Residents' attitudes about deer and deer management in the Central Finger Lakes Management Unit

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EXECUTIVE SUMMARY

In recent decades, the New York State Department of Environmental Conservation (DEC) has attempted to periodically update information about stakeholder interests in and concerns about deer from each of the state's 92 wildlife management units (WMUs). In keeping with its *Management Plan for White-tailed Deer in New York State: 2012-2016*, DEC has grouped the existing 92 WMUs into fewer, larger WMU aggregates that will allow for better use of existing and new data and improved deer population monitoring. Information on deer-related interests and concerns now will be identified for WMU aggregates rather than individual WMUs. The agency is currently evaluating the best approach to engage the public at this larger scale.

Under the new administrative approach, WMUs 8J, 7H, and 8S have been combined into an aggregate called the Central Finger Lakes Management Unit. It is a 1,325-square-mile area which encompass Seneca County and portions of Ontario, Wayne, Yates, Schuyler, Tompkins and Cayuga counties.

In 2015, DEC sponsored a mail survey to learn more about area residents' interests and concerns regarding deer and deer management. The purpose of this report is to summarize findings from the 2015 survey of residents in the Central Finger Lakes Management Unit.

Study purpose

The purpose of the survey was to provide baseline information on deer-related attitudes and experiences among residents of the Central Finger Lakes Management Unit. Specifically, our objectives were to characterize residents':

- interests in and concerns about local deer;
- experiences with deer and perceptions of trends in local deer population and human interactions with deer;
- perceptions about what types of human-deer interactions are important to address or manage;
- overall attitude toward deer and their perception of the cost/benefit ratio associated with presence of deer in their local area; and
- information sources used to learn about deer management.

METHODS

Survey instrument

- In cooperation with a DEC study contact team, we developed a self-administered questionnaire that characterized: interests in and concerns about local deer; experiences with deer and perceptions of trends in local deer population and human interactions with deer; types of human-deer interactions that residents perceive as important to address or manage; residents' overall attitude toward deer and their perception of the cost/benefit ratio associated with presence of deer in their local area; and sources of information used by residents to learn about deer management.

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Survey implementation

- We purchased a random sample of 1,000 listed addresses in each of the three wildlife management units in the study area (total sample 3,000). We implemented survey mailings between March 23, 2015 and April 21, 2015. Each member of the sample was contacted up to four times.

- We contracted the Survey Research Institute (SRI) at Cornell University to complete follow-up telephone interviews with a sample of at least 75 nonrespondents in each of the WMUs sampled. SRI completed interviews between May 11, 2015 and May 26, 2015. Interviews were approximately 5 minutes in duration and contained 20 key questions from the mail survey.

Weighting the data

- To address the possibility of sampling bias we developed weighting factors for each geographic stratum and we applied those weight factors based on the WMU in which respondents resided. The weighting factors adjust the data to reflect the proportion of households in each of the three WMUs in the study area.

FINDINGS HIGHLIGHTS

- Residents returned a total of 1,456 questionnaires, yielding a response rate of 50.8% after deleting undeliverable questionnaires (n=130).

Nonrespondent–respondent comparisons

- We found a number of statistically-significant differences between respondents and nonrespondents. But, at a general level, the groups were similar in important ways. For example, both respondents and nonrespondents were moderately interested in seeing deer in the local area and knowing deer populations were doing well. Both groups were moderately concerned about contracting lyme disease and being injured in a deer-car collision, and both placed high importance on managing those impacts. Respondents and nonrespondents were equally interested in deer hunting and were equally likely to have had experience with Lyme disease. Given these kinds of similarities, we did not adjust the data to address for potential nonresponse bias.

Respondent characteristics

- Mean age of respondents was 61 years old. Sixty-four percent of respondents were male. Respondents were most likely to live in a rural nonfarm area (39%) or a village or hamlet (30%) (11% lived on a farm; 18% lived in a small city).

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- Many respondents engaged in activities or had characteristics that exposed them to negative interactions with local deer, and many had personal experience with negative deer-related impacts. For example, a majority of respondents had flower beds, gardens (77%), or ornamental trees or shrubs (68%) that might be browsed by deer, and 46% of respondents had experienced deer damage to gardens or plantings around their home. A majority (58%) reported spending a lot of time driving in areas with deer, and 39% of respondents reported personal experience with a deer-related auto accident. About 12% of respondents owned agricultural land, and over 10% of respondents had experienced deer-related damage to farm crops.

Deer-related interests and concerns

- The presence of local deer was perceived positively by many residents of the area. A majority of respondents reported that they were very to extremely interested in knowing that deer populations in their local area are healthy (72%) and "doing well" (62%). Many also were very or extremely interested in seeing deer in their local area (49%) or seeing deer near their home (42%). Fewer respondents were very to extremely interested in hunting deer (30%) or photographing deer (22%).

- Most residents had some concerns about negative impacts associated with deer. The highest level of concern focused on threats to human health and safety (i.e., about 60% were very or extremely concerned about themselves or family members contracting Lyme disease or being injured in a deer-vehicle collision). The next highest level of concern related to negative impacts of deer on native plants, wildlife habitat, plant and animal diversity, and farmers' income.

Human-deer interaction levels that residents perceive as important to address

- Residents were most likely to report that it was very to extremely important to them that deer managers address lyme disease and other tick-borne illnesses (73.3%), deer health and wellbeing (66%), and deer-vehicle collisions (64%). Fewer residents said it was very to extremely important that managers address crop damage (53%), damage to natural plants (43%), or damage to plantings near homes (39%).

Attitude Toward Deer and Costs/Benefits of Deer Presence

- About one in three respondents said they (32%) enjoy deer and do not worry about deer related problems. Over half of respondents (54%) said they enjoy deer, but worry about deer-related problems. About 8% of respondents said they did not enjoy deer and regard deer as a nuisance.

- The largest proportion of respondents (53%) believed that the costs and benefits of deer in their local area were about an even tradeoff, while about 27% of respondents believed the costs of deer in their area exceeded the benefits.

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NEXT STEPS

Results from the 2015 survey of residents in the central Finger Lakes Management Unit will be discussed in a small group process with area residents. The process will be sponsored by DEC and will be facilitated by staff from Cornell University and Cornell Cooperative Extension. Deliberations within that small group process will be considered by DEC staff, along with other information sources, to set deer population goals for the area.

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ACKNOWLEDGMENTS

We extend our appreciation to residents of the central Finger Lakes region for their participation in this study. Many staff members within the New York State Department of Environmental Conservation (DEC) Bureau of Wildlife helped during various phases of this research. For their assistance, we express our thanks to DEC staff Gordon Batcheller (retired), James Farquhar, Jeremy Hurst, Steven Joule, Art Kirsch, Courtney LaMere, and Michael Schiavone.

The Survey Research Institute (SRI) at Cornell University conducted nonrespondent follow-up interviews.

Nancy Connelly (Human Dimensions Research Unit) provided consultation on sampling strategy, data weighting, and analysis. Karlene Smith assisted with survey implementation and data coding.

Our survey instrument and request to conduct survey research was reviewed and granted approval by the Cornell University Office of Research Integrity and Assurance (Institutional Review Board for Human Participants Protocol ID# 1006001472).

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Figure 1. Central Finger Lakes Management Unit (represented by dark pink polygon encompassing Seneca County and portions of Wayne, Ontario, Cayuga, and Tompkins Counties). 1

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INTRODUCTION

The New York State Department of Environmental Conservation (DEC) uses biological and social information to make deer management decisions. The agency obtains information about stakeholders through a variety of mechanisms, including surveys of New York State residents. In recent decades, DEC has attempted to periodically update information about stakeholder interests in and concerns about deer from each of the state's 92 wildlife management units (WMUs). In keeping with its *Management Plan for White-tailed Deer in New York State: 2012-2016*, DEC has grouped the existing 92 WMUs into fewer, larger WMU aggregates that will allow for better use of existing and new data and improved deer population monitoring. Information on deer-related interests and concerns now will be identified for WMU aggregates rather than individual WMUs. The agency is currently evaluating the best approach to engage the public at this larger scale.

Under the new administrative approach, WMUs 8J, 7H, and 8S have been combined into an aggregate called the Central Finger Lakes Management Unit. It is a 1,325-square-mile area which encompass Seneca County and portions of Ontario, Wayne, Yates, Schuyler, Tompkins and Cayuga counties (Figure 1). The area encompasses two Finger Lakes (Seneca and Cayuga).

In 2015, DEC sponsored a mail survey to learn more about area residents' interests and concerns regarding deer and deer management. The purpose of this report is to summarize findings from the 2015 survey of residents in the Central Finger Lakes Management Unit.

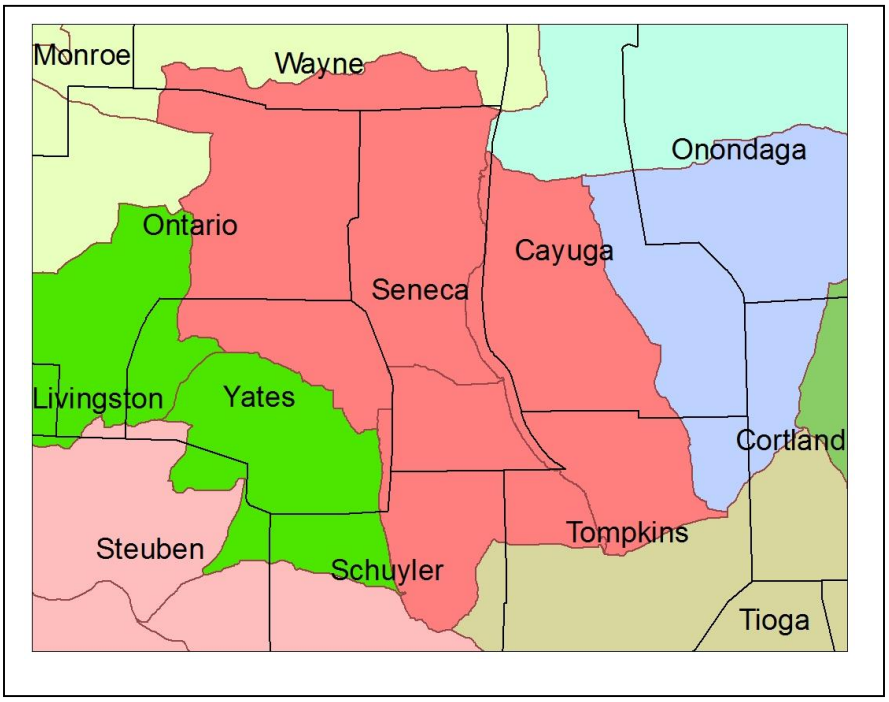

Figure 1. Central Finger Lakes Management Unit (represented by the polygon encompassing Seneca County and portions of Wayne, Ontario, Cayuga, and Tompkins Counties).

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Purpose and Objectives

The purpose of the survey was to provide baseline information on deer-related attitudes and experiences among residents of the Central Finger Lakes Management Unit. Specifically, our objectives were to characterize residents':

- interests in and concerns about local deer;
- experiences with deer and perceptions of trends in local deer population and human interactions with deer;
- perceptions about what types of human-deer interactions are important to address or manage;
- overall attitude toward deer and their perception of the cost/benefit ratio associated with presence of deer in their local area; and
- information sources used to learn about deer management.

DEC will use findings from this survey with other information to make deer management decisions in the Central Finger Lakes Management Unit.

METHODS

Survey Instrument

In cooperation with a DEC contact team, we developed a self-administered questionnaire (Appendix A) to address our research objectives. The questionnaire characterized: interests in and concerns about local deer; experiences with deer and perceptions of trends in local deer population and human interactions with deer; types of human-deer interactions that residents perceive as important to address or manage; residents' overall attitude toward deer and their perception of the cost/benefit ratio associated with presence of deer in their local area; and sources of information used by residents to learn about deer management. The Cornell University Office of Research Integrity and Assurance (Institutional Review Board for Human Participants, Protocol ID#1006001472) approved the questionnaire for use with human subjects.

Survey Implementation and Analysis

We purchased a random sample of 1,000 listed household addresses in each of the three WMUs within the Central Finger Lakes Management Unit (total sample 3,000). We implemented survey mailings between March 23, 2015 and April 21, 2015. We contacted each member of the sample up to four times (i.e., (1) an initial letter and questionnaire, (2) a reminder letter, (3) a third reminder letter and replacement questionnaire, and (4) a final reminder about one week after the third mailing).

We contracted the Survey Research Institute at Cornell University (SRI) to complete follow-up telephone interviews with a sample of at least 75 nonrespondents in each of the WMUs sampled. SRI completed a total of 228 interviews with nonrespondents between May 11, 2015 and May 26, 2015. Interviews contained 20 key questions from the mail survey and took 5 minutes or less to complete.

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We used IBM SPSS Statistics 21.0 (SPSS 2012) software to calculate frequencies and measures of central tendency (e.g., mean). We used the chi-square statistic, t-tests, and one-way analysis of variance (ANOVA) to test for significant differences between groups. Differences are reported at the $P \leq 0.05$ level.

Stratifying the sample by WMU allowed for analyses to learn whether respondents in each of the WMUs within the aggregated unit differed substantially from one another with regard to their deer-related attitudes, experiences, interests, or concerns. Comparisons between responses from residents of WMUs 7H, 8J and 8S were intended to allow DEC managers to evaluate the management implications of aggregating the smaller DMUs into one larger aggregated unit. These comparisons were conducted as part of a larger effort to pilot test a new approach to citizen input for deer management in New York State.

Weighting to address sampling bias

Listed addresses are not evenly distributed across the WMUs in the study area (58% of listed addresses were in the WMU 8J, 30% were in the WMU 7H, and 12% were in WMU 8S). This raises the possibility of sampling bias. To address that possibility, we developed weighting factors for each of the three subsamples. We applied the following weight factors based on WMU of residence: 0.331 for respondents from WMU 8S; 0.894 for respondents from WMU 7H; and 1.896 for respondents from WMU 8J (Appendix B, Table B1). These weighting factors adjust the data to reflect the proportion of households in each of the three WMUs in the study area.

RESULTS

Residents returned a total of 1,456 questionnaires from a pool of 2,870 deliverable questionnaires, yielding a response rate of 50.8% after deleting undeliverable questionnaires (n=130) (Table 1).

Table 1. Summary of survey response by stratum for the 2015 survey of residents in the Central Finger Lakes Management Unit.

	Subsamples			
	WMU 7H	WMU 8J	WMU 8S	Total
Total sample	1,000	1,000	1,000	3,000
Useable returns	496	443	515	1,456
Undeliverable	47	42	41	130
Return rate	52.0%	46.3%	53.8%	50.8%

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Nonresponse Bias Analysis

We present a comprehensive set of respondent-nonrespondent comparisons in Appendix C. We found a number of statistically-significant differences between respondents and nonrespondents. For example, average levels of deer-related interests, concerns about deer, and levels of importance placed on management to address some deer-related impacts were lower among nonrespondents than among respondents.

But, at a general level, the groups were similar in important ways. For example, on average both respondents and nonrespondents expressed moderate interest in seeing deer in the local area and knowing deer populations were doing well. Both groups expressed moderate concern about contracting Lyme disease and being injured in a deer-car collision, and both placed high importance on managing those impacts. Respondents and nonrespondents were equally interested in deer hunting and were equally likely to have had experience with Lyme disease.

We decided not to weight the data to adjust for possible nonrespondent bias because nonrespondents were similar to respondents in several important ways, and because doing so could introduce other potential sources of bias (Groves 2006). For example, the data could be adjusted based on gender (placing higher weight on female respondents); doing this would result in higher rates of concern about deer-related problems and higher level of importance placed on managing those concerns. On the other hand, a few but not all variables could be adjusted based on results from the nonrespondent follow-up making it difficult to compare adjusted to unadjusted results (e.g., concern about crop damage might appear to be higher than other concerns simply because no nonrespondent data is available to adjust that variable).

Respondent Characteristics

Mean age of respondents was 61 years old (range 18 to 101 years old). Sixty-four percent of respondents were male (Table 2).

The Central Finger Lakes Management Unit contains a mix of rural areas, villages, hamlets, and small cities. Respondents were most likely to live in a rural nonfarm area (39%) or a village or hamlet (30%) (11% lived on a farm; 18% lived in a small city) (Table 3). Wildlife Management Unit 7H includes the Village of Cayuga Heights, Village of Lansing, the northeast part of Town

Table 2. Gender of respondents to 2015 survey of residents in the Central Finger Lakes Management Unit, in aggregate and by WMU.

	Aggregate (weighted) (n=1290) %	WMU 7H (n=443) %	WMU 8J (n=391) %	WMU 8S (n=460) %
Male	63.6	55.5	68.0	63.3
Female	36.4	44.5	32.0	36.7

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of Ithaca, and part of the City of Ithaca. That stratum contained the highest proportion of residents living in a small city. Wildlife Management Unit 8S is between the southern portions of Seneca and Cayuga lakes. The WMU 8S stratum included the highest proportion of rural residents. Wildlife Management Unit 8J includes land between the northern portions of Seneca and Cayuga lakes, and land north and west of Seneca Lake.

We asked respondents how often they think about deer or deer management in their local area, as an indicator of how salient deer management is to residents in the Central Finger Lakes Management unit. About 80% of respondents said they think about deer or deer management at least occasionally (20% of respondents indicated that they never or rarely think about deer or deer management) (Table 4).

Many respondents engaged in activities or had characteristics that exposed them to negative interactions with local deer (Table 5), and many had personal experience with negative deer-related impacts (Table 6). For example, a majority of respondents had flower beds, gardens (77%), or ornamental trees or shrubs (68%) that might be browsed by deer, and 46% of respondents had experienced deer damage to gardens or plantings around their home. A majority (58%) reported spending a lot of time driving in areas with deer, and 39% of respondents reported personal experience with a deer-related auto accident. About 12% of respondents owned agricultural land, and over 10% of respondents had experienced deer-related damage to farm crops.

Table 3. Description of area in which respondents lived, in aggregate and by WMU, 2015 survey of residents in the Central Finger Lakes Management Unit.

	Aggregate (weighted) (n=1294) %	WMU 7H (n=486) %	WMU 8J (n=437) %	WMU 8S (n=505) %
Rural—live on a farm	11.1	9.0	11.0	16.9
Rural—do not live on a farm	39.0	31.7	39.8	54.5
Village or hamlet (<10,000 people)	29.8	22.9	34.7	24.0
Small city (10,000-25,000 people)	18.5	33.9	13.3	4.1
Suburb of a large city	0.6	1.3	0.3	0.2
Large city (50,000 people or more)	0.9	1.1	1.1	0.2

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Table 4. Frequency with which respondents to 2015 survey of residents in the Central Finger Lakes Management Unit think about deer or deer management, in aggregate and by WMU.

How frequently you think about deer and/or deer management issues	Aggregate (weighted) (n=1454) %	WMU 7H (n=486) %	WMU 8J (n=437) %	WMU 8S (n=505) %
Never	4.1	3.3	5.0	1.8
Rarely	15.8	14.6	17.2	12.5
Occasionally	39.5	41.2	38.9	38.4
Often	28.0	25.9	28.8	29.1
Very often	12.5	15.0	10.1	18.2

Chi square 23.35, df=8, p=0.003

Table 5. Characteristics that expose residents to deer-related problems, in aggregate and by WMU, from the 2015 survey of residents in the Central Finger Lakes Management Unit.

	Aggregate (weighted) (n=1386) %	WMU 7H (n=471) %	WMU 8J (n=422) %	WMU 8S (n=497) %
Have flower beds or vegetable gardens around my their home	77.1	77.1	76.5	79.7
Have ornamental trees or shrubs around their home	67.9	72.4	64.9	70.6
Spend a lot of time driving in areas with lots of deer	58.0	57.3	56.9	65.0
Own land in a rural area, but not a farm	38.3	34.2	37.0	55.5
Own land with woodlots or forests	25.1	23.4	22.7	41.0
Hunt deer in their local area	24.3	18.7	25.6	32.2
Own agricultural land in my local area for crop or livestock production	12.3	8.3	13.3	17.9

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Table 6. Percentage of respondents to the 2015 survey of residents in the Central Finger Lakes Management Unit who had experienced deer-related problems, in aggregate and by WMU.

Deer-related problems	Aggregate (weighted) (n=1433) %	WMU 7H (n=487) %	WMU 8J (n=438) %	WMU 8S (n=504) %
Deer damage to gardens and plantings around my home	46.0	58.9	35.8	53.1
Deer-related auto accident	39.4	40.0	37.7	46.4
Problems with deer hunters	18.0	12.1	21.2	17.1
Lyme or other tick-borne disease	13.9	15.4	10.3	28.0
Deer damage to farm crops	10.5	8.2	10.5	16.5
Deer damage to forests on private land	7.9	11.3	5.0	13.5

Interests in and Concerns about Deer

Respondents' interests in local deer are listed in order from most to least important in Table 7. A majority of respondents reported that they were very to extremely interested in knowing deer in their local area are healthy (72%) and are doing well (62%). A substantial minority were very to extremely interested in seeing deer in their local area (49%) and seeing deer near their home (42%). On all six interest questions, respondents in WMU 7H expressed lower levels of deer-related interest than were expressed by respondents in WM 8J or WMU 8S (Table 8).

Respondents' deer-related concerns are listed in order from most to least important in Table 9. Respondents expressed the highest levels of concern about human health and safety issues (i.e., exposure to Lyme disease and injuries associated with a deer-vehicle collision). In a second-tier level were concerns about damage to native plants, crop damage, and deer over browsing their natural habitat. Respondents expressed the lowest level of concerns about deer damage to plantings around homes and problems associated with hunting deer.

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Table 7. Deer-related interests among respondents to the 2015 survey of residents in the Central Finger Lakes Management Unit.

Potential interests:	n	Mean[a]	SE	95% Conf. Interval		Interest level				
				lower	upper	Not	Slightly	Mod.	Very	Extreme
Knowing that deer are healthy in your local area	1428	3.95	0.031	3.89	4.01	6.2	6.4	15.9	29.0	42.6
Knowing that deer populations are doing well in your local area	1417	3.65	0.035	3.58	3.72	10.6	9.3	18.4	27.8	33.9
Seeing deer in your local area	1426	3.36	0.033	3.29	3.42	10.2	15.1	25.8	26.7	22.2
Seeing deer near your home	1425	3.10	0.035	3.03	3.17	17.3	14.9	25.9	24.7	17.3
Photographing deer in your local area	1424	2.32	0.036	2.25	2.39	40.0	20.2	17.7	11.7	10.4
Hunting deer in your local area	1415	2.29	0.044	2.21	2.38	56.7	6.3	7.4	10.5	19.1
Other (*no single category greater than 1% of total)	1309	4.29	0.107	4.09	4.49	9.4	3.9	3.6	14.8	68.3

[a] 1=not at all interested, 2=slightly interested, 3=moderately interested, 4=very interested, 5=extremely interested

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Table 8. Mean level of deer-related interests by wildlife management unit (WMU), 2015 survey of residents in the Central Finger Lakes Management Unit.

Interests	WMU	N	Mean[1]	Std. Error Mean
Knowing deer are healthy in your local area	7H	487	3.82 [ab]	.056
	8J	435	4.01 [a]	.055
	8S	507	4.04[b]	.050
Knowing that deer populations are doing well in your local area	7H	480	3.37 [ab]	.066
	8J	433	3.79 [a]	.058
	8S	503	3.70[b]	.060
Seeing deer in your local area	7H	490	3.05 [ab]	.059
	8J	433	3.51 [a]	.058
	8S	505	3.43[b]	.057
Seeing deer near your home	7H	487	2.86[ab]	.063
	8J	434	3.20 [a]	.061
	8S	505	3.21[b]	.061
Photographing deer in your local area	7H	488	2.09 [ab]	.059
	8J	433	2.45 [a]	.067
	8S	504	2.33[b]	.060
Hunting deer in your local area	7H	485	2.14 [ab]	.074
	8J	430	2.31 [a]	.078
	8S	501	2.62[b]	.078

[1] 1=not at all interested, 2=slightly interested, 3=moderately interested, 4=very interested, 5=extremely interested

[a] Means with the same letter are significantly different at p=0.05 level

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Table 9. Deer-related concerns among respondents to 2015 survey of residents in the Central Finger Lakes Management Unit.

Potential concerns:	n	Mean[a]	SE	95% Conf. Interval		Concern level				
				lower	upper	Not	Slightly	Mod.	Very	Extreme
You or those close to you getting Lyme disease	1293	3.71	0.036	3.64	3.78	7.7	13.1	18.7	20.9	39.5
Injury to you or family members from a deer-vehicle collision	1293	3.69	0.036	3.62	3.76	8.1	11.6	20.0	23.5	36.8
Deer preventing natural regrowth of native trees, shrubs and wildflowers	1292	3.22	0.036	3.15	3.29	12.1	18.3	27.5	19.6	22.4
Lost income of local farmers due to deer damage to crops	1286	3.19	0.035	3.12	3.26	11.5	16.9	31.1	22.5	18.1
Over browsing of habitat by deer	1282	3.13	0.036	3.06	3.20	13.2	19.0	28.5	20.3	19.0
Loss of plant or animal diversity due to deer feeding activity	1288	3.08	0.037	3.01	3.15	14.7	18.7	29.9	16.7	19.9
Deer damage to gardens and plantings around your home	1298	2.93	0.038	2.85	3.00	19.5	22.0	23.6	16.4	18.6
Problems associated with hunting of deer	1275	2.71	0.039	2.63	2.79	26.4	22.1	20.7	15.3	15.5
Other (*no single category greater than 1% of total)	1393	3.89	0.190	3.49	4.29	13.8	6.8	11.0	13.6	54.9

[a] 1=not at all concerned, 2=slightly concerned, 3=moderately concerned, 4=very concerned, 5=extremely concerned

Mean level of concern in several areas (i.e., concern about exposure to Lyme disease, deer preventing regrowth of native plants, deer-related crop damage, deer over browsing habitat, loss of plant biodiversity due to deer feeding activity, and deer damage to plantings around homes) was lower in DMU 8J than in DMU 7H or 8S (Table 10).

We offered respondents the opportunity to identify other interests and concerns they had about deer in their local area. Open-ended comments expressed a range of interests, concerns, preferences, and opinions, most of which could be placed into one of the following broad categories:

- controlling, managing, or reducing the size of the deer population (n=36)
- comments about deer hunting conditions or hunting regulation preferences (n=25)
- concerns about hunter behavior, problems with hunters, opposition to hunting (n=18)
- concerns about deer-vehicle collisions (n=14)
- concerns related to ticks and tick-borne illnesses (n=12)
- interest in protecting deer, feeding deer, or concern about deer welfare (n=11)
- concern about deer damaging landscaping plants or gardens (n=10)
- interests in or comments on seeing deer (n=10)
- comments on or concerns about deer predators (e.g., coyotes, wolves) (n=6)
- interests in or concerns about wildlife habitat (n=6)
- interests related to white deer (i.e., Seneca Army Depot deer) (n=6)
- comments on use of venison as a food source (n=5)
- concern about deer-related impacts on livestock (n=4)
- views about keeping deer out of suburban or residential areas (n=4)

Perceived Change in Level of Human-Deer Interactions

We asked residents to report whether they believed a set of nine different types of human-deer interactions had increased, decreased or stayed about the same in their area over the last 5 years. More than one-third of respondents (38%) reported that the number of deer they see in their local area had increased; a majority (58%) reported that they were seeing about the same number or fewer deer (Table 11). We did not find any difference in perceived trend in number of deer seen in the local area in the last 5 years across WMUs (chi square = 11.595, df=6, p=0.07).

Substantial proportions of residents responded “don’t know” to questions about perceived change in number of deer-vehicle accidents (32%), deer hunting opportunity (39%), deer damage to natural plants and forests (46%), deer harvest (48%), deer-related crop damage (51%), and number of people contracting Lyme disease (56%). The proportion of respondents who answered “don’t know” on those items was high in all WMUs. These findings reveal a substantial amount of uncertainty among residents about local trends in deer-related impacts.

Table 10. Mean level of deer-related concerns by wildlife management unit (WMU), 2015 survey of residents in the Central Finger Lakes Management Unit.

	Wildlife Management Unit (WMU)	N	Mean[1]	Std. Error Mean
You or those close to you getting Lyme disease	7H	447	3.84 [a]	.060
	8J	388	3.62 [ab]	.068
	8S	478	3.85[b]	.056
Injury to you or your family members from a deer-vehicle collisions	7H	446	3.72	.062
	8J	388	3.68	.066
	8S	478	3.68	.058
Deer preventing natural regrowth of native trees, shrubs, wildflowers	7H	446	3.46 [a]	.060
	8J	388	3.04 [a b]	.066
	8S	477	3.47[b]	.059
Lost income of local farmers due to deer damage to crops	7H	442	3.31 [a]	.058
	8J	387	3.10 [ab]	.063
	8S	476	3.32[b]	.056
Overbrowsing of habitat by deer	7H	440	3.39 [a]	.062
	8J	387	2.92 [ab]	.064
	8S	468	3.43[b]	.057
Loss of plant or animal diversity due to deer feeding activity	7H	445	3.36 [a]	.061
	8J	387	2.87 [ab]	.066
	8S	474	3.37[b]	.060
Deer damage to gardens and plantings around your home	7H	447	3.22[a]	.065
	8J	390	2.71 [ab]	.068
	8S	479	3.19[b]	.063
Problems associated with hunting of deer	7H	438	2.68	.068
	8J	383	2.74	.072
	8S	475	2.68	.062

[1] 1=not at all concerned, 2=slightly concerned, 3=moderately concerned, 4=very concerned, 5=extremely concerned

[a] Means with the same letter are significantly different at p=0.05 level

Table 11. Perceived trends in deer-related events among respondents to the 2015 survey of residents in the Central Finger Lakes Management Unit.

Deer-related events:	n	Mean[a]	n	Perceived trend			
				Decreased	Stayed the same	Increased	Don't know
Number of deer you see in your local area	1235	0.30	1287	20.4	37.3	38.3	4.0
Number of deer you see around your home	1225	0.18	1290	21.8	41.6	31.6	5.0
Amount of deer damage to plants around your home	1111	0.07	1278	19.7	43.3	24.0	13.1
Number of deer-vehicle collisions	868	0.63	1276	5.9	27.2	35.0	32.0
Deer hunting opportunity	774	-0.25	1259	21.3	27.4	12.7	38.5
Amount of deer damage to natural plants and forests	689	0.17	1278	9.7	28.8	15.3	46.1
Number of deer harvested by hunters	655	-0.26	1270	20.4	20.8	10.4	48.4
Amount of deer damage to farm crops	613	0.15	1260	9.9	23.2	15.6	51.4
Number of people getting Lyme disease	564	0.42	1270	7.7	15.5	21.2	55.6

[a] -2=Decreased greatly, -1=Decreased slightly, 0=Stayed about the same, 1=Increased slightly, 2=Increased greatly; "Don't know" responses not included in calculation of mean.

Human-Deer Interaction Levels that Residents Perceive as Important to Address

We asked residents to report how important they believed it was for deer managers to address a set of nine deer-related concerns. A majority of respondents viewed it as very to extremely important for wildlife managers to address Lyme disease and other tick-borne illnesses (73%), deer health or wellbeing (66%), deer-vehicle collisions (64%), and deer damage to farm crops (53%). They placed the lowest level of importance on addressing problems with hunters, deer viewing opportunities, and deer hunting opportunities (Table 12). Some differences emerged between WMUs (Table 13). Residents of WMU 7H were more likely than residents of other WMUs to place high importance on addressing deer-vehicle collisions and deer damage to farm crops, plantings around homes, or natural plants and forests.

We offered respondents the opportunity to identify other deer-related concerns that they believed to be important for managers to address in their local area. Respondents made 43 open-ended comments, the majority of which (n=28) fell into the categories offered in closed-ended items, including addressing deer hunting opportunities (n=11), deer health and well being (n=6), reducing hazards to motorists (n=4), addressing Lyme disease risks (n=3), problems with hunters (n=3), and negative impacts on farmers (n=1). Other topics that respondents believed were important to address included deer population control (n=6) and coyote control (n=2).

Attitude Toward Deer and Costs/Benefits of Deer Presence

About one in three respondents (32%) enjoy deer and do not worry about deer related problems. Over half of respondents enjoy deer, but worry about deer-related problems. Fewer than 10% of respondents said they do not enjoy deer and regard them as a nuisance Respondents living in WMU 8J were more likely than those living in WMU 7H or 8S to enjoy deer without worry (Table 14).

The largest proportion of respondents (53%) believed that the costs and benefits of deer in their local area are about an even tradeoff, while about 27% of respondents believed the costs of deer in their area exceeded the benefits. Respondents living in WMU 7H were most likely to believe the costs of deer exceeded the benefits (Table 15).

Results presented in Tables 16-20 help clarify why residents may have different perceptions of the relationship between deer-related costs and benefits. Residents who believed that the benefits of deer in the local area exceeded the costs were more likely to hunt deer and own rural land in the local area (Table 16). Residents who believed that the costs outweighed the benefits of local deer were more likely to have experienced deer-related problems, especially damage to gardens and plantings around their home (Table 17). Residents who believed that the costs outweighed the benefits of deer also were (1) less interested than other residents in seeing deer, hunting deer, or knowing that local deer populations were doing well (Table 18), and (2) were more likely than other residents to be concerned about deer-related problems and want those problems to be addressed by deer managers (Table 19-20). Respondents who believed the costs of deer outweighed the benefits were most concerned about having human health and safety threats addressed through management (Table 20).

Table 12. Perceived importance of addressing deer-related concerns among respondents to 2015 survey of residents in the Central Finger Lakes Management Unit.

Potential concerns:	n	Mean[a]	SE	95% Conf. Interval		Importance of addressing concern				
				lower	upper	Not	Slightly	Mod.	Very	Extreme
Lyme disease and other tick-borne illnesses	1419	4.04	0.029	3.98	4.10	3.4	6.8	16.5	28.9	44.4
Deer health and well being	1415	3.82	0.029	3.76	3.88	3.9	7.2	23.2	34.4	31.3
Deer-vehicle collisions	1423	3.78	0.030	3.72	3.84	3.7	10.4	22.2	31.5	32.2
Deer damage to farm crops	1401	3.51	0.030	3.45	3.57	5.8	11.5	29.7	31.5	21.5
Deer damage to natural plants and forests	1413	3.24	0.032	3.18	3.30	9.9	17.2	30.0	25.1	17.9
Deer damage to gardens and plantings around homes	1428	3.16	0.033	3.09	3.23	10.9	19.7	30.7	20.7	18.1
Problems with deer hunters	1400	3.00	0.037	2.93	3.07	19.4	19.4	22.5	18.6	20.0
Deer viewing opportunities	1417	2.88	0.034	2.81	2.95	18.6	20.3	28.4	20.4	12.4
Deer hunting opportunities	1404	2.85	0.040	2.77	2.93	30.9	10.4	21.2	17.6	19.9

[a] 1=not at all important, 2=slightly important, 3=moderately important, 4=very important, 5=extremely important

Table 13. Mean level of importance placed on addressing deer-related concerns, by wildlife management unit (WMU), 2015 survey of residents in the Central Finger Lakes Management Unit.

	Wildlife Management Unit (WMU)	N	Mean[1]	Std. Error Mean
Deer-vehicle collisions	7H	485	3.98[ac]	.047
	8J	436	3.70 [a]	.055
	8S	492	3.65[c]	.050
Deer damage to farm crops	7H	477	3.69 [ac]	.051
	8J	429	3.42 [a]	.054
	8S	488	3.51 [c]	.050
Deer damage to gardens and plantings around homes	7H	488	3.39 [ac]	.058
	8J	436	3.02 [ab]	.057
	8S	499	3.21[bc]	.056
Deer damage to natural plants and forests	7H	483	3.51 [ac]	.053
	8J	431	3.07 [ab]	.059
	8S	497	3.35[bc]	.054
Lyme disease and other tick-borne illnesses	7H	484	4.20 [a]	.046
	8J	433	3.94 [a]	.055
	8S	499	4.10	.045
Deer health and well being	7H	487	3.72 [a]	.051
	8J	430	3.88 [a]	.050
	8S	496	3.78	.050
Deer viewing opportunities	7H	488	2.53 [a]	.058
	8J	431	3.11 [ab]	.059
	8S	495	2.64[b]	.056
Deer hunting opportunities	7H	479	2.67 [ac]	.071
	8J	429	2.91 [a]	.072
	8S	491	3.07 [c]	.068
Problems with deer hunters	7H	478	2.78 [a]	.065
	8J	428	3.15 [ab]	.067
	8S	486	2.83[b]	.061

[1] 1=not at all important, 2=slightly important, 3=moderately important, 4=very important, 5=extremely important

[a] Means with the same letter are significantly different at p=0.05 level

Table 14. Overall attitude toward local deer, in aggregate and by WMU, 2015 survey of residents in the Central Finger Lakes Management Unit.

	Aggregate (weighted) (n=1424) %	7H[a] (n=483) %	8J[ab] (n=436) %	8S[b] (n=499) %
I enjoy deer and do not worry about problems deer may cause	32.4	24.0	37.4	29.1
I enjoy deer but worry about problems deer may cause	54.2	57.3	51.8	57.5
I do not enjoy deer and I regard them as a nuisance	7.7	12.8	4.6	9.8
I have no particular feelings about deer	5.8	5.8	6.2	3.6

[a] Stratum 7H differs from stratum 8J: chi square=32.30, df=3, p<0.001
[b] Stratum 8J differs from stratum 8S: chi square=18.13, df=3, p<0.001

Table 15. Perceived balance of costs and benefits associated with local deer, in aggregate and by WMU, 2015 survey of residents in the Central Finger Lakes Management Unit.

	Aggregate (weighted) (n=1227) %	7H (n=423) %	8J (n=373) %	8S (n=429) %
The benefits of deer in my local area exceed the costs	19.7	16.1	21.4	20.5
The costs of deer in my local area exceed the benefits	27.1	41.6	18.5	31.5
The costs and benefits of deer in my local area are about an even tradeoff	53.2	42.3	60.1	48.0

Table 16. Characteristics of respondents to 2015 survey of residents in the Central Finger Lakes Management Unit who had experienced deer-related problems, in aggregate and by WMU.

	Aggregate (weighted) (n=1175) %	Benefits > costs (n=229) %	Benefits = costs (n=322) %	Costs > benefits (n=624) %
Have flower beds or vegetable gardens around my their home	78.0	82.1	74.2	82.4
Have ornamental trees or shrubs around their home	69.5	76.4	61.4	80.1
Spend a lot of time driving in areas with lots of deer	58.9	65.1	55.4	61.3
Own land in a rural area, but not a farm	39.3	51.1	40.3	28.9
Own land with woodlots or forests	25.3	39.7	21.8	21.7
Hunt deer in their local area	25.1	45.0	25.1	10.9
Own agricultural land in my local area for crop or livestock production	12.8	19.2	11.9	9.9

Table 17. Percentage of respondents to 2015 survey of residents in the Central Finger Lakes Management Unit who had experienced deer-related problems, in aggregate and grouped by perception of benefit/cost ratio of local deer.

Deer-related problems	Aggregate (weighted) (n=1215) %	Benefits > costs (n=239) %	Benefits = costs (n=438) %	Costs > benefits (n=645) %
Deer damage to gardens and plantings around my home	47.1	31.0	37.7	77.0
Deer-related auto accident	40.2	31.8	37.2	52.3
Lyme or other tick-borne disease	15.1	14.2	13.6	18.5
Deer damage to forests on private land	8.3	5.4	4.2	18.4
Deer damage to farm crops	10.5	7.9	9.6	14.2
Problems with deer hunters	18.9	28.0	20.1	10.0

Table 18. Deer-related interests among respondents to 2015 survey of residents in the Central Finger Lakes Management Unit, grouped by perception of relative weights of deer-related costs and benefits in their local area.

Potential interests:		n	Mean[1]	% of group who were very or extremely interested in activity or condition
Knowing that deer are healthy in your local area				
	Benefits > costs	237	4.52 [ac]	90.3
	Benefits = costs	648	4.16 [ab]	77.9
	Costs > benefits	330	3.22 [bc]	49.1
Knowing that deer populations are doing well in your local area				
	Benefits > costs	237	4.38 [ac]	86.1
	Benefits = costs	646	3.96 [ab]	72.3
	Costs > benefits	320	2.60 [bc]	29.1
Hunting deer in your local area				
	Benefits > costs	235	2.91 [ac]	47.0
	Benefits = costs	641	2.34 [ab]	30.9
	Costs > benefits	325	1.94 [bc]	20.9
Seeing deer in your local area				
	Benefits > costs	238	4.16 [ac]	81.9
	Benefits = costs	647	3.60 [ab]	55.7
	Costs > benefits	329	2.41 [bc]	17.0
Seeing deer near your home				
	Benefits > costs	236	3.99[ac]	76.2
	Benefits = costs	649	3.28 [ab]	45.0
	Costs > benefits	331	2.15 [bc]	14.5
Photographing deer in your local area				
	Benefits > costs	234	3.06 [ac]	41.5
	Benefits = costs	647	2.44 [ab]	22.9
	Costs > benefits	329	1.61 [bc]	6.1

[1] 1=not at all interested, 2=slightly interested, 3=moderately interested, 4=very interested, 5=extremely interested

[a] Pairs of means with the same subscript (aa, bb, or cc) are significantly different at p=0.001.

Table 19. Deer-related concerns among respondents to 2015 survey of residents in the Central Finger Lakes Management Unit, grouped by perception of relative weights of deer-related costs and benefits in their local area.

Potential concerns:		n	Mean[1]	% of group who were very or extremely concerned
Injury to you or family members from a deer-vehicle collision				
	Benefits > costs	218	3.09 [ac]	37.0
	Benefits = costs	591	3.60 [ab]	57.8
	Costs > benefits	302	4.30 [bc]	82.1
You or those close to you getting Lyme disease				
	Benefits > costs	218	3.14 [ac]	42.7
	Benefits = costs	591	3.64 [ab]	58.2
	Costs > benefits	305	4.24 [bc]	77.8
Deer damage to gardens and plantings around your home				
	Benefits > costs	220	2.12 [ac]	10.9
	Benefits = costs	593	2.69 [ab]	25.7
	Costs > benefits	305	4.05 [bc]	72.2
Over browsing of habitat by deer				
	Benefits > costs	218	2.58 [ac]	19.7
	Benefits = costs	590	2.93 [ab]	31.0
	Costs > benefits	301	4.00 [bc]	71.1
Deer preventing natural regrowth of native trees, shrubs and wildflowers				
	Benefits > costs	218	2.46 [ac]	20.2
	Benefits = costs	592	3.07 [ab]	36.4
	Costs > benefits	303	4.03 [bc]	69.3
Lost income of local farmers due to deer damage to crops				
	Benefits > costs	216	2.50 [ac]	17.7
	Benefits = costs	590	3.07 [ab]	34.4
	Costs > benefits	302	3.88 [bc]	66.6
Loss of plant or animal diversity due to deer feeding activity				
	Benefits > costs	218	2.43 [ac]	20.6
	Benefits = costs	591	2.91 [ab]	29.6
	Costs > benefits	302	3.92 [bc]	63.6

[1] 1=not at all concerned, 2=slightly concerned, 3=moderately concerned, 4=very concerned, 5=extremely concerned

[a] Pairs of means with the same subscript (aa, bb, or cc) are significantly different at p=0.001.

Table 20. Deer-related concerns that could be addressed by managers, grouped by perception of relative weights of deer-related costs and benefits in their local area.

Potential concerns that could be addressed:		n	Mean[1]	% very or extremely important to address concerns
Lyme disease and other tick-borne illnesses	Benefits > costs	236	3.65 [ac]	59.1
	Benefits = costs	644	3.95 [ab]	70.3
	Costs > benefits	328	4.47 [bc]	87.5
Deer-vehicle collisions	Benefits > costs	237	3.24 [ac]	44.1
	Benefits = costs	644	3.67 [ab]	59.6
	Costs > benefits	325	4.38 [bc]	85.8
Deer damage to farm crops	Benefits > costs	230	2.89 [ac]	32.2
	Benefits = costs	638	3.41 [ab]	47.9
	Costs > benefits	322	4.11 [bc]	76.2
Deer damage to gardens and plantings around homes	Benefits > costs	237	2.36 [ac]	12.7
	Benefits = costs	646	3.01 [ab]	31.7
	Costs > benefits	330	4.04 [bc]	71.0
Deer damage to natural plants and forests	Benefits > costs	233	2.61 [ac]	23.6
	Benefits = costs	642	3.08 [ab]	36.1
	Costs > benefits	329	3.98 [bc]	68.4
Deer health and well being	Benefits > costs	237	4.10 [ac]	76.5
	Benefits = costs	641	3.99 [ab]	73.4
	Costs > benefits	325	3.34 [bc]	45.8
Deer hunting opportunities	Benefits > costs	235	3.11	47.2
	Benefits = costs	637	2.83	36.4
	Costs > benefits	321	2.81	35.3
Problems with deer hunters	Benefits > costs	237	3.14 [ac]	43.5
	Benefits = costs	632	3.09 [ab]	41.2
	Costs > benefits	320	2.78 [bc]	31.5
Deer viewing opportunities	Benefits > costs	237	3.50 [ac]	54.4
	Benefits = costs	642	3.11 [ab]	37.8
	Costs > benefits	325	1.99 [bc]	6.8

[1] 1=not at all important, 2=slightly important, 3=moderately important, 4=very important, 5=extremely important that managers address concern

[a] Pairs of means with the same subscript (aa, bb, or cc) are significantly different at p=0.001.

Sources of Information on Deer Management

We asked respondents to identify their most common sources of information about local deer management (information that DEC can use to plan future communication with deer-management stakeholders). Their most common sources of information were community newspapers and local television news. Use of other information sources to learn about local deer management issues was far less common. The pattern of most frequently to least frequently used sources was similar across the three areas that comprise the Central Finger Lakes Management Unit (Table 21).

Table 21. Sources of information residents used to learn about local deer management, in aggregate and by WMU, 2015 survey of residents in the Central Finger Lakes Management Unit.

	Aggregate (weighted) (n=1298) %	WMU 7H (n=447) %	WMU 8J (n=394) %	WMU 8S (n=458) %
Reading a local community newspaper	68.6	69.8	68.3	66.8
Watching local television news	49.6	40.9	55.6	42.6
Reading regional or national newspapers, online or print	29.0	31.5	27.4	30.1
Reading magazines	26.8	22.4	28.4	30.8
Listening to the radio	25.3	30.4	22.3	26.2
Doing internet searches for information	20.7	23.7	18.0	25.5
Watching national television news	17.4	17.2	17.5	17.0
Reading books	11.3	11.6	10.9	12.4
Local meetings related to deer or deer management	11.4	11.4	10.9	13.8
Other	10.2	9.6	9.6	14.2

DISCUSSION

Comparison of these data to those gathered in previous surveys suggests that attitudes toward deer in the Central Finger Lakes Management Unit in 2015 are more positive than attitudes observed in other local areas of New York where deer management issues have emerged. We found that 7% of respondents to this survey said they do not enjoy deer and regard them as a nuisance. When asked the same question, the proportions of residents who did not enjoy deer and regarded them as a nuisance was 34% in the Village of Cayuga Heights in 1999 (Chase et al. 1999), 30% in communities on Fire Island, New York in 2007 (Siemer et al. 2007a), 21% in the Village of Cayuga Heights in 2007 (Siemer et al. 2007b), and 13% among residents living within the Tompkins County Deer Management Focus Area in 2015 (Siemer et al. 2015).

We compared WMUs within the aggregate management unit because we wanted to assess whether concerns about deer-related issues differed across the area studied. Several findings emerged that suggest interests, concerns, and management expectations in WMU 7H are somewhat different from those in WMU 8J or 8S. Specifically:

- On all six interest questions, respondents in WMU 7H expressed lower levels of deer-related interest than were expressed by respondents in WM 8J or WMU 8S.

- Mean level of concern in several areas (i.e., concern about exposure to Lyme disease, deer preventing regrowth of native plants, deer-related crop damage, deer over browsing habitat, loss of plant biodiversity due to deer feeding activity, and deer damage to plantings around homes) was higher in WMU 7H than in WMU 8J.

- Residents of WMU 7H were more likely than residents of other WMUs to place high importance on addressing deer-vehicle collisions and deer damage to farm crops, plantings around homes, or natural plants and forests.

- Respondents living in WMU 7H were more likely than those living in WMU 8J to worry about deer-related problems or regard deer as a nuisance.

- Respondents living in WMU 7H were most likely to believe the costs of deer exceeded the benefits.

Relatively high levels of public concerns about negative impacts of deer have been recognized in portions of WMU 7H for years, so we expected respondents in that area to express high levels of concern in this survey. The finding that respondents from WMU 7H were most likely to perceive that the costs of having local deer outweigh the benefits was not surprising, given that conflicts with deer have been prominent in that WMU for a number of years. DEC wildlife managers will need to consider similarities and differences across WMUs to assess whether the differences revealed in this survey warrant different deer population management goals in each WMU. Input obtained through local stakeholder involvement processes should be helpful in reaching those decisions.

Summary and Conclusions

In 2015, DEC sponsored a mail survey to learn more about residents' interests and concerns regarding deer and deer management in the Central Finger Lakes Management Unit. The purpose of the survey was to provide baseline information that can be used to inform deer management decisions in that management unit. The survey results indicated that the presence of deer was regarded positively by many area residents, who are interested in seeing deer in their area and knowing that local deer are healthy. At the same time, many residents in the Central Finger Lakes Management Unit are exposed to and have experienced negative interactions with deer, such as deer-related vehicular accidents or damage to garden and landscaping plants. Survey results suggest that many area residents are concerned about deer-related problems, and the highest level of concern is associated with interactions that threaten human health and safety (i.e., deer-vehicle accident and contracting tick-borne diseases). A majority of respondents indicated that it was very or extremely important to them that deer managers address the issues of deer-vehicle collisions and tick-borne diseases in their area.

In any management unit, residents can be placed in one of three groups that reflect their tolerance for deer-related problems. In the Central Finger Lakes Unit, we found that about 20% of all respondents believed the benefits of local deer outweighed the costs. About 53% of all respondents believed deer-related benefits and costs were about equal, and about 27% believed costs associated with local deer outweighed benefits of having deer. This finding suggests that in the Central Finger Lakes Management Unit experience with deer-related problems is still within tolerable levels for a majority of residents.

Research on human-wildlife conflict suggests that tolerance for deer can be improved by reducing the negative impacts that deer have on the things that people value, such as their health, safety, the plants and gardens around their homes, or the forests and natural landscapes in their local area. Results from this study demonstrate that many residents who are negatively impacted by deer believe that the costs of local deer exceed the benefits they receive. DEC strives to manage negative impacts by managing the size of the deer population, but residents should be made aware that the relationship between deer population and levels of specific impacts (e.g., number of deer-vehicle collisions, incidence of tick-borne illnesses) can be complex and that other actions may also be needed to manage impact levels. Some of those actions can be taken by individual residents or by communities most affected by deer.

Next Steps

In fall 2015, results from the 2015 survey of residents in the Central Finger Lakes Management Unit will be discussed in a small group process with area residents. The process will be sponsored by DEC and will be facilitated by staff from Cornell University and Cornell Cooperative Extension. Deliberations within that small group process will be considered by DEC staff, along with other information sources, to set deer population goals for the area.

Data from this survey establish a baseline against which future survey data can be compared. An increase in the proportion of residents who believe costs of having deer outweigh benefits would indicate that overall tolerance for deer had declined between the times of the first and second

surveys. Ideally, DEC should re-survey residents of the Central Finger Lakes Management Unit at multi-year intervals, to assess whether tolerance for deer in the unit increased or decreased following deer management decisions made and implemented in the unit.

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APPENDIX A (SURVEY INSTRUMENT)

Deer and Deer Management in Central New York:
Residents' Interests and Concerns

Research conducted for the
NYS Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources

by the

Human Dimensions Research Unit
Department of Natural Resources, Cornell University

The New York State Department of Environmental Conservation (DEC) is sponsoring this survey to learn more about residents' interests and concerns regarding deer and deer management in their local area. Information that you and other residents provide in this survey will help set deer management goals in your local area.

We would like to hear from EVERYONE who receives this questionnaire, not just those who have strong opinions about deer. Everyone's opinions count.

Please complete this questionnaire as soon as you can, seal it with the white re-sealable label provided, and drop it in any mailbox; ***return postage has been pre-paid***. Your identity will be kept confidential and the information you give us will never be associated with your name.

THANK YOU FOR YOUR HELP!

YOUR VIEWS ABOUT DEER IN YOUR LOCAL AREA

1. **The following is a list of interests people may have in deer. Please indicate how interested <u>you</u> are in each of the following <u>in your local area</u>.** *(Circle one number for each interest.)*

Potential interests:	Not at all interested	Slightly interested	Moderately interested	Very interested	Extremely interested
a. Seeing deer near your home	1	2	3	4	5
b. Seeing deer in your local area	1	2	3	4	5
c. Hunting deer in your local area	1	2	3	4	5
d. Photographing deer in your local area	1	2	3	4	5
e. Knowing that deer are healthy in your local area	1	2	3	4	5
f. Knowing that deer populations are doing well in your local area	1	2	3	4	5
g. Other (please specify): _____	1	2	3	4	5

2. **The following is a list of concerns people can have about the presence of deer. Please indicate how concerned you are about each <u>in your local area</u>.** *(Circle one number for each concern.)*

Potential concerns about deer in your area:	Not at all concerned	Slightly concerned	Moderately concerned	Very concerned	Extremely concerned
a. Deer damage to gardens and plantings around your home	1	2	3	4	5
b. Lost income of local farmers due to deer damage to crops	1	2	3	4	5
c. Over browsing of habitat by deer	1	2	3	4	5
d. Injury to you or family members from a deer-vehicle collision	1	2	3	4	5
e. You or those close to you getting Lyme disease	1	2	3	4	5
f. Deer preventing natural regrowth of native trees, shrubs and wildflowers	1	2	3	4	5
g. Loss of plant or animal diversity due to deer feeding activity	1	2	3	4	5
h. Problems associated with hunting of deer	1	2	3	4	5
i. Other (please specify): _____	1	2	3	4	5

3. **Please indicate the extent to which you believe the following events have increased, decreased, or stayed the same <u>in your local area</u> over the last 5 years.** *(Circle one number for each item.)*

Deer-related events:	Decreased greatly	Decreased slightly	Stayed about the same	Increased slightly	Increased greatly	Don't know
a. Number of deer you see around your home	1	2	3	4	5	6
b. Number of deer you see in your local area	1	2	3	4	5	6
c. Amount of deer damage to plants around your home	1	2	3	4	5	6
d. Amount of deer damage to farm crops	1	2	3	4	5	6
e. Deer hunting opportunity	1	2	3	4	5	6
f. Amount of deer damage to natural plants and forests	1	2	3	4	5	6
g. Number of people getting Lyme disease	1	2	3	4	5	6
h. Number of deer-vehicle collisions	1	2	3	4	5	6
i. Number of deer harvested by hunters	1	2	3	4	5	6
j. Other (please specify): _____	1	2	3	4	5	6

4. **How important is it to you that deer managers address each of the following deer-related concerns <u>in your local area?</u>** *(Circle one number for each item.)*

Deer-related concerns that could be addressed:	Not at all important	Slightly important	Moderately important	Very important	Extremely important
a. Deer-vehicle collisions	1	2	3	4	5
b. Deer damage to farm crops	1	2	3	4	5
c. Deer damage to gardens and plantings around homes	1	2	3	4	5
d. Deer damage to natural plants and forests	1	2	3	4	5
e. Lyme disease and other tick-borne illnesses	1	2	3	4	5
f. Deer health and well being	1	2	3	4	5
g. Deer viewing opportunities	1	2	3	4	5
h. Deer hunting opportunities	1	2	3	4	5
i. Problems with deer hunters	1	2	3	4	5
j. Other (please specify): _____	1	2	3	4	5

5. **Which of the following deer-related problems have you personally experienced in the last 5 years?** *(Circle all numbers that apply.)*

1 Deer damage to gardens and plantings around my home
2 Deer damage to farm crops
3 Deer-related auto accident
4 Lyme or other tick-borne disease
5 Deer damage to forests on private land
6 Problems with deer hunters

6. **Generally, how frequently do you think about deer and/or deer management issues?** *(Circle one number.)*

1 Never
2 Rarely
3 Occasionally
4 Often
5 Very often

7. Generally, how do you feel about having deer in your local area? *(Circle one number.)*

1 I enjoy deer and I do not worry about problems deer may cause
2 I enjoy deer but I worry about problems deer may cause
3 I do not enjoy deer and I regard them as a nuisance
4 I have no particular feelings about deer

8. Generally, when you think about all aspects of living with deer, how would you weigh the benefits and costs of having deer in your area? *(Circle one number.)*

1 The benefits of deer in my local area exceed the costs
2 The costs of deer in my local area exceed the benefits
3 The costs and benefits of deer in my local area are about an even tradeoff

HOW YOU LIKE TO GET INFORMATION ABOUT DEER

9. How do you prefer to get information about deer? *(Circle all that apply.)*

1 Reading a local community newspaper
2 Reading regional or national newspapers, online or print
3 Doing internet searches for information
4 Reading magazines
5 Watching local television news
6 Watching national television news
7 Listening to the radio
8 Reading books
9 Local meetings related to deer or deer management
10 Other (specify: _____)

BACKGROUND INFORMATION

10. Are you male or female? *(Circle one number.)*

1 Male
2 Female

11. In what year were you born? *(Fill in the blank.)* 19____

12. Which category best describes the area where you live for most of the year? *(Circle one number.)*

1 Rural—live on a farm
2 Rural—do not live on a farm
3 Village or hamlet (less than 10,000 people)
4 Small city (10,000 to 50,000 people)
5 Large city (over 50,000 but less than 200,000)
6 Very large city (over 200,000 people)
7 Suburb of a large or very large city

13. What is your current county of residence? *(Fill in the blank.)*

_____

14. Which characteristics listed below apply to you personally? *(Circle all that apply to you.)*

1 I have flower beds or vegetable gardens around my home
2 I have ornamental trees or shrubs around my home
3 I hunt deer in my local area
4 I own land in a rural area, but not a farm
5 I own agricultural land in my local area for crop or livestock production
6 I own land with woodlots or forests
7 I spend a lot of time driving in areas with lots of deer

*****END OF SURVEY*****

APPENDIX B (CALCULATION OF WEIGHT FACTORS)

Table B1. Calculation of factors to weight responses by geographic stratum, 2015 survey of residents in Central Finger Lakes Management Unit.

Stratum label	Responses	Non respondents	Total	Proportion of addresses	Respondents in proportion	Weight Factor
WMU 8S	515	443	958	0.1173	171	0.331
WMU 7H	496	457	953	0.3048	443	0.894
WMU 8J	443	514	957	0.5778	840	1.896
Total	1454	1414	2868	1.00	1454	

APPENDIX C (RESPONDENT – NONRESPONDENT COMPARISONS)

Table C1. Comparison of respondents to nonrespondents on gender, 2015 survey of residents in the Central Finger Lakes Management Unit.

	Respondents (n) %	Nonrespondents[a] (n) %
Male	(821) 63.6	(102) 44.5
Female	(469) 36.4	(127) 55.5
Total	(1,454)	(228)

[a]chi square= 29.96, df=1, p<0.001

Table C2. Deer-related experiences among respondents and nonrespondents, 2015 survey of residents in the Finger Lakes Management Unit.

Deer-related events:	n	Yes %	No %	chi square	df	P
Deer damage to plantings around home						
Respondents	1433	46.0	54.0	11.053	1	<0.001
Nonrespondents	228	34.2	65.8			
Deer-related auto accident						
Respondents	1433	39.4	60.6	7.69	1	0.005
Nonrespondents	228	29.8	70.2			
Tick-related illnesses						
Respondents	1433	13.9	86.1	1.44	1	0.230
Nonrespondents	228	10.9	89.1			

Table C3. Comparison of interests in local deer among respondents and nonrespondents, 2015 survey of residents in the Central Finger Lakes Management Unit.

Potential interests:	n	Mean[a]	Level of interest: Not at all interested	Slightly interested	Moderately interested	Very interested	Extremely interested	Chi square	df	P
Knowing that deer populations are doing well in your local area										
Respondents	1417	3.65	10.6	9.3	18.4	27.8	33.9	34.932	4	<0.001
Nonrespondents	228	3.16	18.2	10.6	28.5	22.9	19.9			
Seeing deer in your local area										
Respondents	1426	3.36	10.2	15.1	25.8	26.7	22.2	24.047	4	<0.001
Nonrespondents	228	3.08	21.1	10.4	26.2	23.2	19.1			
Seeing deer near your home										
Respondents	1425	3.10	17.3	14.9	25.9	24.7	17.3	23.792	4	<0.001
Nonrespondents	228	2.88	28.9	10.8	27.3	15.3	17.8			
Hunting deer in your local area										
Respondents	1415	2.29	56.7	6.3	7.4	10.5	19.1	7.949	4	0.093
Nonrespondents	228	2.05	62.0	8.1	7.6	10.5	11.8			

[a] 1=not at all interested, 2=slightly interested, 3=moderately interested, 4=very interested, 5=extremely interested

Table C4. Comparison of concerns about local deer among respondents and nonrespondents, 2015 survey of residents in the Central Finger Lakes Management Unit.

Potential concerns:	n	Mean[a]	Level of concern: Not at all concerned	Slightly concerned	Moderately concerned	Very concerned	Extremely concerned	Chi square	df	P
You or those close to you getting Lyme disease										
Respondents	1293	3.71	7.7	13.1	18.7	20.9	39.5	58.135	4	<0.001
Nonrespondents	228	3.27	22.8	14.7	16.5	22.5	23.5			
Injury to you or family members from a deer-vehicle collision										
Respondents	1293	3.69	8.1	11.6	20.0	23.5	36.8	44.543	4	<0.001
Nonrespondents	228	3.15	20.7	13.8	21.9	22.2	21.5			
Deer preventing natural regrowth of native trees, shrubs and wildflowers										
Respondents	1292	3.22	12.1	18.3	27.5	19.6	22.4	159.22	4	<0.001
Nonrespondents	228	2.41	45.2	9.2	17.3	19.3	9.0			
Deer damage to gardens and plantings around your home										
Respondents	1298	2.93	19.5	22.0	23.6	16.4	18.6	94.646	4	<0.001
Nonrespondents	228	2.46	49.2	13.0	13.1	10.0	14.7			

[a] 1=not at all concerned, 2=slightly concerned, 3=moderately concerned, 4=very concerned, 5=extremely concerned

Table C5. Perceived trends in deer-related events among respondents and nonrespondents to 2015 survey of residents in the Central Finger Lakes Management Unit.

Deer-related events:	n	Perceived trend in last 5 years Decreased	Stayed the same	Increased	Don't know	chi square	df	P
Number of deer you see in your local area								
Respondents	1287	20.4	37.3	38.3	4.0	4.13	3	0.247
Nonrespondents	228	18.9	44.3	33.3	3.5			
Number of deer you see around your home								
Respondents	1290	21.8	41.6	31.6	5.0	11.063	3	0.011
Nonrespondents	228	23.2	49.6	25.9	1.3			
Amount of deer damage to plants around your home								
Respondents	1278	19.7	43.3	24.0	13.1	23.224	3	<0.001
Nonrespondents	228	14.0	60.1	18.9	7.0			

TableC6. Comparison of perceived importance of addressing deer-related concerns among respondents and nonrespondents, 2015 survey of residents in the Central Finger Lakes Management Unit.

Potential concerns:	n	Mean[a]	Importance of addressing concern: Not at all important	Slightly important	Moderately important	Very important	Extremely important	Chi square	df	P
Lyme disease and other tick-borne illnesses										
Respondents	1419	4.04	3.4	6.8	16.5	28.9	44.4	69.171	4	<0.001
Nonrespondents	228	3.67	16.2	7.3	17.3	24.9	34.3			
Deer-vehicle collisions										
Respondents	1423	3.78	3.7	10.4	22.2	31.5	32.2	43.942	4	<0.001
Nonrespondents	228	3.46	13.9	8.4	23.1	28.0	26.6			
Deer damage to natural plants and forests										
Respondents	1413	3.24	9.9	17.2	30.0	25.1	17.9	193.04	4	<0.001
Nonrespondents	228	2.34	41.8	17.7	20.3	12.3	7.8			
Deer damage to gardens and plantings around homes										
Respondents	1428	3.16	10.9	19.7	30.7	20.7	18.1	94.825	4	<0.001
Nonrespondents	228	2.52	34.7	18.2	22.9	13.7	10.5			

[a] 1=not at all important, 2=slightly important, 3=moderately important, 4=very important, 5=extremely important

Table C7. Comparison of respondents to nonrespondents on overall attitude toward deer in their area, 2015 survey of residents in the Central Finger Lakes Management Unit.

	Respondents (n) %	Nonrespondents[a] (n) %
I enjoy deer and do not worry about problems deer may cause	(461) 32.4	(88) 38.6
I enjoy deer but worry about problems deer may cause	(771) 54.2	(105) 46.1
I do not enjoy deer and I regard them as a nuisance	(110) 7.7	(14) 6.4
I have no particular feelings about deer	(82) 5.8	(20) 8.9
Total	(1,454)	(228)

[a]chi square=8.287, df=3, p=0.040

Table C8. Comparison of respondents to nonrespondents on balance of deer-related costs and benefits in their area, 2015 survey of residents in the Central Finger Lakes Management Unit.

	Respondents (n) %	Nonrespodents[a] (n) (%)
The benefits of deer in my local area exceed the costs	(242) 19.7%	(41) 18.2
The costs of deer in my local area exceed the benefits	(333) 27.1	(41) 18.2
The costs and benefits of deer in my local area are about an even tradeoff	(653) 53.2	(143) 63.6
	(1,454)	(235)

[a]chi square=9.80, df=2, p=0.007