = 191; and outside, n = 90.

[b]Total number of responses: inside, n = 194; and outside, n = 94.

[c]Total number of responses: inside, n = 197; and outside, n = 95.

[d]Total number of responses: inside, n = 194; and outside, n = 92.

Appendix 14. Opinions of respondents who resided inside and outside of the pronghorn zone relative to the impact of pronghorn grazing on wheat yields.

Opinions about pronghorn grazing on wheat yields	**Percent responding**	
	Inside	**Outside**
Pronghorn do not reduce wheat yields.[a]		
Agreed	20	21
Neutral	22	17
Disagreed	58	62
Pronghorn reduce wheat yields.[b]		
Agreed	63	59
Neutral	20	19
Disagreed	17	22
Pronghorn cause severe wheat yield reductions.[c]		
Agreed	31	25
Neutral	30	27
Disagreed	39	48

[a]Total number of responses: inside, n = 199; and outside, n = 97.

[b]Total number of responses: inside, n = 200; and outside, n = 97.

[c]Total number of responses: inside, n = 195; and outside, n = 94.

Appendix 15. Comparison of answers given by respondents who resided inside and outside of the pronghorn zone relative to whether or not they thought problem-causing pronghorn were commonly shot.

	Percent responding[a]	
Are problem pronghorn shot?	**Inside**	**Outside**
Yes	53	58
No	47	44

[a]Total number of responses: inside, n = 131; and outside, n = 66.

Appendix 16. Comparison of reactions of respondents who resided inside and outside of the pronghorn zone relative to individuals who shot problem-causing pronghorn on their own property.

	Percent responding[a]	
Reaction	**Inside**	**Outside**
Supportive	25	24
Avoided those individuals	1	0
None of my business	23	18
Informed authorities	6	5
Questioned judgement	24	29
No opinion	21	24

[a]Total number of responses: inside, n = 218; and outside, n = 146.

Appendix 17. Reactions of respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to how many pronghorn they wanted on their land.[a]

Number of pronghorn respondents	**Percent responding[a]**	
wanted on their land	**≤50%**	**>50%**
0	66	68
>0	34	32

[a]Total number of responses: less than or equal to 50% farm income, n = 125; and greater than 50% farm income, n = 167.

Appendix 18. Comparison of answers given by respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to pronghorn population trends in Kansas during the last five years.

	Percent responding[a]	
Pronghorn population has:	**≤50%**	**>50%**
Increased	61	58
Stayed the same	21	20
Decreased	10	8
Did not know	8	15

[a]Total number of responses: less than or equal to 50% farm income, n = 54; and greater than 50% farm income, n = 132.

Appendix 19. Comparison of answers given by respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to whether or not they thought pronghorn and white-tailed deer damage could be distinguished.

	Percent responding [a]	
Is damage distinguishable?	**≤50%**	**>50%**
Yes	25	35
No	23	20
Did not know	52	45

[a]Total number of responses: less than or equal to 50% farm income, n = 175; and greater than 50% farm income, n = 215.

Appendix 20. Comparison of answers given by respondents who derived less than or equal to 50% and greater than 50% of their total income from farming relative to whether or not they thought problem-causing pronghorn were commonly shot.

	Percent responding [a]	
Are problem pronghorn shot?	**≤50%**	**>50%**
Yes	53	56
No	47	44

[a]Total number of responses: less than or equal to 50% farm income, n = 86; and greater than 50% farm income, n = 109.

Appendix 21. Comparison of answers given by respondents who owned different amounts of cropland relative to pronghorn population trends in Kansas during the last five years.

Pronghorn population has:	Hectares of cropland Percent responding in each group[a, b]			
	1	**2**	**3**	**4**
Increased	54	56	68	62
Stayed the same	19	20	16	28
Decreased	12	7	13	9
Did not know	15	17	3	2

[a]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[b]Total responses in each group: 1, n = 26; 2, n = 41; 3, n = 38; and 4, n = 65.

Appendix 22. Opinions of respondents who owned different amounts of cropland relative to bindweed spread by pronghorn.

Opinions about pronghorn and the spread of bindweed	Hectares of cropland Percent responding in each group[a]			
	1	2	3	4
Pronghorn do not spread bindweed.[b]				
Agreed	15	6	15	13
Neutral	15	13	20	14
Disagreed	69	81	65	73
Pronghorn are important in the spread of bindweed.[c]				
Agreed	62	73	77	65
Neutral	17	18	17	21
Disagreed	21	10	6	13
Pronghorn are one of many causes of bindweed spread.[d]				
Agreed	84	83	84	86
Neutral	10	15	12	5
Disagreed	7	2	4	9

Appendix 22 (Continued).

Opinions about pronghorn and the spread of bindweed	Hectares of cropland Percent responding in each group[a]			
	1	2	3	4
Pronghorn are a minor factor in bindweed spread.[e]				
Agreed	27	15	13	18
Neutral	20	25	13	16
Disagreed	54	60	75	66
Pronghorn are the primary cause of bindweed spread.[f]				
Agreed	27	32	33	38
Neutral	24	30	43	20
Disagreed	49	38	24	42

[a]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[b]Total responses in each group: 1, n = 52; 2, n = 63; 3, n = 20; and 4, n = 79.

[c]Total responses in each group: 1, n = 52; 2, n = 62; 3, n = 48; and 4, n = 75.

[d]Total responses in each group: 1, n = 61; 2, n = 66; 3, n = 50; and 4, n = 76.

[e]Total responses in each group: 1, n = 56; 2, n = 67; 3, n = 48; and 4, n = 76.

[f]Total responses in each group: 1, n = 55; 2, n = 63; 3, n = 49; and 4, n = 74.

Appendix 23. Opinions of respondents who owned different amounts of cropland relative to the spread of disease to livestock by pronghorn.

Opinions about pronghorn and the spread of disease	Hectares of cropland Percent responding in each group[a]			
	1	2	3	4
Pronghorn are a minor factor in the spread of disease.[b]				
Agreed	60	52	37	46
Neutral	26	33	40	33
Disagreed	14	14	23	21
Pronghorn are important in the spread of disease.[c]				
Agreed	13	26	18	17
Neutral	35	33	53	35
Disagreed	52	40	30	48
Pronghorn are a severe problem in the spread of disease.[d]				
Agreed	10	8	10	11
Neutral	29	38	46	39
Disagreed	60	55	44	50

Appendix 23 (Continued).

Opinions about pronghorn and the spread of bindweed	Hectares of cropland Percent responding in each group[a]			
	1	2	3	4
Pronghorn do not spread disease.[e]				
Agreed	31	28	20	35
Neutral	45	47	49	43
Disagreed	24	25	32	22

[a]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[b]Total responses in each group: 1, n = 50; 2, n = 42; 3, n = 35; and 4, n = 61.

[c]Total responses in each group: 1, n = 48; 2, n = 42; 3, n = 40; and 4, n = 60.

[d]Total responses in each group: 1, n = 48; 2, n = 40; 3, n = 39; and 4, n = 62.

[e]Total responses in each group: 1, n = 49; 2, n = 36; 3, n = 41; and 4, n = 60.

Appendix 24. Opinions of respondents who owned different amounts of cropland relative to the impact of pronghorn grazing on wheat yields.

Opinions about pronghorn and wheat yields	Hectares of cropland Percent responding in each group[a]			
	1	2	3	4
Pronghorn do not reduce wheat yields.[b]				
Agreed	27	13	17	20
Neutral	16	33	12	22
Disagreed	57	54	71	58
Pronghorn reduce wheat yields.[c]				
Agreed	55	60	76	62
Neutral	18	27	10	22
Disagreed	27	13	14	17
Pronghorn cause severe wheat yield reductions.[d]				
Agreed	24	32	34	26
Neutral	26	33	34	26
Disagreed	50	35	32	48

Appendix 24 (Continued).

[a]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[b]Total responses in each group: 1, n = 67; 2, n = 61; 3, n = 52; and 4, n = 79.

[c]Total responses in each group: 1, n = 67; 2, n = 62; 3, n = 51; and 4, n = 78.

[d]Total responses in each group: 1, n = 66; 2, n = 60; 3, n = 50; and 4, n = 77.

Appendix 25. Opinions of respondents who owned different amounts of cropland relative to whether or not they thought pronghorn and white-tailed deer damage could be distinguished.

	Hectares of cropland			
	Percent responding in each group[a, b]			
Is damage distinguishable?	**1**	**2**	**3**	**4**
Yes	24	39	32	43
No	26	25	25	20
Did not know	50	36	44	38

[a]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[b]Total responses in each group: 1, n = 94; 2, n = 83; 3, n = 57; and 4, n = 87.

Appendix 26. Comparison of answers given by respondents who owned different amounts of cropland relative to whether or not they thought problem-causing pronghorn were commonly shot.

	Hectares of cropland			
	Percent responding in each group[a, b]			
Are problem pronghorn shot?	**1**	**2**	**3**	**4**
Yes	55	44	55	58
No	45	56	45	42

[a]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[b]Total responses in each group: 1, n = 42; 2, n = 41; 3, n = 31; and 4, n = 57.

Appendix 27. Reactions of respondents who owned different amounts of cropland relative to individuals who shot problem-causing pronghorn on their own property.

	Hectares of cropland			
	Percent responding in each group[a, b]			
Reaction	**1**	**2**	**3**	**4**
Supportive	17	24	33	30
Avoided them	0	0	0	0
None of my business	19	18	30	21
Informed authorities	9	5	4	6
Questioned their judgement	27	33	13	24
No opinion	27	19	20	17

[a]Hectares of cropland owned by respondents: group 1 = less than or equal to 130 ha (½ section); group 2 = 130-389 ha (½-1½ sections); group 3 = 389-778 ha (1½-3 sections); and group 4 = greater than 778 ha (3 sections).

[b]Total responses in each group: 1, n = 88; 2, n = 78; 3, n = 54; and 4, n = 87.

Appendix 28. Number of pronghorn wanted by respondents who owned different amounts of rangeland.

Number of pronghorn respondents wanted on their land	Hectares of rangeland: Percent responding in each group[a, b]			
	1	2	3	4
0	61	58	66	66
>0	39	42	34	34

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 33; 2, n = 53; 3, n = 35; and 4, n = 41.

Appendix 29. Comparison of answers given by respondents who owned different amounts of rangeland relative to pronghorn population trends in Kansas during the last five years.

Pronghorn population has:	Hectares of rangeland Percent responding in each group[a, b]			
	1	**2**	**3**	**4**
Increased	65	61	52	58
Stayed the same	24	17	36	21
Decreased	0	10	8	16
Did not know	12	12	4	5

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 17; 2, n = 41; 3, n = 25; and 4, n = 38.

Appendix 30. Comparison of answers given by respondents who owned different amounts of rangeland relative to the number of pronghorn in Kansas.

Number of pronghorn	Hectares of rangeland Percent responding in each group[a, b]			
	1	**2**	**3**	**4**
<1,000	7	3	0	0
1,001 - 5,000	4	11	8	16
>5,000	42	29	42	47
Did not know	47	57	50	38

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 45; 2, n = 65; 3, n = 36; and 4, n = 45.

Appendix 31. Opinions of respondents who owned different amounts of rangeland relative to whether or not pronghorn spread bindweed.

Do pronghorn spread bindweed?	Acres of rangeland Percent responding in each group[a, b]			
	1	**2**	**3**	**4**
Yes	51	58	71	73
No	0	3	3	4
Did not know	49	39	26	22

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 45; 2, n = 66; 3, n = 35; and 4, n = 45.

Appendix 32. Opinions of respondents who owned different amounts of rangeland relative to bindweed spread by pronghorn.

Opinions about pronghorn and the spread of bindweed	Hectares of rangeland Percent responding in each group[a]			
	1	2	3	4
Pronghorn do not spread bindweed.[b]				
Agreed	5	8	12	8
Neutral	16	16	6	5
Disagreed	78	76	82	87
Pronghorn are important in the spread of bindweed.[c]				
Agreed	62	63	77	79
Neutral	18	22	19	8
Disagreed	21	16	3	13
Pronghorn are one of many causes of bindweed spread.[d]				
Agreed	85	82	94	87
Neutral	8	11	6	5
Disagreed	8	7	0	8

Appendix 32 (Continued).

Opinions about pronghorn and the spread of bindweed	Hectares of rangeland Percent responding in each group[a]			
	1	2	3	4
Pronghorn are a minor factor in bindweed spread.[e]				
Agreed	24	15	10	13
Neutral	16	26	20	15
Disagreed	59	58	70	72
Pronghorn are the primary cause of bindweed spread.[f]				
Agreed	35	33	43	45
Neutral	12	37	23	16
Disagreed	53	30	33	39

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 37; 2, n = 51; 3, n = 33; and 4, n = 39.

[c]Total responses in each group: 1, n = 34; 2, n = 51; 3, n = 31; and 4, n = 38.

[d]Total responses in each group: 1, n = 39; 2, n = 57; 3, n = 31; and 4, n = 38.

[e]Total responses in each group: 1, n = 37; 2, n = 53; 3, n = 30; and 4, n = 39.

[f]Total responses in each group: 1, n = 34; 2, n = 54; 3, n = 30; 4, n = 38.

Appendix 33. Opinions of respondents who owned different amounts of rangeland relative to the spread of disease to livestock by pronghorn.

Opinions about pronghorn and the spread of disease	Hectares of rangeland Percent responding in each group [a]			
	1	2	3	4
Pronghorn are a minor factor in the spread of disease.[b]				
Agreed	47	43	46	47
Neutral	31	40	38	25
Disagreed	22	17	15	28
Pronghorn are important in the spread of disease.[c]				
Agreed	16	27	13	21
Neutral	35	41	50	21
Disagreed	48	32	38	58
Pronghorn are a severe problem in the spread of disease.[d]				
Agreed	13	13	5	18
Neutral	35	35	36	27
Disagreed	52	53	59	55

Appendix 33 (Continued).

Opinions about pronghorn and the spread of bindweed	Hectares of rangeland Percent responding in each group[a]			
	1	2	3	4
Pronghorn do not spread disease.[e]				
Agreed	35	32	19	25
Neutral	42	39	67	41
Disagreed	23	29	14	34

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 32; 2, n = 42; 3, n = 26; and 4, n = 32.

[c]Total responses in each group: 1, n = 31; 2, n = 41; 3, n = 24; and 4, n = 33.

[d]Total responses in each group: 1, n = 31; 2, n = 40; 3, n = 22; and 4, n = 33.

[e]Total responses in each group: 1, n = 31; 2, n = 41; 3, n = 21; and 4, n = 32.

Appendix 34. Opinions of respondents who owned different amounts of rangeland relative to fence damage caused by pronghorn.

Opinions about pronghorn and fence damage	Hectares of rangeland Percent responding in each group[a]			
	1	2	3	4
Pronghorn cause excessive damage to fences.[b]				
Agreed	38	54	70	56
Neutral	22	18	13	23
Disagreed	41	29	17	21
Pronghorn frequently damage fences.[c]				
Agreed	50	56	67	72
Neutral	21	11	12	21
Disagreed	29	33	21	8
Pronghorn cause very little fence damage.[d]				
Agreed	39	36	17	28
Neutral	18	9	17	10
Disagreed	42	55	66	62

Appendix 34 (Continued).

Opinions about pronghorn and fence damage	Hectares of rangeland Percent responding in each group[a]			
	1	2	3	4
Pronghorn do not damage fences.[e]				
Agreed	16	17	10	3
Neutral	21	21	17	13
Disagreed	63	62	73	85

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 37; 2, n = 56; 3, n = 30; and 4, n = 39.

[c]Total responses in each group: 1, n = 38; 2, n = 55; 3, n = 33; and 4, n = 39.

[d]Total responses in each group: 1, n = 38; 2, n = 53; 3, n = 29; and 4, n = 39.

[e]Total responses in each group: 1, n = 38; 2, n = 53; 3, n = 30; and 4, n = 39.

Appendix 35. Opinions of respondents who owned different amounts of rangeland relative to pronghorn competition with cattle for forage.

Opinions about pronghorn competition with cattle	Hectares of rangeland: Percent responding in each group[a]			
	1	2	3	4
Pronghorn grazing causes severe forage reductions for cattle.[b]				
Agreed	28	36	30	27
Neutral	23	29	23	29
Disagreed	49	36	47	44
Pronghorn grazing reduces forage for cattle.[c]				
Agreed	53	51	53	61
Neutral	20	22	27	24
Disagreed	28	27	20	15
Pronghorn grazing causes minor forage reductions for cattle.[d]				
Agreed	53	44	63	54
Neutral	13	24	16	10
Disagreed	35	32	22	37

Appendix 35 (Continued).

Opinions about pronghorn competition with cattle	Hectares of rangeland Percent responding in each group[a]			
	1	2	3	4
Pronghorn grazing does not reduce cattle forage.[e]				
Agreed	15	22	13	10
Neutral	28	29	29	15
Disagreed	56	49	58	76

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 39; 2, n = 59; 3, n = 30; and 4, n = 41.

[c]Total responses in each group: 1, n = 40; 2, n = 59; 3, n = 30; and 4, n = 41.

[d]Total responses in each group: 1, n = 40; 2, n = 59; 3, n = 32; and 4, n = 41.

[e]Total responses in each group: 1, n = 39; 2, n = 59; 3, n = 31; and 4, n = 41.

Appendix 36. Opinions of respondents who owned different amounts of rangeland relative to the impact of pronghorn grazing on wheat yields.

Opinions about pronghorn and wheat yields	Hectares of rangeland Percent responding in each group[a]			
	1	2	3	4
Pronghorn do not reduce wheat yields.[b]				
Agreed	23	17	23	8
Neutral	23	19	19	15
Disagreed	54	54	58	78
Pronghorn reduce wheat yields.[c]				
Agreed	56	64	65	78
Neutral	15	21	19	15
Disagreed	28	15	16	8
Pronghorn cause severe wheat yield reductions.[d]				
Agreed	29	35	30	41
Neutral	16	32	20	26
Disagreed	55	33	50	33

Appendix 36 (Continued).

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 39; 2, n = 59; 3, n = 31; and 4, n = 40.

[c]Total responses in each group: 1, n = 39; 2, n = 61; 3, n = 31; and 4, n = 40.

[d]Total responses in each group: 1, n = 38; 2, n = 60; 3, n = 30; and 4, n = 39.

Appendix 37. Comparison of answers given by respondents who owned different amounts of rangeland relative to whether or not they thought problem-causing pronghorn were commonly shot.

	Hectares of rangeland			
	Percent responding in each group [a, b]			
Are problem pronghorn shot?	**1**	**2**	**3**	**4**
Yes	40	51	77	62
No	60	49	23	38

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 20; 2, n = 39; 3, n = 22; and 4, n = 29.

Appendix 38. Reactions of respondents who owned different amounts of rangeland relative to individuals who shot problem-causing pronghorn on their own property.

	Hectares of rangeland			
	Percent responding in each group[a, b]			
Reaction	**1**	**2**	**3**	**4**
Supportive	23	34	27	40
Avoided them	0	0	0	2
None of my business	21	17	27	24
Informed authorities	0	3	8	4
Questioned their judgement	35	32	19	22
No opinion	21	14	19	7

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 43; 2, n = 59; 3, n = 37; and 4, n = 45.

Appendix 39. Reactions of respondents who owned different amounts of rangeland relative to individuals who shot pronghorn on their land without a permit.

	Hectares of rangeland			
	Percent responding in each group[a, b]			
Reaction	**1**	**2**	**3**	**4**
Supportive	2	9	12	18
Asked them to leave	33	16	36	16
Did nothing	19	17	9	25
Informed authorities	35	41	27	20
No opinion	12	17	15	20

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 43; 2, n = 64; 3, n = 33; and 4, n = 44.

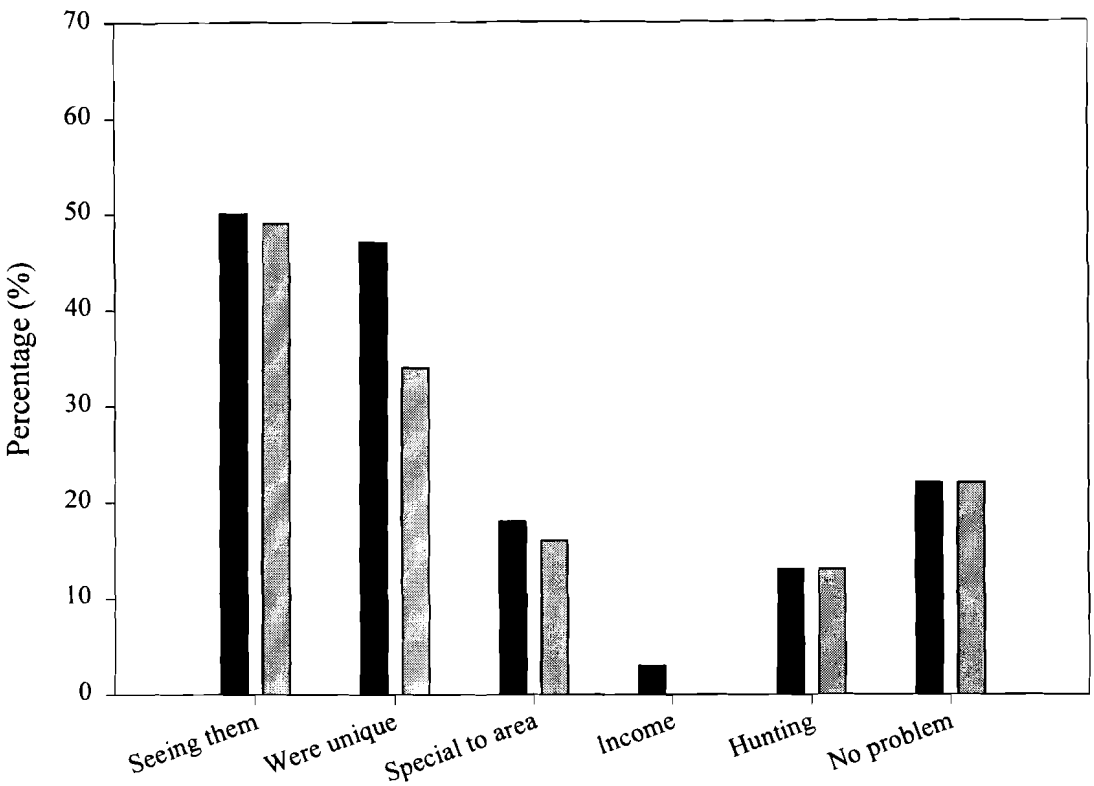
Appendix 40. Opinions of respondents who owned different amounts of rangeland relative to whether or not they liked pronghorn.

	Hectares of rangeland			
I like pronghorn.	**Percent responding in each group[a, b]**			
Response:	**1**	**2**	**3**	**4**
Agreed	38	32	32	36
Neutral	33	38	32	34
Disagreed	29	30	35	30

[a]Hectares of rangeland owned by respondents: group 1 = less than or equal to 65 ha (1/4 section); group 2 = 65-259 ha (1/4-1 section); group 3 = 260-518 ha (1-2 sections); and group 4 = greater than 518 ha (2 sections).

[b]Total responses in each group: 1, n = 45; 2, n = 63; 3, n = 37; and 4, n = 44.

Appendix 41. Comparison of respondents who owned different amounts of rangeland relative to reasons to like pronghorn.



Things respondents who owned different amounts of rangeland liked about pronghorn

Respondents owning less than or equal to 259 ha of rangeland
Respondents owning greater than 259 ha of rangeland

Appendix 42. Number of pronghorn wanted by respondents in different age groups.

Number of pronghorn wanted by respondents	Age group[a] Percent responding		
	≤ 45	46-65	> 65
0	65	71	66
>0	35	29	34

[a]Total number of responses in each age group: less than or equal to 45 years, n = 68; 46-65 years, n = 131; and greater than 65 years, n = 99.

Appendix 43. Comparison of answers given by respondents in different age groups relative to the number of pronghorn in Kansas.

	Age group[a]		
	Percent responding		
Number of pronghorn	**≤ 45**	**46-65**	**> 65**
≤1,000	6	4	4
1,001 - 5,000	16	9	10
>5,000	34	32	27
Did not know	45	55	60

[a]Total number of responses in each age group: less than or equal to 45 years, n = 83; 46-65 years, n = 159; and greater than 65 years, n = 136.

Appendix 44. Comparison of answers given by respondents in different age groups relative to whether or not pronghorn spread bindweed.

Do pronghorn spread bindweed?	Age group[a] Percent responding		
	≤ 45	46-65	> 65
Yes	57	57	50
No	4	5	2
Did not know	39	39	49

[a]Total responses in each age group: less than or equal to 45 years, n = 82; 46-65 years, n = 161; and greater than 65 years, n = 133.

Appendix 45. Opinions of respondents in different age groups relative to the spread of disease to livestock by pronghorn.

Opinions about pronghorn and the spread of disease	Age group Percent responding ≤ 45	46-65	> 65
Pronghorn are a minor factor in the spread of disease.[a]			
Agreed	44	49	50
Neutral	27	40	31
Disagreed	29	10	19
Pronghorn are important in the spread of disease.[b]			
Agreed	24	16	20
Neutral	33	41	36
Disagreed	43	44	43
Pronghorn are a severe problem in the spread of disease.[c]			
Agreed	10	7	15
Neutral	27	43	37
Disagreed	63	50	48

Appendix 45 (Continued).

Opinions about pronghorn and the spread of disease	Age group Percent responding ≤ 45	46-65	> 65
Pronghorn do not spread disease.[d]			
Agreed	10	7	15
Neutral	27	43	37
Disagreed	63	50	48

[a]Total responses in each age group: less than or equal to 45 years, n = 52; 46-65 years, n = 97; and greater than 65 years, n = 74.

[b]Total responses in each age group: less than or equal to 45 years, n = 49; 46-65 years, n = 96; and greater than 65 years, n = 69.

[c]Total responses in each age group: less than or equal to 45 years, n = 48; 46-65 years, n = 94; and greater than 65 years, n = 71.

[d]Total responses in each age group: less than or equal to 45 years, n = 49; 46-65 years, n = 94; and greater than 65 years, n = 68.

Appendix 46. Opinions of respondents in different age groups relative to pronghorn competition with cattle for forage.

Opinions about pronghorn competition with cattle	Age group Percent responding ≤ 45	46-65	> 65
Pronghorn grazing causes severe forage reductions for cattle.[a]			
Agreed	37	25	26
Neutral	15	34	34
Disagreed	48	41	40
Pronghorn grazing reduces forage for cattle.[b]			
Agreed	55	57	50
Neutral	22	21	32
Disagreed	23	22	18
Pronghorn grazing causes minor forage reductions for cattle.[c]			
Agreed	48	58	53
Neutral	20	19	26
Disagreed	31	23	21

Appendix 46 (Continued).

Opinions about pronghorn competition with cattle	Age group Percent responding ≤ 45	46-65	> 65
Pronghorn grazing does not reduce cattle forage.[d]			
Agreed	16	16	15
Neutral	24	25	33
Disagreed	60	60	52

[a]Total responses in each age group: less than or equal to 45 years, n = 62; 46-65 years, n = 127; and greater than 65 years, n = 92.

[b]Total responses in each age group: less than or equal to 45 years, n = 64; 46-65 years, n = 128; and greater than 65 years, n = 96.

[c]Total responses in each age group: less than or equal to 45 years, n = 64; 46-65 years, n = 129; and greater than 65 years, n = 99.

[d]Total responses in each age group: less than or equal to 45 years, n = 63; 46-65 years, n = 126; and greater than 65 years, n = 97.

Appendix 47. Opinions of respondents in different age groups relative to the impact of pronghorn grazing on wheat yields.

Opinions about pronghorn grazing on wheat yields	Age group Percent responding ≤ 45	46-65	> 65
Pronghorn do not reduce wheat yields.[a]			
Agreed	15	18	28
Neutral	21	18	22
Disagreed	64	64	49
Pronghorn reduce wheat yields.[b]			
Agreed	69	62	56
Neutral	19	18	22
Disagreed	12	20	21
Pronghorn cause severe wheat yield reductions.[c]			
Agreed	26	29	31
Neutral	26	30	29
Disagreed	48	41	40

[a]Total responses in each age group: less than or equal to 45 years, n = 67; 46-65 years, n = 130; and greater than 65 years, n = 99.

Appendix 47 (Continued).

[b]Total responses in each age group: less than or equal to 45 years, n = 68; 46-65 years, n = 131; and greater than 65 years, n = 98.

[c]Total responses in each age group: less than or equal to 45 years, n = 65; 46-65 years, n = 130; and greater than 65 years, n = 94.

Appendix 48. Comparison of answers given by respondents in different age groups relative to whether or not they thought pronghorn and white-tailed deer damage could be distinguished.

Is damage distinguishable?	Age group[a] Percent responding		
	≤45	46-65	>65
Yes	35	35	25
No	18	24	23
Did not know	47	40	52

[a]Total responses in each age group: less than or equal to 45 years, n = 83; 46-65 years, n = 161; and greater than 65 years, n = 134.

Appendix 49. Comparison of answers given by respondents in different age groups relative to whether or not they thought problem-causing pronghorn were commonly shot.

Are problem-causing pronghorn shot?	Age group[a] Percent responding ≤ 45	46-65	> 65
Yes	49	61	49
No	51	39	51

[a]Total responses in each age group: less than or equal to 45 years, n = 43; 46-65 years, n = 95; and greater than 65 years, n = 59.

Appendix 50. Reactions of respondents in different age groups relative to individuals who shot pronghorn on their land without a permit.

Reaction	Age group[a] Percent responding		
	≤ 45	46-65	> 65
Supportive	11	9	6
Asked them to leave	25	22	19
Did nothing	10	20	13
Informed authorities	34	36	37
No opinion	20	14	25

[a]Total responses in each age group: less than or equal to 45 years, n = 80; 46-65 years, n = 151; and greater than 65 years, n = 128.

Appendix 51. Opinions of respondents in different age groups relative to whether or not they liked pronghorn.

	Age group[a]		
I like pronghorn.	**Percent responding**		
Response:	**≤ 45**	**46-65**	**> 65**
Agreed	36	34	31
Neutral	41	38	49
Disagreed	23	29	21

[a]Total responses in each age group: less than or equal to 45 years, n = 81; 46-65 years, n = 160; and greater than 65 years, n = 131.

Appendix 52. Number of pronghorn wanted by respondents who did and did not belong to a farm or sporting organization.

	Organizational affiliation?[a]	
Number of pronghorn respondents	**Percent responding**	
wanted on their land	**Yes**	**No**
0	65	70
>0	35	30

[a]Total number of responses: yes, n = 107; and no, n = 177.

Appendix 53. Comparison of answers given by respondents who did and did not belong to a farm or sporting organization relative to pronghorn population trends in Kansas during the last five years.

	Affiliated with an organization? [a]	
	Percent responding	
Pronghorn population has:	**Yes**	**No**
Increased	58	62
Stayed the same	28	16
Decreased	10	8
Did not know	5	14

[a]Total number of responses: yes, n = 83; and no, n = 95.

Appendix 54. Opinions of respondents who did and did not belong to a farm or sporting organization relative to the spread of bindweed by pronghorn.

Opinions about pronghorn and the spread of bindweed	Affiliated with an organization? Percent responding	
	Yes	**No**
Pronghorn do not spread bindweed.[a]		
Agreed	14	13
Neutral	12	13
Disagreed	75	74
Pronghorn are important in the spread of bindweed.[b]		
Agreed	70	69
Neutral	18	17
Disagreed	12	13
Pronghorn are one of many causes of bindweed spread.[c]		
Agreed	87	82
Neutral	8	12
Disagreed	5	6

Appendix 54 (Continued).

Opinions about pronghorn and the spread of bindweed	Affiliated with an organization? Percent responding	
	Yes	**No**
Pronghorn are a minor factor in bindweed spread.[d]		
Agreed	19	19
Neutral	17	18
Disagreed	63	62
Pronghorn are the primary cause of bindweed spread.[e]		
Agreed	36	35
Neutral	24	29
Disagreed	39	37

[a]Total number of responses: yes, n = 111; and no, n = 152.

[b]Total number of responses: yes, n = 106; and no, n = 150.

[c]Total number of responses: yes, n = 111; and no, n = 163.

[d]Total number of responses: yes, n = 109; and no, n = 157.

[e]Total number of responses: yes, n = 107; and no, n = 150.

Appendix 55. Opinions of respondents who did and did not belong to a farm or sporting organization relative to the spread of disease to livestock by pronghorn.

Opinions about pronghorn and the spread of disease	Affiliated with an organization? Percent responding	
	Yes	No
Pronghorn are a minor factor in the spread of disease.[a]		
Agreed	49	48
Neutral	30	37
Disagreed	21	15
Pronghorn are important in the spread of disease.[b]		
Agreed	24	16
Neutral	32	40
Disagreed	44	44
Pronghorn are a severe problem in the spread of disease.[c]		
Agreed	14	9
Neutral	31	40
Disagreed	55	51

Appendix 55 (Continued).

Opinions about pronghorn and the spread of disease	Affiliated with an organization? Percent responding	
	Yes	**No**
Pronghorn do not spread disease.[d]		
Agreed	29	29
Neutral	43	48
Disagreed	29	23

[a]Total number of responses: yes, n = 82; and no, n = 130.

[b]Total number of responses: yes, n = 78; and no, n = 125.

[c]Total number of responses: yes, n = 78; and no, n = 124.

[d]Total number of responses: yes, n = 77; and no, n = 124.

Appendix 56. Opinions of respondents who did and did not belong to a farm or sporting organization relative to fence damage caused by pronghorn.

Opinions about pronghorn and fence damage	Affiliated with an organization? Percent responding	
	Yes	**No**
Pronghorn cause excessive damage to fences.[a]		
Agreed	47	48
Neutral	22	22
Disagreed	31	31
Pronghorn frequently damage fences.[b]		
Agreed	62	52
Neutral	16	24
Disagreed	22	25
Pronghorn cause very little fence damage.[c]		
Agreed	34	34
Neutral	13	22
Disagreed	53	44

Appendix 56 (Continued).

Opinions about pronghorn and fence damage	Affiliated with an organization? Percent responding	
	Yes	**No**
Pronghorn do not damage fences.[d]		
Agreed	11	16
Neutral	20	22
Disagreed	69	63

[a]Total number of responses: yes, n = 108; and no, n = 160.

[b]Total number of responses: yes, n = 107; and no, n = 161.

[c]Total number of responses: yes, n = 106; and no, n = 159.

[d]Total number of responses: yes, n = 109; and no, n = 158.

Appendix 57. Opinions of respondents who did and did not belong to a farm or sporting organization relative to pronghorn competition with cattle for forage.

Opinions about pronghorn competition with cattle	Affiliated with an organization? Percent responding	
	Yes	**No**
Pronghorn grazing causes severe forage reductions for cattle.[a]		
Agreed	28	29
Neutral	25	31
Disagreed	47	39
Pronghorn grazing reduces forage for cattle.[b]		
Agreed	58	52
Neutral	22	28
Disagreed	21	20
Pronghorn grazing causes minor forage reductions for cattle.[c]		
Agreed	59	51
Neutral	15	26
Disagreed	26	23

Appendix 57 (Continued).

Opinions about pronghorn competition with cattle	Affiliated with an organization? Percent responding	
	Yes	**No**
Pronghorn grazing does not reduce cattle forage.[d]		
Agreed	17	15
Neutral	23	30
Disagreed	60	55

[a]Total number of responses: yes, n = 106; and no, n = 160.

[b]Total number of responses: yes, n = 107; and no, n = 165.

[c]Total number of responses: yes, n = 108; and no, n = 167.

[d]Total number of responses: yes, n = 107; and no, n = 163.

Appendix 58. Opinions of respondents who did and did not belong to a farm or sporting organization relative to the impact of pronghorn grazing on wheat yields.

	Affiliated with an organization?	
Opinions about impact of	**Percent responding**	
pronghorn on wheat yields	**Yes**	**No**
Pronghorn do not reduce		
wheat yields.[a]		
Agreed	18	23
Neutral	18	20
Disagreed	65	56
Pronghorn reduce wheat yields.[b]		
Agreed	70	58
Neutral	14	21
Disagreed	16	20
Pronghorn cause severe wheat		
yield reductions.[c]		
Agreed	32	29
Neutral	29	30
Disagreed	40	41

[a]Total number of responses: yes, n = 114; and no, n = 166.

[b]Total number of responses: yes, n = 112; and no, n = 168.

[c]Total number of responses: yes, n = 111; and no, n = 164.

Appendix 59. Comparison of answers given by respondents who did and did not belong to a farm or sporting organization relative to whether or not they thought pronghorn and white-tailed deer damage could be distinguished.

	Affiliated with an organization?[a]	
	Percent responding	
Is damage distinguishable?	**Yes**	**No**
Yes	36	28
No	24	22
Did not know	40	49

[a]Total number of responses: yes, n = 127; and no, n = 229.

Appendix 60. Comparison of answers given by respondents who did and did not belong to a farm or sporting organization relative to whether or not they thought problem-causing pronghorn were commonly shot.

	Affiliated with an organization?[a]	
	Percent responding	
Are problem pronghorn shot?	**Yes**	**No**
Yes	53	56
No	47	44

[a]Total number of responses: yes, n = 70; and no, n = 111.

Appendix 61. Comparison of reactions of respondents who did and did not belong to a farm or sporting organization relative to individuals who shot problem-causing pronghorn on their own property.

	Affiliated with an organization?[a]	
	Percent responding	
Reaction	**Yes**	**No**
Supportive	30	22
Avoided those individuals	2	0
None of my business	20	21
Informed authorities	5	6
Questioned judgement	27	25
No opinion	16	25

[a]Total number of responses: yes, n = 122; and no, n = 220.

Appendix 62. Comparison of reactions of respondents who did and did not belong to a farm or sporting organization relative to individuals who shot pronghorn on their land without a permit.

	Affiliated with an organization?[a]	
	Percent responding	
Reaction	**Yes**	**No**
Supportive	10	8
Asked them to leave	26	19
Did nothing	17	14
Informed authorities	30	38
No opinion	17	21

[a]Total number of responses: yes, n = 121; and no, n = 219.

Appendix 63. Opinions of respondents who did and did not belong to a farm or sporting organization relative to whether or not they liked pronghorn.

	Affiliated with an organization?	
I like pronghorn.	**Percent responding[a]**	
Response:	**Yes**	**No**
Agreed	30	38
Neutral	46	34
Disagreed	25	28

[a]Total number of responses: yes, n = 225; and no, n = 126.

Appendix 64. Number of pronghorn wanted by respondents who did and did not allow pronghorn hunting on their land.

	Allow pronghorn hunting?[a]	
Number of pronghorn respondents	**Percent responding**	
wanted on their land	**Yes**	**No**
0	62	69
>0	38	31

[a]Total number of responses: yes, n = 147; and no, n = 84.

Appendix 65. Opinions of respondents who did and did not allow pronghorn hunting on their land relative to the spread of disease to livestock by pronghorn.

Opinions about pronghorn and the spread of disease	Allow pronghorn hunting? Percent responding	
	Yes	**No**
Pronghorn are a minor factor in the spread of disease.[a]		
Agreed	48	59
Neutral	35	25
Disagreed	17	16
Pronghorn are important in the spread of disease.[b]		
Agreed	20	15
Neutral	37	32
Disagreed	43	53
Pronghorn are a severe problem in the spread of disease.[c]		
Agreed	13	5
Neutral	35	35
Disagreed	52	60

Appendix 65 (Continued).

Opinions about pronghorn and the spread of disease	Allow pronghorn hunting? Percent responding	
	Yes	**No**
Pronghorn do not spread disease.[d]		
Agreed	29	32
Neutral	48	46
Disagreed	23	23

[a]Total number of responses: yes, n = 117; and no, n = 63.

[b]Total number of responses: yes, n = 114; and no, n = 59.

[c]Total number of responses: yes, n = 114; and no, n = 57.

[d]Total number of responses: yes, n = 111; and no, n = 57.

Appendix 66. Comparison of answers given by respondents who did and did not allow pronghorn hunting on their land relative to whether or not they thought problem-causing pronghorn were commonly shot.

	Allow pronghorn hunting?[a]	
	Percent responding	
Are problem pronghorn shot?	**Yes**	**No**
Yes	55	59
No	45	41

[a]Total number of responses: yes, n = 108; and no, n = 56.

Appendix 67. Human subjects consent form.

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APPENDIX C

APPLICATION FOR APPROVAL TO USE HUMAN SUBJECTS

For R&G Use Only	Date approved			
File No. _____	Full Review _____	Expedited Review _____	Exempted Review ✓	

This application should be submitted, along with the Informed Consent Document and supplemental material, to the Institutional Review Board for Treatment of Human Subjects, Research and Grants Center, Plumb Hall 313F, Campus Box 4003.

1. Name of Principal Investigator(s) (Individual(s) administering the procedures): Elmer J. Finck

   Jenny Halstead

2. Departmental Affiliation: Biological Sciences

3. Person to whom notification should be sent: Elmer J. Finck

   Address: ESU, PO Box 4050 Telephone: 341-5623

4. Title of Project: Survey of Landowner Attitudes Toward Pronghorn in Western Kansas

5. Funding Agency (if applicable): Kansas Department of Wildlife and Parks

6. This is a dissertation _____ thesis XX class project _____ other _____

7. Project Purpose(s): To survey the attitudes of landowners relative to the population of pronghorn in western Kansas. The Kansas Department of Wildlife and Parks will develop an educational program directed to landowners from our results.

8. Describe the proposed subjects: (*age, sex, race, or other special characteristics, such as students in a specific class, etc.*) Landowners of western Kansas. mixed age, race, and sex

9. Describe how the subjects are to be selected: Random selection of landowners from the list provided by the Soil Conservation Service.

10. Describe the proposed procedures in the project. Any proposed experimental activities that are included in evaluation, research, development, demonstration, instruction, study, treatments, debriefing, questionnaires, and similar projects must be described here. **Copies of questionnaires, survey instruments, or tests should be attached.** (*Use additional page if necessary.*) See attached.

11. Will questionnaires, tests, or related research instruments not explained in question #10 be used?
____ Yes XX No (*If yes, attach a copy to this application.*)

12. Will electrical or mechanical devices be applied to the subjects? ____Yes XX No (*If yes, attach a detailed description of the device(s) used and precautions and safeguards that will be taken.*)

13. Do the benefits of the research outweigh the risks to human subjects? XX Yes ____ No (*If no, this information should be outlined here.*)

14. Are there any possible emergencies which might arise in utilization of human subjects in this project?
____ Yes XX No (*If yes, details of these emergencies should be provided here.*)

15. What provisions will you take for keeping research data private? (*Be specific.*)
The forms are coded and will not be shared by anyone.

16. **Attach a copy of the informed consent document, as it will be used for your subjects.**

STATEMENT OF AGREEMENT: I have acquainted myself with the Federal Regulations and University policy regarding the use of human subjects in research and related activities and will conduct this project in accordance with those requirements. Any changes in procedures will be cleared through the Institutional Review Board for Treatment of Human Subjects.

Elmer J. Finck
Signature of Principal Investigator

May 2, 2001
Date

Faculty advisor/instructor on project (if applicable)

Date

I, Jennifer Halstead Jensen, hereby submit this thesis to Emporia State University as partial fulfillment of the requirements for an advanced degree. I agree that the Library of the University may make it available to use in accordance with its regulations governing materials of this type. I further agree that quoting, photocopying, or other reproduction of this document is allowed for private study, scholarship (including teaching), and research purposes of a nonprofit nature. No copying which involves potential financial gain will be allowed without written permission of the author.

Signature of Author

5/9/01
Date

Landowner attitudes toward pronghorn in western Kansas
Title of Thesis

Signature of Graduate Office Staff

May 16, 2001
Date Received