

## WILDLIFE CONFLICTS IN AN URBAN AREA: OCCURRENCE OF PROBLEMS AND HUMAN ATTITUDES TOWARD WILDLIFE

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Today's world is undergoing increasing urbanization, and as most metropolitan expansions have resulted in urban sprawl, much original wildlife habitat has been heavily modified or eliminated. Populations of many wildlife species have decreased as a result of habitat changes, but at the same time, numbers of some native and many exotic species have increased in urban areas. As the process of urbanization continues and human's intensive use of land encroaches upon the use of land by wildlife, contact between people and wildlife will change in form and increase in residential areas.

Most of the problems of natural resource managers pertain to human needs or desires (Baptiste 1977). A major goal of wildlife management is to increase the quality of human-wildlife interactions. The task of the wildlife biologist in urban areas is to encourage preferred wildlife species while decreasing negative wildlife-human interactions. These negative interactions may range from mere annoyance (e.g., a flock of birds making a constant noise) to serious damage (such as utility lines being chewed by squirrels).

Whether an animal species is preferred or not depends upon the attitudes and perceptions of the individual resident. As the U.S. Forest Service recognized (Thomas and DeGraaf 1973), an understanding of urbanites' attitudes toward wildlife, and an examination of the type of contact that residents have with local wildlife, are necessary before the implementation of any successful wildlife program. Many surveys of urban residents have examined attitudes toward preferred species of local wildlife and positive interactions with wildlife (Dagg 1970, Brown and Dawson 1978, Hardin and VanDruff 1978, Shaar 1979). Previous studies dealing with negative human-wildlife interactions have examined attitudes toward wildlife damage or nuisance in rural situations (Baptiste 1977, Decker et al. 1981a, 1981b). Though Stearns (1967) stated that "people are the major deterrent to habitat development, and the tolerance of people to wildlife is as important as that of wildlife to people", little has been done to quantify attitudes toward nuisance and damage caused by urban wildlife.

Given the need for research and management efforts to be directed at both positive and negative aspects of human-wildlife interactions, and the paucity of available, relevant information, this study was designed to:

- 1) record incidences of wildlife damage or nuisance on

- 2) determine any social or physiographic factors which influence the distribution of wildlife problems, 3) quantify attitudes of residents who have experienced wildlife problems, and 4) determine the effect of human-wildlife conflicts on those attitudes.

### METHODS AND MATERIALS

The study area was the Syracuse metropolitan area, located in central New York State's Onondaga County, including the City of Syracuse and the neighboring towns of Camillus, DeWitt, Geddes, Salina, Cicero, Clay, and Onondaga. The population in the region is concentrated in the City of Syracuse (170,105) and in developed corridors extending to the north, east and west. All of the areas surveyed are classified as medium density residential (2.5-25 housing units/residential ha.) or medium-high density residential (25-50 housing units/residential ha.) (Central N.Y. Regional Planning and Development Board 1978).

Households in 13 communities, 7 inside the City of Syracuse and 6 in the suburbs (see Fig. 1), were surveyed by telephone. Households were selected using a systematic grid to sample street blocks.

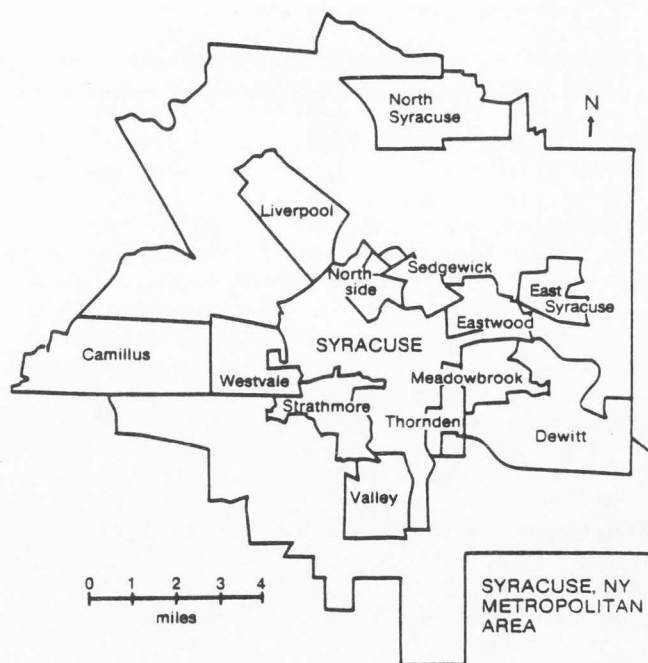


Figure 1. Map of the wildlife problem survey study area, including the 13 survey neighborhoods.

Individual households were then randomly chosen from those street blocks using a Polk Directory List (R.L. Polk & Co. 1981). Only those homeowners who had experienced a problem with wildlife during the past year were interviewed following initial telephone contact. One household with a problem from each block was surveyed. The telephone questionnaire was divided into 9 parts: an introductory section; 6 parts each dealing with a different category of wildlife problems; questions on attitudes toward selected urban wildlife species, and personal questions about the household and its members. The 6 categories of wildlife-related problems were:

- 1) stealing feeder food—unwanted wild animals stealing bird seed or other food from a wildlife feeder or feeding station,
- 2) vegetable garden damage—wild animals causing damage to a vegetable garden on the homeowner's property,
- 3) landscape (yard) damage—wildlife causing damage to the lawn, trees, shrubs, or flower beds on the homeowner's property,
- 4) structural (house) damage—damage done to the house, garage, utility wires, shed, or any other structure on the property,
- 5) inside home—wildlife inside or under the home or garage, including the attic and basement, and
- 6) general nuisance—any nuisance problem or annoyance that could not be placed in the other categories, i.e., pigeon roosting, noise, foul odor, raccoons in the garbage, etc.

Respondents' attitudes toward individual species or groups of potential local wildlife were measured using a general preference or desirability rating scale of "1 to 5", where "1" meant the animal was not liked at all, and "5" meant the animal was liked very much. The respondents were also asked what they would like to see done with the numbers of individuals of certain local wildlife species; whether they would like the numbers of individuals decreased, stay the same, or increased (with a scale of 1 to 3, respectively). Questions were worded as open-ended but were coded into categorical answers by the interviewer. This allowed flexibility in respondents' answers and easy data coding and comparison among respondents. The survey consisted of 40 main questions and 64 contingency questions, depending on how many wildlife-related problems the respondent had. All survey calls, made by several volunteers, were between the hours of 6:30 and 9:30 p.m. from Monday through Thursday over the 55 nights of the survey period from Nov. 1, 1982 through March 9, 1983. Descriptive statistics were generated from frequency distributions of categorical data. Contingency tables were constructed, and the data were analyzed by cross-tabulation analysis and Kruskal-Wallis tests (Hildebrand et al. 1977, Pine 1977, Reynolds 1977, SAS Institute 1982).

## RESULTS

### SURVEY RESPONSE

A total of 3,033 different telephone numbers were dialed by the interviewers over the survey period. Sixty-six percent (n = 1993) of those numbers dialed resulted in a household being contacted and an attempted interview. Eighty-six percent (n = 1715) of those contacted cooperated, 7% refused the interview (n = 144), and 6.6 percent (n = 131) asked to be called back. Of the 1,715 respondents who cooperated, 30 percent (n = 523) reported a problem with wildlife (Table 1). The duration of the telephone interviews averaged 9.7 minutes. Because respondents frequently had more than one wildlife problem, each respondent was asked an average of 58 of the 104 possible survey questions.

Table 1. Telephone call success for the wildlife problem survey, Syracuse metropolitan area.

	City Respondents N (%)	Suburban Respondents N (%)	All Respondents N (%)
<i>No. of telephone numbers dialed</i>	1302	1731	3033
<i>No Answers<sup>1</sup></i>	203 (15.6)	237 (13.7)	440 (14.5)
<i>Busy Signals<sup>1</sup></i>	86 (6.6)	122 (7.0)	208 (6.9)
<i>Nonworking or<sup>1</sup> wrong numbers</i>	221 (17.0)	171 (9.9)	392 (12.9)
<i>Households contacted<sup>1</sup></i>	792 (60.8)	1201 (69.4)	1993 (65.7)
<i>Call-Backs<sup>1</sup></i>	39 (4.9)	92 (7.7)	131 (6.6)
<i>Refusals<sup>1</sup></i>	49 (6.2)	95 (7.9)	144 (7.2)
<i>Cooperate<sup>1</sup></i>	701 (88.5)	1014 (84.4)	1715 (86.1)
<i>Without Problems<sup>1</sup></i>	513 (73.2)	683 (67.4)	1196 (69.7)
<i>With Problems<sup>1</sup></i>	189 (26.8)	334 (32.6)	523 (30.3)

<sup>1</sup> All of the response rate frequencies are significantly different (p = 0.01) between the city and the suburbs.

Interviewees were homeowners who lived in a single-family home. Most respondents were classified as middle to upper-class; only 26% reported an income of less than \$20,000, and 58% reported that their home and lot were valued between \$30,000-\$60,000.

### PROBLEM OCCURRENCE

The 523 respondents with problems reported a total of 831 wildlife-related problems for an average of 1.6 problems per respondent. The percentage of suburban households reporting a wildlife problem (32.6%) was significantly higher (p = 0.01) than the percentage of city households (26.8%) with a problem. The most commonly reported problem in both the city and the suburbs was general nuisance. This accounted for 30% of all reported problems and was reported by almost half (47.6%) of all respondents. The second most-frequently-reported problem (18% of all problems) was landscape (yard) damage, defined earlier, although the

frequency of reported yard damage in the city (10.5%) was much lower than that reported in the suburbs (22.6%). Table 2 shows frequencies for types of problems reported in the city and the suburbs.

**Table 2. Occurrence of wildlife-related problems reported by survey respondents, Syracuse metropolitan area.**

Type of Problem	Percent of City Problems (N = 295)	Percent of Suburban Problems (N = 536)	Percent of All Problems (N = 831)
Stealing feeder food <sup>1</sup>	13.6	14.9	14.0
Vegetable garden damage <sup>1</sup>	13.2	18.3	17.0
Yard damage <sup>1</sup>	10.5	22.6	18.0
House damage	6.8	6.5	6.6
Animals inside the house <sup>1</sup>	16.9	12.7	14.0
General nuisance <sup>1</sup>	39.0	25.0	30.0

<sup>1</sup>The frequency of reports of these problems are significantly different ( $p = 0.01$ ) between the city and suburbs.

Those species reported to have caused the most problems in the city were the gray squirrel and the pigeon (*Columba livia*) (23% and 20% of all problems, respectively); whereas the species most frequently reported to have caused problems in the suburbs were the gray squirrel and the cottontail rabbit (*Sylvilagus floridanus*) (23% and 19% of all problems, respectively). The pigeon was blamed for only 3.9% of all problems in the suburbs (Table 3).

**Table 3. Reported wildlife species or group which caused problems.**

Wildlife Species or Group <sup>1</sup>	Percent of City Problems (N = 295)	Percent of Suburban Problems (N = 536)	Percent of All Problems (N = 831)
Squirrels	23.1	22.8	23.0
Rabbits	10.5	19.2	16.0
Skunks	11.9	16.0	14.6
Pigeons	19.7	3.9	9.5
Mice	7.1	7.6	7.5
Raccoons	8.1	6.0	7.0
Moles	3.4	7.1	5.8
Woodchucks	4.1	4.3	4.2
Blackbirds/Starlings	2.4	2.6	2.6
Rats	1.4	1.9	1.7
Bats	3.4	0.6	1.6
Woodpeckers	1.0	1.3	1.2
Sparrows	1.0	0.6	0.7

<sup>1</sup> Because of the large sample size, the occurrence of species-specific problem reports is significantly different for each species or group between the city and the suburbs. (Levels of significance = 0.05 for squirrels and 0.01 for all other groups.)

The occurrence of problem reports by type of problem and by type of problem-causing species or group was tested across the 13 survey communities and across socioeconomic responses (lot value, income, respondents' background, and ages of household members). No relationships among the occurrence of specific

problem-causing animals and the various socioeconomic responses were found. The only significant relationship found to exist between the occurrence of a specific type of problem and any socioeconomic factor was the positive association between the frequency of yard damage reports in the city and the respondents' lot value ( $p = 0.05$ ,  $\gamma = 0.40$ ). Lot value and reports of yard damage were not related for suburban respondents, and the homeowner's lot value was not related to any other problem type. The respondent's area of residence (neighborhood) was significantly related to the occurrence of wildlife-related problems by type of problem and by problem-causing species. The frequency of problem-causing species differed among communities for both the city and suburbs ( $p = 0.01$ ), and the occurrence of wildlife problems by type differed across the 7 city communities ( $p = 0.01$ ). Over 50% of the problems in the older, earlier developed north side communities of the city (North side, Sedgewick, and Eastwood) were reported as nuisance problems. The residents in the remaining communities to the south reported a wider variety of problems—nuisance problems, though still the largest category, accounted for less than 35% of all reported problems. The frequency of reports of damage done in the yard (both yard damage and vegetable garden damage) was significantly higher in the southeastern city communities of Meadowbrook and Thornnden South ( $p = 0.01$ ), even though the reported number of gardens in those areas were not significantly higher than in the northern city areas. In the suburbs, only the distribution of general nuisance reports was significantly different from community to community ( $p = 0.05$ ) because of the high number of nuisance reports in the northern suburbs of Liverpool and North Syracuse, where skunks (*Mephitis mephitis*) were commonly reported.

As with the occurrence of problem types, the city communities differed drastically between the northern and southern halves for reports of specific problem-causing wildlife species or groups. Pigeons and squirrels accounted for 61% of all reported problems in the nuisance-laden northern communities. Residents in the southern communities of Meadowbrook, Thornnden, and Valley experienced 94% of all the city's skunk problems and 68% of all the rabbit problems. In the suburbs, skunks alone accounted for 35% of all problem reports in Liverpool and North Syracuse, and 75% of all suburban skunk problems were located in these two northern suburban communities.

**Table 4. Preference ratings for selected wildlife species or group by all survey respondents (N = 523).**

Wildlife Species or Group	Preference Categories					Mean Rating (Scale = 1-5)
	1 Do Not Like at All (%)	2 Dislike A Little (%)	3 Indifferent or Like and Don't Like (%)	4 Like A Little (%)	5 Like Very Much (%)	
<i>Cardinals</i>	1.9	1.3	7.9	15.9	72.8	4.6
<i>Blue Jays</i>	2.9	6.7	21.6	23.5	45.3	4.0
<i>Sparrows</i>	4.2	6.7	37.8	24.5	26.8	3.7
<i>Rabbits</i>	5.1	9.4	30.0	27.5	27.9	3.7
<i>Squirrels</i>	8.0	13.0	38.6	23.5	16.8	3.3
<i>Woodchucks</i>	19.1	17.0	48.5	8.6	5.6	2.7
<i>Blackbirds/Starlings</i>	25.2	20.7	38.3	9.5	6.3	2.5
<i>Pigeons</i>	42.0	21.6	26.0	6.5	3.7	2.1
<i>Skunks</i>	48.0	14.8	27.9	5.7	3.6	2.0
<i>Snakes</i>	54.3	10.3	24.3	5.8	5.4	1.9
<i>Mice</i>	56.0	17.0	20.1	3.9	3.1	1.8
<i>Bats</i>	66.0	11.9	17.0	2.1	2.9	1.7

**ATTITUDES OF RESIDENTS TOWARD NEIGHBORHOOD WILDLIFE**

The order of respondents' preference for the 12 wildlife groups from least to most liked was: bats, mice, snakes, skunks, pigeons, blackbirds/starlings, woodchucks, squirrels, sparrows and rabbits, blue jays, and cardinals (Table 4). Accordingly, many people expressed a desire to see a reduction in numbers of mice, pigeons, and skunks, while there was favor in increasing cardinals. The majority of respondents said to "keep the same" numbers of bats, squirrels, woodchucks, rabbits, blackbirds/starlings, blue jays, snakes, and sparrows (Table 5). The mean ratings did not significantly differ between urban and suburban

respondents. However, those ratings did differ significantly from community to community within both the city and the suburbs. A wildlife species or group was generally rated lower (i.e., they were more disliked and residents favored a decrease in their numbers) in those communities in which residents reported a high incidence of problems with the species. For example, the preferred management option ratings for skunks were lowest in the communities of Meadowbrook, Valley, Liverpool, and North Syracuse (respondents wanted skunk numbers decreased), and highest in areas with smaller frequencies of skunk problems (where respondents favored keeping skunk numbers "the same").

**Table 5. Management option ratings for selected wildlife species or group from all survey respondents (N = 523).**

Wildlife Species or Group	Management Option			Mean Rating (Scale = 1-3)
	1 Decrease (%)	2 Keep the Same (%)	3 Increase (%)	
<i>Cardinals</i>	1.3	32.1	66.6	2.7
<i>Blue Jays</i>	5.9	58.3	35.8	2.3
<i>Sparrows</i>	11.8	76.1	12.0	2.0
<i>Rabbits</i>	23.1	65.7	11.1	1.9
<i>Squirrels</i>	25.1	69.0	6.0	1.8
<i>Woodchucks</i>	27.7	68.6	3.2	1.8
<i>Snakes</i>	40.7	54.3	5.0	1.6
<i>Blackbirds/Starlings</i>	43.0	53.3	3.6	1.6
<i>Bats</i>	43.4	53.7	2.5	1.6
<i>Skunks</i>	50.7	48.4	1.0	1.5
<i>Pigeons</i>	57.2	41.3	1.5	1.4
<i>Mice</i>	60.6	39.0	0.4	1.4

**Table 6. Effect of a previous problem with a species on the ratings of that species.**

Wildlife Species or Group*	City Respondents				Suburban Respondents			
	Preference Rating		Management Rating		Preference Rating		Management Rating	
	Without Problem	With Problem	Without Problem	With Problem	Without Problem	With Problem	Without Problem	With Problem
<i>Rabbits</i>	3.6	3.3	1.9	1.8	3.8	3.5 <sup>3</sup>	2.0	1.7 <sup>1</sup>
<i>Squirrels</i>	3.2	2.8 <sup>2</sup>	1.9	1.6 <sup>3</sup>	3.5	3.1 <sup>2</sup>	1.9	1.6 <sup>1</sup>
<i>Woodchucks</i>	2.8	2.5	1.9	1.4 <sup>2</sup>	2.7	2.4	1.8	1.6
<i>Blackbirds/Starlings</i>	2.5	1.5 <sup>2</sup>	1.7	1.3	2.6	1.7 <sup>1</sup>	1.6	1.2 <sup>1</sup>
<i>Pigeons</i>	2.0	1.5 <sup>1</sup>	1.4	1.2 <sup>1</sup>	2.3	1.6 <sup>2</sup>	1.6	1.0 <sup>1</sup>
<i>Skunks</i>	2.1	1.7 <sup>3</sup>	1.6	1.2 <sup>1</sup>	2.1	1.9	1.6	1.2 <sup>1</sup>
<i>Mice</i>	1.8	1.4	1.5	1.2 <sup>2</sup>	1.9	1.7	1.4	1.1 <sup>1</sup>
<i>Bats</i>	1.7	1.2	1.6	1.1 <sup>2</sup>	1.7	1.5	1.6	1.5

1 Significantly different, p = 0.01

2 Significantly different, p = 0.05

3 Significantly different, p = 0.1

\* Some species or groups were omitted because they were responsible for very few reported problems.

**Table 7. Correlation between the desirability of a species and its preferred management option (using the gamma statistic for cross tabulation association).**

Wildlife Species or Group	City Respondents	Suburban Respondents (Gamma correlation coefficient) <sup>1</sup>	All Respondents
<i>Snakes</i>	0.913	0.818	0.853
<i>Squirrels</i>	0.729	0.797	0.772
<i>Blue Jays</i>	0.748	0.769	0.761
<i>Blackbirds/Starlings</i>	0.674	0.802	0.755
<i>Cardinals</i>	0.896	0.608	0.714
<i>Bats</i>	0.722	0.704	0.711
<i>Skunks</i>	0.729	0.646	0.677
<i>Sparrows</i>	0.665	0.669	0.668
<i>Mice</i>	0.662	0.671	0.668
<i>Pigeons</i>	0.750	0.593	0.651
<i>Woodchucks</i>	0.556	0.697	0.645
<i>Rabbits</i>	0.631	0.583	0.601

1 0.70 or higher = very strong positive association  
0.50 - 0.69 = substantial positive association  
0.30 - 0.49 = moderate positive association

The attitude ratings for most species were significantly lower if the respondent had previously experienced a problem with that species (Table 6). The relationship between the preference ratings (desirability) and the management option ratings were tested by contingency table analysis. For all groups, the preference and management ratings had at least a substantial positive association (Table 7). Respondents who did not like the species or group usually wanted its numbers reduced, and vice-versa. The preference and management option ratings association for every animal was significantly affected by the experience of having had a problem with that animal (p = 0.01) (see Table 8).

**Table 8. The effect of a previous problem with a species on the correlation between the desirability of the species and its preferred management option.\***

Wildlife Species or Group <sup>2</sup>	Gamma Correlation Coefficient <sup>1</sup>			
	City Respondents		Suburban Respondents	
	Without Problem	With Problem	Without Problem	With Problem
<i>Squirrels</i>	0.752	0.672	0.821	0.742
<i>Skunks</i>	0.687	0.902	0.598	0.806
<i>Woodchucks</i>	0.546	0.714	0.690	0.800
<i>Mice</i>	—	—	0.683	0.581
<i>Rabbits</i>	0.603	0.787	0.546	0.433
<i>Pigeons</i>	0.707	0.856	—	—
<i>Blackbirds/Starlings</i>	—	—	0.795	0.929

\* Using the gamma statistic for cross-tabulation association.

1 0.70 or higher = very strong positive association

0.50 - 0.69 = substantial positive association

0.30 - 0.49 = moderate positive association

2 Some animals were omitted because problems with those groups were minimal.

Since previous studies examined attitudes of rural residents or farmers toward wildlife damage, tests were performed to see if the background of the urban respondent had an effect on the correlation between a species' desirability and preferred management option. Comparisons were made between the preference rating and management option correlations of those who had lived in the country and those who had never lived in the country for the leading problem-causing species. Examination of Table 9 reveals that for city dwellers, all of the preference and management option correlations (except for mice) were weaker for those with a rural background. For the suburban respondents, the correlations were lower for half the species. No negative correlations were found. Table 10 shows the next ratings correlation comparison that was made, on the basis of whether or not the respondent

Table 9. The effect of respondents' background on the correlation between the desirability of species and its preferred management option (gamma statistic<sup>1</sup>).

Wildlife Species or Group	City Respondents		Suburban Respondents	
	Never lived in country	Once lived in country	Never lived in country	Once lived in country
Bats	0.784	0.610	0.671	0.754
Squirrels	0.779	0.638	0.768	0.841
Skunks	0.805	0.672	0.682	0.592
Woodchucks	0.745	0.217	0.660	0.753
Mice	0.646	0.691	0.660	0.687
Rabbits	0.655	0.587	0.615	0.535
Pigeons	0.838	0.591	0.665	0.484
Blackbirds/ Starlings	0.710	0.610	0.861	0.713

<sup>1</sup> 0.70 or higher = very strong positive association  
0.50 - 0.69 = substantial positive association  
0.30 - 0.49 = moderate positive association

Table 10. Effect of respondents' background on the correlation between the desirability of a species and its preferred management option (gamma statistic<sup>1</sup>).

Wildlife Species or Group	City Respondents		Suburban Respondents	
	Never lived on farm	Once lived on farm	Never lived on farm	Once lived on farm
Bats	0.712	0.775	0.710	0.680
Squirrels	0.765	0.532	0.790	0.824
Skunks	0.740	0.671	0.726	0.350
Woodchucks	0.661	-0.012	0.706	0.664
Mice	0.721	0.339	0.687	0.612
Rabbits	0.674	0.395	0.600	0.521
Pigeons	0.847	0.223	0.668	0.316
Blackbirds/ Starlings	0.729	0.375	0.829	0.702

<sup>1</sup> 0.70 or higher = very strong positive association  
0.50 - 0.69 = substantial positive association  
0.30 - 0.49 = moderate positive association  
0.10 - 0.29 = low positive association  
0.00 - (-0.10) = negligible negative association

had lived on a farm at one time. For those respondents who had previously lived on a farm, both city and suburban, the correlations between the preference ratings and preferred management options were weaker than those of their non-farm counterparts, for almost every species.

## DISCUSSION

### SURVEY RESPONSE RATE

The response rates show that the telephone is an efficient survey instrument. The overall refusal rate (7.2%) is the lowest we have found in the literature. Reported refusal rates for telephone surveys, generally much lower than refusal rates for mailed

questionnaires, have previously ranged from 12 percent (Applegate 1973) to 40 percent (Snyder and George 1980). The high completion rate also shows that a telephone interview can be at least 10 minutes long and still hold the respondent's attention. The subject matter is important; surveys about natural resource issues generally receive a good response rate. Compliance is also enhanced when interviewing a select group somehow affected by the subject matter of the survey (Brown et al. 1980). Brown and Dawson's (1978) survey of urbanites in several N.Y. metropolitan areas revealed a relatively high interest in and knowledge of wildlife among residents of the Syracuse area.

The percent of contacted households that reported having had a wildlife-related problem (30%) was slightly higher than the percent of respondents with a wildlife problem reported by Brown and Dawson (1978) for Syracuse, N.Y. (25%). Unlike Brown and Dawson's survey, this questionnaire emphasized wildlife-related problems as the main topic. This emphasis can lead to increased respondent recall of wildlife problems. This study does support Brown and Dawson's findings of a much higher frequency of wildlife-related problems than the 13% reported by Missouri urbanites (Witter et al. 1981).

Reports of specific problem-causing wildlife species or groups were found to be independent of almost all socioeconomic and human activity data. However, these reports were related to the community in which the respondent lived. The occurrence of problems caused by a specific animal species depended upon whether or not local habitat conditions were favorable for the existence of a resident population of that species. By definition, an animal can become a "pest" when an increased population leads to a number of wildlife-human conflicts; habitat conditions must first be favorable for an increase in population size.

The frequency of pigeon problems in the city, where pigeon habitat is more favorable, was 5 times greater than in the suburbs. Emlen (1974) and Geis (1974) showed that populations of pigeons and other commensals increase along the gradient of urbanization. Johnsen (1982) stated that pigeons show an affinity for older buildings which contain more roost sites. Among the city communities, most pigeon problems occurred in the 3 northern communities. These 3 areas have a higher household density than the other areas of the city, and are the oldest of the city communities, thus containing houses of an architectural style that allows for higher building complexity and a greater number of roost sites.

This difference in the distribution of reported problem-causing species is found between the city and the suburbs as a whole, and among those communities within the city or the suburbs which are most markedly different. Among studies done in the Syracuse, NY area, both Rowse (1980) and Powell (1982) reported higher populations of raccoons (*Procyon lotor*) in areas adjacent to water, open land and travel corridors. The city

and suburban communities with the most raccoon problems were the Valley and Camillus, respectively. Both those communities are surrounded by the greatest amount of open land and are provided with numerous travel access corridors. Most urban skunk problems occurred in the Valley (which contains Onondaga Creek) or Salt Springs/Meadowbrook (which includes the Meadowbrook waterway). Almost all skunk problems in the suburbs occurred in North Syracuse (near Clay Marsh) or Liverpool (by Onondaga Lake).

The gray squirrel has been reported to be distributed throughout the Syracuse metropolitan area (Rowse 1980, Powell 1982). In this study, squirrel-caused problems were the most widespread of any problem. The communities with the highest incidence of squirrel problems each contained a large tract of greenspace with a large population of mast-bearing trees. The 2 areas were Thornden South (includes Thornden Park) in the city and East Syracuse (includes Franklin Park) in the suburbs.

The occurrence of reports by type of problem was also found to be dependent on the community, but only for the City of Syracuse. Since the type of problem was related to the type of animal which caused the problem, the relationship between problem type and community followed the pattern of the relationship between problem-causing species and community. A certain type of problem occurred in an area where habitat was favorable for the existence of the responsible species or group.

The only relationship between occurrence of reported problems and socioeconomic data was that between yard damage reports in the city and the respondent's lot value. The value of the respondent's home and lot was the only socioeconomic datum that directly affected the chances of a specific problem. Those respondents with a higher lot value generally have more land area than other respondents, and also have a greater number of trees and shrubs on their property. This increases the chance of damage in the yard. The value of those landscaping features is higher on the more expensive lots.

Previous studies (Szot 1975, Dagg 1970) have shown little difference among "likability" of a wildlife species from area to area across a city. This study has shown that, when dealing with respondents who have experienced a problem with wildlife, there is a marked difference among the attitudes of residents from different areas, especially when the distribution of species-specific problems is different from area to area. Areal difference in attitudes toward damage-causing animals has been reported by Decker et al. (1981) for white-tailed deer, among areas of different deer densities and agricultural characteristics.

A significant correlation existed between reports of specific problems and attitudes. In almost all cases, the experience of a previous problem with a species lowered either the preference or management rating for that species. When the species was one of the top

problem-causing species in the area, then the experience of a problem with that species lowered both the preference and management ratings for that species. Agricultural studies (McNeil 1962, Flyger and Thoerig 1962) have assessed tolerance among farmers toward deer damage. Decker et al. (1981) reported that as the size of the deer management unit decreases, the damage complaint level more closely correlates with farmers' dissatisfaction. At the level of the urban/suburban homeowner, who has the home and lot as the "management unit", the association between attitudes and management goals is substantial, especially for those species which have caused a problem. Two exceptions were with the ratings association for the gray squirrel in both the city and the suburbs, and the ratings association for the cottontail rabbit in the suburbs. Having had a problem with a squirrel weakened the preference/management ratings correlation—those with squirrel problems wanted their numbers decreased (mean management option rating of 1.6), while still rating them neutral (mean preference rating of 3.0). Rabbit preference and management ratings were still high even after a problem in the city. In the suburbs, however, rabbit management ratings dropped to a low of 1.7 while the preference ratings remained favorable at 3.5. Overall, rabbits were tolerated more than any other problem-causing animal.

Kellert (1976) stated that urbanites have more emotional attachment to wildlife than their rural counterparts. Urban residents are less likely to want the numbers of a preferred species decreased: they usually respond negatively to thoughts of decreasing the population of preferred animals. At the same time, urbanites' response to animals that are disliked are more emotional because they are less tolerant of disliked animals than suburbanites. This association between "likability" of an animal and the preferred management goals was shown in this study to be affected by the background of the respondent. Those urban respondents who had a rural background showed more disparity between attitude and management ratings than did those respondents with an urban background. For all respondents, those who had once lived on a farm showed greater disparity between attitude and management preferences than those who had not lived on a farm. People with a rural background are more likely to still want the population of a species decreased even though they may rate the species as favorable.

## SUMMARY AND CONCLUSIONS

A telephone survey of 523 Syracuse, N. Y. metropolitan area respondents who previously had a wildlife-related problem was conducted over a period of 4 months. The telephone proved to be an efficient survey instrument—low cost of survey administration, ability to reach a large sample in a relatively short period of time, a low refusal rate, and the ability to question for as long as 10 minutes or more proved to be major advantages.

The occurrence of reports of wildlife-related problems was independent of socioeconomic factors but dependent upon the geographical area in which the respondent lived. The frequency of problems caused by a specific animal depended upon whether local habitat conditions were favorable for the species. A difference in habitat (greatly reflected by age of the neighborhood) was the major contributor to differences in problem reports by type of problem or species responsible.

Attitudes toward certain wildlife species or groups were affected by the occurrence of problems with wildlife. The existence of a previous problem with a species lowered the preference and management ratings for that species. Attitudes toward species differed from community to community, following the pattern of problem-causing species distribution. Attitudes did not significantly differ across socioeconomic groups. The effect of the experience of a negative human-wildlife interaction is an important consideration when studying human attitudes toward wildlife.

Respondents' species preferences (desirability) strongly correlated with a preferred management goal for that species. Having had experienced a previous problem with wildlife generally strengthened this correlation for most species. Respondents' background also affected the preference and management option correlation. Respondents with non-rural backgrounds were more likely to have less disparity between their attitudes toward a species and desired management options for that species. Those urbanites are more emotionally attached to animals, as witnessed by the stronger preference/management ratings association.

The urban resident does not respond to wildlife problems and animal damage control in the same manner as rural residents respond to agricultural pest management. The decision to control an agricultural pest and the labelling of an animal as a pest is based on economic considerations. In the urban environment, the actual perception of an animal as a pest depends upon individual experience, attitudes, and aesthetic values. An animal that is a nuisance to one household may be a joy to watch for another household. If most people felt that all potential nuisance animals should be reduced in numbers, the job of the control specialist would be greatly simplified. Wildlife control in urban/suburban areas must be as specific as the actual problem. Public attitudes toward and perception of wildlife will limit methods employed by and effectiveness of wildlife control specialists. The knowledge of what characteristics affect occurrence of wildlife-related problems and attitudes toward wildlife is an important component in urban wildlife management.

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