

**Kansas Department of Wildlife and Parks
Presence Of and Attitudes Toward Furbearer Species:
A Survey of Kansas Landowners
Conducted July 13, 2000 to August 29, 2000**

Executive Summary

The primary objectives of this survey for the Kansas Department of Wildlife and Parks (KDWP) were to:

- ! Determine landowner farming/ranching operation characteristics.
- ! Determine landowners' perceptions of changes in furbearer populations.
- ! Assess landowners' attitudes toward certain furbearer species.
- ! Obtain information on distribution of furbearer populations or measure evidence of furbearer presence on owned or operated property.
- ! Assess perceived destructiveness of furbearer populations, types of damage incurred, and response to damage.

From the analysis of the survey of 1156 respondents, we find that:

- ! Size of acreage owned or operated is smallest in the eastern part of the state and largest in the western part of the state. Fewer landowners live on their farm/ranch operations in the western sections of the state than in the central and eastern sections of the state. The average number of years respondents have worked on their agricultural operation is in the middle twenties. Wheat and rangeland are the two most common types of land uses across the state as a whole, with corn being slightly more prevalent than wheat in the south west region of the state.
- ! Most respondents believe that coyote and racoon populations have increased or remained the same on their land between 1995 and 1999. There was much more uncertainty about change in beaver populations, but most who do have an opinion believe the beaver population has increased or remained the same. Differences in perceived changes in populations do differ by region of the state.
- ! As one would expect, generally the more respondents in a region who sighted at least one of a particular furbearer species on their land, the higher the mean

number of species seen among respondents in the region. The most observed species are coyote, striped skunk, opossum, and raccoon. The least observed species include: river otter, mink, spotted skunk, weasel, and gray fox. Differences in species distribution among regions does exist, and swift fox is a species observed solely in the western regions.

- ! The general pattern in *evidence of species presence* is consistent with species natural distribution in the state. As reflected in other surveys conducted by KDWP, the sighting of evidence of coyote and striped skunk presence is lower in the northern regions than the other regions of the state.
- ! Half (51%) of the respondents indicate that they did not experience damage from a furbearer species in 1999, 44% report that they did experience damage from furbearers in 1999, and about six percent do not know. Nearly half of the respondents from the south central, central west, and the north central regions of the state reported damage. The lowest percentages of respondents reporting damage in 1999 is found in the south west (38%) and the north west (38%).
- ! Cattle are the most common type of livestock losses, while “holes” or burrows are cited as the most common type of range related problem. Corn is the most heavily damaged crop, and beavers are the primary cause of forestry related problems. Damage to grain and hay facilities is the most commonly mentioned type of farm building damaged.
- ! The maximum dollar losses across several agricultural operation categories vary from \$2,500 for “range” damage to \$20,000 for “crop” and “other” damage. Medians show that the highest average loss (\$500) by agricultural operation category occurs in forestry related damages, followed by livestock and poultry related damage with a median loss of \$300 per operation among operations experiencing damage from furbearers.
- ! Almost half of the respondents experiencing damage from furbearers remove the offending animal, and almost one third use assistance in removing the animal. By far the most common type of assistance is use of a local hunter or trapper, while use of an agency is very uncommon. Consistent with the reported source of assistance, over 90% of the respondents report that they incurred no cost for the assistance. On average the problem was resolved within a month.
- ! Support for furbearing species on one’s property is evident among a majority of landowners, however, some species are clearly less desirable than others. It also seems that financial loss attributed to furbearers may contribute to higher levels of concern about furbearer damage, and that concern about furbearer damage contributes to less support for some furbearers on one’s property. In terms of

concern about livestock damage from particular species, more concern is expressed for coyotes than bobcats or foxes. Well over half indicate a concern about crop damage from furbearers, and a large part of that concern can probably be attributed to concerns about raccoons in particular. Just over one-third are concerned about the damage beaver may cause to timber.

- ! Almost half of the respondents shoot coyotes whenever the opportunity arises, while over one third of the landowners indicate that they are never involved in any hunting or trapping of furbearers. Although many never hunt or trap furbearers hunting and trapping of furbearers is largely approved of as only 7% oppose it.

Methods

Between July 3 and August 29, 2000 the University Center for Survey Research conducted a survey of 2,500 randomly selected landowners in Kansas from a list of agricultural operators maintained by the Kansas Agricultural Statistics Service (KASS). A self-administered mail survey was sent by the KASS to a sample landowners from all counties in Kansas. The number of landowners sampled from each county was proportionate to the total number of landowners in the county according to KASS lists.

The self-administered mail survey included return postage to the Docking Institute paid by the Docking Institute. The first copy of the survey was mailed with a cover letter briefly explaining the survey. Two follow-up waves followed this initial mailing to all those who had not yet responded to the previous wave(s) of mailing. Of 2,500 questionnaires mailed, 15 were undeliverable due to changes in address, etc. Another 14 were considered ineligible respondents due to the targeted respondent being deceased or having sold all land. Thus the total number of eligible respondents was 2471. The University Center for Survey Research received 1156 completed questionnaires, resulting in a response rate of 47%. Non respondent bias was not assessed.

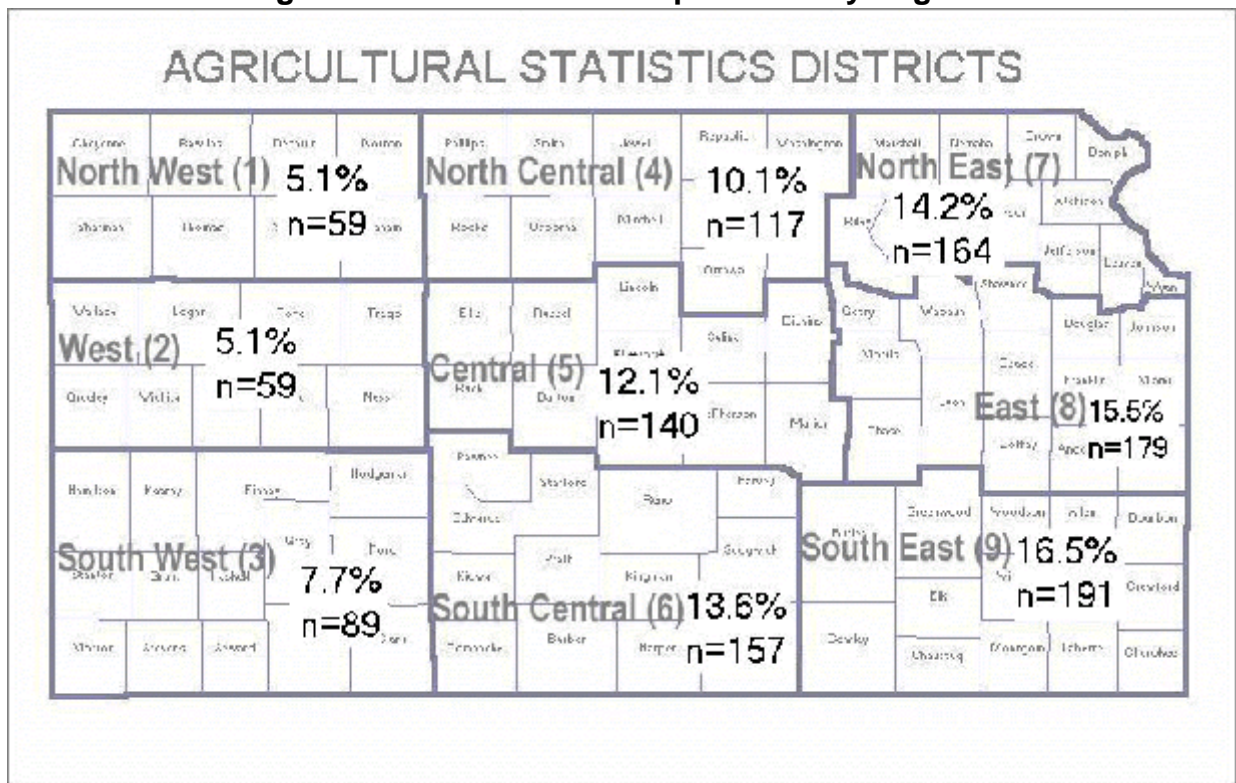
Survey Instrument

The Docking Institute and the Kansas Department of Wildlife and Parks agreed on the survey items used. It was the responsibility of KDWP to identify information areas and objectives of the survey. It was the responsibility of the Docking Institute to develop survey items that were technically correct and without bias. Question wording and the design of the survey instrument are the joint property of the Docking Institute and KDWP and are not to be used for additional surveys unless written permission is given by both owners. Appendix 1 contains frequencies for all survey items, and the survey instrument appears as Appendix 2.

Demographics of Respondents

Figure 1 shows the distribution of the sample across Kansas Agricultural Statistics Service Districts of Kansas. In general, the percentage of respondents by region increases moving from the western part of the state (the area with the fewest

Figure 1. Distribution of Respondents by Region*

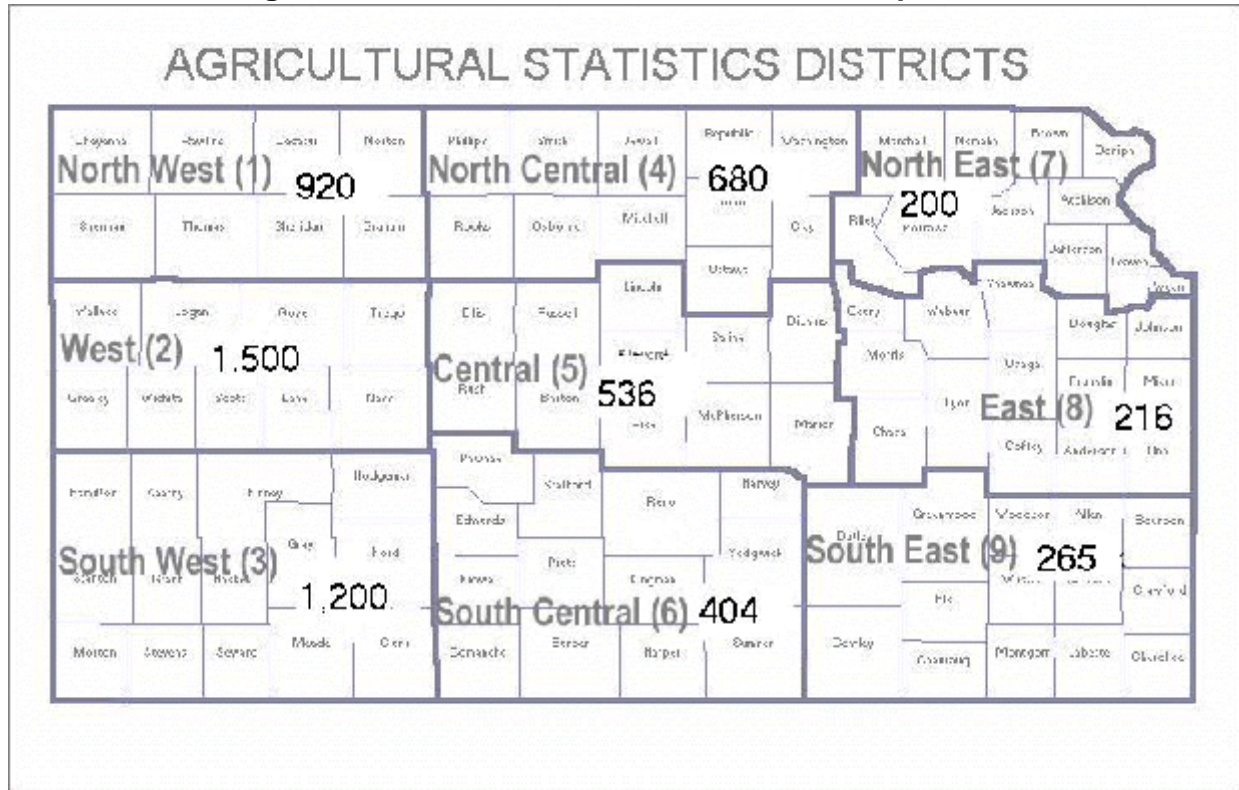


* The location of the agricultural operation's headquarters as recorded by the Kansas Agricultural Statistics Service is used to locate the respondents by KASS region.

number of landowners) to the eastern part of the state (the area with the largest number of landowners).

Size of acreage owned or operated is smallest in the eastern part of the state and largest in the western part of the state as shown in Figure 2 . Median for acres of land owned or operated in the western regions are 920 acres for the north west, 1,500 acres for the central west, and 1,200 acres for the south west region, while the medians for the eastern regions are only 200 for the north east, 216 for the central east, and 265 for the

Figure 2. Median Number of Acres Owned/Operated

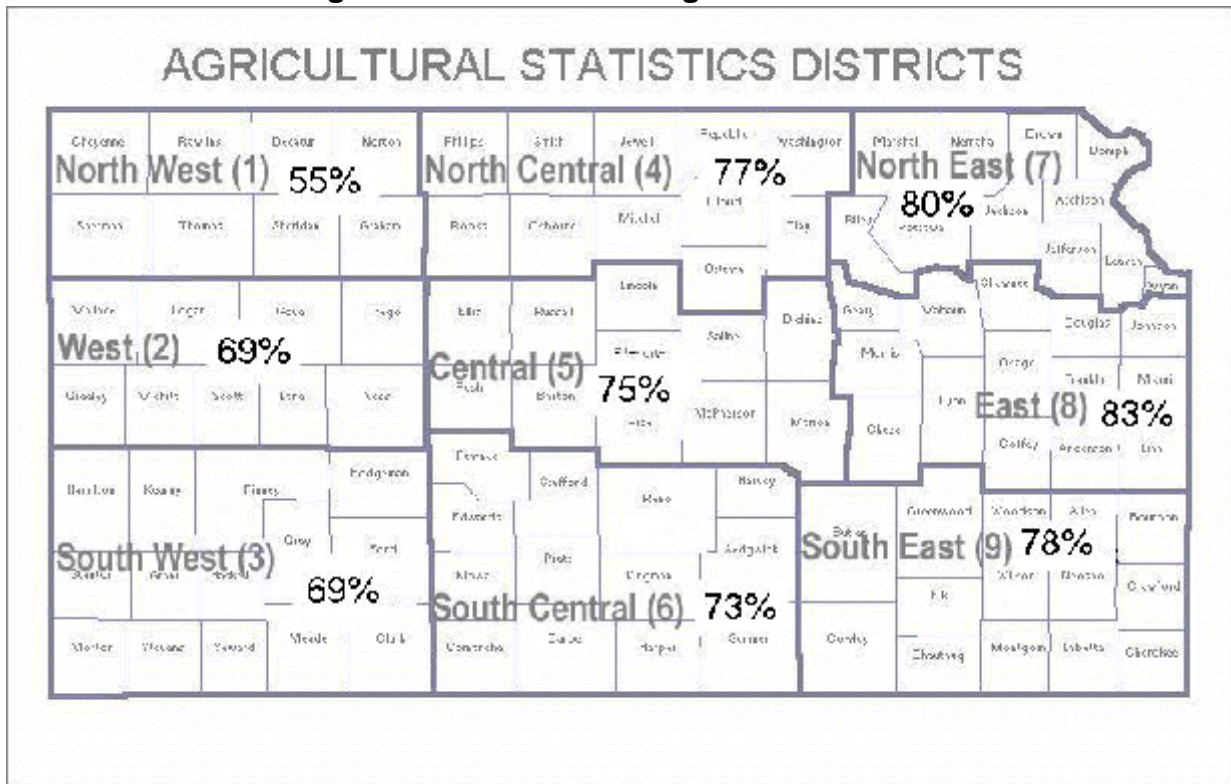


south east regions. The median acres owned or operated in the central regions of the state fall in between medians for the western and eastern regions. Operations range in size from two acres to 28,000 acres.

There are noticeable differences in living on the farm or ranch among regions of the state. Figure 3 shows that smaller percentages of landowners live on their farm/ranch in the western sections of the state than in the central and eastern sections of the state, with the eastern sections having the highest rates of on farm/ranch residence.

Measures of central tendency indicate that the average number of years respondents have worked on the agricultural operation is in the middle twenties, with a median of 25 years, a mode of 20 years, and a mean of 28 years (standard deviation = 16.6 years). A difference of means analysis (not shown) of the mean number of years worked on the operation by region finds that the mean (32 years) for the central central region is statistically significantly higher than the means (25 years) for the north east and

Figure 3. Percent Residing on Farm/Ranch



the south east regions.

In addition to total number of acres owned/operated, respondents were asked to report the number of acres in certain types of uses in 1999. Dividing the total number of acres/owned operated by the total number of acres in particular types of land uses (calculated for all those respondents who report at least some acreage in the particular use) finds differences in predominant land uses by region of the state. Table 1 shows the *mean percentage* of acres owned/operated in particular types of uses within region.

Not surprisingly, wheat represents a very widespread type of land use in the western third of the state. It is the single largest land use in the north west (29%) and the central west (29%) regions of the state. While wheat is still very common in the south west (32%) region of the state, corn has overtaken wheat as the single largest (36%) land use in the south west. Corn represents a large proportion (22%) of land use in the north east region of the state.

Rangeland constitutes the most prevalent type of the land use for landowners in the

central and eastern thirds of the state, varying from a low of 40% of the operations'

**Table 1. Average Percentage (and Standard Deviation)*
of Land in Particular Uses by Region**

	NW	CW	SW	NC	CC	SC	NE	CE	SE
Alfalfa	9% (16%) n=13	2% (1%) n=6	11% (10%) n=18	10% (20%) n=67	11% (16%) n=67	13% (14%) n=61	12% (18%) n=53	5% (4%) n=28	9% (11%) n=29
Corn	19% (14%) n=26	14% (13%) n=18	36% (27%) n=39	12% (12%) n=30	12% (19%) n=24	19% (15%) n=25	22% (15%) n=62	14% (13%) n=40	10% (8%) n=17
Milo	12% (9%) n=13	10% (8%) n=26	17% (16%) n=33	16% (11%) n=75	19% (16%) n=62	18% (12%) n=70	15% (11%) n=47	12% (10%) n=40	15% (11%) n=46
Soybean	3% (3%) n=4	14% (24%) n=5	11% (8%) n=7	12% (9%) n=42	17% (21%) n=35	13% (12%) n=39	25% (17%) n=75	24% (16%) n=78	26% (19%) n=69
Wheat	29% (15%) n=49	29% (16%) n=44	32% (20%) n=66	29% (19%) n=89	37% (22%) n=96	41% (23%) n=123	12% (9%) n=42	13% (15%) n=41	21% (16%) n=63
Forage Sorghum	4% (3%) n=19	7% (12%) n=21	9% (12%) n=14	5% (8%) n=31	8% (11%) n=40	6% (8%) n=41	13% (22%) n=8	6% (6%) n=6	7% (8%) n=10
Hay Pasture	28% (34%) n=12	16% (15%) n=15	18% (20%) n=7	17% (20%) n=59	21% (24%) n=81	18% (19%) n=74	36% (30%) n=125	36% (27%) n=139	34% (29%) n=140
Range-land	26% (31%) n=37	26% (29%) n=37	22% (32%) n=43	43% (23%) n=76	41% (28%) n=77	40% (27%) n=92	47% (26%) n=71	52% (26%) n=89	56% (29%) n=105
Nursery	a.	2% (3%) n=2	a.	a.	a.	5% (5%) n=2	a.	24% (32%) n=3	0.7% (0.6%) n=3
Orchard	a.	0.02% (0.006%) n=2	a.	0.9% (0.1%) n=2	0.9% (0.1%) n=3	3% (1%) n=3	6% (5%) n=3	3% (3%) n=7	1% (2%) n=7
Wood-land	a.	7% (10%) n=5	4% (4%) n=6	6% (12%) n=36	6% (7%) n=30	9% (12%) n=42	16% (15%) n=78	17% (17%) n=70	13% (16%) n=74
Garden Crop	0.1% (0.1%) n=5	a.	4% (5%) n=4	0.2% (0.1%) n=9	0.7% (0.7%) n=11	2% (3%) n=12	2% (3%) n=17	3% (10%) n=22	1% (3%) n=17
Ponds/ Lakes	1% (2%) n=10	0.9% (2.0%) n=7	0.6% (0.8%) n=13	0.6% (0.6%) n=48	1% (2%) n=51	2% (4%) n=55	3% (5%) n=75	3% (4%) n=84	2% (3%) n=93

Other	21% (14%) n=10	30% (21%) n=14	25% (23%) n=28	19% (28%) n=25	11% (14%) n=23	21% (27%) n=43	22% (19%) n=27	16% (17%) n=37	21% (28%) n=36
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a. The number of cases in the cell is one or less.

*. For each land use type, only those cases that had reported holding at least one acre of land are included in the analysis.

land in the south central region to a high of 56% in the south east region. The eastern regions of the state have the highest mean percentages of land in hay pasture usage (36%, 36% and 34%), soybeans (25%, 24% and 26%) and wood production (16%, 17%, 13%). The distributions of the remainder of land uses are relatively equal, in terms of the average percentage present in landowners' operation, among the regions of the state. Results for cells with small sample sizes (less than 40) should be interpreted with caution; they should be considered *merely suggestive* of the characteristics of all operations within the region.

Notable differences in predominant types of livestock on operations exists among the regions of the state. However, our sample sizes by region are small. Table 2 shows the mean percentages of types of livestock on operations for the nine regions of the state.

Table 2. Mean Percentage (and Standard Deviation)* of Particular Livestock on Agricultural Operations by Region

	NW	CW	SW	NC	CC	SC	NE	CE	SE
Cattle	91% (19%) n=27	92% (20%) n=31	95% (10%) n=37	89% (23%) n=65	87% (25%) n=89	85% (26%) n=95	87% (26%) n=104	87% (25%) n=109	88% (25%) n=138
Poultry	33% (27%) n=5	60% (39%) n=8	42% (41%) n=8	33% (31%) n=10	48% (32%) n=18	45% (35%) n=25	49% (33%) n=16	55% (31%) n=16	52% (28%) n=19
Hogs	65% (21%) n=2	50% (70%) n=2	2% (1%) n=3	82% (17%) n=6	40% (34%) n=4	38% (39%) n=7	60% (40%) n=14	28% (39%) n=12	59% (40%) n=8
Horses	18% (34%) n=8	17% (35%) n=14	34% (45%) n=23	25% (39%) n=18	11% (28%) n=23	20% (34%) n=42	26% (35%) n=26	29% (40%) n=43	27% (39%) n=51
Sheep	52% (11%) n=3	a.	18% (15%) n=2	92% (12%) n=2	33% (38%) n=6	34% (33%) n=11	36% (55%) n=3	30% (36%) n=8	8% (4%) n=5
Other	a.	a.	a.	16% (13%) n=2	21% (37%) n=7	37% (42%) n=8	20% (14%) n=6	31% (37%) n=9	17% (20%) n=4

a. The number of cases in the cell is one or less.

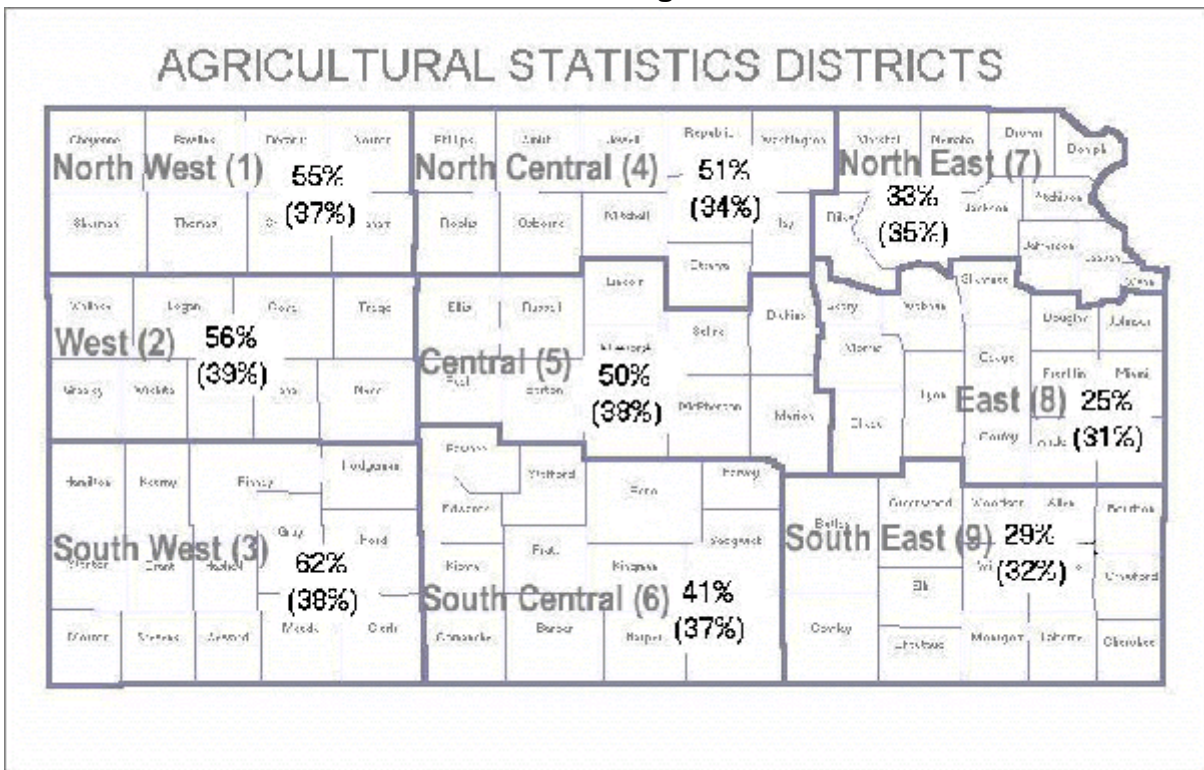
*. For each livestock type, only those cases that had reported at least one head of the livestock type are included in the analysis.

Cattle constitute the most predominant type of livestock among Kansas landowners. Mean percentage in the western regions tends to be higher (over 91%) than

in the central and eastern regions (ranging from 85% to 89%). With the exception of cattle, cell totals in Table 2 generally are less than 40, making inference to the general population of landowners from the sample on other types of livestock only suggestive.

Respondents were asked to indicate the percentage of their total household income in 1999 that came from the sale of agricultural products in an effort to assess the relative importance of the agricultural operation to the economic viability of the household. Figure 4 shows that the agricultural operation tends to comprise a larger portion of landowners' total household income in the western and central regions of the state than in the eastern regions of the state. This suggests that part-time farming is more

Figure 4. Mean Percentage (and Standard Deviation) of Household Income From the Sale of Agricultural Products



prevalent in the eastern third of the state than in the central and western regions.

Perceptions About Furbearer Populations

Respondents were asked whether coyote populations have increased, remained the same, or decreased on their land over the past five years (1995-1999). As figure 5 shows, landowners indicate that coyote populations primarily increased (39%) or remained the same (36%).

Table 3 reports perceived changes in coyote population by region of the state. No clear regional pattern emerges in terms of change in coyote populations. In six of the regions the single highest percentage of respondents reports an increase in population, and in the other three regions the single highest percentage of respondents indicate that the population has remained the same. Notably, 25% of the landowners in the north central region indicate a decrease.

Figure 5. Perceived Change in Coyote Population Over the Past Five Years (N=1155)

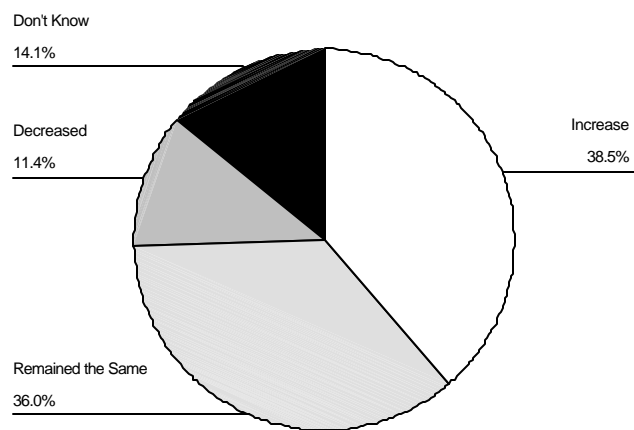


Table 3. Perceived Change in Coyote Population by Region

	Increased	Remained Same	Decreased	Don't Know
North West (n=59)	39%	41%	2%	19%
Central West (n=59)	48%	36%	5%	12%
South West (n=89)	44%	37%	9%	10%
North Central (n=117)	21%	44%	25%	10%
Central Central (n=140)	39%	37%	9%	16%
South Central (n=157)	31%	42%	17%	10%
North East (n=165)	41%	30%	14%	15%
Central East (n=179)	44%	27%	11%	18%
South East (n=190)	43%	37%	5%	15%

Respondents were asked whether populations of beaver had increased, remained the same, or decreased over the past five years (1995-1999). Figure 6 shows that uncertainty about the change in the beaver population is a very prevalent (50.2%) response among respondents. About 26% of the respondents believe the population has remained unchanged between 1995 and 1999, and about 19% believe the population of beavers has increased.

Figure 6. Perceived Change in Beaver Population Over the Past Five Years (N=1155)

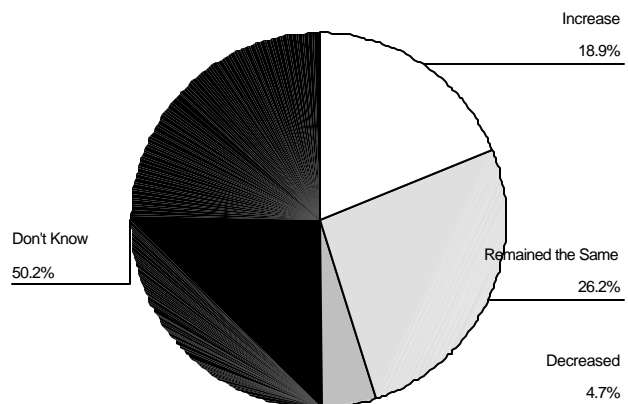


Table 4 reports perceived changes in beaver population by region of the state. The north east region is the only region in which a greater percentage of respondents perceive

an increase in population (26%). However, 24% perceive a steady population over the past five years. The south east finds equal percentages indicating an increase (24%) and a steady population (24%) of beavers. Reports of increases in beaver populations were lowest in the western regions of the state, and the degree of uncertainty regarding change in beaver populations was highest in the western regions of the state.

Table 4. Perceived Change in Beaver Population by Region

	Increased	Remained Same	Decreased	Don't Know
North West (n=59)	5%	27%	3%	64%
Central West (n=59)	7%	25%	2%	66%
South West (n=89)	6%	23%	2%	70%
North Central (n=117)	21%	30%	8%	41%
Central Central (n=140)	21%	24%	4%	50%
South Central (n=157)	19%	38%	5%	38%
North East (n=165)	26%	24%	5%	45%
Central East (n=179)	18%	20%	3%	58%
South East (n=189)	24%	24%	7%	44%

Respondents were asked whether the raccoon population has increased, remained the same, or decreased on their land over the past five years (1995-1999). Figure 7 shows that the percentage that perceive an increase (36.3%) in raccoon population is only slightly higher than the percentage who feel their numbers have remained the same (34.5%).

Figure 7. Perceived Change in Coyote Population Over the Past Five Years (N=1155)

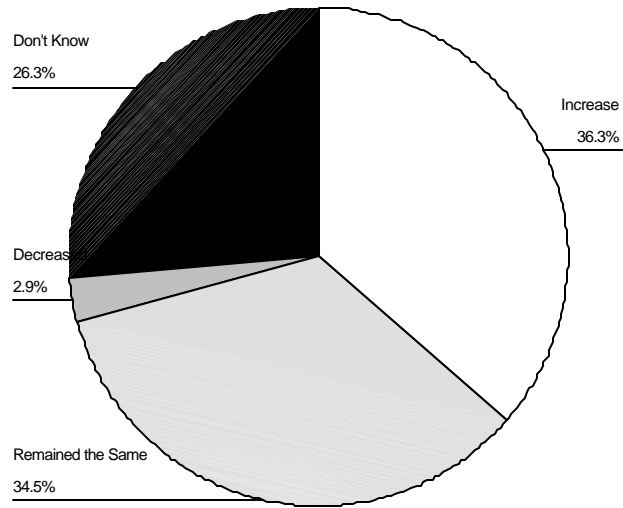


Table 5 reports perceived changes in raccoon populations by regions of the state. The percentage of respondents reporting an increase in raccoon populations is highest in the south central region (43%), followed by the north central (41%), the north east (39%) the central central (39%), the central west (39%), the central east (35%), and the southeast (33%) regions. A fourth of the respondents report seeing an increase in raccoon populations in the north west (25%) and the south west (24%) regions.

Table 5. Perceived Change in Coyote Population by Region

	Increased	Remained Same	Decreased	Don't Know
North West (n=59)	25%	37%	0%	37%
Central West (n=59)	39%	39%	0%	22%
South West (n=89)	24%	33%	5%	39%
North Central (n=117)	41%	37%	3%	20%
Central Central (n=140)	39%	36%	1%	24%
South Central (n=157)	43%	37%	3%	17%
North East (n=165)	39%	33%	2%	26%
Central East (n=179)	35%	30%	3%	32%
South East (n=190)	33%	35%	5%	28%

Presence of Furbearers

Respondents were presented a list of species and asked to indicate how many of each they saw on their land in 1999. Table 6 reports findings from this series of items. For each species, the percentage of respondents who reported seeing at least one member of the species on their land in 1999 is reported. The mean number of species observed and the standard deviation are also reported for each region.

Table 6. Percentage of Respondents Who Saw Species on Their Land in 1999 and Mean Number of Species Observed

	NW	CW	SW	NC	CC	SC	NE	CE	SE
Badger									
% saw species	60%	72%	72%	67%	43%	42%	34%	28%	31%
mean	2.98	5.39	3.58	3.26	1.77	1.68	1.51	0.63	1.36
(standard deviation)	(3.66)	(7.16)	(4.30)	(4.99)	(2.86)	(3.58)	(3.60)	(1.45)	(5.06)
number respondents	n=58	n=57	n=86	n=113	n=134	n=151	n=158	n=168	n=186
Beaver									
% saw species	13%	9%	8%	25%	19%	22%	33%	19%	26%
mean	0.33	0.4	0.18	1.54	0.87	0.81	2.69	0.8	2.02
(standard deviation)	(1.01)	(1.75)	(0.64)	(3.82)	(2.5)	(2.0)	(6.62)	(2.42)	(5.26)
number respondents	n=57	n=57	n=85	n=112	n=135	n=148	n=55	n=166	n=185
Bobcat									
% saw species	24%	26%	26%	35%	43%	57%	50%	54%	57%
mean	0.59	0.65	0.65	2.61	1.4	2.31	2.11	1.68	3.85
(standard deviation)	(1.2)	(1.64)	(1.65)	(4.56)	(2.88)	(3.84)	(4.36)	(2.35)	(11.47)
number respondents	n=58	n=57	n=85	n=114	n=136	n=148	n=159	n=167	n=186
Coyote									
% saw species	80%	82%	84%	77%	77%	84%	79%	81%	85%
mean	11.08	16.16	21.23	11.04	9.41	12.4	11.18	12.18	16.01
(standard deviation)	(12.03)	(16.99)	(35.8)	(14.84)	(11.59)	(30.12)	(16.97)	(19.51)	(35.0)
number respondents	n=59	n=56	n=84	n=113	n=137	n=152	n=159	n=172	n=184
Gray Fox									
% saw species	7%	4%	3%	a.	2%	3%	4%	3%	4%
mean	0.62	0.14	0.047		0.081	0.041	0.098	0.054	0.098
(standard deviation)	(3.95)	(0.84)	(0.26)		(0.78)	(0.28)	(0.67)	(0.37)	(0.78)
number respondents	n=58	n=56	n=85		n=136	n=147	n=153	n=166	n=183
Red Fox									
% saw species	26%	19%	25%	26%	23%	26%	42%	32%	19%
mean	0.71	1.95	0.85	1.02	0.79	0.62	1.89	0.95	0.69
(standard deviation)	(1.83)	(7.31)	(3.39)	(2.44)	(2.15)	(1.44)	(4.85)	(2.07)	(2.16)
number respondents	n=58	n=57	n=85	n=112	n=136	n=148	n=156	n=171	n=185
Swift Fox									
% saw species	19%	21%	17%	1%	a.	a.	a.	1%	1%
mean	0.69	1.75	0.63	0.018				0.0061	0.033
(standard deviation)	(1.88)	(4.37)	(2.26)	(0.19)				(0.078)	(0.44)
number respondents	n=58	n=57	n=84	n=111				n=165	n=183

Table 6. (continued)	NW	CW	SW	NC	CC	SC	NE	CE	SE
Mink									
% saw species	2%	3%	2%	4%	4%	2%	2%	2%	2%
mean	0.035	0.035	0.047	0.072	0.16	0.34	0.033	0.042	0.071
(standard deviation)	(0.26)	(0.19)	(0.3)	(0.35)	(1.16)	(0.25)	(0.24)	(0.3)	(0.75)
number respondents	n=58	n=57	n=85	n=111	n=134	n=147	n=151	n=165	n=184
Muskrat									
% saw species	2%	10%	5%	24%	16%	17%	31%	30%	17%
mean	0.035	0.6	0.53	1.10	0.77	0.48	1.94	1.28	0.98
(standard deviation)	(0.26)	(2.04)	(3.49)	(3.23)	(2.66)	(1.69)	(4.88)	(2.72)	(3.58)
number respondents	n=58	n=57	n=85	n=110	n=136	n=147	n=155	n=166	n=184
Opossum									
% saw species	52%	49%	39%	81%	74%	82%	79%	79%	80%
mean	2.26	5.14	1.78	1.17	9.82	10.42	8.94	12.45	17.28
(standard deviation)	(3.8)	(9.39)	(3.80)	(15.97)	(23.53)	(14.84)	(12.83)	(22.01)	(45.48)
number respondents	n=58	n=57	n=85	n=112	n=137	n=150	n=156	n=173	n=187
Raccoon									
% saw species	44%	77%	55%	81%	74%	82%	76%	69%	70%
mean	7.64	10.41	4.52	14.52	12.73	14.91	14.6	10.64	12.14
(standard deviation)	(10.69)	15.82	(7.65)	(18.71)	(33.49)	(25.19)	(27.58)	(22.17)	(26.02)
number respondents	n=58	n=56	n=85	n=110	n=135	n=149	n=160	n=170	n=185
River Otter									
% saw species	2%	a.	2%	1%	1%	1%	2%	a.	2%
mean	0.035		0.059	0.009	0.15	0.014	0.026		0.06
(standard deviation)	(0.26)		(0.39)	(0.095)	(0.17)	(0.16)	(0.2)		(0.56)
number respondents	n=58		n=85	n=111	n=134	n=147	n=154		n=183
Striped Skunk									
% saw species	73%	84%	74%	77%	76%	83%	68%	76%	75%
mean	7.51	17.57	8.14	8.49	9.13	12.76	5.87	1.19	9.51
(standard deviation)	(10.15)	(36.63)	(10.32)	(14.75)	(23.64)	(23.77)	(9.38)	(29.45)	(19.02)
number respondents	n=59	n=58	n=85	n=112	n=136	n=151	n=158	n=170	n=184
Spotted Skunk									
% saw species	8%	4%	5%	4%	6%	2%	5%	5%	4%
mean	0.19	0.96	0.16	0.064	0.31	0.15	0.78	0.35	0.37
(standard deviation)	(0.68)	(6.69)	(0.78)	(0.34)	(1.98)	(1.31)	(4.74)	(1.92)	(2.71)
number respondents	n=59	n=56	n=85	n=110	n=134	n=147	n=152	n=164	n=183
Weasel									
% saw species	19%	8%	12%	4%	3%	2%	3%	4%	4%
mean	0.58	0.14	0.20	0.11	0.15	0.034	0.073	0.078	0.093
(standard deviation)	(1.87)	(0.52)	(0.61)	(0.59)	(1.03)	(0.25)	(0.48)	(0.49)	(0.61)
number respondents	n=59	n=57	n=85	n=111	n=135	n=147	n=151	n=166	n=183

a. The number of cases from this region that saw the species is zero.

In general, the higher the percentage of respondents who observed at least one of the species on their land in a region, the higher the mean number of species seen in the

region. There are some exceptions, but those exceptions seem to be a function of a few outliers – see the high standard deviations – (e.g. racoons in the central west region) or a small number of respondents within region (e.g. muskrats in the south west region). Results indicate that the most observed species are coyote, striped skunk, opossum, and raccoon. The least observed species are: river otter, mink, spotted skunk, weasel, and gray fox. Swift fox is observed only in the western regions, where its population is distributed. Similarly, badgers are predominately observed in the west, while beavers, bobcats, red fox, and muskrat are predominately observed in the east. Our results reflect species natural distribution in the state.

An analysis of the bivariate associations between number of acres owned (not shown) and number of each species seen on one's land for the aggregate sample, shows that there are very few statistically significant associations. Moreover, the magnitude of the associations are quite small with a Pearson's r coefficient of .283 or less. When observing bivariate associations controlling for region (Table 7), there are several associations that do emerge as significant. Thus, the region is more important than size of operation as a determinant of the frequency at which particular species are observed.

As would be expected, nearly all associations that are statistically significant in Table 7 are also positive in direction (the only exception is number of spotted skunk observed in the southwest region where the number of spotted skunk observed is inversely but weakly [$r = -.186$] related to the size of the respondents' operations). In addition, the strongest associations between number of species seen and operation size are consistently observed for those species that are most common across all regions (as shown in Table 6 above), coyote, striped skunk, and badgers. While statistically significant associations between number of acres operated and number of species seen are not achieved at all for one species (i.e. mink) and only in one or two regions for many of the other species, this lack of statistically significant relationships may be a function of the low number of observations of those species in the regions (again, see Table 6). Low number of observations also accounts for the absence of variability for a few correlations, as reported by an "a." in the cells of Table 7.

Table 7. Bivariate Associations (Pearson's r) Between Number of Acres Operated and Number of Each Species Observed on Land Owned/Operated in 1999

	NW	CW	SW	NC	CC	SC	NE	CE	SE
Badger	.282* n=57	.233* n=55	.126 n=85	.178* n=109	.279** n=126	.160* n=148	.234** n=158	.448** n=167	.294** n=183
Beaver	.315** n=56	.019 n=55	-.053 n=84	.016 n=108	.153* n=127	.065 n=145	.311** n=155	.111 n=165	.079 n=182
Bobcat	.330** n=57	.126 n=55	-.016 n=84	.126 n=110	.144 n=128	.136 n=145	.169* n=159	.134* n=166	.208** n=183
Coyote	.200 n=58	.376** n=54	.344** n=83	.206* n=109	.443** n=128	.210** n=149	.185** n=159	.467** n=171	.169* n=181
Gray Fox	.495** n=57	-.044 n=54	.035 n=84	a. n=109	-.027 n=128	-.067 n=144	.032 n=153	.078 n=165	.021 n=180
Red Fox	.232* n=57	.072 n=55	-.004 n=84	-.053 n=108	-.025 n=128	.011 n=145	.030 n=156	-.088 n=170	-.012 n=182
Swift Fox	.596** n=57	.021 n=55	.124 n=83	.004 n=107	a. n=128	a. n=144	-.009 n=152	-.052 n=164	.003 n=180
Mink	-.074 n=57	-.080 n=55	-.068 n=84	.021 n=107	.039 n=126	-.053 n=144	-.029 n=151	-.017 n=164	.082 n=181
Muskrat	-.074 n=57	-.009 n=55	-.007 n=84	-.103 n=106	.309** n=128	-.018 n=144	.133* n=155	.000 n=165	.028 n=181
Opossum	.006 n=57	.139 n=55	.010 n=84	.033 n=108	.125 n=128	.371** n=147	.241** n=156	.271** n=172	.037 n=184
Raccoon	.180 n=57	.142 n=55	.055 n=84	.089 n=106	.164* n=126	.407** n=146	.274** n=160	.182** n=169	.193** n=182
River Otter	-.074 n=57	a. n=55	.318** n=84	.283** n=107	-.062 n=126	-.044 n=144	.010 n=154	a. n=165	.044 n=180
Striped Skunk	.435** n=58	.132 n=56	.110 n=84	.042 n=108	.169* n=127	.438** n=148	.298** n=158	.158* n=169	.179** n=181
Spotted Skunk	-.128 n=58	.008 n=54	-.186* n=84	-.014 n=106	.023 n=126	.083 n=144	.355** n=152	-.032 n=163	.072 n=180
Weasel	.462** n=58	.061 n=55	-.089 n=84	-.011 n=107	-.035 n=127	-.060 n=144	-.043 n=151	-.019 n=165	.063 n=180

a. Cannot be computed because at least one of the variables is constant.

* significance \leq .05

** significance \leq .01

A follow-up question was asked of those who reported seeing none of a particular species on their land. These respondents were asked to indicate whether they had seen any *evidence* of the species on their land in 1999. Table 8 reports a regional breakdown of the percentage of respondents who indicate sighting evidence of each species.

The general pattern of evidence sighted by region mirrors the general pattern of sighted species by region. Evidence of coyote, striped skunk, opossum, and raccoon is the most common evidence sighted. The least evidence of species sighted is for river otter, mink, spotted skunk, weasel, and gray fox. As expected given species natural distribution, evidence sighted for both coyotes and striped skunk is lower in the northern regions than the other regions of the state.

**Table 8. Percentage of Respondents Who Saw Evidence
of Species on Their Land in 1999***

	NW	CW	SW	NC	CC	SC	NE	CE	SE
Badger	56% n=18	69% n=13	67% n=15	55% n=33	24% n=59	40% n=68	21% n=77	17% n=86	9% n=86
Beaver	6% n=36	25% n=40	6% n=53	45% n=72	35% n=85	29% n=94	41% n=81	30% n=105	30% n=102
Bobcat	7% n=28	10% n=31	5% n=42	40% n=43	33% n=61	30% n=50	40% n=58	31% n=58	19% n=58
Coyote	56% n=9	88% n=8	77% n=13	61% n=23	68% n=22	77% n=22	65% n=26	76% n=33	65% n=23
Gray Fox	0% n=34	0% n=42	0% n=50	0% n=78	3% n=94	2% n=104	3% n=97	3% n=105	3% n=121
Red Fox	17% n=30	6% n=36	0% n=40	10% n=60	6% n=78	9% n=81	15% n=66	18% n=80	4% n=99
Swift Fox	3% n=31	0% n=38	5% n=41	0% n=78	2% n=96	1% n=105	1% n=98	0% n=106	0% n=125
Mink	a.	0% n=42	0% n=51	4% n=77	2% n=93	6% n=103	2% n=99	a.	1% n=105
Muskrat	5% n=38	3% n=37	4% n=52	7% n=58	8% n=83	12% n=92	21% n=78	26% n=84	20% n=104
Opossum	12% n=17	17% n=18	15% n=34	53% n=19	60% n=25	71% n=24	57% n=28	66% n=35	55% n=29
Raccoon	31% n=16	55% n=11	28% n=25	53% n=19	58% n=26	74% n=23	66% n=29	55% n=44	44% n=41
River Otter	3% n=35	0% n=42	0% n=52	1% n=76	0% n=93	2% n=102	0% n=95	0% n=107	2% n=124
Striped Skunk	42% n=12	57% n=7	56% n=16	42% n=24	65% n=23	68% n=25	46% n=41	76% n=37	46% n=33
Spotted Skunk	3% n=31	3% n=39	2% n=49	3% n=73	7% n=87	2% n=106	4% n=93	5% n=104	8% n=119
Weasel	7% n=31	0% n=38	0% n=47	1% n=72	1% n=90	0% n=106	0% n=95	2% n=107	4% n=123

a. The number of cases in the cell is zero.

* The n for each cell is the number of respondents who answered “yes” or “no” to the question and excludes those who refused to answer the question.

Damage from Furbearers

Respondents were asked a number of questions regarding damage caused by furbearers including:

experience of such damage, type of loss, and monetary value of loss. Respondents who received assistance in taking action to mitigate future furbearer damage were also asked to indicate source of assistance, cost of assistance, and effectiveness of action.

Figure 8 shows that half (51%) indicate they did not experience damage in 1999, while 44% report that they did experience damage from furbearers in 1999. About 6% did not know whether they had experienced damage from a furbearer species in 1999.

There are important differences in percent of respondents reporting damage by region of the state. Figure 9. shows that about half of the respondents from both the central west region and the north central region report damage, followed by the central central region where 48% report damage. Nearly half (47%) of the respondents from the south central region report damage as well. The lowest percentages of respondents reporting damage is found in the south west at 38% and the north west at 39%.

Figure 8. Experienced Damage By Furbearers in 1999 (N=1151)

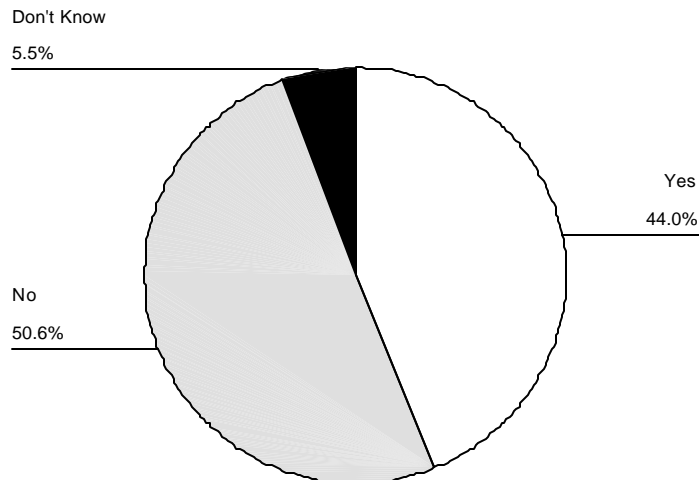
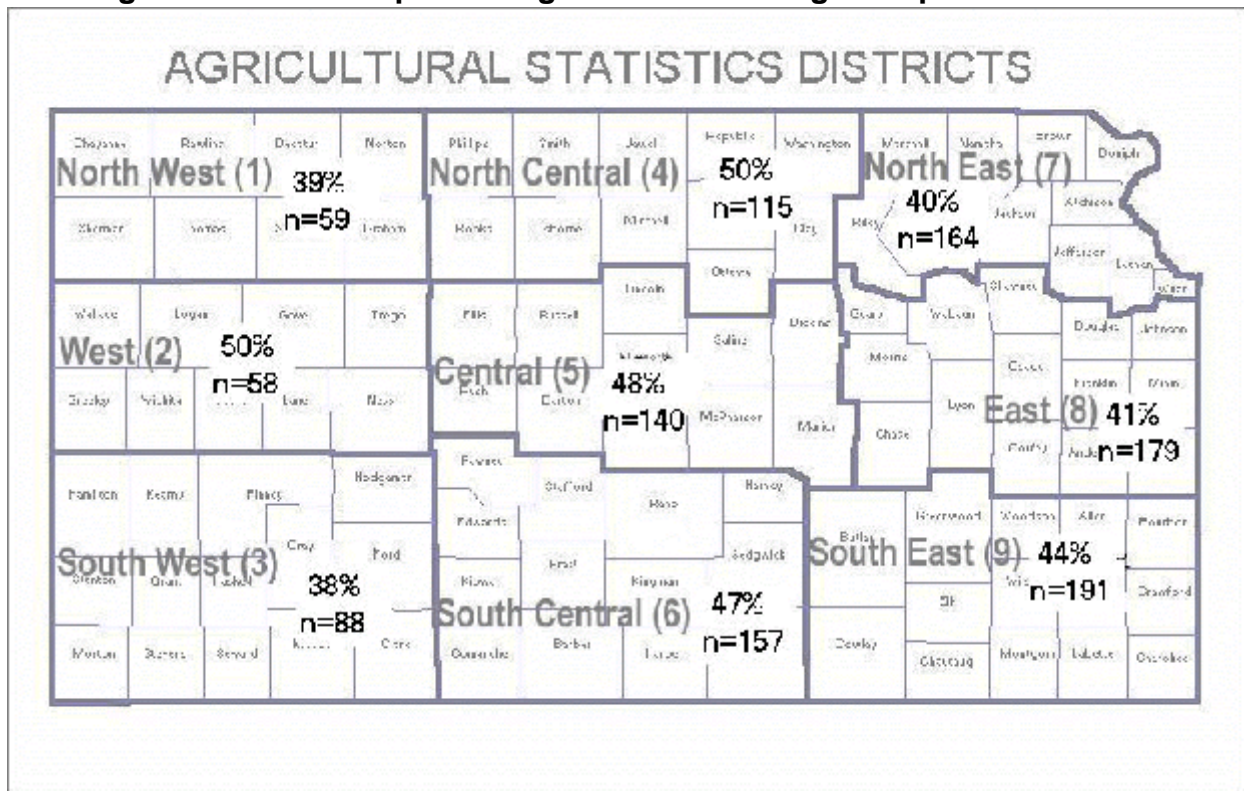


Figure 9. Percent Experiencing Furbearer Damage to Operation in 1999



Respondents who experienced damage were asked to describe the *type* of loss in terms of up to six common aspects of farm/ranching operations. The survey item stated “If you experienced damage by any furbearer species in 1999, please specify the approximate total loss (for example: 4 calves, 2 acres of wheat) and the total dollar amount of the loss.” Respondents were provided with the following open-ended response categories, “livestock and poultry, range, forestry, crops, farm building structure, other,” and had the opportunity to respond to as many items as applied to their operation. Open-ended responses to these items were coded into common themes for each item. Respondents primarily mentioned but did not limit their responses to furbearer damages only, mentioning damage by other wildlife (e.g. deer) as well.

Figure 10 shows the number of respondents indicating certain types of damage on the “livestock and poultry” item. Clearly cattle are the most often reported type of livestock loss to furbearers, with about 85 respondents reporting this type of loss. Cattle loss is followed by poultry loss with about 47 respondents reporting poultry loss to furbearers on

their operations in 1999. The next most frequently mentioned loss is the loss of multiple livestock species.

Figure 11 shows the types of “range” related losses reported by respondents. The most frequently mentioned range problem is holes, which create hazards for livestock. About 37 respondents mention this problem, while fewer than ten respondents mention the other problems appearing in Figure 11.

Respondents were also asked to indicate types of “forestry” losses if any. Figure 12 shows the most prevalent types of forestry related losses. Respondents tend to report either the physical damage that was experienced or the species involved. About 49 respondents report damage to trees, and about 35 report that beaver were responsible for forestry related losses.

Figure 10. Numbers of Livestock and Poultry Related Losses by Type of Loss

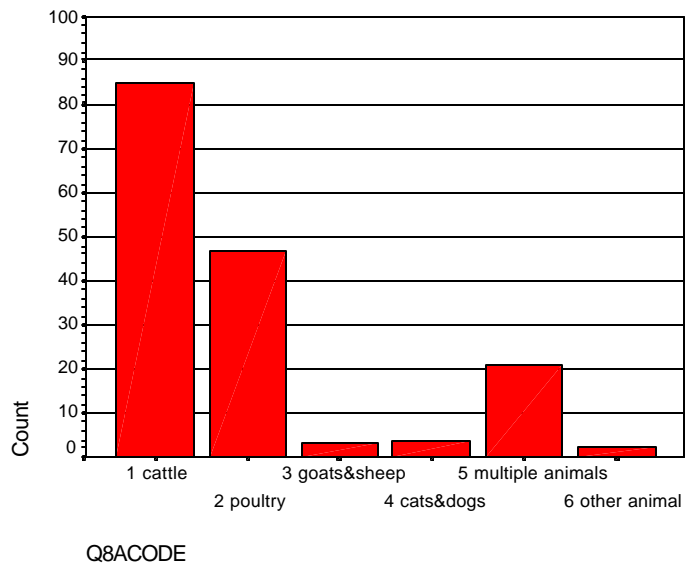


Figure 11. Numbers of Range Losses by Type of Loss

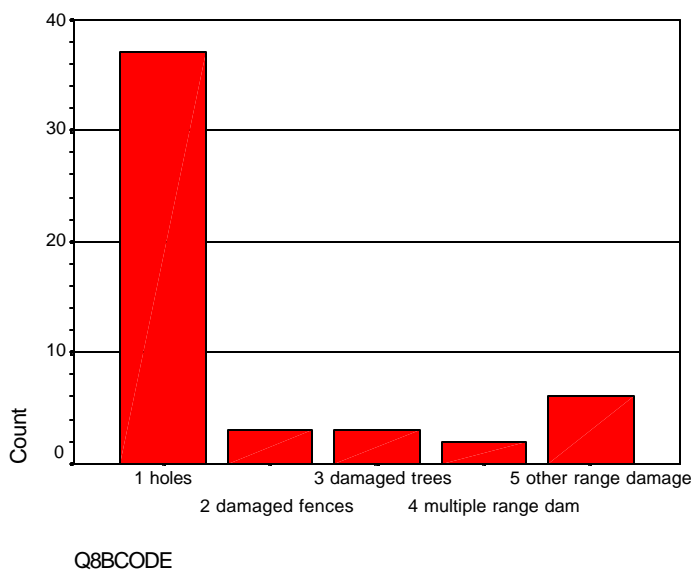


Figure 13 represents the type of crop related damage reported. Respondents describe either the type of crop that was damaged, the species involved, or both. These responses were coded into the themes appearing in Figure 13. The loss of corn was the single most frequently mentioned, with nearly 60 respondents reporting this type of loss. In addition several respondents report loss of corn due to racoons and beavers.

Figure 12. Numbers of Forestry Related Losses by Type of Loss

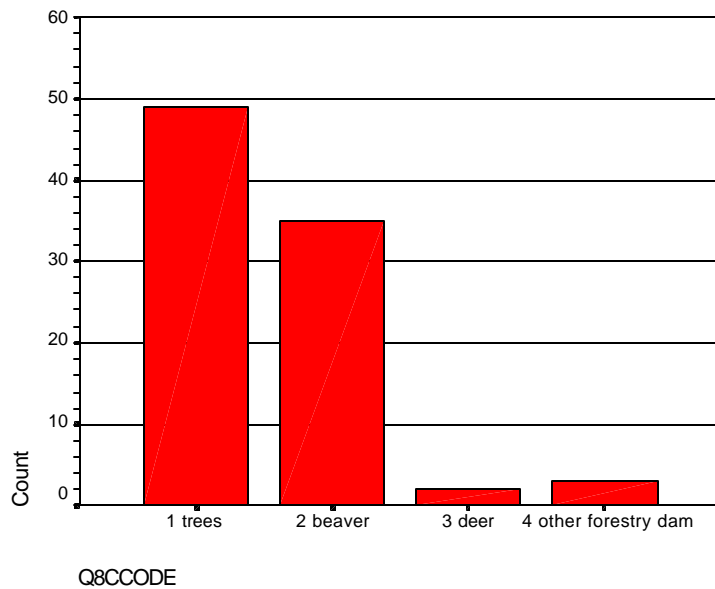
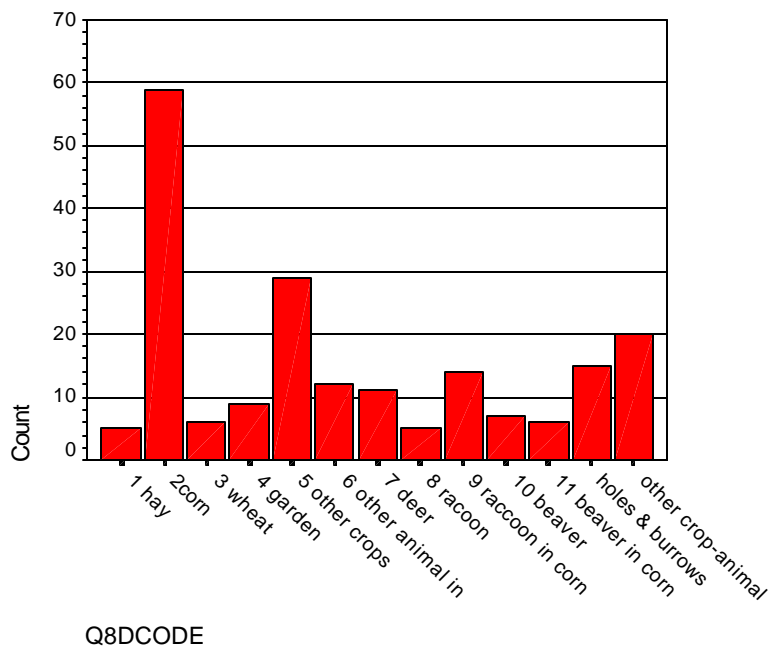


Figure 14 shows “farm building structure” related losses. The single most report type of damage is hay and grain facility damage, with about 27 respondents reporting this type of damage. Less than 15 respondents report damage in any other single category of farm building structure damage.

Figure 13. Numbers of Crop Related Losses by Type of Loss



Finally, Figure 15 shows the other types of operation damages not necessarily fitting into the previously mentioned categories in Figures 10 through 14. Figure 15 shows that pond and creek damage and loss of feed grains are two other types of losses mentioned relatively frequently, with over 30 respondents reporting these two types of losses.

Figure 14. Numbers of Farm Building Structural Losses by Type of Loss

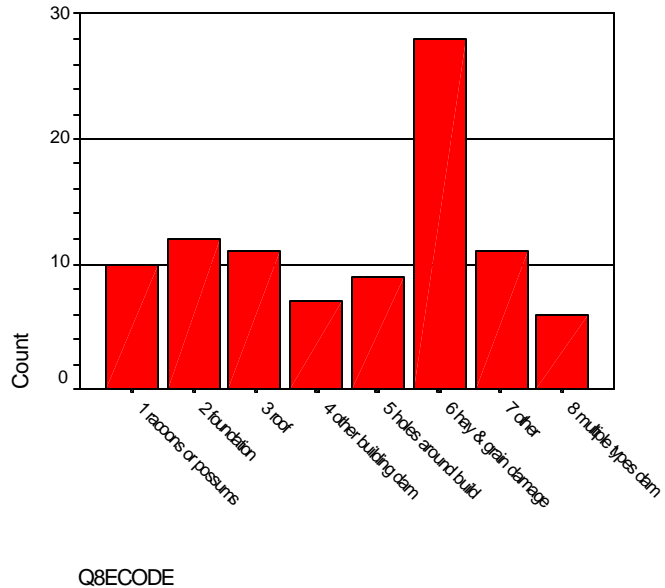
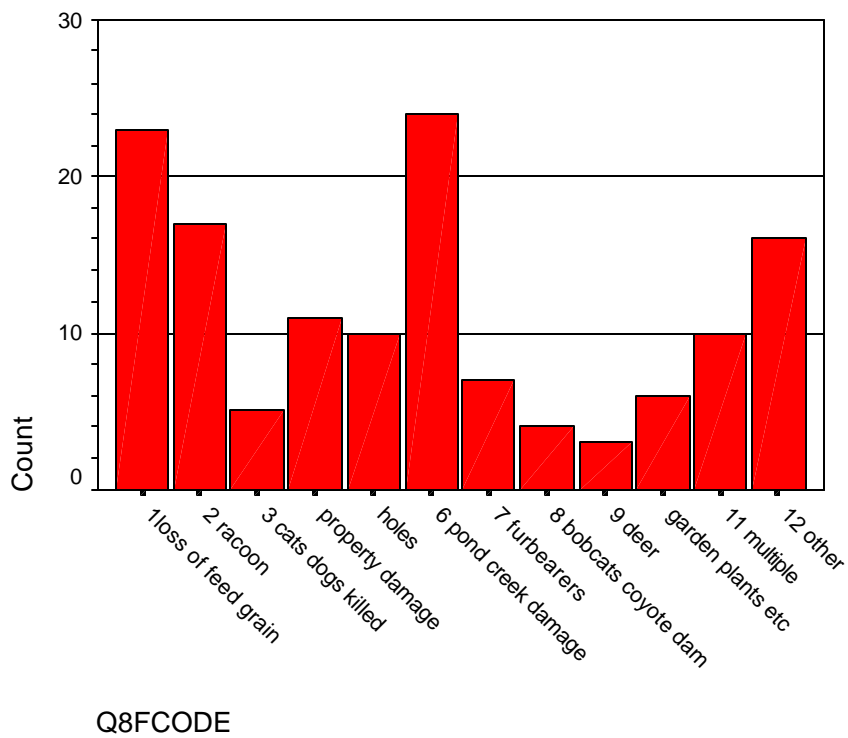


Figure 15. Numbers of “Other” Operation Losses by Type of Loss



For the six categories of losses illustrated in Figures 10 through 15, respondents were also asked to indicate the dollar value of the loss experienced in 1999. Table 9 shows summary statistics on the dollar amount of losses in the six agricultural operation related categories among those respondents indicating some dollar amount of monetary damage.¹ Table 9 shows that the maximum dollar losses vary from \$2,500 for “range” damage to \$20,000 for “crop” and “other” damage. Because the mean is heavily influenced by extreme (outlier) values, the median dollar losses serve as a better measure of “average” loss. The medians show that the highest average loss (\$500) occurs with forestry related damages, followed by livestock and poultry related damage (\$300). The lowest average loss occurs in range damage and “other” damage.

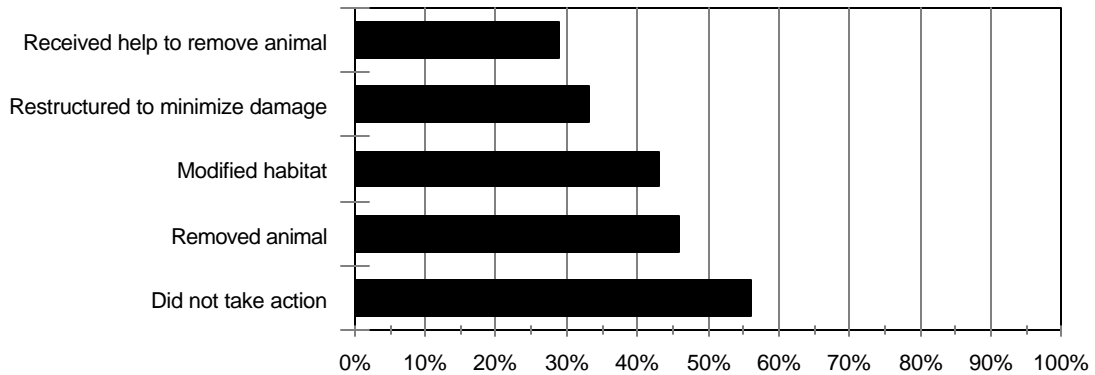
Table 9. Summary Statistics on Dollar (\$) Amount of Losses for Six Agricultural Operation Related Categories and Combined Loss

	Mean (\$)	Median (\$)	Mode (\$)	Std. Deviation (\$)	Range (\$)
Livestock and Poultry Damage	\$638	\$300	\$300	\$1,112	\$2 – \$10,000
Range Damage	\$408	\$175	\$50	\$567	\$30 – \$2,500
Forestry Damage	\$974	\$500	\$500	\$1,580	\$6 – \$8,000
Crop Damage	\$696	\$250	\$100	\$1,967	\$10 – \$20,000
Farm Building Structure Damage	\$721	\$200	\$200	\$1,624	\$10 – \$10,000
Other Damage	\$1,240	\$200	\$50	\$3,449	\$10 – \$20,000
Combined Damage	\$1,043	\$300	\$200	\$2,592	\$2 – \$24,000

Those respondents who experienced damage from furbearers were also asked to indicate whether they had pursued a number of possible actions. Figure 16 indicates that

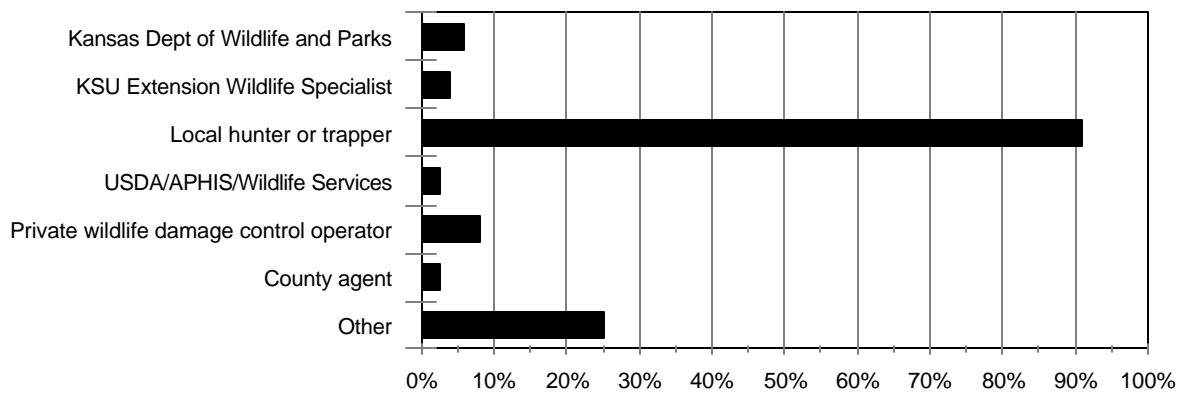
¹Some respondents who reported a *type* of damage reported a dollar amount loss of zero or “don’t know”. For purposes of calculating summary statistics on dollar amount of loss, those reporting no dollar amount loss or don’t know are excluded from the analysis, as any type of damage is assumed, analytically, to represent at least a monetary cost in terms of labor for correcting the damage or a loss in physical capital if the damage is not corrected.

Figure 16. Action Taken in Response to Furbearer Damage



the most common response among landowners to damage is taking no action (56%). The second most common response is removal of the animal (46%). Less than one third (29%) of the respondents indicate that they have utilized someone's help in removing the animal believed to be responsible for the damage, and some follow-up questions were asked of these respondents to determine from what source(s) of help was received, cost of the assistance, and extent to which the problem was resolved. Figure 17 shows that the 112 respondents who experienced damage by furbearers and received help from someone in resolving the problem most commonly used assistance from a local hunter or trapper. Ninety-one percent reported that a local hunter or trapper was used. Very few respondents indicate using official agency personnel to assist in resolving the problem.

Figure 17. Source of Assistance in Reducing Furbearer Problems



Respondents were provided with a closed-ended survey item to determine the cost of the damage control assistance. An overwhelming majority (92%) experience no cost for the assistance. Thus, only about 8% of the respondents incur a cost for assistance in removal of the animal, and less than 1% pay more than \$100 for the assistance.

Respondents were asked to report the extent to which the problem was solved. Figure 18 shows that only 3% believe that their problem was permanently solved. The majority (60%) feel that the problem was solved temporarily, and over a third (37%) report that the problem was not solved at all.

Finally, respondents who reported that their problem was solved temporarily or permanently (n=69) were asked the number of days it took to resolve the problem. Table 10 shows that the number of days taken ranges from one day to 365 days (one year). The median number of days is 30 or about one month.

Figure 18. Extent to Which Furbearer Damage Problem was Solved Among Those Receiving Damage Control Assistance (N=111)

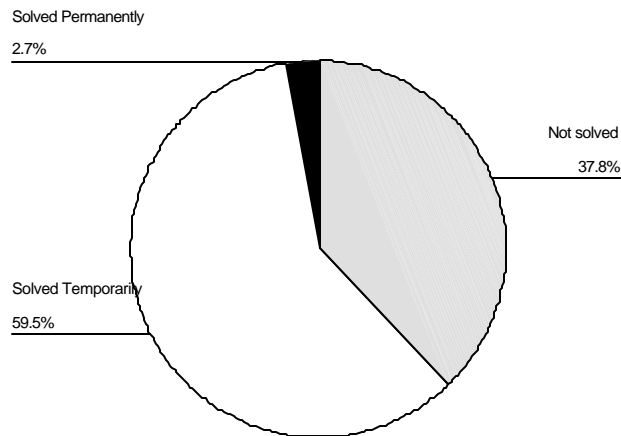


Table 10. Summary Statistics on Number of Days to Resolve Problem

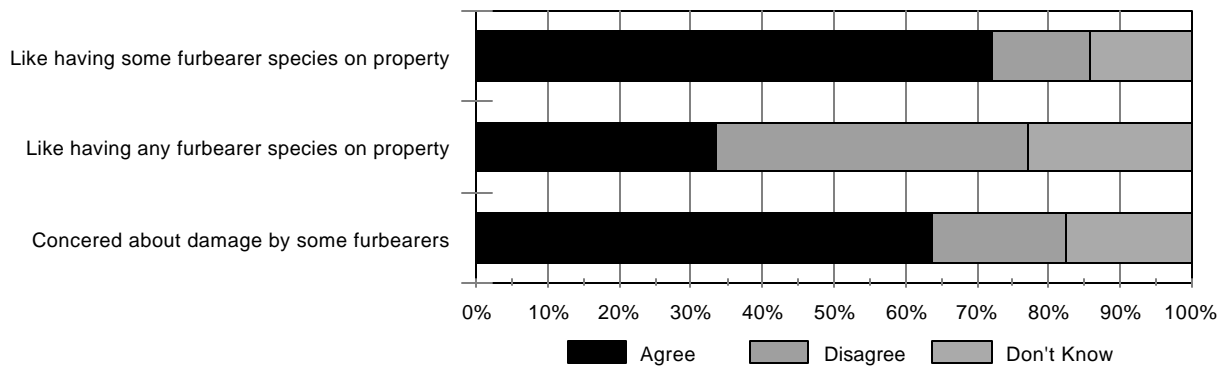
q13 How long it took to resolve problem

N	Valid	58
	Missing	1099
Mean		49.36
Median		30.00
Mode		30
Std. Deviation		74.09
Minimum		1
Maximum		365

Attitudes Toward Furbearers

Figure 19 shows results on four items assessing landowners' attitudes toward furbearers. It is apparent that landowners' attitudes toward furbearers are more complex than simply polarized opposites of approval and disapproval. A majority (72%) agree that they like having *some* furbearer species on their property, while only 14% indicate that they do not like having *some* furbearers. Turning to an item measuring a more qualified level of support for furbearers, landowners tend to express less agreement (34%) with the

Figure 19. Attitudes Toward Furbearers



statement, “I like having *any* furbearer species on my property.” About 44% disagree that they like having *any* furbearers species on their property. While support for furbearing species is evident, some species are clearly less desirable than others. Finally, it is clear that damage by furbearers is an important perceptual issue with the majority of farmers, as 63% indicate that they are concerned about damage by some furbearers. Although this percentage is higher than the percentage actually reporting some damage by furbearers in 1999 (44%), it is not surprising to find a higher level of concern than actual damage. It is also possible that more than 44% have experienced some form of damage from furbearers at some time in the past.

An analysis of bivariate relationships (see Table 11) between level of concern about damage by furbearers finds a fairly strong negative (Pearson’s $r = -0.407$), statistically significant association with support for furbearers on ones property. It is not implausible to imagine a causal path in which high concern about damage by furbearers contributes to

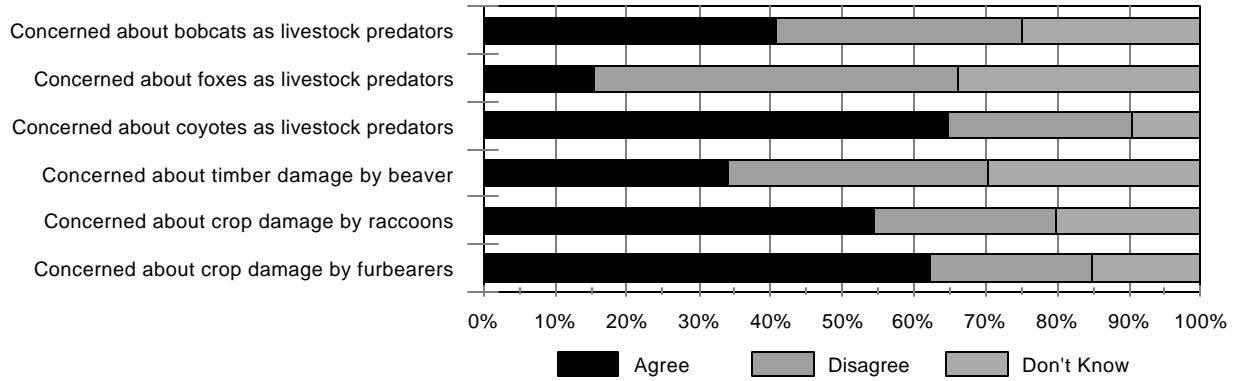
low support for *any* (i.e. all) furbearers on one's property. Although the magnitude is small (Pearson's $r = 0.118$), level of concern about furbearer damage is also significantly associated with having experienced damage to the operation by furbearers in 1999. Finally, there is also a weak association (Pearson's $r = .110$) between total monetary loss from furbearers in 1999 and level of concern about furbearer damage; this association has a significance level of 0.07. Thus, it appears that financial loss attributed to furbearers could be a factor contributing to higher concern about furbearer damage.

**Table 11. Bivariate (Pearson's r) Associations
Between Concern About Damage by Furbearers
and Selected Correlates**

Correlates	Concerned About Damage by Furbearers (1 = Disagree, 2 = Agree)
Like to have <i>any</i> furbearers on my property (1 = Disagree, 2 = Agree)	$r = -0.407$ sig. = 0.000 N = 803
Experienced damage from furbearers in 1999 (1 = No, 2 = Yes)	$r = 0.118$ sig. = 0.000 N = 949
Total dollar amount of monetary loss from furbearer damage in 1999 (continuous variable)	$r = 0.101$ sig. = 0.076 N = 312

Those who indicated that they are concerned about damage caused by some furbearers were also presented with a number of survey items designed to more precisely characterize the type of concern. Figure 20 shows that with respect to livestock predation more concern is expressed for coyotes (65%) than bobcats (41%) or foxes (15%). Well over half (62%) indicate a concern about crop damage from furbearers, and a large part of that concern can probably be attributed to concerns about raccoons, as about 54% worry about raccoon damage to crops. Just over one-third are concerned about the damage beaver may cause to timber.

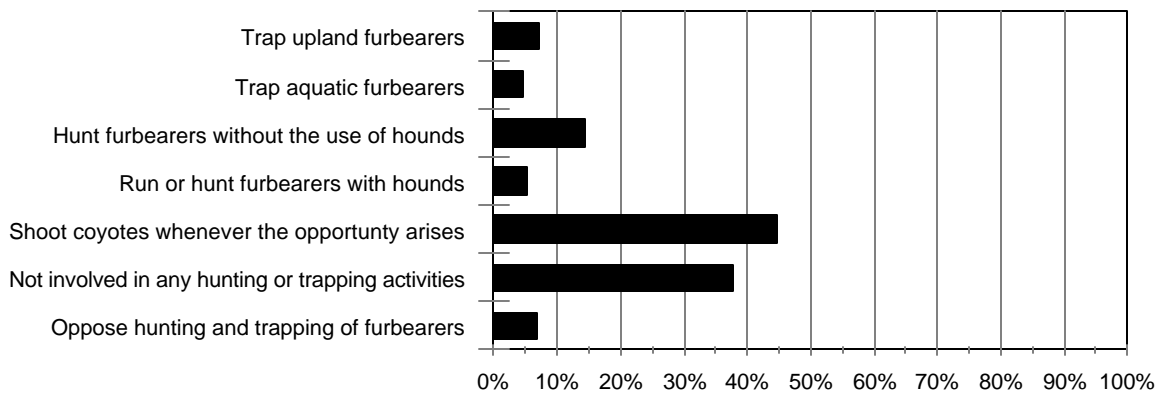
Figure 20. Specific Concerns About Furbearers



Hunting and Trapping Behaviors

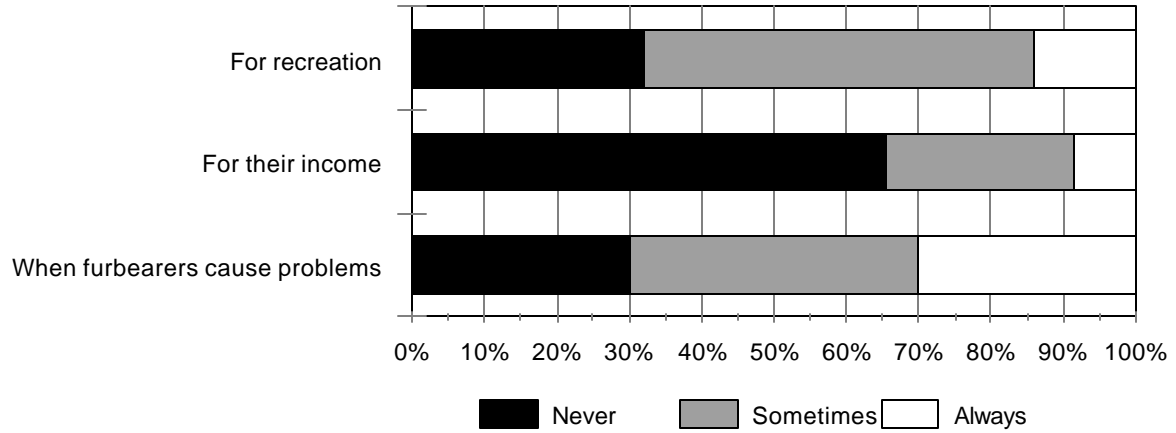
Landowners were asked whether they or their family members participate in various types of hunting and trapping activities. Figure 21 shows that less than 10% of respondents trap upland, trap aquatic furbearers and hunt furbearers with hounds. About 14% hunt furbearers without the use of hounds. Almost 45% shoot coyotes whenever the opportunity arises. Over one third of the landowners indicate that they are not involved in any hunting or trapping of furbearers, yet hunting and trapping of furbearers is largely approved of as only 7% oppose hunting or trapping of furbearers.

Figure 21. Trapping and Hunting Behaviors



Landowners were also asked to indicate how often non family members are allowed to hunt or trap for various reasons. Figure 22 shows that about two-thirds of the respondents sometimes or always allow non family members to hunt or trap for recreational purposes, and about one-third never allow this. A majority (about 65%) never allow non family members to hunt or trap for income purposes. About two-thirds allow non family members to hunt or trap when furbearers are creating difficulties for the landowner.

Figure 22. How Often Do You Allow Hunters Outside Your Family to Hunt or Trap For the Following Reasons



Conclusions

Size of acreage owned or operated is smallest in the eastern part of the state and largest in the western part of the state. Fewer landowners live on their farm/ranch operations in the western sections of the state than in the central and eastern sections of the state. The average number of years respondents have worked on their agricultural operation is in the middle twenties. Wheat and rangeland are the two most common types of operation land uses across the state as a whole, with corn being slightly more prevalent than wheat in the south west region of the state.

Most respondents believe that coyote and racoon populations have increased or remained the same on their land between 1995 and 1999. There was much more uncertainty about change in beaver populations, but most who did have an opinion believe the beaver population has increased or remained the same. Differences in perceived changes in populations do differ by region of the state.

As one would expect, generally the more respondents in a region who sighted at least one of a particular furbearer species on their land, the higher the mean number of species seen among respondents in the region. The most sighted species are coyote, striped skunk, opossum, and raccoon. The least sighted species include: river otter, mink, spotted skunk, weasel, and gray fox. Some differences among region do exist, and importantly, swift fox is a species observed solely in the western regions.

The general pattern in sightings of species evidence (tracks, dens, chewing of trees, etc.) by region mirrors the general pattern of species actually sighted by region. That is, the most species evidence is sighted for coyote, striped skunk, opossum, and raccoon. The least species evidence is sighted for river otter, mink, spotted skunk, weasel, and gray fox. It is noteworthy that evidence sighted for both coyotes and striped skunk is lower in the northern regions than the other regions of the state.

Half of the respondents indicate they did not experience damage in 1999, while 44% report that they did experience damage from furbearers in 1999. The remaining 6% do not know whether they had experienced damage from a furbearer species in 1999. There are important differences in percent of respondents reporting damage by region of

the state. About half of the respondents from both the central west region and the north central region report damage, followed by the central central region where 48% report damage. Nearly half (47%) of the respondents from the south central region report damage as well. The lowest percentages of respondents reporting damage is found in the south west at 38% and the north west at 39%.

Cattle are the most common type of livestock losses, while “holes” or burrows are cited as the most common type of range related problem. Corn is the most heavily damaged crop, and beavers are the primary cause of forestry related problems. Damage to grain and hay facilities is the most commonly mentioned type of farm building damaged.

The maximum dollar losses across several agricultural operation categories vary from \$2,500 for “range” damage to \$20,000 for “crop” and “other” damage. Medians show that the highest average loss (\$500) by agricultural operation category occurs in forestry related damages, followed by livestock and poultry related damage with a median loss of \$300 per operation among operations experiencing damage from furbearers.

Almost half of the respondents experiencing damage from furbearers remove the offending animal, and almost one third have used assistance in removing the animal. By far the most common type of assistance is use of a local hunter or trapper, while use of an agency is very uncommon. Consistent with the reported source of assistance, over 90% of the respondents report that they incurred no cost for the assistance. On average the problem was resolved within a month.

Support for furbearing species on one’s property is evident among a majority of landowners, however, some species are clearly less desirable than others. It is also seems that financial loss attributed to furbearers may contribute to higher levels of concern about furbearer damage, and concern about furbearer damage contributes to less support for some furbearers on one’s property. In terms of concern about livestock damage from particular species, more concern is expressed for coyotes than bobcats or foxes. Well over half indicate a concern about crop damage from furbearers, and a large part of that concern can probably be attributed to concerns about raccoons. Just over one-third are concerned about the damage beaver may cause to timber.

Finally, almost half of the respondents shoot coyotes whenever the opportunity arises, while over one third of the landowners indicate that they are never involved in any hunting or trapping of furbearers. Although many never hunt or trap furbearers hunting and trapping of furbearers is largely approved of as only 7% oppose it.