



Deer and Deer Management in Howard County, Maryland

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Deer and Deer Management in Howard County, Maryland

Executive Summary

The results of a survey of 800 Howard County residents show that residents enjoy the presence of deer but also believe that they are nuisances and that the deer population in the county should be reduced. The survey was conducted for the Howard County Department of Recreation and Parks (DRP). The majority of residents have seen deer in the county in the past year, and 84 percent of respondents said they enjoy seeing deer. However, encounters with deer also cause problems for residents. Six in ten residents felt that there were too many deer in the county. Nearly two-thirds of those surveyed either have had Lyme disease, or know a family member or friend who has had the disease, which can be transmitted by black legged ticks transported by deer. Half of those surveyed have had an auto accident with a deer, or know a family member or friend who has had a deer-related auto accident. Over 60 percent reported that deer had caused damage to shrubs, trees, flowers, garden or crops in the past few years.

With regard to methods of deer management, more than 70 percent supported the use of non-lethal means to control the deer population, providing those means were effective. However, over 80 percent supported the use of managed hunts, if non-lethal means were not effective. Majorities also supported contraception (60 percent) and capturing and transferring deer (56 percent). Overall, the views expressed in the survey would seem to provide strong support for county decisions regarding controlling and the methods of controlling the deer population in the county.

Data from the study indicate that the county government has a teaching opportunity at hand. Experts have found that deer contraception and capture and release are not feasible control options for a region like Howard County. Residents would benefit from objective, scientific information about the county's deer population, and from information about alternative methods of deer population control and the cost-effectiveness of those methods. Such information would be valuable in overcoming misconceptions about deer and deer management and would serve to better inform the discussion around deer management in the county.

Deer and Deer Management in Howard County, Maryland

In the fall of 2007, the Department of Recreation and Parks (DRP) of Howard County, Maryland, approached the Maryland Institute for Policy Analysis and Research (MIPAR) of the University of Maryland, Baltimore County (UMBC) to conduct a survey of county residents' knowledge, opinions and attitudes about deer and deer management in the county. The purpose of the survey was to provide an independent and objective examination of this subject and to produce reliable data that the DRP and county officials could use to make informed decisions about the county's deer management program. The author of this report was the principal investigator and project manager on this survey.

The DRP convened a broadly representative advisory committee to work with DRP staff and the author on the development of the questionnaire or survey instrument that was used in the survey. (See Appendix A for the survey instrument and Appendix B for a list of advisory committee members and their affiliations.) The DRP staff and advisory committee members suggested topic areas for inclusion in the survey. They also read and provided comments on iterations of the survey instrument. Their assistance was invaluable, and the author wishes to thank them for the time they took and the care and concern with which they approached this survey.

Although the DRP requested and funded the survey, and although the advisory committee provided suggestions, all decisions regarding the survey instrument, survey methodology, and data analysis and reporting were the sole purview of the author. No official or staff person from Howard County or the Howard County DRP attempted in any way to influence the survey or the analysis and reporting of the survey data.

Methodology

This survey was conducted between April 14 and April 21, 2008, using a Computer Assisted Telephone System and Random Digit Dialing. The random sample was of 800 residents living in Howard County, Maryland. Interviewers screened respondents and only adult county residents (age 18 or older) were interviewed. On average, the survey required approximately 10 minutes for respondents to complete. A random sample of 800 produces a margin of error of plus or minus 3.5 percent at a 95 percent level of confidence. This means that if this survey were conducted 100 times using the same methodology, 95 times out of 100 it would produce results that were plus or minus 3.5 percent of the results seen here. Therefore, readers can have a high degree of confidence that the data presented here represent the opinions of Howard County residents on the issues included in the survey.

The survey instrument, which is included as Appendix A in this report, contained questions about several areas of interest to this research, including:

- How frequently residents reported seeing both live deer and deer carcasses in the county;
- Their general views about deer, including whether they believe that there are too many deer in the county;
- Residents' knowledge, attitudes and opinions about various forms of interaction with deer; and
- Their opinions about deer management, including various forms of deer management and the effectiveness of same.

Finally, we asked respondents a number of demographic and related questions such as their residential location, age, gender, race, education, income, and whether they were hunters. We used these characteristics to examine the representativeness of the sample to the county population (Table 1).¹

According to a comparison of Census data and data from the survey, the sample was largely representative except for the following: over-representation of middle aged persons (ages 35-54), over-representation of older persons (ages 55 and greater), under-representation of low income families (under \$25,000), over-representation of higher income families (\$100,000 to \$149,999), and under-representation of very high income families (\$150,000 and more). In all other demographic categories, the sample closely represents the actual county population. Furthermore, it is doubtful that the noted differences would materially affect the results of this survey.

All respondents who provided zip codes lived within zip codes that are completely or partially within Howard County (Table 1a). Over half said that they live within sight of a county park or other large undeveloped land area, and another quarter lived within a mile (Table 1b). Finally, only about one in 12 residents (7.9 percent) reported that they were hunters, and only 6.4 percent said that they were deer hunters (Table 1c).

¹ I wish to thank Evan Perlman and M. Cosar Unal, graduate research assistants at the Maryland Institute for Policy Analysis and Research of the University of Maryland, Baltimore County, for their assistance in the data analysis for this report.

Table 1 Survey Representativeness		
	Actual County Population	Sample Population
Age	Census Categories	Percent
18-25	18-24	9.0
26-35	25-34	12.6
36-55	35-54	48.1
56-64	55-64	16.5
65+	65+	13.4
Refused		0.4
Gender		
Male		47.80
Female		52.20
Race		
White		69.40
Black		16.00
Others		14.60
Income		
Less than \$25,000		1.50
\$25,000-\$49,999		2.80
\$50,000-\$74,999		17.10
\$75,000-\$99,999		15.30
\$100K-\$149,999		30.60
\$150,000+		12.80
Refused		20.00
Education		
High School or less		21.00
Some College		21.80
College Degree		30.30
Grad. or Prof. Degree		27.00
¹ Census population categories do not add to 100% because we did not include the 17 year and under category.		

Table 1a: Respondent Zip Codes	
ZIP Code	County
20701	Howard
20723	Howard
20759	Howard
20763	Howard
20777	Howard
20794	Howard and Anne Arundel
21029	Howard
21036	Howard
21042	Howard
21043	Howard
21044	Howard
21045	Howard
21046	Howard
21075	Howard
21076	Howard and Anne Arundel
21104	Howard
21150	Howard
21163	Howard
21723	Howard
21737	Howard
21738	Howard
21765	Howard
21771	Howard, Carroll and Frederick
21784	Howard and Carroll
21794	Howard
21797	Howard and Carroll

Table 1b: Proximity to Parks and Open Space		
How close is your home to a state or county park or other large undeveloped land areas such as wooded areas, open space or farmland?		
	No.	Percent
Within sight	461	57.6
Within a mile or so	202	25.3
Within three miles	82	10.3
More than three miles away	54	6.8
DK/Refused	1	0.1
Total	800	100.1

Note: Percents in Tables 1b, 2, 3 and 4 total to 100.1% due to rounding. Also, in all tables, DK means “don’t know.”

Table 1c: Percent Hunters		
	% Population (16 years+) that are hunters*	% of Hunters that are Deer Hunters
U.S. *	5.89%	79.00%
Maryland **	2.80%	87.00%
Sample	7.90%	93.60%
* http://library.fws.gov/nat_survey2001_deerhunting.pdf		
** Data from 2000 Census: Total Population age 15 years and older		

Survey Results

We report the data from the survey in three sub-sections in this report: residents' contact with and views about deer; residents' views about deer management; and deer-environment and deer-human interaction.

Residents' contact with and views about deer

We were first interested in finding out how frequently Howard County residents actually see deer, both live deer and deer carcasses (Tables 2 and 3) and whether residents feel that there are too few, too many or about the right number of deer in the county (Table 4). More than eight in 10 residents (85.1 percent) reported seeing live deer sometimes, often or all the time in the county within the past year. Over three quarters (78.7 percent) reported seeing deer carcasses in the county sometimes, often or all the time. This suggests that the vast majority of county residents have at least visual interactions with both live deer and deer that have been killed in vehicular accidents.

Table 2		
How often would you say you have seen live deer in Howard County in the past year?		
	No.	Percent
Never	17	2.1
Rarely	103	12.9
Sometimes	147	18.4
Often	258	32.3
All the Time	275	34.4
Total	800	100.0

Table 3		
How often would you say you have seen deer carcasses on the side of the road or in the median in Howard County within the past year?		
	No.	Percent
Never	30	3.8
Rarely	141	17.6
Sometimes	262	32.8
Often	248	31.0
All the Time	119	14.9
Total	800	100.0

Table 4		
Do you personally believe that there are too many deer in Howard County, about the right number of deer or too few?		
	No.	Percent
Far too many	244	30.5
Somewhat too many	223	27.9
About Right	226	28.3
Somewhat too few	9	1.1
Far too few	3	0.4
DK	95	11.9
Total	800	100.0

These data support the next finding that nearly six in ten (58.4 percent) of county residents felt that there were either somewhat or far too many deer in the county (Table 4). Just over a quarter (28.3 percent) said that there were about the right number of deer in the county, and only 1.5 percent said that there were somewhat or far too few. More than one in ten (11.9 percent) did not know or had no opinion. Additionally, in answer to a later question, nearly nine in ten residents (87.0 percent) somewhat or strongly disagreed with the statement that “there are not enough deer in Howard County” (Table 5). These data strongly suggest that the great majority of residents believe that the county is home to too many deer.

Table 5

Please tell me whether you agree or disagree with the following statements. That is, do you agree strongly, somewhat agree, somewhat disagree or disagree strongly:

	Strongly Agree		Somewhat Agree		Somewhat Disagree		Strongly Disagree		Do Not Know		Total No.
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	
Enjoy seeing deer	329	41.0	345	43.1	60	7.5	60	7.5	6	0.8	800
Deer are nuisances	217	27.1	255	31.9	188	23.5	134	16.8	6	0.8	800
Not enough deer in county	11	1.4	46	5.8	263	32.9	433	54.1	47	5.9	800
Lyme disease is a problem	244	30.5	199	24.9	100	12.5	13	1.6	244	30.5	800
Auto-deer accidents are not a problem	8	1.0	115	14.4	276	34.5	274	34.3	127	15.9	800

Regardless of one's visual contact with deer or one's opinion about the number of deer in the county, one could have positive or negative attitudes, or both, toward deer. Indeed, this accurately portrays the views of Howard County residents (Table 5). More than eight in ten respondents (84.2 percent) enjoy seeing deer. Yet, a strong though smaller majority views deer as nuisances (59.0 percent). It is possible that these seemingly conflicting opinions are not conflicting at all. Deer, after all, are beautiful creatures. Yet, they do cause problems for residents as seen in responses to the following survey questions.

Most residents (55.4 percent), for example, agreed strongly or somewhat with the statement that Lyme disease is a problem in the county (Table 5). Only 14.1 percent disagreed and nearly one-third (30.5 percent) did not know. This may be because just about all (99.4 percent) residents are aware of Lyme disease (Table 6) and nearly two-thirds (63.7 percent) have either had Lyme disease (6.5 percent), or had a family member, relative or friend who has had Lyme disease (57.2 percent). See Table 7.

In answering a question later in the survey, residents also show a solid, though not a perfect understanding of the main method of transmission of Lyme disease (Table 8). Nearly all (94.8 percent) said that ticks, in some way, are the principal transmitters of Lyme disease: ticks alone (48.7 percent), deer and ticks (23.0 percent), or ticks on deer (22.8 percent) were the primary answers to this open-ended question.² Lyme disease is transmitted by black legged ticks, and deer are considered important in transporting ticks and maintaining tick populations.

² Interviewers did not read choices to respondents but recorded the respondents' answers and placed them into the categories shown in Table 10.

Table 6		
Have you heard of Lyme disease?		
	No.	Percent
Yes	795	99.4
No	5	0.6
Total	800	100.0

Table 7		
Have you, has anyone in your family or has a relative, friend or acquaintance had Lyme disease?		
	No.	Percent
You	52	6.5
Family Member	120	15.1
Other Relative	60	7.5
Friend or Acquaintance	275	34.6
No One	288	36.2
DK/Refused	5	0.6
Total	800	100.0

Table 8		
Can you tell me if you know how Lyme disease is transmitted?		
	No.	Percent
Deer (Alone)	6	0.8
Deer and Ticks	183	23.0
Deer and Anything Else	2	0.3
Tick (Alone)	387	48.7
Ticks Carried by Deer	181	22.8
Ticks Carried by Deer and Other Animals	2	0.3
DK/Not Sure	34	4.3
Total	800	100

More than two-thirds (68.8 percent) of county residents disagreed somewhat or strongly with the statement that “automobile accidents with deer are not a problem” in the county (Table 5) and only 15.4 percent agreed. About one in six residents (15.9 percent) had no opinion.

Residents' opinions about whether auto accidents with deer are or are not a problem in the county are probably affected by their frequency of seeing deer carcasses on the roadside (Table 3) and the frequency with which they experience auto accidents with deer. Regarding the latter, nearly half (49.5 percent) reported either having had an auto accident with a deer (17.3 percent), having a family member or other relative who had an auto-deer accident (16.4 percent), or having a friend who had an auto-deer accident (15.8 percent) within the past five years (Table 9).

As a result of these findings and other findings from this survey, it should not be surprising to learn that although county residents say that they enjoy seeing deer, residents also view deer as nuisances. As we will see later, these views clearly have affected residents' attitudes about deer management.

Table 9		
Have you, has anyone in your family, or has a relative, friend or acquaintance been involved in an auto accident with a deer within the past five years?		
	No.	Percent
You	138	17.3
Family Member	126	15.8
Other Relative	5	0.6
Friend or Acquaintance	126	15.8
No One	404	50.5
DK/Refused	1	0.1
Total	800	100.0

Residents' views about deer management

Next we asked several questions about deer management. We prefaced the first two such questions with the following statement:

*Some people believe that if Howard County wants to reduce its deer population, it should do so by using **non-lethal means**. That is, by methods other than hunting. Others believe that hunting is the only effective means to reduce the number of deer in the county.*

We then asked whether respondents would support the use of non-lethal means for deer management, *if such means were effective in reducing the deer population* (Table 10). Not surprisingly, a substantial majority of residents (70.5 percent) supported the use of non-lethal means, although about one in five were opposed (20.4 percent). Nearly one in ten (9.1 percent) did not know or had no opinion. We asked those who supported the use of non-lethal means whether they would also support hunting for deer management (Table 11). Two-thirds of residents said that they also supported hunting while about one-third would not.

Table 10		
If there were effective non-lethal means to reduce the number of deer in Howard County, would you support or oppose the use of non-lethal means?		
	No.	Percent
Strongly Support	321	40.1
Somewhat Support	243	30.4
Somewhat Oppose	79	9.9
Strongly Oppose	84	10.5
DK/Refused	73	9.1
Total	800	100.0

Table 11*		
Would you support the use of non-lethal means along with hunting or would you support only non-lethal means?		
	No.	Percent
Non-lethal means and hunting	374	66.3
Non-lethal means and no hunting	187	33.2
DK/Refused	3	0.5
Total	564	100.0

* Asked only of those who supported non-lethal means (Q.9)

We prefaced the next question about deer management with the following statement:

A managed hunt is when the county permits specially qualified hunters who have met safety and proficiency standards to hunt deer on county land. The managed hunts strictly regulate the specific location, date and hours of the hunt and the movement of hunters.

We then asked respondents whether they would support managed hunts *if non-lethal means were not effective to reduce the number of deer in the county* (Table 12). More than eight in ten (80.9 percent) said that they would support managed hunts under this circumstance. Fewer than one in five (18.5 percent) would oppose managed hunts if non-lethal means were not effective to reduce the number of deer in the county.

The next series of questions sought county residents' opinions on the importance of four factors in determining the methods that should be used to reduce the deer population in the county (Table 13). The results show that, while residents felt that all factors were important, safety of county residents was the most important: safety of county residents – 99.0 percent very or somewhat important; cost to the county – 87.1 very or somewhat important; effectiveness in reducing the number of deer – 86.8 percent very or somewhat important; humaneness to deer – 82.9 percent very or somewhat important.

The next set of questions asked about which methods to reduce the deer population in the county residents would prefer or oppose (Table 14). Slightly more than three-quarters of respondents preferred managed hunts (77.7 percent). Next came two non-lethal methods, where

majorities preferred contraception (59.6 percent) and capture and transfer of deer (55.7 percent). Three quarters (75.3 percent) opposed reintroducing predators to control the deer population. And three-quarters (77.5 percent) opposed doing nothing to reduce the deer population.

If non-lethal means are not effective to reduce the number of deer in Howard County, would you support the use of managed hunts?		
	No.	Percent
Strongly Support	414	51.8
Somewhat Support	233	29.1
Somewhat Oppose	49	6.1
Strongly Oppose	99	12.4
DK/Refused	5	0.6
Total	800	100.0

In your opinion, how important are each of the following factors in determining the methods that should be used to reduce the number of deer in Howard County?											
	Very Important		Somewhat Important		Not too important		Not important		Not sure		Total
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.
Humaneness to deer	393	49.1	270	33.8	67	8.4	62	7.8	8	1.0	800
Effectiveness reducing deer	423	52.9	271	33.9	92	11.5	7	0.9	7	0.9	800
Safety of residents	703	87.9	89	11.1	3	0.4	1	0.1	4	0.5	800
Cost	354	44.3	342	42.8	89	11.1	6	0.8	9	1.1	800

Which of the following methods to reduce the number of deer in Howard County would you prefer or oppose?											
	Strongly Prefer		Somewhat Prefer		Somewhat Oppose		Strongly Oppose		Do not know/Refused		Total
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.
Contraception	249	31.1	228	28.5	78	9.8	104	13.0	141	17.6	800
Reintroducing predators	35	4.4	107	13.4	171	21.4	431	53.9	56	7.0	800
Capture and transfer deer	214	26.8	231	28.9	166	20.8	182	22.8	7	0.9	800
Managed hunts	231	41.4	290	36.3	66	8.3	109	13.6	4	0.5	800
Do nothing	80	10.0	86	10.8	203	25.4	417	52.1	14	1.8	800

We next asked a series of questions to ascertain county residents' knowledge about the effectiveness of various means of reducing the deer population (Table 15). These data suggest that the county has an opportunity to provide information to residents about the effectiveness of various deer management options. To begin with, sizeable fractions of county residents said that they did not know how effective most options were. And for two options (contraception and predators), only small percentages thought that they were effective. The only option that a strong majority (82.9 percent) believed was effective was managed hunts, although nearly sixty percent thought capture and transfer was effective.

- Contraception – 33.0 percent effective; 22.4 percent not effective; and 44.6 percent don't know;
- Reintroducing predators – 28.7 percent effective; 36.2 percent not effective; and 35.0 percent don't know.
- Capture and transfer deer – 44.7 percent effective; 33.4 percent not effective; and 21.0 percent don't know;
- Managed hunts – 82.9 percent effective; 1.8 percent not effective and 15.4 don't know;
- Do nothing to reduce deer population – 1.7 percent effective; 84.6 percent not effective and 13.6 percent don't know.

Table 15											
To your knowledge, how effective would you say the following methods are to reduce a deer population?											
	Very Effective		Somewhat Effective		Not Too Effective		Not At All Effective		Not Sure		Total
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.
Contraception	73	9.1	191	23.9	65	8.1	114	14.3	357	44.6	800
Reintroducing predators	61	7.6	169	21.1	133	16.6	157	19.6	280	35.0	800
Capture and transfer deer	133	16.6	225	28.1	122	15.3	145	18.1	175	21.0	800
Managed hunts	340	42.5	323	40.4	8	1.0	6	0.8	123	15.4	800
Do nothing	9	1.1	5	0.6	93	11.6	584	73.0	109	13.6	800

These data suggest that residents do not have complete information about methods to control deer populations. The current scientific evidence shows that contraception does not work, except for herds that are isolated and easily accessible (e.g., on islands). Likewise, capture and transfer is not a viable option for at least four reasons. First, deer in some parts of the country suffer something known as chronic wasting disease and, as a result, capture and transfer in Maryland may not be a legal option. Second, to what area in the state would Howard County release its deer that does not already have an excessive deer population? Third, capture and transfer would be a very costly option. Finally, capture and transfer produces stress on deer and results in high mortality rates.³

³ See for example: <http://www.dnr.state.md.us/wildlife/options.html>;

Since 1998, Howard County has conducted managed hunts on county lands to control the county’s deer population. We sought to learn the extent to which county residents were aware of managed hunts (Table 16) and whether this knowledge affected their views about managed hunts (Table 17). More than two-thirds of county residents (68.7 percent) said that they knew that the county had been conducting managed hunts, and less than one-third (31.3 percent) did not. When asked if knowing this affected their opinions about managed hunts to reduce the deer population, 83.1 percent said it did not, 9.8 percent said it made them more likely to support managed hunts and 6.8 percent said it made them less likely to support managed hunts.

Table 16		
Are you aware that managed hunts have been conducted on Howard County lands to control the deer population since 1998?		
	No.	Percent
Yes	550	68.7
No	250	31.3
Total	800	100.0

Table 17		
Does the fact that managed hunts have been conducted since 1998 affect your opinion about hunting as a means of reducing the number of deer in the county?		
	No.	Percent
No, No Change	665	83.1
Less Likely	54	6.8
More Likely	78	9.8
Not Sure	3	0.4
Total	800	100.0

We followed this up by asking which hunting methods respondents would prefer should the county continue to use managed hunts (Table 18). About a third (35.0 percent) preferred the use of sharpshooters, 14.1 percent said bow and arrow, 7.9 percent said shotgun, 31.1 percent said any of the above (for a total of 88.1 percent indicating a preference for some form of managed hunts), while 10.6 percent said none of the above.⁴

⁴ Note that earlier (Table 14), 20.4 percent of respondents opposed managed hunts.

Table 18		
If Howard County continues to use managed hunts as a means to reduce the deer population, which, if any, of the following methods of managed hunts would you prefer most?		
	No.	Percent
Hunters Using Bows and Arrows	113	14.1
Hunters Using Shotguns	63	7.9
Trained and Licensed Sharpshooters Using Rifles	280	35.0
Any of the Above	249	31.1
None of the Above	85	10.6
DK/Refused	10	1.3
Total	800	100.0

According to DRP, about one-quarter (25 percent) or more of the meat from managed hunts in the county goes to charities to feed the hungry. We wanted to know the extent to which county residents were aware of this (Table 19) and whether this knowledge affected their views about managed hunts (Table 20). About one-third of county residents were aware that meat from managed hunts goes to charity (32.4 percent). And about the same fraction (34.7 percent) said that knowing this would make them more likely to support managed hunts to reduce the deer population in the county. Two-thirds (64.4 percent) said that this would not affect their opinions about managed hunts, and less than one percent said it would make them less likely to support managed hunts.

Table 19		
Are you aware that at least 25 percent of the meat from managed deer hunts in Howard County is donated to charities to feed the hungry?		
	No.	Percent
Yes	259	32.4
Not Sure	541	67.6
Total	800	100.0

Table 20		
Does knowing that at least 25 percent of the meat from these hunts is donated to feed the hungry affect your opinion about managed hunts as a means of reducing the number of deer in Howard County?		
	No.	Percent
Much More Likely	149	18.6
Somewhat More Likely	129	16.1
Somewhat Less Likely	4	0.5
Much Less Likely	3	0.4
No Effect on Opinion	515	64.4
Total	800	100.0

Deer-environment and deer-human interaction

We asked questions about a number of deer-environment and deer-human interactions, such as deer damage to shrubs, etc., auto accidents with deer, contraction of Lyme disease, and deer damage to forests. We asked these questions both to collect perceptual information and also to learn if these interactions affected respondents' attitudes toward deer and deer management.

Nearly two-thirds (61.5 percent) responded that deer had caused damage to their shrubs, trees, flowers, garden or crops within the past few years (Table 21). As indicated earlier in this report, nearly half of respondents reported that they, a family member, relative or a friend had had an auto accident with a deer within the past five years (Table 9); nearly all (99.4 percent) had heard of Lyme disease (Table 6); and nearly two-thirds of respondents (63.7 percent) reported that they, a family member, relative or a friend had contracted Lyme disease (Table 7).⁵

We also asked whether residents knew that deer over-population causes damage to forests (Table 22). Three-quarters (74.1 percent) said that they did. Two-thirds of residents (66.4 percent) also said that knowing that deer caused damage to forests would make them more likely to support a reduction in the deer population in the county (Table 23).

Table 21		
Have deer caused damage to your shrubs, trees, flowers, garden or crops within the past few years?		
	No.	Percent
Yes, A lot	263	32.9
Yes, A Little	229	28.6
No, None	308	38.5
Total	800	100.0

Table 22		
Are you aware that an over-abundant deer population causes damage to the County's forests, reduces the habitat for other species and reduces the ability of forests to regenerate?		
	No.	Percent
Yes	593	74.1
Not Sure	203	25.4
DK/Refused	4	0.5
Total	800	100.0

⁵ For the reported incidence of Lyme disease in Maryland and Howard County, see: Carson, Larry. 2008. *Lyme disease more than doubles in state*. Baltimore Sun. May 20, 2008, p. 5B. Also available at: <http://www.baltimoresun.com/news/local/howard/bal-md.ho.lyme20may20,0,2841273.story>. Carson also reported that the incidence of the disease had "...more than tripled in Howard County..."

Table 23		
Does knowing that an over-abundant deer population causes damage to the County's forests make you more likely or less likely to support reductions in the deer population in Howard County?		
	No.	Percent
Much More Likely	269	33.6
Somewhat More Likely	262	32.8
Somewhat Less Likely	3	0.4
Much Less Likely	3	0.4
No Effect	258	32.3
DK/Refused	5	0.6
Total	800	100.0

Summary and Conclusions

This survey provides compelling evidence that county residents enjoy seeing deer but also believe that deer are nuisances and that the deer population in the county should be reduced. These views provide strong support for county decisions regarding controlling and the methods of controlling the deer population in the county. The principal findings from this survey are:

- Large majorities of Howard County residents have seen both live deer and deer carcasses in Howard county in the past year;
- Residents enjoy seeing deer, but they also view deer as nuisances;
- Most residents believe that there are too many deer in the county;
- Most residents believe that Lyme disease is a problem in the county and many believe that deer are an important factor in transmitting Lyme disease;
- Most residents said that automobile-deer accidents are a problem in the county, and half have either had an auto-deer accident or know someone who has had one;
- A large majority reported deer damage to their shrubs, flowers, gardens, or crops;
- A large majority understood that an excessive population of deer does damage to the county's forests;
- Although large majorities supported non-lethal means to reduce the county's deer population if those means were effective, two-thirds supported hunting to reduce the county's deer population;
- Large majorities were concerned about humaneness, effectiveness and cost to the county of methods of reducing the deer population, but the greatest majority was concerned about safety to county residents;
- Large majorities of residents also supported various methods to reduce the deer population, except for reintroducing predators; the greatest percentage preferred managed hunts;

- The greatest fraction of residents believed that managed hunts were the most effective method of reducing the deer population; and
- Few residents were aware that a quarter of the meat from managed hunts is donated to feed the hungry, but one-third said that this knowledge would make them more likely to support managed hunts.

Some of the data from the study indicate that Howard County government has a teaching opportunity at hand. County residents would benefit from having objective, scientific information about the number of deer in the county and about the effects of an excessive deer population on the county and its citizens. Residents would also benefit from information about alternative methods of deer population control and the cost-effectiveness of those methods. Such information would be valuable in overcoming misconceptions about deer and deer management that are identified in this survey and would serve to better inform the discussion around deer management in the county.

Howard County, Maryland, is a relatively small county both in terms of geography and population. The county is also home to an affluent, well-educated population. Other things being equal, one might assume that a population with these particular characteristics would not be positively disposed toward the use of lethal means, i.e., hunting, to control a deer population. Yet, not only do substantial majorities of Howard County residents believe that the county's deer population is too large, substantial majorities also report that use of managed hunts is their preferred means to reduce the deer population.

These and other findings generally support current county deer management policy and practice. DRP officials and staff and county officials should use these results as they continue to fine-tune the county's deer management policy and practice over time.

About the Author

Donald F. Norris is Professor and Chair of the Department of Public Policy, and Director of the Maryland Institute for Policy Analysis and Research (MIPAR). Dr. Norris is a specialist in public management, urban politics, and the application, uses and impacts of information technology (including e-government) in public organizations. He has conducted surveys and analyzed survey data throughout an academic career of more than 35 years.

Dr. Norris teaches courses in public management and urban affairs. As MIPAR Director, he oversees the work of UMBC's principal social science and policy research institute with current (FY2008) annual external funding of \$3.5 million.

Dr. Norris has authored three books (including one forthcoming in 2009), has edited or co-edited four books, and has contributed chapters to 22 others. He has published 27 articles and four book reviews in scholarly journals and has authored or co-authored more than 60 research reports and monographs and over 50 scholarly papers on a variety of issues. He has consulted with local and state governments in a wide range of areas in public policy and management.

Dr. Norris holds a B.S. in history from the University of Memphis and an M.A. and a Ph.D. in government from the University of Virginia.

He can be reached at norris@umbc.edu or via the following urls: www.umbc.edu/mipar and www.umbc.edu/pubpol.

Appendix A: Survey Instrument

FINAL COPY

(rev.4-11-08)

Instrument for Howard County Deer Management Survey

Good evening, my name is _____ and I am calling on behalf of the University of Maryland, Baltimore County. I am calling residents of Howard County, Maryland, to ask them about deer and deer management in the county.

1. How often would you say you have seen live deer in Howard County, just in Howard County, in the past year? (Choose one.)

1=	NEVER
2=	RARELY
3=	SOMETIMES
4=	OFTEN
5=	ALL THE TIME
6=	DON'T KNOW/NO OPINION

2. How often would you say you have seen deer carcasses on the side of the road or in the median in Howard County within the past year? (Choose one.)

1=	NEVER
2=	RARELY
3=	SOMETIMES
4=	OFTEN
5=	ALL THE TIME
6=	DON'T KNOW/NO OPINION

3. Do you personally believe that there are too many deer in Howard County, about the right number of deer or too few? Are there: (Choose one.)

1=	FAR TOO MANY DEER IN HOWARD COUNTY
2=	SOMEWHAT TOO MANY
3=	ABOUT THE RIGHT NUMBER
4=	SOMEWHAT TOO FEW
5=	FAR TOO FEW
6=	DON'T KNOW/NO OPINION

Please tell me whether you agree or disagree with the following statements. That is, do you agree strongly, somewhat agree, somewhat disagree or disagree strongly:

4. I enjoy seeing deer

1=	STRONGLY AGREE
2=	SOMEWHAT AGREE
3=	SOMEWHAT DISAGREE
4=	STRONGLY DISAGREE
5=	DK/REFUSED

5. Deer are nuisances

1=	STRONGLY AGREE
2=	SOMEWHAT AGREE
3=	SOMEWHAT DISAGREE
4=	STRONGLY DISAGREE
5=	DK/REFUSED

6. There are not enough deer in Howard County

1=	STRONGLY AGREE
2=	SOMEWHAT AGREE
3=	SOMEWHAT DISAGREE
4=	STRONGLY DISAGREE
5=	DK/REFUSED

7. Lyme disease is a problem in Howard County

1=	STRONGLY AGREE
2=	SOMEWHAT AGREE
3=	SOMEWHAT DISAGREE
4=	STRONGLY DISAGREE
5=	DK/REFUSED

8. Automobile accidents involving deer in Howard County are not a problem

1=	STRONGLY AGREE
2=	SOMEWHAT AGREE
3=	SOMEWHAT DISAGREE
4=	STRONGLY DISAGREE
5=	DK/REFUSED

Now let me ask you some questions about deer management in Howard County.

Some people believe that if Howard County wants to reduce its deer population, it should do so by using **non-lethal means**. That is, by methods other than hunting. Others believe that hunting is the only effective means to reduce the number of deer in the county.

9. *If there were effective non-lethal means to reduce the number of deer* in Howard County, would you support or oppose the use of non-lethal means? That is, would you: (Choose one.)

1=	STRONGLY SUPPORT
2=	SOMEWHAT SUPPORT
3=	SOMEWHAT OPPOSE – SKIP TO Q11
4=	STRONGLY OPPOSE – SKIP TO Q11
5=	DK/REFUSED – SKIP TO Q11

10. *If respondent says any variant of “support,” ask:* Would you support the use of non-lethal means along with hunting or would you support only non-lethal means? That is, would you support: (Choose one.)

1=	NON-LETHAL MEANS AND HUNTING TOGETHER
2=	NON-LETHAL MEANS ALONE, AND NO HUNTING
3=	DK/REFUSED

A managed hunt is when the county permits specially qualified hunters who have met safety and proficiency standards to hunt deer on county land. The managed hunts strictly regulate the specific location, date and hours of the hunt and the movement of the hunters.

11. If *non-lethal means are not effective to reduce the number of deer* in Howard County, would you support the use of *managed hunts*? Would you: (Choose one.)

1=	STRONGLY SUPPORT
2=	SOMEWHAT SUPPORT
3=	SOMEWHAT OPPOSE
4=	STRONGLY OPPOSE
5=	DK/REFUSED

In your opinion, how important are each of the following factors in determining the methods that should be used to reduce the number of deer in Howard County?

Factors

12. Humaneness to deer

1=	VERY IMPORTANT
2=	SOMEWHAT IMPORTANT
3=	NOT TOO IMPORTANT
4=	NOT AT ALL IMPORTANT
5=	NOT SURE

13. Effectiveness in reducing the number of deer

1=	VERY IMPORTANT
2=	SOMEWHAT IMPORTANT
3=	NOT TOO IMPORTANT
4=	NOT AT ALL IMPORTANT
5=	NOT SURE

14. Safety of county residents

1=	VERY IMPORTANT
2=	SOMEWHAT IMPORTANT
3=	NOT TOO IMPORTANT
4=	NOT AT ALL IMPORTANT
5=	NOT SURE

15. Cost to the county

1=	VERY IMPORTANT
2=	SOMEWHAT IMPORTANT
3=	NOT TOO IMPORTANT
4=	NOT AT ALL IMPORTANT
5=	NOT SURE

Which of the following methods to reduce the number of deer in Howard County *would you prefer or oppose?*

16. Contraception

1=	STRONGLY PREFER
2=	SOMEWHAT PREFER
3=	SOMEWHAT OPPOSE
4=	STRONGLY OPPOSE
5=	DK/REFUSED

17. Reintroducing predators

1=	STRONGLY PREFER
2=	SOMEWHAT PREFER
3=	SOMEWHAT OPPOSE
4=	STRONGLY OPPOSE
5=	DK/REFUSED

18. Capture and transfer deer

1=	STRONGLY PREFER
2=	SOMEWHAT PREFER
3=	SOMEWHAT OPPOSE
4=	STRONGLY OPPOSE
5=	DK/REFUSED

19. Managed hunts

1=	STRONGLY PREFER
2=	SOMEWHAT PREFER
3=	SOMEWHAT OPPOSE
4=	STRONGLY OPPOSE
5=	DK/REFUSED

20. Do nothing to reduce the deer population

1=	STRONGLY PREFER
2=	SOMEWHAT PREFER
3=	SOMEWHAT OPPOSE
4=	STRONGLY OPPOSE
5=	DK/REFUSED

21. Do something else? (*Interviewer, do not read "something else," but record answer verbatim*)

To your knowledge, **how effective** would you say the following methods are to reduce a deer population?

22. Contraception

1=	VERY EFFECTIVE
2=	SOMEWHAT EFFECTIVE
3=	NOT TOO EFFECTIVE
4=	NOT AT ALL EFFECTIVE
5=	NOT SURE

23. Reintroducing predators

1=	VERY EFFECTIVE
2=	SOMEWHAT EFFECTIVE
3=	NOT TOO EFFECTIVE
4=	NOT AT ALL EFFECTIVE
5=	NOT SURE

24. Capture and transfer deer

1=	VERY EFFECTIVE
2=	SOMEWHAT EFFECTIVE
3=	NOT TOO EFFECTIVE
4=	NOT AT ALL EFFECTIVE
5=	NOT SURE

25. Managed hunts

1=	VERY EFFECTIVE
2=	SOMEWHAT EFFECTIVE
3=	NOT TOO EFFECTIVE
4=	NOT AT ALL EFFECTIVE
5=	NOT SURE

26. Do nothing to reduce the deer population

1=	VERY EFFECTIVE
2=	SOMEWHAT EFFECTIVE
3=	NOT TOO EFFECTIVE
4=	NOT AT ALL EFFECTIVE
5=	NOT SURE

27. Something else (*Interviewer, only if they said "something else" previously*)

1=	VERY EFFECTIVE
2=	SOMEWHAT EFFECTIVE
3=	NOT TOO EFFECTIVE
4=	NOT AT ALL EFFECTIVE
5=	NOT SURE

28. Are you aware that managed hunts have been conducted on Howard County lands to control the deer population since 1998?

1=	YES
2=	NO
3=	REFUSED

29. Does the fact that managed hunts have been conducted since 1998 affect your opinion about hunting as a means of reducing the number of deer in the county? (Choose one.)

1=	NO, DOES NOT CHANGE YOUR OPINION
2=	YES, MAKES YOU LESS LIKELY TO SUPPORT MANAGED HUNTS
3=	YES, MAKES YOU MORE LIKELY TO SUPPORT MANAGED HUNTS
4=	DON'T KNOW/NO ANSWER

30. If Howard County continues to use managed hunts as a means to reduce the deer population, which, if any, of the following methods of managed hunts would you prefer most? Let me read the following methods to you and then please choose only one. *(Interviewer, be sure to read all before recording answer.)*

1=	HUNTERS USING BOWS AND ARROWS
2=	HUNTERS USING SHOTGUNS
3=	TRAINED AND LICENSED SHARPSHOOTERS USING RIFLES
4=	ANY OF THE ABOVE
5=	NONE OF THE ABOVE
6=	DON'T KNOW / REFUSED [DO NOT READ]

31. Have deer caused damage to your shrubs, trees, flowers, garden or crops within the past few years? (Choose one.)

1=	YES, A LOT
2=	YES, A LITTLE
3=	NO, NONE
4=	DON'T KNOW/NO OPINION

32. Have you, has anyone in your family, or has a relative, friend or acquaintance been involved in an auto accident with a deer within the past five years?

1=	YOU
2=	FAMILY MEMBER
3=	OTHER RELATIVE
4=	FRIEND OR ACQUAINTANCE
5=	NO ONE – SKIP TO Q34
6=	DON'T KNOW / REFUSED – SKIP TO Q34

33. Has anyone else you know been involved in an auto accident with a deer within the past five years?

1=	YOU
2=	FAMILY MEMBER
3=	OTHER RELATIVE
4=	FRIEND OR ACQUAINTANCE
5=	NO ONE –
6=	DON'T KNOW / REFUSED –

34. Have you heard of Lyme disease?

1=	YES
2=	NO – SKIP TO Q39
3=	REFUSED – SKIP TO Q39

35. Have you, has anyone in your family or has a relative, friend or acquaintance had Lyme disease?

1=	YOU
2=	FAMILY MEMBER
3=	OTHER RELATIVE
4=	FRIEND OR ACQUAINTANCE
5=	NO ONE – SKIP TO Q37
6=	DON'T KNOW / REFUSED – SKIP TO Q37

36. Has anyone else you know had Lyme disease?

1=	YOU
2=	FAMILY MEMBER
3=	OTHER RELATIVE
4=	FRIEND OR ACQUAINTANCE
5=	NO ONE
6=	DON'T KNOW / REFUSED

37. Can you tell me if you know how Lyme disease is transmitted? (*Interviewer: Do not read the choices, but record respondent's answer*)

1=	DON'T KNOW/NOT SURE – SKIP TO Q39
2=	DEER (ALONE)
3=	DEER AND TICKS
4=	DEER AND ANYTHING ELSE
5=	TICKS (ALONE)
6=	TICKS CARRIED BY DEER
7=	TICKS CARRIED BY DEER AND OTHER ANIMALS
8=	TICKS CARRIED BY ANIMALS OTHER THAN DEER
9=	WALKING IN THE WOODS
10=	other (<i>Interviewer, do not read "other" but record response verbatim</i>)

38. Are you aware of any other way Lyme disease is transmitted? (*Interviewer: Do not read the choices, but record respondent's answer*)

1=	NO - DON'T KNOW/NOT SURE
2=	DEER (ALONE)
3=	DEER AND TICKS
4=	DEER AND ANYTHING ELSE
5=	TICKS (ALONE)
6=	TICKS CARRIED BY DEER
7=	TICKS CARRIED BY DEER AND OTHER ANIMALS
8=	TICKS CARRIED BY ANIMALS OTHER THAN DEER
9=	WALKING IN THE WOODS
10=	other (<i>Interviewer, do not read "other" but record response verbatim</i>)

39. Are you aware that at least 25 percent of the meat from managed deer hunts in Howard County is donated to charities to feed the hungry?

1=	YES
2=	NO
3=	REFUSED

40. Does knowing that at least 25 percent of the meat from these hunts is donated to feed the hungry affect your opinion about hunting as a means of reducing the number of deer in Howard County? (Choose one.)

1=	MUCH MORE LIKELY
2=	SOMEWHAT MORE LIKELY
3=	SOMEWHAT LESS LIKELY
4=	MUCH LESS LIKELY
5=	NO EFFECT ON OPINION – DO NOT READ
6=	REFUSED (DO NOT READ)

41. Are you aware that an over-abundant deer population causes damage to the County's forests by consuming shrubs and small trees, thereby reducing the habitat for other species and reducing the ability of forests to regenerate?

1=	YES
2=	NO
3=	REFUSED

42. Does knowing that an over-abundant deer population causes damage to the County's forests make you more likely or less likely to support reductions in the deer population in Howard County? (Choose one.)

1=	MUCH MORE LIKELY
2=	SOMEWHAT MORE LIKELY
3=	SOMEWHAT LESS LIKELY
4=	MUCH LESS LIKELY
5=	NO EFFECT ON OPINION - DO NOT READ
6=	REFUSED (DO NOT READ)

Now, I'm going to ask you some questions about you and your family.

43. Are you a hunter?

1=	YES
2=	NO- SKIP TO Q45
3=	REFUSED -SKIP TO Q45

44. Are you a deer hunter?

1=	YES
2=	NO
3=	REFUSED

45. How close is your home to a state or county park or other large undeveloped land areas such as wooded areas, open space or farmland? Let me read the following choices to you and then please select one.

1=	WITHIN SIGHT; THAT IS, YOU CAN SEE IT FROM YOUR HOME
2=	WITHIN A MILE OR SO
3=	WITHIN THREE MILES
4=	MORE THAN THREE MILES AWAY
5=	DON'T KNOW/NO ANSWER

46. What is your zip code?

47. How old are you?

1=	18-25
2=	26-35
3=	36-55
4=	56-64
5=	65 or older
6=	refused

48. Record Gender?

1=	MALE
2=	FEMALE

49. What is your race or ethnicity?

1=	White/Caucasian
2=	Black/African-American
3=	Hispanic/Latino
4=	Asian of Pacific Islander
5=	Native-American or Alaskan Native
6=	OTHER
7=	REFUSED

50. What is your highest level of education?

1=	DID NOT COMPLETE HIGH SCHOOL
2=	HIGH SCHOOL/GED
3=	SOME COLLEGE
4=	COLLEGE DEGREE
5=	GRADUATE OR PROFESSIONAL DEGREE
6=	REFUSED

51. What is your annual family income; that is the combined income that all members of your family living at your current address earned last year? *(Interviewer – do not read the choices but put the respondent's answer in the correct category. Read only if respondent does not volunteer number.)*

1=	less than \$25,000
2=	\$25,000 to \$49,999
3=	\$50,000 to \$74,999
4=	\$75,000 to \$99,999
5=	\$100,000 to \$149,999
6=	\$150,000 or more
7=	refused

Thank you for participating in the survey. *(If respondent asks for the results of the survey, give this address to request the survey: mipar_info@.umbc.edu)*

Appendix B: Advisory Committee Members

Adams, Lowell	Howard County Department of Recreation and Parks Advisory Board
Broida, Gail	Columbia Council, Town Center Representative
Cederbaum, Sandy	Oakland Mills Village Manager
Eacker, Georgia	Howard County Cooperative Extension
Eyler, Brian	Maryland State Department of Natural Resources
Farragut, Paul	Middle Patuxent Environmental Foundation
Feaga, Howie	Howard County Farm Bureau
Frank, John	Howard County Antique Farm Machinery Club
Grill, Jennifer	Animal Advocates of Howard County
Heffernan, Kevin	Howard County Bird Club
Hudson, Cathy	Howard County Citizens Assoc.
Odum, Linda	Wilde Lake Village Board
Petry, Patti	Harpers Choice Village Board
Polniasczek, Ron and Susan	Audubon Society
Rhodehamel, Chick	Columbia Association
Romack, Alan	Owen Brown Community Association
Salatel, Frank	River Hill Community Association
Schumacher, Meg	Howard County Conservancy
Smith, Susan	River Hill Community Association
Solem, Bob and Jo	Howard County Bird Club
Stewart, Pearl Atkinson	Owen Brown Community Association
Timko, George	Maryland Department of Natural Resources
Uphouse, Sarah	Long Reach Community Association

Note: The representative of Animal Advocates of Howard County was a member of the Advisory Committee but has stated that she does not agree with survey questions or results.



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