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# Perceptions of American agricultural producers about wildlife on their farms and ranches

*Michael R. Conover*

**Abstract** Perceptions of U.S. agricultural producers about wildlife were examined by distributing questionnaires in 1993 and 1994 to 2,000 farmers and ranchers: 1,000 selected from a random list maintained by Survey Sampling, Inc., and 1,000 contacted through county offices of the U.S. Department of Agriculture's Farm Service Agency. One thousand three hundred forty-seven usable questionnaires were returned. Most respondents (51%) purposely managed for wildlife on their farm or ranch. Activities included providing cover for wildlife near fields (reported by 39% of the respondents), providing a water source (38%), leaving crop residue in the field (36%), leaving a portion of the crop unharvested (17%), and providing salt licks (12%). In the prior year, respondents spent a mean of \$223 (SE = \$24) and 14 hours (SE = 1) to help or encourage wildlife on their property. Most respondents (77%) allowed hunting on their property; 5% charged hunters a fee. Most respondents (80%) suffered wildlife damage in the year prior to the survey, and 53% reported that damage exceeded their tolerance. Respondents spent a mean of 43.6 hours and \$1,002 in the prior year trying to solve or prevent wildlife damage. Despite these efforts, 54% of respondents reported >\$500 in losses annually from wildlife damage. Because their losses were so severe, 24% said they were reluctant to provide habitat for wildlife, and 38% said they would oppose the creation of a wildlife sanctuary near their property. Problems were caused most often by deer (*Odocoileus* spp.; listed by 53% of all respondents), raccoons (*Procyon lotor*; 25%), coyotes (*Canis latrans*; 24%), and ground hogs (*Marmota* spp.; 21%). Regional differences were found in wildlife enhancement practices, hunter access, and species causing problems, but not in the extent of wildlife damage.

**Key words** agricultural producers, *Canis latrans*, human-wildlife interactions, *Marmota*, *Odocoileus*, *Procyon lotor*, wildlife damage, wildlife management, wildlife perceptions.

Agricultural producers control 401 million ha in the United States, 45% of the nation's surface area (U.S. Bur. of the Census 1991). Hence, their impact on wildlife resources in the United States is immense (Kellert 1981). Programs to maintain or improve wildlife habitat on private lands cannot succeed without the support of farmers and ranchers. Indeed, the perception of American agricultural producers about wildlife is a crucial issue in wildlife management. Perceptions of agricultural producers often differ

from those held by the general public (Kellert and Berry 1980, McIvor and Conover 1994a). In surveying grass-root leaders of the agricultural community, Conover (1994) found that most respondents spent both time and money to improve wildlife habitat on their property; most also allowed hunting.

For many agricultural producers, however, an abundance of wildlife on their lands brings about costs as well as benefits (Conover 1997a). Although many farmers and ranchers like to hunt and others

just enjoy seeing wildlife on their property (Conover 1994), most report lost income due to wildlife damage (Conover 1994, Wywiałowski 1994).

Perceptions of high levels of wildlife damage can reduce a farmer's tolerance of the species responsible (Conover 1997a). For instance, New York fruit growers preferred lower white-tailed deer (*Odocoileus virginianus*) populations than other farmers (Decker and Brown 1982; Decker et al. 1983a, 1983b). The hypothesis that members of society that are harmed by a wildlife species have a lower tolerance for that species than other members of society is embodied in the concept of "wildlife acceptance capacity" (Decker and Purdy 1988). It is unclear whether wildlife damage on a national level is extensive enough to influence the nation's agricultural producers' perceptions about wildlife and diminish their willingness to manage their lands to enhance wildlife populations. I examined these 2 issues in this study.

Thus far, we know little about the magnitude of wildlife damage on a national level. Conover and Decker (1991) noted a consensus among professionals working for federal or state wildlife or agricultural agencies across the United States that wildlife-induced damage reduces the profitability of local agricultural producers and that the problem has worsened in the last few decades. Most (87%) grass-roots leaders of the agricultural community reported that wildlife damage occurred on their own farms and ranches, and 56% stated that the levels of damage they were sustaining exceeded their tolerance (Conover 1994). But, do the perceptions of wildlife and agricultural professionals and grass-root leaders of the agricultural community accurately mirror the concerns and perceptions of the nation's farmers? To answer this question, I sampled a random selection of farmers drawn from every state to assess their perceptions of wildlife resource and wildlife damage and to learn what they do to encourage wildlife on their property. Further, I examined the question of whether wildlife damage influences an agricultural producer's willingness to manage his or her property for wildlife.

## Methods

I surveyed agricultural producers in 1993 and 1994 using Dillman's (1978) total-design method. One thousand agricultural producers from the United States were drawn from a random list maintained by Survey Sampling, Inc. and were sent a questionnaire; a self-addressed, stamped envelope; and a cover letter explaining the survey. A week later, I mailed a letter to all respondents reminding them to complete

and return the survey. A month later, nonrespondents were sent a second questionnaire, cover letter, and self-addressed, stamped envelope.

Each questionnaire contained questions about the respondent's experiences with and attitudes towards wildlife on their farm or ranch during the last year. They were asked whether they allowed hunting on their land, charged hunters a fee, or purposely provided habitat for wildlife. The questionnaire contained a list of management practices designed to encourage wildlife, and respondents were asked to mark those that they employed on their property. In addition, I asked whether the respondents experienced wildlife damage during the last year, whether they considered their losses due to wildlife to be tolerable, and whether the severity of their losses reduced their willingness to provide habitat for wildlife on their property or would lead them to oppose the creation of a wildlife sanctuary near their property. Finally, I gave respondents a list of wildlife species and asked them to identify which species caused damage on their farm or ranch during the previous year. This sampling method, questionnaire, experimental design, and statistical analysis were similar to those used earlier to assess the wildlife management practices and perceptions of metropolitan residents in the United States (Conover 1997b). To check for any non-response bias, I phoned 15% of the people who received the questionnaire but failed to return it.

## Validation survey

One concern with attitudinal surveys is the uncertainty of whether the selected sample is representative of the population of interest. Usually, it is assumed that the sample is representative. However, I used a more conservative approach and tested this assumption by conducting a "validation" survey. In employing this approach, I used a different method to select a second group of respondents from the target population and compared the answers of these 2 respondent groups to each other. Where no statistical differences were found, I assumed that these 2 samples were unbiased samples of the population. Where differences existed, I knew that  $\geq 1$  of these samples was biased and that I should take caution in interpreting the results.

I selected agricultural producers for the validation test using the United States Department of Agriculture's (USDA) Farm Service Administration's (FSA) county offices. These local offices, which serve all counties in the United States, are an important contact point between the USDA and individual farmers. Most farmers visit FSA offices several times a year.

I chose FSA offices for sampling by randomly se-

lecting 3 counties in each state (150 total) and the FSA office that served them. An additional 183 FSA offices were selected from the different states by prorating the proportion of the nation's farms located in each state (U.S. Bur. of Census 1991). Once I determined the number of additional FSA offices to be drawn from each state, offices were selected at random from state lists of FSA offices. Hence, a total of 333 FSA offices were contacted for this study.

Each selected FSA office was sampled by sending a cover letter and 3 questionnaires to the Executive Director of that FSA office. The Director was instructed to present the questionnaire to the first 3 unrelated farmers who walked into the office and to ask them to complete it. When the 3 questionnaires were filled out, the Director mailed the completed questionnaires to me in the enclosed postage-paid, self-addressed return envelope. A week after the first mailing, I sent the Directors a letter reminding them to return the questionnaires. One month later, a new set of questionnaires and a return envelope were sent to anyone who had not returned the original questionnaires.

### Data analyses

I compared answers of those people who returned my questionnaire to nonrespondents whom I phoned to check for a nonresponse bias. For these and all other comparisons, I used contingency tables to analyze categorical data and paired *t*-tests to analyze normally distributed data. I assumed that a difference was statistically significant if  $P < 0.05$ . All data analyses were based on questions respondents answered (i.e., unanswered questions were ignored). I conducted a similar analysis comparing the respondents contacted through the list provided by Surveying Sample, Inc. to those contacted through the FSA.

I tested whether regional differences existed in wildlife attitudes and experiences by grouping each respondent into 1 of 4 regions of the United States based on farm location (Western, Great Plains, Northeast, or Southeast; Fig. 1). I used contingency tables and *F*-tests to assess statistical differences among regions and to assess how wildlife management concerns and practices differed between those farmers who allowed hunting and those who did not.

I compared the characteristics of farmers who were experiencing what they considered unacceptably high losses to those who considered their losses tolerable, using Fisher exact-probability tests for categorical data and Student *t*-tests for

normally distributed data. Similar tests were conducted to compare farmers who allowed hunting on their farms to those who did not.

## Results

Ninety-four of the surveys mailed to farmers on the list maintained by Survey Sampling, Inc. were returned by the post office as undeliverable; the response rate for farmers receiving questionnaires was 74%, resulting in 647 usable questionnaires (30 respondents had left farming or did not complete the questionnaire). Forty-three packages sent to FSA offices were returned by the post office as undeliverable (apparently many FSA offices were moving during this period so that the annual FSA directory had quickly become out-of-date); the response rate from the FSA offices receiving questionnaires was 78%, resulting in 700 usable questionnaires.

There were no significant differences between the answers provided by the respondents to the written questionnaire and those provided by nonrespondents who were phoned. Answers by respondents contacted through the FSA were similar to those contacted from the list provided by Survey Sampling, Inc. except for the question about the amount of money spent annually to encourage wildlife ( $t = 2.64$ ,  $P = 0.008$ ). Hence, caution was exercised when interpreting the results of this question. For all other questions, the data from these 2 respondent groups were pooled for further analyses.

Most respondents had diversified operations: 73% raised field crops, 55% livestock, 17% timber, 13% vegetables, and 8% fruit. The size of their farms and ranches averaged 897 ha (SE = 335 ha).

Most respondents (51%) purposely managed their farm for wildlife. Activities to encourage wildlife in-

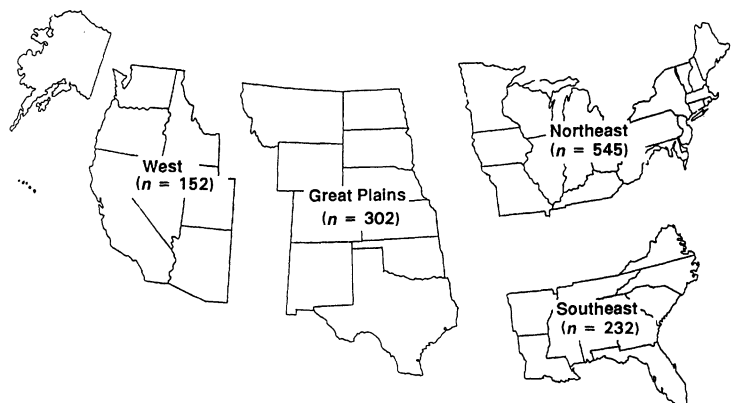


Fig. 1. Regional distribution of respondents to a 1993–1994 survey of United States farmers and ranchers.

cluded providing cover for wildlife near fields (reported by 39% of the respondents), providing a water source (38%), leaving crop residue in the field (36%), leaving a portion of the crop unharvested (17%), or providing salt licks for wildlife (12%). Most respondents (77%) allowed hunting on their property, and 5% reported that they charged hunters a fee.

Respondents indicated that they spent a mean of 14 hours (SE = 1) in the previous year enhancing conditions for wildlife on their property. Respondents on the Survey Sampling list spent \$303 (SE = 45) to encourage wildlife, while those contacted through FSA offices reported spending \$168 (SE = 26). This is the 1 question where the 2 groups of respondents gave different answers.

Most respondents (80%) stated that wildlife caused damage on their farm or ranch in the previous year, and 53% stated that this loss exceeded their tolerance. When asked to categorize this loss in dollars, 11% gave no answer; of those who answered, 22% reported losses of <\$100; 23%, \$100–\$499; 22%, \$500–\$999; 23%, \$1,000–\$4,999; 6%, \$5,000–\$10,000; and 3%, >\$10,000. In addition to this loss, the respondents reported spending an average of 43.6 hours (SE = 3.0) and \$1,002 (SE = 358) in the prior year trying to solve or prevent a wildlife problem.

Deer caused the most problems; 53% of respondents indicated problems with deer. Other species identified as causing problems included raccoons (*Procyon lotor*; listed by 25% of respondents), coyotes (*Canis latrans*; 24% of respondents), ground hogs (*Marmota monax*; 21% of respondents), blackbirds (*Icteridae*; 18% of respondents), beavers (*Castor canadensis*; 19% of respondents), mice and voles (Rodentia; 18% of respondents), starlings (*Sturnus vulgaris*; 16% of respondents), rabbits (*Leporidae*; 16% of respondents), foxes (*Canidae*; 12% of respondents), skunks (*Mustelidae*; 9% of respondents), waterfowl (*Anatidae*; 6% of respondents), prairie dogs (*Cynomys* spp.; 6% of respondents), and elk (*Cervus canadensis*; 1% of respondents).

When asked whether wildlife damage on their farms or ranches was so severe that it reduced their willingness to provide habitat for wildlife on their farms or ranches, 24% of re-

spondents said yes. When asked whether wildlife damage on their farms or ranches was so severe that they would oppose the creation of a wildlife sanctuary near their property, 38% answered affirmatively.

Regional differences existed in the farmers' perceptions of wildlife. A higher proportion of respondents from the Great Plains tried to encourage wildlife on their property than those from other regions (Table 1). Southeastern agricultural producers, however, devoted the most time and money to this endeavor (Table 2). Southeastern and western farmers and ranchers were the least likely to allow hunters on their property and were most likely to charge hunters a fee (Table 1).

Wildlife damage was widespread across the United States. Significant differences did not exist among regions in the proportion of agricultural producers who (1) suffered from wildlife damage, (2) reported that losses from wildlife damage exceeded their tolerance, or (3) stated that their wildlife losses were so severe that it reduced their willingness to manage for wildlife or would cause them to oppose the creation of a wildlife sanctuary nearby (Table 3). However, western agricultural producers spent more time and money trying to solve or prevent wildlife damage problems than those in the other regions; northeastern agricultural producers spent the least time and money (Table 2).

Not surprisingly, regional differences existed in the proportions of farmers reporting problems with specific wildlife species (Table 4). Deer, ground hog, and raccoon problems were most common in the

Table 1. Percent of respondents by region reporting management efforts to enhance wildlife on their farms and ranches, allow hunter access, and charge hunters a fee, from a 1993–1994 survey of United States farmers and ranchers.

Respondents reporting that they...	Respondents (%) by region				$\chi^2$
	Northeast (n = 545)	Southeast (n = 232)	Great Plains (n = 302)	West (n = 152)	
Manage for wildlife	46.5	52.1	62.5	47.2	19.28
Leave cover near fields for wildlife	41.7	34.9	45.4	22.5	25.64
Provide a water source for wildlife	32.7	34.5	52.3	33.8	35.25
Leave crop residues in the fields for wildlife	30.5	43.5	46.0	25.8	32.85
Leave some crops unharvested for wildlife	18.3	17.7	19.5	7.9	10.76
Provide a salt lick for wildlife	7.9	15.1	17.2	13.9	18.67
Allow hunting on their property	83.0	66.8	79.8	66.7	31.88
Charge hunters a fee	2.7	9.9	4.5	7.9	14.43

\* All  $\chi^2$  values are statistically significant ( $P < 0.05$ ) based on Bonferroni protected alpha levels, except for the practice of leaving some crops unharvested.

Table 2. Regional differences in the mean (SE) amount of time and money spent annually by respondents trying to solve or prevent wildlife damage (WD) or to encourage wildlife on their property from a 1993–1994 survey of United States

Time and money spent by respondents . . .	Northeast (n = 545)	Southeast (n = 232)	Great Plains (n = 302)	West (n = 152)	F*
To encourage wildlife					
Hr	8.3 (1.0)	25.9 (3.9)	16.0 (1.7)	13.3 (2.3)	13.80
Dollars	108 (17)	471 (91)	173 (25)	315 (86)	12.08
To solve or prevent WD					
Hr	28.9 (2.7)	41.9 (4.5)	50.1 (5.3)	85.6 (18.0)	12.31
Dollars	293 (35)	961 (33)	570 (93)	4,350 (2771)	4.42

\* All *F* values are statistically significant ( $P < 0.05$ ) based on Bonferroni protected alpha levels.

Northeast; deer and beaver problems in the Southeast; deer, coyote, raccoon, prairie dog, and blackbird problems in the Great Plains; and deer, European starling, blackbird, and coyote problems in the West.

Most farmers (80%) with losses <\$500 from wildlife damage considered their losses to be acceptable. In contrast, few farmers (31%) who had losses >\$500 considered their losses to be acceptable. Farmers with unacceptable losses spent more time, but not more money, trying to solve wildlife damage problems than farmers with acceptable losses (Table 5). Both groups of farmers spent equal amounts of money and time trying to enhance wildlife on their property (Table 5). A higher proportion (82%) of agricultural producers with unacceptable losses allowed hunting than

those with acceptable losses (76%,  $P = 0.02$ ). Most farmers (66%) with unacceptable losses reported that they either would oppose the creation of a wildlife refuge in their area or were less willing to manage their land to enhance wildlife; only 26% of farmers with acceptable losses held similar views ( $P < 0.0001$ ).

Farmers who allowed hunting on their property did not differ from those who prohibited it in the amount of time and

money spent either to solve wildlife problems or to manage their property to benefit wildlife (Table 6). Farmers who allowed hunting (87%) were more likely than farmers who prohibited it (66%) to state that wildlife damage occurred on their farm ( $P < 0.0001$ ) and that their losses were >\$500 (57% of farmers who allowed hunting vs. 37% of farmers prohibiting it,  $P < 0.0001$ ). Farmers who allowed hunting were also more likely to consider their losses as unacceptable (47%) than farmers who prohibited it (38%,  $P = 0.02$ ).

## Discussion

Although 2 distinctive methods for sampling agricultural producers were used in this study, responses of the 2 groups were similar, with the exception of 1

Table 3. Regional differences in the percentage of respondents who reported that they experienced wildlife damage (WD) in the prior year, the level of reported damage, and the impact of WD on their willingness to provide habitat for wildlife or oppose the creation of a local wildlife sanctuary, from a 1993–1994 survey of United States farmers and ranchers.

Respondents reporting that . . .	Respondents (%) by region				$\chi^2$ *
	Northeast (n = 545)	Southeast (n = 232)	Great Plains (n = 302)	West (n = 152)	
They suffered WD	80.5	78.7	81.9	76.0	2.31
Their WD exceeded their tolerance	52.9	48.2	55.2	56.4	2.93
Their WD losses last year:					
<\$100	22.7	21.5	22.4	19.3	
\$100–\$500	26.5	15.7	24.9	20.0	
\$500–\$1,000	21.8	24.6	19.0	27.4	
\$1,000–\$5,000	21.5	24.1	26.6	20.7	
\$5,000–\$10,000	6.1	8.9	5.9	3.0	
>\$10,000	1.4	5.2	1.3	9.6	45.59*
WD was so severe that it reduces their willingness to provide wildlife habitat on their farm	25.6	28.4	18.3	21.5	8.06
WD was so severe that they would oppose the creation of a wildlife sanctuary near their farm	40.4	31.8	40.1	42.6	5.99

\* This  $\chi^2$  value is statistically significant ( $P < 0.05$ ) based on Bonferroni protected alpha levels.

Table 4. Regional difference in the percentage of respondents who reported that they experienced wildlife damage problems caused by different wildlife species, from a 1993–1994 survey of United States farmers and ranchers.

Species causing problems	Respondents (%) by region				$\chi^2$ *
	Northeast (n = 545)	Southeast (n = 232)	Great Plains (n = 302)	West (n = 152)	
Deer	63.9	56.9	45.0	21.9	93.61
Ground hogs	38.2	11.6	4.6	7.3	174.07
Raccoons	35.8	14.2	26.5	2.6	87.80
Coyotes	16.7	19.8	40.4	19.9	64.85
Mice and voles	20.5	7.8	23.2	15.2	24.96
Rabbits	17.1	12.9	16.6	14.6	2.38
Beavers	15.6	31.9	19.2	7.3	43.29
Foxes	15.9	12.2	9.9	1.3	25.80
Skunks	8.3	3.9	15.9	4.6	29.21
Waterfowl	5.5	3.0	5.3	17.2	35.16
European starlings	19.3	6.5	13.6	23.8	28.22
Prairie dogs	1.3	0.0	20.5	5.3	143.52
Blackbirds	17.8	13.8	21.9	20.5	6.27
Elk	0.0	0.4	1.3	6.6	44.55

\* All  $\chi^2$  values except for rabbits and blackbirds are statistically significant ( $P < 0.05$ ) based on Bonferroni protected alpha levels.

question. This similarity provides some assurance that the survey methods I used were unbiased. Furthermore, agricultural producers' perceptions about wildlife were the subject of an earlier study that used different sampling methodologies than those employed by this study. Conover (1994) surveyed grass-roots leaders of the agricultural community, first by sampling members at county and state board meetings of the American Farm Bureau, and, secondly, by randomly selecting people attending the national convention of the American Farm Bureau Federation. Despite differences in sampling schemes between Conover's (1994) study and the current study, many of the results are similar. For instance, Conover (1994) found that 89% of respondents reported that wildlife caused damage on their farms or ranches in the year prior to the survey, and 56% felt their losses were intolerable (vs. this study's findings of 80% and 53%, respectively). In Conover (1994), 33% of respondents estimated their losses from wildlife at >\$1,000; in the current study, 32% estimated such damage. In Conover (1994), 79% of respondents allowed hunting; in the present study, 77% allowed hunting. In Conover (1994), 55% of the grass-roots leaders

purposely provided habitat for wildlife, 30% left crop residue in the field, 32% provided cover near crops; in this study the percentages were slightly different at 51%, 36%, and 39%, respectively. Farmers who allowed hunting were more likely to have wildlife damage, to consider their damage unacceptable, and to report annual losses >\$500 than farmers who prohibited it. Apparently, farmers experiencing wildlife damage are more likely to allow hunting in an effort to reduce wildlife damage. Many wildlife managers try to persuade farmers to allow hunting on their property by arguing that hunting would reduce wildlife damage; my findings indicate that this strategy is successful.

My results indicate that a large proportion of America's farmers and ranchers place a high value on the wildlife that inhabit their lands. Most respondents indicated that they deliberately provided habitat for wildlife, and many reported engaging in different management techniques to encourage wildlife on their property, such as providing cover for wildlife near fields, leaving a portion of the crop unharvested, or providing a source of water or salt. Most respondents allowed hunting on their property. Considering that only 5% of respondents reported that they charged hunters a fee, the high value respondents placed on wildlife apparently resulted from the esthetics and enjoyment wildlife provide rather than from direct financial benefits. Respondents indicated that they spent annually a mean

Table 5. Differences between farmers who considered their losses due to wildlife damage (WD) acceptable ( $n = 650$ ) and those who considered their losses unacceptable ( $n = 539$ ) in the amount of time and money they reported spending to encourage wildlife on their property or to solve or prevent WD, from a 1993–1994 survey of United States farmers and ranchers.

Characteristic	Losses acceptable?		<i>t</i> -test	<i>P</i>
	Yes	No		
Ha ( $\bar{x} \pm SE$ )	1,210 (636)	542 (46)	1.05	0.29
To encourage wildlife				
Hr ( $\bar{x} \pm SE$ )	15.4 (1.4)	13.3 (1.7)	0.94	0.35
Dollars ( $\bar{x} \pm SE$ )	214 (29)	246 (42)	0.64	0.52
To solve or prevent WD				
Hr ( $\bar{x} \pm SE$ )	20.7 (2.1)	71.8 (5.9)	8.13	0.0001
Dollars ( $\bar{x} \pm SE$ )	909 (649)	1,171 (257)	0.38	0.71

Table 6. Differences between farmers who allowed hunting ( $n = 931$ ) and those who prohibited it ( $n = 263$ ) in the amount of time and money they reported spending to encourage wildlife on their property or to solve or prevent wildlife damage (WD), from a 1993–1994 survey of United States farmers and ranchers.

Characteristic	Allow hunting?		<i>t</i> -test	<i>P</i>
	Yes	No		
Ha ( $\bar{x} \pm SE$ )	1,035 (443)	405 (105)	1.38	0.17
To encourage wildlife				
Hours ( $\bar{x} \pm SE$ )	14.2 (1.0)	15.1 (2.9)	0.29	0.77
Dollars ( $\bar{x} \pm SE$ )	217 (25)	250 (61)	0.51	0.61
To solve or prevent WD				
Hours ( $\bar{x} \pm SE$ )	45.4 (3.5)	35.6 (5.8)	1.43	0.15
Dollars ( $\bar{x} \pm SE$ )	1,115 (462)	659 (267)	0.86	0.61

of 14 hours and \$168 (Survey Sampling respondents) or \$303 (FSA respondents) to encourage wildlife on their property. There were 2,088,000 farm operators in the United States in 1987 (U.S. Bur. of the Census 1991). If these figures are extrapolated to them, then American agricultural producers spent 29 million hours and \$300–\$600 million annually trying to encourage wildlife on their farms and ranches.

Most (80%) of the respondents faced wildlife damage problems on their farms and ranches, and 53% of them claimed that the damage exceeded their tolerance. For many farmers, \$500 appeared to be a cut-off point between acceptable and unacceptable losses, because 80% of farmers experiencing <\$500 in damage considered their losses as acceptable; however, only 31% of farmers considered their losses as acceptable when damages were >\$500.

Respondents reported spending a mean of 43.6 hours and \$1,002 annually trying to solve or prevent wildlife damage. When these values are extrapolated to the nation's 2,088,000 agricultural producers, the amounts exceed 90 million hours and \$2 billion. Despite these efforts to solve or prevent wildlife damage, 32% of agricultural producers reported that they sustained losses >\$1,000 due to wildlife damage in the year prior to the study. If we conservatively assign the lowest value to each of the 6 monetary categories listed on my questionnaire (i.e., \$0 to those reporting losses of \$0–\$100, \$100 to those reporting losses of \$100–\$500, etc.) and then extrapolate the proportion of respondents in each group to the nation's 2,088,000 agricultural producers, this yields a perceived annual loss of \$2 billion.

It may seem counter-productive for farmers to simultaneously be spending time and money to enhance wildlife habitat and to reduce wildlife damage. One reason for this apparent paradox is that many farmers enjoy having abundant wildlife on their property but do not like the damage caused by the animals. Hence, they

take steps to try to accomplish both objectives. For instance, a farmer may simultaneously manage for trophy deer and at the same time attempt to keep deer out of his soybean field. Another reason is that the people's attitudes about wildlife are species specific: they like some species and dislike others (Conover 1997b). For instance, sunflower growers in North Dakota spent resources to protect their crop from blackbirds by both harassing the birds (Linz and Hanzel 1997) and by using herbicides to

open up marshes (Leitch et al. 1997). Many of these same growers spent time in attempting to increase pheasant populations on their properties for hunting.

These figures represent perceived losses. Their relationship to actual losses is unclear and probably depends in part on the conspicuousness of the damage (Conover 1994). For instance, farmers overestimate sandhill crane (*Grus canadensis*) damage to grain fields, because the damage occurs along the field's edge where it is obvious to farmers driving along their fields (McIvor and Conover 1994b). Similarly, red-winged blackbird (*Agelaius phoeniceus*) damage to corn is typically overestimated because damaged corn ears are shredded, making them conspicuous (Wakeley and Mitchell 1981). Aquaculture producers also overestimate their losses to piscivorous birds (Pitt and Conover 1996). In contrast, farmers underestimate the magnitude of losses caused by geese grazing in rye fields (Conover 1988).

Although the relationship between perceived and actual levels of wildlife damage is unclear, a farmer's perceptions are important, because, as my results indicate, they influence his or her attitudes about wildlife. For instance, 40% of the respondents reported that wildlife damage was so severe on their farm or ranch that they would oppose the creation of a wildlife sanctuary near their property, and 26% said that wildlife damage reduced their willingness to provide wildlife habitat on their property. Considering that 45% of the total surface area of the United States, or 401 million ha, is under the control of agricultural producers (U.S. Bur. of the Census 1991), perceptions of wildlife by this group are critical if America's wildlife resources are to be maintained or enhanced (Kellert 1981, Noonan and Zagata 1982, Wright and Kaiser 1986, Conover et al. 1995). Wildlife damage appears to be a serious concern of many farmers and ranchers, and that perception should be of concern to wildlife man-



agers. Development and implementation of effective strategies to alleviate wildlife damage to agricultural producers would not only enhance the nation's productivity and strengthen rural economies, but it would also strengthen America's wildlife legacy.

One method to assess the value of a resource is to measure the amount of time and money spent to acquire or manage it. By this standard, the nation's farmers and ranchers, who spend 120 million hours and \$2.5 billion annually on wildlife management, value wildlife. In a similar study, Conover (1997b) reported that United States metropolitan residents, who far outnumber agricultural producers, spent 1.6 billion hours and \$5.5 billion annually to manage urban wildlife. The United States is blessed with a valuable wildlife resource. On this point, both its urban and rural citizens agree.

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## Literature cited

- CONOVER, M. R. 1988. Effect of grazing by Canada geese on the winter growth of rye. *Journal of Wildlife Management* 52:76–80.
- 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. 1997a. Monetary and intangible valuation of deer in the United States. *Wildlife Society Bulletin* 25:298–305.
- CONOVER, M. R. 1997b. Wildlife management by metropolitan residents in the United States: practices, perceptions, costs, and values. *Wildlife Society Bulletin* 25:306–311.
- 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.
- CONOVER, M. R., W. C. PITT, K. K. KESSLER, T. J. DuBOW, AND W. A. SANBORN. 1995. Review of human injuries, illnesses, and economic losses caused by wildlife in the United States. *Wildlife Society Bulletin* 23:407–414.
- DECKER, D. J., AND T. L. BROWN. 1982. Fruit growers' vs. other farmers' attitudes toward deer in New York. *Wildlife Society Bulletin* 10:150–155.
- DECKER, D. J., G. F. MATTFELD, AND T. L. BROWN. 1983a. Influence of deer damage on farmers' perceptions of deer population trends: important implications for managers. *Proceedings of the Eastern Wildlife Damage Control Conference* 1:191–194.
- DECKER, D. J., AND K. G. PURDY. 1988. Toward a concept of wildlife acceptance capacity in wildlife management. *Wildlife Society Bulletin* 16:53–57.
- DECKER, D. J., N. SANYAL, T. L. BROWN, R. A. SMOLKA, JR., AND N. A. CONNELLY. 1983b. Reanalysis of farmer willingness to tolerate deer damage in western New York. *Proceedings of the Eastern Wildlife Damage Control Conference* 1:37–44.
- DILLMAN, D. A. 1978. Mail and telephone surveys, the total design method. John Wiley and Sons, Inc., New York, New York.
- KELLERT, S. R. 1981. Wildlife and the private landowner. Pages 18–34 in R. T. Dumke, G. V. Berger, and J. R. March, editors. *Proceedings of the Wildlife Management on Private Lands Symposium*. LaCrosse Printing Company, LaCrosse, Wisconsin.
- KELLERT, S. R., AND J. K. BERRY. 1980. Knowledge, affection and basic attitudes toward animals in American society—Phase III. National Technical Information Service, Accession Number PB-81-173106.
- LEITCH, J. A., G. M. LINZ, AND J. F. BALTEZORE. 1997. Economics of cattail (*Typha* spp.) control to reduce blackbird damage to sunflowers. *Agriculture, Ecosystems and Environment* 65:141–149.
- LINZ, G. M., AND J. J. HANZEL. 1997. Birds and sunflowers. *Agronomy Monograph* 35:381–394.
- MCIVOR, D. E., AND M. R. CONOVER. 1994a. Perceptions of farmers and non-farmers toward management of problem wildlife. *Wildlife Society Bulletin* 22:212–219.
- MCIVOR, D. E., AND M. R. CONOVER. 1994b. Impact of greater sandhill cranes foraging on corn and barley crops. *Agriculture, Ecosystems and Environment* 49:233–327.
- NOONAN, P. F., AND M. D. ZAGATA. 1982. Wildlife in the market place: using the profit motive to maintain wildlife habitat. *Wildlife Society Bulletin* 10:46–49.
- PITT, W. C., AND M. R. CONOVER. 1996. Predation at Intermountain West fish hatcheries. *Journal of Wildlife Management* 60:616–624.
- U. S. BUREAU OF THE CENSUS. 1991. Statistical abstract of the United States: 1991. One-hundred eleventh edition. U.S. Government Printing Office, Washington D.C.
- WAKELEY, J. S., AND R. C. MITCHELL. 1981. Blackbird damage to ripening field corn in Pennsylvania. *Wildlife Society Bulletin* 9:52–55.
- WRIGHT, B. A., AND R. A. KAISER. 1986. Wildlife administrators' perceptions of hunter access problems: a national overview. *Wildlife Society Bulletin* 14:30–35.
- WYWIALOWSKI, A. P. 1994. Agricultural producers' perceptions on wildlife-caused losses. *Wildlife Society Bulletin* 22:370–382.



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