

INFLUENCE OF DEER DAMAGE ON FARMERS' PERCEPTIONS OF DEER POPULATION TRENDS: IMPORTANT IMPLICATIONS FOR MANAGERS¹

Daniel J. Decker, Research Associate, Department of Natural Resources, Cornell University, Ithaca, N.Y. 14853; George F. Mattfeld, Environmental Management Specialist, New York State Department of Environmental Conservation, Albany, N.Y. 12233; and Tommy L. Brown, Senior Research Associate, Department of Natural Resources, Cornell University, Ithaca, N.Y. 14853.

INTRODUCTION

Farmers' attitudes toward deer, their perceptions of deer depredations and their preferences for future deer population levels have been extensively studied in New York (Brown and Decker 1979; Brown et al. 1977a, 1977b, 1978a, 1978b, 1979, 1980; Decker and Brown 1982; Decker et al. 1981a, 1981b). These studies have contributed to deer-population-management decisions that give consideration to farming interests. Nevertheless, farmers cannot be expected to support deer management efforts on their behalf if they do not understand the population changes such management is designed to achieve. Consequently, wildlife managers need to know whether or not the effects of such efforts are recognized. A direct indication of this, which had not been examined previously, is how well the farming community perceives changes in deer abundance over a reasonable period of time, say 5 years. Using data from the previous studies cited and a deer-population index, the authors sought an answer to the following question: Do farmers recognize managed increases or decreases in deer populations, or do they simply react to experience with deer damage?

METHODS

Questionnaires used in 3 surveys of farmers between 1976 and 1979 in 197 towns across central and western New York (see Brown et al. 1980 or Decker et al. 1981a for discussion of methods) contained the following questions.

1. Over the past 5 years, what trend have you seen in deer populations in the area of your farm?
 - more deer now than 5 years ago
 - fewer deer now than 5 years ago
 - about the same number now as 5 years ago
 - don't know
2. The Department of Environmental Conservation is updating its management plan for deer population

levels in your town. Please indicate below whether you would like them to increase, decrease, or leave deer populations in your town at their current level: (check one).

- moderately increase deer population
- slightly increase deer population
- slightly decrease deer population
- moderately decrease deer population

Questions concerning the incidence of deer damage were also included. Responses were compared with changes in the calculated buck take per square mile of deer habitat, an index provided by the State Department of Environmental Conservation for the surveyed towns over the 5-year period immediately preceding each survey. For the present analysis, the data from these surveys were aggregated and the relationship between the population trend as perceived by the respondents and the actual trend as represented by the population index was evaluated. The evaluation was based on 3 assumptions: (1) the 5-year period used in Question 1 was an appropriate time frame for respondents to perceive a change in the local deer population; (2) the index correctly reflected deer population trends in the respondents' town; and (3) respondents made no deliberate attempts to influence the results by giving deceptive answers.

RESULTS AND DISCUSSION

Table 1 shows a lack of association between the farmers' perception of population change and the actual trend as reflected in the index. Respondents in areas where the index decreased by 1 perceived the trend no differently ($\chi^2 = 0.558$ with 3 d.f.) than did respondents in areas where the index increased by 3 or more. Furthermore, only 23 per cent of the respondents in the latter towns reported an increase. Over-all, only 35 per cent of the respondents (40 per cent of those with an opinion) correctly perceived the direction of change in deer population density in their towns over the 5-year period. There was little difference between full-time (more than 75 per cent of the family income derived from farming) and part-time farmers in their perception of population change. However, there were significant differences between farmers living in areas where the deer population had previously been low (less than 2.0 bucks taken per square mile) and those in areas where the population had been higher than that; those from areas with the lower densities more often correctly assessed population change (42 vs. 34

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per cent). Nevertheless, those who correctly perceived the trend were still in the minority, previous population levels notwithstanding.

A possible explanation for the failure to recognize actual trends might be that the farmers' views primarily reflected their attitudes or experiences with respect to deer damage to their crops. Accordingly, the responses of farmers concerning population trends were compared with their responses regarding damage experienced from deer (Table 2). This showed that, regardless of the actual population trend, about twice as many respondents who had suffered deer damage as had not, felt that deer populations had increased during the preceding 5 years. Conversely, about 1 1/4 to 2 times as many who had not had damage than who had, felt that the deer population had decreased. Full-time farmers exhibited these tendencies more strongly than part-time farmers (Table 3).

The farmers' perception of change in the deer population, according to whether or not they had experienced deer damage, was also compared with their preference with respect to future population levels (Table 4). For the respondents who felt that deer populations had increased in the past, there was little difference between those who had suffered damage and those who had not, in their preference regarding future deer abundance; both groups wanted it to remain the same or increase. However, among those who felt that deer had decreased, a markedly greater proportion of those who had suffered damage than of those who had not, wanted the population to remain the same or decrease still more, while the majority of those without damage wanted it to increase.

These relationships between the respondents' perception of deer population trends and their experience with deer damage lead to several testable hypotheses.

A. Perception of deer population trends by farmers is independent of their prior experience with respect to damage from deer.

Following is a general alternative hypothesis.

B. Perception of deer population trends by farmers is not independent of their prior experience with respect to damage from deer.

A pertinent subset of alternative hypotheses would be the following.

C. Compared with those who have not suffered damage from deer, farmers who have suffered damage would:

1. More often correctly assess and report an increase in the deer population.
2. Less often incorrectly assess an increase and report a decrease.
3. More often incorrectly assess a lack of change in the deer population and report an increase.

4. Less often incorrectly assess a lack of change and report a decrease.
5. More often incorrectly assess a decrease and report an increase.

The data are summarized in Table 5 and support all of the alternative hypotheses.

IMPLICATIONS

An implication of these findings for deer management in New York is that wildlife managers who endeavor to take farmers' preferences into consideration in manipulating deer populations must communicate their intentions and subsequent success or failure to those farmers. They should not assume that most farmers will correctly assess management results, even when substantial changes in the deer population occur. In fact, in the absence of such communication, farmers' perceptions of deer population trends are likely to be governed primarily by the crop damage they experience. The general finding that farmers who have experienced damage from deer are less likely to accurately perceive trends in deer abundance than those without such experience indicates the importance of targeting communications toward that group.

Table 1. Farmers' perception of deer population change compared with change in population index for their locality over a 5-year period in Central and Western New York

Respondents' perception of change	Change in bucks taken per square mile*				
	-1	0	+1	+2	+3 or more
	percent				
Increase	20	16	18	10	23
No change	42	42	44	55	40
Decrease	30	33	29	32	30
Don't know	8	9	9	3	7
Total	100	100	100	100	100
Number of respondents	1,199	6,260	1,640	62	115

* Each column represents all the towns having the indicated change in the population index, and the figures are the percentages of the respondents from those towns according to their perception of population change.

Table 2. Farmers' perception of deer population changes, compared with whether or not they reported deer damage, according to the trend in the population index for their locality

Respondents' perception of change	Trend in population index and percentages of respondents in the corresponding towns who did and did not report damage from deer							
	Decrease		No change		Increase		Total*	
	No damage	Damage	No damage	Damage	No damage	Damage	No damage	Damage
Increase	14	31	12	27	13	29	12	28
No change	42	41	40	47	43	48	41	46
Decrease	35	22	37	22	34	18	36	21
Don't know	9	6	11	4	10	5	11	5
Total	100	100	100	100	100	100	100	100
Number of respondents	1760	439	4403	1857	1271	546	6434	2842

* In terms of the total figures, there was a significant difference ($\chi^2 = 143.2$, $df = 15$; $P < 0.05$) between farmers who reported deer damage and those who did not in their perception of population change.

Table 3. Farmers' perception of deer population change, according to whether or not they reported deer damage and whether or not they were full-time or part-time farmers, according to the trend in the population index for their locality.

Farmers' perceptions of deer population change	Actual 5-year deer population trend												Overall			
	Decrease				Same				Increase				Without damage		With damage	
	Without damage		With damage		Without damage		With damage		Without damage		With damage		Without damage		With damage	
	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time	Full-time	Part-time
	percentage of respondents															
Increase	16	13	38	25	14	11	32	23	15	12	36	24	15	11	34	24
Same	48	40	39	43	45	38	46	47	49	41	46	50	46	39	45	47
Decrease	33	36	17	26	35	38	19	24	31	35	14	21	34	37	18	24
Don't Know	4	10	6	6	6	13	3	5	5	12	4	5	5	13	3	5
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of Respondents	217	543	215	224	1050	3353	834	1023	305	966	229	317	1572	4862	1278	1564

Table 4. Farmers' perception of population change, according to whether or not they reported deer damage, compared with their preference with respect to future population levels

Respondents' perception of change	Respondents		Preference for future deer population levels (percent of respondents)			
	Reported damage or not	No.	Increase	Remain the same	Decrease	Total
Increase	No damage	1271	19	49	32	100
	Damage	546	16	51	33	100
No change	No damage	4403	34	63	3	100
	Damage	1857	20	73	7	100
Decrease	No damage	760	68	32	0	100
	Damage	439	46	41	13	100

Table 5. Comparative perception and reporting of trends in the deer population over the preceding 5 years by farmers who had not and by those who had experienced deer damage.

Actual population trend*	Validity of perception by respondent	Trend reported		
		Directions§	According to respondent's experience with deer damage† (% of respondents)	
			No damage	Damage
Increase	Correct	Increase(1)	2.8	5.9
No change	Correct	No change	30.6	31.9
Decrease	Correct	Decrease	4.7	3.5
Increase	Incorrect	No change	9.5	9.7
		Decrease(2)	7.5	3.7
No change	Incorrect	Increase(3)	8.9	18.6
		Decrease(4)	28.6	14.9
Decrease	Incorrect	No change	5.6	6.7
		Increase(5)	1.8	5.1
Total			100.0	100.0
Number of respondents ‡			5736	2712

* According to population index. § Figures in parentheses denote alternative hypotheses as given under category "C" in text.

† Figures represent percentages of total respondents in each group. Distribution of those with vs. those without damage significantly different for the nine groups collectively ($\chi^2 = 455.05$ with 8 d.f.; $P \leq 0.05$). ‡ Total less than in Tables 1 to 4 because respondents who reported "don't know" are excluded.

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