

# **Knowledge, attitudes, and opinions about human-wildlife conflicts held by community leaders in Virginia**

Regina M. Elsner

Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements of the degree of

Master of Science  
In  
Fisheries and Wildlife Sciences

Dr. James Parkhurst, Co-Chair  
Dr. Steve L. McMullin, Co-Chair  
Dr. Bruce Goldstein, Committee Member  
Dr. Eric Hallerman, Department Head

July 25, 2008  
Blacksburg, Virginia

Keywords: Co-management, human-wildlife conflicts, human dimensions of wildlife, local government, shared management, Virginia

Copyright 2008, Regina Elsner

# **Knowledge, attitudes, and opinions about human-wildlife conflicts held by community leaders in Virginia**

Regina Elsner

## **ABSTRACT**

Using a mail survey, I questioned 490 representatives of local government (i.e., elected officials, administrative officials, animal control officers, and county Cooperative Extension agents) about their understanding of human-wildlife conflicts in their communities, and their receptivity to participating in co-management partnerships with regulatory agencies. Response rates for the mail survey of these four populations ranged from 25.2% to 75.9%. Knowledge of and perceptions about human-wildlife conflicts varied among leader subpopulations, as did their assessment of risks associated with and prioritization of human-wildlife conflicts. Animal control and Extension personnel displayed greater knowledge about wildlife, expressed greater concern about potential risks, and assigned higher priority to human-wildlife conflicts in their community.

Respondents indicated that wildlife complaints are being received from constituents in their community, but questions exist over who is responsible for managing these conflicts. Most respondents indicated a willingness to become involved in conflict resolution, but indicated less willingness for local government to take on a leadership role. Respondents could identify potential partners valuable to resolving human-wildlife conflicts, but they demonstrated uncertainty about the specific roles and responsibilities of these outside agencies (e.g., Virginia Department of Game and Inland Fisheries). Respondents identified important potential impediments (i.e., financial and personnel resources, the need to provide additional training or equipment) that could preclude or reduce their ability to become involved in conflict resolution.

Most respondents viewed community-based co-management approaches as realistic (74%) and attractive (63%) options for local governments to exercise in managing human-wildlife conflicts. Most respondents (74%) believed that co-management offered local governments a direct way to be involved in managing their own conflicts. Respondents believed that staffing and budget shortages would be significant impediments that would limit local government's participation in co-management agreements.

This study clearly illustrates that human-wildlife conflicts are occurring in Virginia, but overall local governments are not at a point when they are willing or able to consider a proactive approach to managing these conflicts. Until some threshold is met or exceeded, leaders in these communities may not be willing to devote the time or resources necessary to enact proactive approaches. Before that threshold is met, the development and utilization of informational and educational resources can increase local government's capacity to develop and implement a comprehensive wildlife management plan for Virginia communities in the future.

## **ACKNOWLEDGEMENTS**

I would like to take this opportunity to everyone who has journeyed with me as this project has taken shape. I truly appreciate all the encouragement and challenges that have allowed me to grow as a scholar and natural resources professional.

First, I would like to thank my co-advisors, Drs. Jim Parkhurst and Steve McMullin. Both of them have greatly influenced my graduate education. Steve, I would like to thank you for taking the time to counsel me at the MRPD course in January 2005. Before these conversations, I was unsure how to pursue my goals of integrating sound science in the application of public policy. Jim, I would like to thank you for the opportunity to work on a project that has provided me with valuable insights in the application of wildlife management in everyday situations. Thank you for constantly challenging me and forcing me outside of my academic comfort zone. Those have been some of the most truly valuable lessons I've gained. I would also like to thank Dr. Bruce Goldstein for his guidance and sound advice at various points during this project.

I would like to thank all my friends and fellow graduate students who have stood by each other through all our struggles and joys. To Amy Carrozzino, Meghann Vincie, Sarah Orlofske, and Sarah Kozlowski, I have truly enjoyed getting to know each of you and look forward to continuing our friendships, even as we all begin to move on from our Blacksburg homes. I would also like to thank Ann Wanasz, Kelli Stephenson, and Terri Schroeder for their support, from all across the country.

I would like to thank my family for their undying love and faith. All my life you each have had a hand in making me the person I am today, thank you. Mom, thank you for always believing in me and letting me follow my dreams to Texas and Virginia.



Finally, I would like to thank my wonderful husband, Kenny. Thank you for cleaning the house and providing a comfortable loving place for me to retreat to when I needed it the most.

You are my hero in so many ways.

## TABLE OF CONTENTS

<b>ACKNOWLEDGEMENTS</b> .....	iv
<b>LIST OF FIGURES</b> .....	viii
<b>LIST OF TABLES</b> .....	xii
<b>CHAPTER 1: INTRODUCTION AND JUSTIFICATION, LITERATURE REVIEW, AND OBJECTIVES</b> .....	1
<b>Introduction and Justification</b> .....	1
<b>Literature Review</b> .....	4
<i>Causes of human-wildlife conflicts.</i> .....	4
<i>Types of human-wildlife conflicts..</i> .....	6
<i>Who handles human-wildlife conflicts.</i> .....	8
<i>Case studies of community-based human-wildlife conflict management.</i> .....	10
<b>Objectives</b> .....	17
<b>CHAPTER 2: METHODS</b> .....	20
<b>Focus Groups</b> .....	20
<b>Survey Instrument</b> .....	21
<i>Questionnaire content and purpose.</i> .....	23
<b>Non-Response Analysis</b> .....	23
<b>Data Analysis</b> .....	24
<b>CHAPTER 3: FOCUS GROUP RESULTS AND SURVEY RESULTS</b> .....	27
<b>Focus Group Results</b> .....	27
<i>Task #1: Define “wildlife”</i> .....	27
<i>Task #2: Establish common ground on human-wildlife interaction..</i> .....	27
<i>Task #3: Establish relative importance of human-wildlife conflicts.</i> .....	30
<i>Task #4: Examine role of local governance in conflict resolution..</i> .....	30
<i>Task #5: Determine opinion on concept of shared management responsibilities.</i> .....	32
<b>Survey Results</b> .....	32
<i>Response rates.</i> .....	32
<i>Non-response results</i> .....	33
<i>Characterization of respondents.</i> .....	35
<i>Knowledge and perceptions of human-wildlife conflicts in Virginia communities..</i> .....	36

<i>Roles and responsibilities of communities in managing human-wildlife conflicts.</i> .....	43
<i>Knowledge, perceptions, and opinions about community-based co-management.</i> .....	47
<i>Influences of demographic characteristics.</i> .....	51
<b>CHAPTER 4: DISCUSSION, MANAGEMENT RECOMMENDATIONS, AND FUTURE</b>	
<b>RESEARCH</b> .....	58
<b>Discussion</b> .....	58
<i>Respondents' knowledge of wildlife and wildlife complaints.</i> .....	58
<i>Records of human-wildlife conflicts</i> .....	59
<i>Community response to human-wildlife conflicts</i> .....	61
<i>Application of Geographic Information Systems technology.</i> .....	62
<i>Concern and priorities of community leaders.</i> .....	63
<i>Roles and responsibilities of communities in managing human-wildlife conflicts</i> .....	65
<i>Impediments to local government involvement in human-wildlife conflict resolution.</i> ....	68
<i>Knowledge, perceptions, and opinions about community-based co-management.</i> .....	69
<b>Management Recommendations</b> .....	72
<i>Educational outreach</i> .....	72
<i>Informational resources</i> .....	76
<b>Future Research</b> .....	78
<b>SUMMARY</b> .....	81
<b>LITERATURE CITED</b> .....	84
<b>APPENDIX A: Demographic Comparisons</b> .....	142
<b>APPENDIX B: Mail Questionnaire</b> .....	190
<b>APPENDIX C: Cover Letters and Postcards</b> .....	203
<b>APPENDIX D: Non-response Questionnaire</b> .....	208
<b>APPENDIX E: IRB Approvals</b> .....	212

## LIST OF FIGURES

Figure 3. 1. Age of respondent, categorized by subpopulation group, from a mail survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. ....	89
Figure 3. 2. Respondents' description of the type of community they served, categorized by subpopulation group, from a mail survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	89
Figure 3. 3. Respondents' characterization of the size of community they served, categorized by subpopulation group, from a mail survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	90
Figure 3. 4. Respondents' characterization of the size of community served, as compared to their stated opinion of type of community they represent, from a mail survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	90
Figure 3. 5. Reported frequency of wildlife complaints received during FY2007, categorized by respondent subpopulation, in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008 ( $G=120.410$ , $df=12$ , $p<0.0005$ ). ....	91
Figure 3. 6. Reported frequency of wildlife complaints received during FY2005 and FY2006, categorized by respondent subpopulation, in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008 ( $G=114.747$ , $df=12$ , $p<0.0005$ ). ....	91
Figure 3. 7. Respondents' concern about risks to human health associated with human-wildlife conflicts, categorized by one's level of knowledge of taxonomic group inclusion in the term "wildlife.".....	92
Figure 3. 8. Respondents' concern about risks to human health associated with human-wildlife conflicts, categorized by one's opinion on whether to include domestic animals in the definition of "wildlife." .....	92
Figure 3. 9. Respondents' concern about risks to human health associated with human-wildlife conflicts, categorized by one's opinion on whether to include feral animals in the definition of "wildlife.".....	93
Figure 3. 10. Respondents' concern about risks to human health associated with human-wildlife conflicts, categorized by one's opinion on whether such interactions always refer to a negative situation.....	93

Figure 3. 11. Respondents’ prioritization of human-wildlife conflicts, categorized by one’s opinion on whether such interactions always refer to a negative situation.....	94
Figure 3. 12. Respondents’ prioritization of developing and implementing a comprehensive wildlife conflict resolution program, categorized by one’s level of knowledge of taxonomic group inclusion in the term “wildlife.” .....	94
Figure 3. 13. Respondents’ prioritization of developing and implementing a comprehensive wildlife conflict resolution program, categorized by one’s opinion on whether to include domestic animals in the definition of “wildlife.” .....	95
Figure 3. 14. Respondents’ prioritization of developing and implementing a comprehensive wildlife conflict resolution program, categorized by one’s opinion on whether to include feral animals in the definition of “wildlife.” .....	95
Figure 3. 15. Respondents’ prioritization of developing and implementing a comprehensive wildlife conflict resolution program, categorized by one’s opinion on whether human-wildlife interactions always refer to a negative situation. ....	96
Figure 3. 16. Respondents’ agreement or disagreement that local government plays an important decision-making role in managing human-wildlife interactions, categorized by one’s prioritization of human-wildlife conflicts. ....	96
Figure 3. 17. Respondents’ agreement or disagreement that local government should not be expected to take on additional responsibilities without receiving additional resources, categorized by one’s prioritization of human-wildlife conflicts. ....	97
Figure 3. 18. Respondents’ agreement or disagreement that local government plays an important decision-making role in the management of human-wildlife conflicts, categorized by their expressed level of concern about the risk to human safety from such conflicts. ....	97
Figure 3. 19. Respondents’ agreement or disagreement that local government should not be expected to take on additional responsibilities without being provided additional resources, categorized by their expressed level of concern about the risk to human safety from such conflicts.....	98
Figure 3. 20. Respondents’ agreement or disagreement that local government plays an important decision-making role in the management of human-wildlife conflicts, categorized by one’s expressed concern about the risk of property damage from such conflicts. ....	98

Figure 3. 21. Respondents’ agreement or disagreement that local governments should play a central decision-making role in the management of human-wildlife conflict, categorized by one’s expressed level of concern about the risk of property damage from such conflicts. ....	99
Figure 3. 22. Respondents’ agreement or disagreement that local government should assume leadership in the management of human-wildlife conflict, categorized by one’s expressed level of concern about the risk of property damage from such conflicts.....	99
Figure 3. 23. Respondents’ agreement or disagreement that local governments require technical assistance to manage human-wildlife conflicts, categorized by one’s prioritization of human-wildlife conflicts. ....	100
Figure 3. 24. Respondents’ agreement or disagreement that local governments require financial assistance to manage human-wildlife conflicts, categorized by one’s prioritization of human-wildlife conflicts. ....	100
Figure 3. 25. Respondents’ agreement or disagreement that local governments lack the legislative authority necessary to manage human-wildlife conflict, categorized by one’s prioritization of human-wildlife conflicts. ....	101
Figure 3. 26. Respondents’ agreement or disagreement that local government needs financial assistance to manage human-wildlife conflicts, categorized by one’s expressed level of concern about the risks to human safety from such conflicts.....	101
Figure 3. 27. Respondents’ agreement or disagreement that local government needs financial assistance to manage human-wildlife conflicts, categorized by one’s expressed level of concern about the risk of property damage from such conflicts.....	102
Figure 3. 28. Respondents’ agreement or disagreement that co-management is a realistic option for managing human-wildlife conflicts, categorized by one’s prioritization of human-wildlife conflicts.....	102
Figure 3. 29. Respondents’ agreement or disagreement that insufficient staff numbers would likely limit local government’s participation in co-management, categorized by one’s prioritization of human-wildlife conflicts.....	103
Figure 3. 30. Respondents’ agreement or disagreement that local government is willing to partner with other state agencies, categorized by one’s prioritization of human-wildlife conflicts. ....	103

Figure 3. 31. Respondents’ agreement or disagreement that local government is willing to assume responsibility in the management of human-wildlife conflicts, categorized by one’s prioritization of human-wildlife conflicts. .... 104

Figure 3. 32. Respondents’ agreement or disagreement that co-management is a realistic option for managing human-wildlife conflicts, categorized by the expressed level of concern about the risk to human safety from such conflicts. .... 104

Figure 3. 33. Respondents’ agreement or disagreement that local government is willing to assume responsibility in the management of human-wildlife conflicts, categorized by the expressed level of concern about the risk to human safety from such conflicts. .... 105

Figure 3. 34. Respondents’ agreement or disagreement that co-management is a realistic option for managing human-wildlife conflicts, categorized by one’s expressed concern about the risk of property damage from such conflicts. .... 105

Figure 3. 35. Respondents’ agreement or disagreement that local government is willing to assume responsibility in the management of human-wildlife conflicts, categorized by one’s expressed concern about the risk of property damage from such conflicts. .... 106

## LIST OF TABLES

Table 3. 1. Analysis comparing responses and opinions of respondents vs. non-respondents among administrative officials to a survey about human-wildlife conflicts in Virginia communities, conducted during winter of 2007-2008.....	107
Table 3. 2. Analysis comparing responses and opinions of respondents vs. non-respondents among elected officials to a survey about human-wildlife conflicts in Virginia communities, conducted during winter of 2007-2008.....	108
Table 3. 3. Analysis comparing demographic characteristics of respondent vs. non-respondent administrative and elected officials to a survey about human-wildlife conflicts in Virginia communities, conducted during winter of 2007-2008.....	109
Table 3. 4. Analysis of responses about length of service (in years) of respondent vs. non-respondent administrative and elected officials in a survey about human-wildlife conflicts in Virginia communities, conducted during winter of 2007-2008.....	109
Table 3. 5. Relationships between respondent subpopulation and opinion on whether a taxonomic group belonged in the definition of wildlife, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	110
Table 3. 6. Relationships between respondent subpopulation and response to wildlife knowledge questions, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	112
Table 3. 7. Relationships between respondent subpopulation and knowledge about wildlife complaints made in their community, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	113
Table 3. 8. Relationships between respondent subpopulation and opinion on severity of wildlife complaints in their community, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	114
Table 3. 9. Relationships between respondent subpopulation and expressed level of concern in reaction to hypothetical conflict scenarios in their community, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. ....	115



Table 3. 10. Relationships between respondent subpopulation and prioritization of alternative human-wildlife conflict management strategies, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	116
Table 3. 11. Rankings of severity over 5 commonly encountered human-wildlife conflict scenarios based on weighted averages, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. (1 = most severe, 5 = least severe) .....	118
Table 3. 12. Rankings of severity over 5 commonly encountered human-wildlife conflict scenarios based on weighted averages, as provided by administrative officials and categorized by community type, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. (original scale: 1 = most severe, 5 = least severe) Rural: N=71; Suburban: N=23; Urban: N=13 .....	118
Table 3. 13. Rankings of severity over 5 commonly encountered human-wildlife conflict scenarios based on weighted averages, as provided by animal control officers and categorized by community type, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. (1 = most severe, 5 = least severe) Rural: N=31; Suburban: N=20; Urban: N=12.....	118
Table 3. 14. Rankings of severity over 5 commonly encountered human-wildlife conflict scenarios based on weighted averages, as provided by elected officials and categorized by community type, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. (1 = most severe, 5 = least severe) Rural: N=73; Suburban: N=15; Urban: N=16.....	119
Table 3. 15. Rankings of severity over 5 commonly encountered human-wildlife conflict scenarios based on weighted averages, as provided by Extension agents and categorized by community type, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. (1 = most severe, 5 = least severe) Rural: N=48; Suburban: N=11; Urban: N=7.....	119
Table 3. 16. Relationships between respondent subpopulation and knowledge about wildlife complaint records kept within local government, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	120

Table 3. 17. Actions taken with records maintained in a respondents’ office within local government, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	120
Table 3. 18. Relationships between respondent subpopulation and knowledge about record keeping practices in specific local government offices, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. ....	121
Table 3. 19. Respondents’ knowledge of the type of records kept by specific local government offices, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	123
Table 3. 20. Relationships between respondent subpopulation and opinion about local government’s response to wildlife complaints, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	124
Table 3. 21. Relationship between respondent subpopulation and knowledge of GIS capabilities in the community, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	126
Table 3. 22. Relationship between respondent subpopulation and opinion about anticipated timeframe for beginning GIS use in the community, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	126
Table 3. 23. Relationships between respondent subpopulation and opinion about perceived benefits of GIS, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	127
Table 3. 24. Relationships between respondent subpopulation and opinion about expected community response to human-wildlife conflicts, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	128
Table 3. 25. Relationships between respondent subpopulation and opinion about the perceived level of contribution various organizations provide to the long-term resolution of human-wildlife conflicts, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	130
Table 3. 26. Relationships between respondent subpopulation and opinion of local government’s needs to manage human-wildlife conflicts, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.....	131

Table 3. 27. Relationships between respondent subpopulation and opinion on the importance of factors that could affect one’s decision to participate in co-management, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. .... 132

Table 3. 28. Relationship between respondent subpopulation and knowledge about community involvement in co-management programs, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008..... 133

Table 3. 29. Relationships between respondent subpopulation and knowledge of community-based co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008..... 134

Table 3. 30. Relationships between respondent subpopulation and expressed satisfaction on cooperation within past or existing community-based co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. .... 136

Table 3. 31. Relationships between respondent subpopulation and expressed satisfaction on outcome from existing or past community-based co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008..... 138

Table 3. 32. Relationships between respondent subpopulation and opinions about future community-based co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008..... 140

# CHAPTER 1: INTRODUCTION AND JUSTIFICATION, LITERATURE REVIEW, AND OBJECTIVES

## Introduction and Justification

Human-wildlife conflicts are defined as interactions between humans and wildlife where negative consequences, whether perceived or real, exist for one or both parties (Decker et al. 2002). The suite of potential impacts to humans comprises 3 broad categories: economic, health and safety, and psychological (Decker et al. 2002). Human-wildlife conflicts are not restricted to any single wildlife species, but may involve charismatic species, like white-tailed deer (*Odocoileus virginianus*) and black bear (*Ursus americanus*), or less charismatic species, such as beaver (*Castor canadensis*) or raccoon (*Procyon lotor*).

Human-wildlife conflicts are increasing in the United States (Sullivan and Messmer 2003). Bruggers et al. (2002) identified 5 factors that contribute to an increased number of wildlife complaints: increasing suburban development, overabundance among adaptable species, a shift in public attitudes from utilitarian views of wildlife to those concerned with animal welfare and rights, increased media interest in wildlife issues, and advances in wildlife science and technology that enable recovery of previously low density wildlife populations. Evidence of increasing complaints exists both nationally and in Virginia. For example, the number of insurance claims filed by Virginians in response to deer-vehicle collisions rose from 7th nationally in 2005 to 6th in 2006; nation-wide insurance claims involving deer-vehicle collisions increased 6% overall from 2005 to 2006 (State Farm Insurance 2005, State Farm Insurance 2006).

In Blacksburg, Virginia, a pair of beavers that took up residence in a municipally-owned recreation park stirred controversy during early 2006 when dammed water began to back up, affecting neighboring property, and damage from their foraging activity began to spread (Moxley

2006a, Moxley 2006b, Moxley 2006c, Moxley 2006d, Pillow 2006). The Blacksburg Town Council decided to eradicate the beavers despite objections from some townspeople. In this case, a relatively isolated incident instigated widespread community reaction, well outside the expected norms for such a small-scale issue. The Blacksburg beaver case typifies today's human-wildlife conflicts in urban and suburban areas. Although this case involved only several animals, it represents the kind of unique and often controversial challenges wildlife managers face (Curtis et al. 2000, Schusler et al. 2000). Managers usually try to resolve such issues regionally, at a scale where emphasis is on the wildlife population, rather than on individual animals or site-specific conflicts. In contrast, community stakeholders personally become most involved when resolution of human-wildlife conflicts occurs at a local scale where they can participate directly in the discussion and assist in designing a management response that may be implemented (Schusler et al. 2000, Lauber et al. 2002, Raik et al. 2006).

The hierarchy of multiple possible authorities also creates a maze of potentially confusing rules, regulations, and overlapping jurisdictions. Depending on the species involved and nature of the conflict, multiple agencies may have jurisdiction. State wildlife agencies hold regulatory authority for most non-migratory and resident species of wildlife; federal agencies assume lead responsibility for most migratory game and endangered species. In addition to these potentially confusing regulations or questions of authority, local communities can restrict the use or application of certain management options (e.g., promulgate restrictions to prevent the discharge of firearms), which can further complicate successful resolution of such conflicts.

Confronted with perpetual funding and staffing challenges, many state wildlife agencies today are unable to provide individualized service to each community or address conflicts attributed to each species of wildlife separately. As a result, a new management approach,

community-based co-management, is being tested in several states (Chase et al. 2000, Curtis et al. 2000, Siemer et al. 2000, Raik et al. 2004, Decker et al. 2005, Raik et al. 2005). Co-management can engage the local community in all parts of management, from issue identification to the implementation and evaluation of a management plan. However, the local community often bears more management responsibility and financial costs by participating in these arrangements. Despite the possible benefits derived from co-management, local governments may resist such approaches; in fact, implementation rates exhibited by communities for other hazard mitigation strategies are low (Deyle and Smith 1998). Local governments may hesitate to agree to co-management proposals, given the additional responsibilities and existing staffing and funding limitations.

A needs assessment conducted by Virginia Cooperative Extension (Bruce 1999) determined that managing and reducing wildlife damage to crops, livestock, and home plants was one of several very high priorities across Virginia. Community members and local government leaders expect county-based extension agents to have, or to be able to obtain, expert knowledge on a variety of subjects, including resolution of human-wildlife conflicts. My research, conducted in response to this need, was to investigate the specific needs of municipal and county governments in Virginia related to human-wildlife conflicts and to assess their readiness to respond to potential conflicts in their communities.

I attempted to determine what knowledge and resources community leaders currently possess and what they need to better handle human-wildlife conflict situations when they arise. Instead of seeing communities react ineffectively by treating symptoms rather than the root causes of conflict, communities need to be better prepared to avert crises by accurately identifying appropriate resources and management approaches well before a conflict arises. The

apparent success of communities that have utilized a co-management approach suggests that a similar approach may benefit other communities. Until now, co-management has been used primarily in response to single-species issues and implemented on a community-by-community basis. A highly desired outcome would be for communities to implement a comprehensive co-management strategy, one applicable to many species rather than to only a single species.

Baseline research attempted has to “measure [the] perceptions of conflict and its management” (Treves et al. 2006:385). To best prepare communities, one first must understand the knowledge, attitudes, and opinions of the individuals within communities responsible for making decisions and implementing those decisions.

## **Literature Review**

*Causes of human-wildlife conflicts.* – Human-wildlife conflict occurs “when the needs and behavior of wildlife impact negatively on the goals of humans or when the goals of humans negatively impact the needs of wildlife” (Madden 2004:248). Negative impacts on human goals generally result when stakeholders’ wildlife acceptance capacity (WAC: defined as the wildlife population level in an area that is acceptable to people [Decker and Purdy 1988]) has been exceeded. A wildlife population can exceed stakeholders’ WAC in 3 possible ways; 1) when wildlife population numbers become too high, 2) when a wildlife population becomes threatened or endangered by low numbers, which increases risk to stakeholders by their presence, or 3) when a population becomes threatened or endangered, increasing the risk of extinction. This general concept also has been expressed as the cultural carrying capacity (CCC) for wildlife. The WAC concept was modified slightly (West and Parkhurst 2002) to describe a population level where the greatest net value for diverse and divergent stakeholder groups is attained. In this case, value refers to the broadest definition of value, including inherent, societal values as

well as economic values. When properly assessed, WAC can provide valuable information to managers faced with management decisions that affect human beliefs and preferences (Decker 1991).

All wildlife species possess value, yet that value may change when human-wildlife conflicts are discussed. Value is assigned by society, and represents the net sum of positive and negative values given to a species. Wildlife value reflects the species' effect on an individual's economic state, sense of well-being, or quality of life (Conover 1997). Positive values generally are associated with the species' existence, society's knowledge of their presence, and beneficial economic returns or values gained; negative values derive from various forms of damage (economic and/or physical) inflicted by wildlife on agriculture and society in general. When Sullivan and Messmer (2003) adjusted Romin's (1994) economic value of deer in year 2000 dollars, as estimated by annual expenditures by hunters, they attained a value of \$1604 per deer. This suggests that every deer lost to other sources of mortality represents a potential economic opportunity loss. Despite the fact that many species of wildlife do not yet have an assessed economic value, they still possess other values recognized by stakeholders.

Human-wildlife conflicts have been increasing dramatically in recent years (Sullivan and Messmer 2003). Five factors contributing to this change include: increasing suburban development, overabundance among adaptable species, a shift in public attitudes from utilitarian views of wildlife to those concerned with animal welfare and rights, increased media interest in wildlife issues, and advances in wildlife science and technology that enable recovery of previously low density wildlife populations (Bruggers et al. 2002). Nearly 80% of the U.S. population now lives in an urban setting (Adams et al. 2006), but as this sprawl expands outward from these urban centers, competition between humans and wildlife increases (Kellert and Clark



1991). Suburban development often occurs with little consideration of or planning for wildlife issues. As people alter the landscape, sometimes the habitat that is “created” is better for wildlife (i.e., offers more essential needs) (Koles and Muench 2002, Adams et al. 2006). In these modified habitats, many wildlife species, especially those better able to adapt or co-exist with humans, find these habitats attractive and often become habituated (Whittaker and Knight 1998). Additionally, the public’s knowledge and understanding of basic wildlife biology and life history have decreased as fewer and fewer members of society possess prior experience living in rural environments or in close proximity to wildlife (Kellert 1980, Manfredo et al. 2003, Adams et al. 2006).

*Types of human-wildlife conflicts.* –Human-wildlife conflicts can be real or perceived, economic or aesthetic, social or political (Messmer 2000). Conflicts generally fall into 3 major categories; health and safety, economic, and psychological (Decker et al. 2002). Psychological conflicts involve the disruption of human behavior by “nuisance” wildlife, but the resulting economic costs of such conflicts generally are minimal (Decker et al. 2002). The negative impacts of psychological conflicts on stakeholders are not well studied and therefore tend to be less recognized than other types of impacts that may arise from human-wildlife conflicts. An extreme example of a psychological human-wildlife conflict is a person confined to their home due to a severe phobia of some type of wildlife (e.g., snakes).

Economic conflicts occur when damage caused by wildlife species negatively affects a stakeholder’s income (Decker et al. 2002). Abundant research exists on the economic costs of human-wildlife conflicts. Studies of agricultural producers have found that deer are cited most commonly for causing economically significant damage, but raccoons, coyotes, groundhogs, and other species also are reported (Wywiałowski 1994, Conover 1998). Conover et al. (1995)

estimated \$4.1 billion dollars (adjusted to 2008 dollars) in wildlife-related damage costs annually based on a multitude of published and unpublished reports of economic losses from conflicts ranging from vehicle/aircraft collisions to crop damage. Wywialowski (1994) estimated \$787 million (adjusted to 2008 dollars) in producer losses alone in 1989. Unfortunately, agricultural producers are not the only American businesses that experience wildlife damage. Bird-aircraft collisions cost the civil aviation industry an estimated \$601 million annually (adjusted to 2008 dollars) in direct and associated costs; losses to commercial aviation are estimated at \$1.57 billion annually (adjusted to 2008 dollars) (Blackwell and Bernhardt 2000). According to the United States Air Force, the annual cost to repair and/or replace a single military aircraft after a bird strike averaged \$37 million (adjusted to 2008 dollars) (Mason 1992). Unlike businesses that may be able to receive insurance compensation for wildlife damage costs, homeowners often must absorb the up-front costs of wildlife damage to their property (Decker et al. 2002). Examples of such costs include the value of replacing ornamental plantings browsed by deer or structural damage caused by roosting or denning species (Adams et al. 2006).

Health and safety conflicts fall into 3 subcategories; disease, motor vehicle collisions, and physical threat (Conover et al. 1995, Decker et al. 2002). Health and safety concerns most often involve diseases transmitted to humans from wildlife, but they also encompass wildlife-vehicle collisions (Conover et al. 1995, Decker et al. 2002). Each year approximately 75,000 cases of injury or illness are reported due to an encounter with wildlife (Conover et al. 1995). Many wildlife species are known vectors for diseases that can afflict human populations, including rabies, hantavirus, Lyme disease, and West Nile virus (Adams et al. 2006, CDCP 2006). Raccoon rabies is of particular concern in the East, so much so that USDA's Animal and Plant Health Inspection Service has implemented a multi-million dollar oral rabies vaccination

program to stem the western spread of raccoon rabies. Lyme disease and chronic wasting disease currently are causing great concern for many people. Lyme disease is now the leading cause of vector-borne infectious disease in the U.S., with 15,000 cases reported annually (Adams et al. 2006).

As the incidence of wildlife-vehicle collisions (most often involving deer) increases, affected communities often begin to view the species involved more negatively. The Virginia Department of Transportation (VDOT) conservatively estimates that 7,000 to 8,000 deer carcasses have been collected from the state's highways by VDOT employees over the past 2 years (WDBJ7 2006). The actual number of vehicle accidents that involve deer likely is much higher, as many incidents go unreported. Bird-aircraft strikes also are becoming more common; fortunately few collisions result in human fatalities (Servoss et al. 2000). Unfortunately, when fatalities do occur, they tend to be catastrophic, as when a U.S. Air Force aircraft ingested several Canada geese at Elmendorf Air Force Base, Alaska. The pilot was unable to keep control of the aircraft, causing it to crash and kill all 24 people aboard (York et al. 2000).

*Who handles human-wildlife conflicts.* – Determining who has ultimate jurisdiction over human-wildlife conflicts can be a complex and confusing problem. In general, state wildlife management agencies manage those species not otherwise under the jurisdiction of the federal government. For instance, state wildlife agencies promulgate and enforce regulations regarding non-migratory game species (e.g., deer, bear, turkey) and other non-game species not considered federally endangered or threatened. The United States Fish and Wildlife Service (USFWS) retains authority in situations that involve endangered and threatened species and, in many cases, migratory species. The National Marine Fisheries Service (NMFS) retains authority over conflicts that involve marine mammals and some other marine species. In addition to these

agencies, other state and federal agencies may become involved, depending on the specific characteristics of a given conflict. State Public Health Departments and the Centers for Disease Control and Prevention have roles in conflicts that involve infectious wildlife diseases. Other agencies fill important roles in human-wildlife conflicts, including state agriculture and environmental quality agencies, USDA-APHIS Wildlife Services, and the Environmental Protection Agency (EPA). At the local level, residents often expect their municipal government to play a role in managing conflicts. In fact, some municipal governments have promulgated rules and regulations that directly influence management practices or limit the use of management tools or options (e.g., preventing the discharge of firearms or imposing limits on the use of traps, both of which preclude certain options for dealing with nuisance species) (Messmer 2000, Peine 2001, Raik et al. 2005).

If conflict management is to be at all successful, the many agencies potentially involved must maintain good working relationships to navigate the complex matrix of laws, regulations, and overlapping authorities. In addition to regulatory authority complications, other factors influence the response to conflicts. State and federal agencies today face substantial financial and personnel limitations that hinder the type of response they may be able to make (Decker et al. 2005). Due in part to these limitations, some state authorities have begun to partner with local governments to respond to conflicts and in decision-making. Different partnership models exist, including citizen action, citizen-agency partnership, and community vote (Decker et al. 2004). The most appropriate model to adopt depends on the community, and how the community weighs the pros and cons of each model. The prominent model currently cited in the literature is called “co-management” and will be discussed in more detail in the next section.

The literature reports growing agreement that the public needs to be involved in decision making, especially when the outcomes of those decisions directly affect the public's social or economic well-being (Redpath et al. 2004). Drake et al. (2005) argue that well-informed, involved stakeholders help produce better decisions and plans, which ultimately lead to reduced conflicts. Given that policy formation at the local government level can be volatile, and certain key stakeholders often have greater influence than others at this level, effectively engaging the public in this process can be difficult (Peine 2001). Additionally, because local government usually has limited capacity to handle wildlife issues directly, stakeholder expectations and the reality of what actually can be delivered likely will differ (Peine 2001). Therefore, at the local level, community co-management has the promise of success as it operates at the scale most relevant to the stakeholders who are experiencing the conflict and incorporates the involvement of agencies who hold regulatory authority (Schusler et al. 2000).

*Case studies of community-based human-wildlife conflict management.* – Co-management is defined as “arrangements where authority and responsibility are shared between the wildlife agency and others” (Curtis et al. 2000, Siemer et al. 2000) and is found at the power-sharing end of the continuum of decision-making approaches (Lauber et al. 2002, Raik et al. 2006). Those in the “others” category can range from a citizen action group to another agency, whether federal or state (Chase et al. 2000, Decker et al. 2004). Examples of these decision-making models can be found in recent literature as case studies (Chase et al. 1999, Curtis et al. 2000, Schusler et al. 2000, Siemer et al. 2000, Shanahan et al. 2001, Chase et al. 2002, Chase et al. 2004, Decker et al. 2004, Raik et al. 2004, Raik et al. 2006).

Irondequoit, New York. - The Town of Irondequoit, New York, provides a useful case study of how one community handled an urban deer conflict and may represent one of the

earliest examples of wildlife conflict co-management in published literature. The citizens of Irondequoit requested assistance from New York's Department of Environmental Conservation (NYDEC) several times for help to reduce deer damage, starting in the early 1970s (Decker et al. 2004). After the first petition, the state legislature granted the Town of Irondequoit permission to hunt deer within town limits for approximately 2 years to control the deer herd. Following the second citizen petition, the town was allowed to conduct a limited archery hunting season under NYDEC damage permits. A third petition resulted in the citizen participation model currently used in the Town of Irondequoit. In the late-1980s and early-1990s, NYDEC began using citizen task forces to establish deer population goals throughout the state's deer management units (Curtis et al. 1993). Encouraged by the success of these citizen task forces, NYDEC decided to implement a similar process in Irondequoit. This citizen task force process was coordinated by Cornell Cooperative Extension, as well as Cornell University's Human Dimensions Research Unit (HDRU) (Curtis et al. 1993). The citizen task force met for approximately 2 years, finally reaching agreement on a set of management strategies to recommend to Montgomery County legislators and the Irondequoit Town Council. Although the task force attained the group's predefined rule for agreement, one member of the task force produced a dissenting opinion report, which forced a delay in implementing the management recommendations (Curtis et al. 1993). While the dispute played out in the courts, research began to investigate the efficacy of immunocontraceptives to control herd size. The town also implemented a limited bait-and-shoot program. After a few years of research, the contraceptive program was determined to be unfeasible. A restricted and tightly structured archery program was instituted when police records indicated that incidences of vehicle collisions around the bait sites decreased. This archery hunt continues today as a means to achieve and maintain the task force's deer population

goal (Decker et al. 2004). The Town of Irondequoit case provides a foundation for future investigations into the effectiveness of community-involvement in the decision-making process, but also illustrates that towns are capable of making wildlife management decisions, provided they receive guidance from professional wildlife managers.

Cayuga Heights, New York. – Following the controversy and outcomes of the situation in the Town of Irondequoit, other New York communities that were experiencing similar deer conflicts began to engage in the public involvement experiment. Residents of Cayuga Heights, New York, recognized they had a deer problem and approached village authorities to request that an official committee be sanctioned to study the deer issue and develop recommendations for the village (Siemer et al. 2000, Decker et al. 2004). As in the Irondequoit case, Cornell's HDRU facilitated the process in Cayuga Heights. HDRU personnel first surveyed village residents to determine their attitudes and opinions regarding deer in the community, as well as their desired level of participation in the decision-making process (Chase et al. 1999, Curtis et al. 2000, Shanahan et al. 2001, Chase et al. 2002). Based on this survey, the citizen deer committee, HDRU, Cornell Cooperative Extension, and NYDEC were able to make informed decisions about the deer problem and how to effectively involve all stakeholders in achieving a village consensus (Siemer et al. 2000). The citizen committee recommended an experimental contraceptive treatment as a means of population control, before making a management decision regarding deer population goals and how to achieve those goals (Decker et al. 2004). Beyond this research, no further management action has taken place in Cayuga Heights. Using the information gathered from the stakeholder survey and citizen committee, managers were able to craft an acceptable approach that incorporated the input of local residents into the management decision-making process and avoided potential community conflict.

Evergreen, Colorado.— While sharing some similarities with Cayuga Heights, the case of elk (*Cervus elaphes*) in Evergreen, Colorado, began differently. In Evergreen, residents did not organize; rather, the Colorado Division of Wildlife (CDOW) began to field complaints from individual residents regarding elk in the community (Chase et al. 2004). Before selecting a decision-making model or coming to a management decision, the CDOW contacted Cornell's HDRU to conduct a stakeholder survey (Chase and Decker 1998, Chase et al. 2002). This survey assessed Evergreen residents' knowledge and attitudes about the local elk population and their preferences about involvement in the decision-making process. Similar to Cayuga Heights, residents of Evergreen preferred stakeholder involvement methods that allowed for public deliberation and debate (Chase et al. 2004). In contrast, though, Evergreen residents were comfortable leaving the final decision-making authority with the CDOW (Chase et al. 2002). The contrasts between the deer issues in Cayuga Heights and the elk issues in Evergreen clearly illustrate how important it is to treat each community individually as each has a unique situation and set of stakeholders. The agency and the community stakeholders must reach a compromise when their goals for a management process conflict before any plan or model can be implemented successfully.

Other cases. — Many other examples of co-management exist in the wildlife literature. The successful passage of a community referendum to extirpate deer from Monhegan, Maine, and the unsuccessful attempt to open Bedford, Massachusetts, to deer hunting clearly illustrate how community votes on deer management plans indicate the support of its respective community (Decker et al. 2004). Actions taken in Montgomery County, Maryland, illustrate successful co-management by multiple cooperating agencies. The Montgomery County Council appointed a task force to identify deer issues and management recommendations. The task force



included representatives of governmental and non-governmental organizations, as well as county residents (Decker et al. 2004). The appointed task force recommended the establishment of a permanent committee composed of municipal, county, and state representatives, all collaborating in the deer management process (Decker et al. 2004). Over the years, this planning group has drafted management plans that citizens review and ultimately are approved by the Director of Parks. Each year, residents are allowed to evaluate the previous year's progress and communities within the planning area are briefed on the proposed management actions before the plan is sent to the Director for final approval (Decker et al. 2004). In Union County, New Jersey, successful co-management was achieved by 6 communities bordering a wooded park with a thriving deer population. The Union County Department of Parks and Recreation and the New Jersey Division of Fish and Wildlife convened a committee composed of residents of each community and representatives from various organizations with a stake in the issue (Decker et al. 2004). The committee originally met to define the deer problem and make management recommendations, but it continues to meet yearly to evaluate the management plan's objectives and effectiveness. This community has served as a model for other New Jersey community-based deer management plans (Decker et al. 2004).

The current status in Virginia. – Community-based co-management is not a foreign concept to residents of Virginia. In 1993, the community of Governor's Land, Virginia, approached the Virginia Department of Game and Inland Fisheries (VDGIF) about concerns involving deer issues in the community (Decker et al. 2004). VDGIF played an advisory role to Governor's Land, providing information about deer biology and suggesting the formation of a community study committee. The community committee met and recommended application of lethal management strategies to control the deer herd. After approximately 5 years, the

management plan was terminated. Deer became an issue again in 2001, by which time the community make-up had changed and a new set of community meetings was needed to come to an agreeable community decision. Through a collaborative process, community members agreed to hire professional archers to harvest deer, which represented a compromise, given that several homeowners previously were opposed to lethal management techniques (Decker et al. 2004). This case illustrates that both VDGIF and some communities in Virginia are capable and willing to implement community-based co-management when faced with a human-wildlife conflict situation.

In addition to Governor's Land, Fairfax County, the City of Lynchburg, and the Town of Blacksburg all have used some form of co-management to manage overabundant deer in their communities. Of these 3 examples, Lynchburg has the longest running deer management plan. In 1991, the Lynchburg City Council created the Wildlife Study Commission to study the deer issue and propose management actions. This commission developed 3 solutions; 1) public education, 2) shotgun hunting on parcels of land >25 contiguous acres, and 3) hiring a wildlife management specialist to cull deer on these parcels with state-approved kill permits (J. Parkhurst, Virginia Polytechnic Institute and State University, personal communication). For approximately 15 years, the City of Lynchburg relied on a team of retired police officers to patrol the city and remove deer from residents' property with the permission of that resident. In their continuing efforts to manage the urban deer herd, the City of Lynchburg instituted an urban archery program in 2002. Lynchburg successfully reached its objective to reduce deer-vehicle collisions while reducing public complaints and having no active protests against the management action (Nelson Lafon, Virginia Department of Game and Inland Fisheries, personal communication).

Fairfax County, Virginia, began its deer management program in the late 1990s. In 1998, the Deer Management Committee began to study the issue and develop management recommendations. A sharp-shooting program began in 1999 and an urban archery pilot program began in 2000 (J. Parkhurst, Virginia Polytechnic Institute and State University, personal communication). Unfortunately, the program in Fairfax County has not been able to meet public demand for controlling the deer population. This most likely is due to the inability to apply sufficient archery hunting pressure over the county (N. Lafon, Virginia Department of Game and Inland Fisheries, personal communication). Public acceptance for controlling the deer population is high, but, due to the diversity of stakeholders in this urban area, some active protests have arisen against managed hunts conducted in public parks.

The Town of Blacksburg started its deer management program in 2000, after receiving numerous complaints from local residents. As a result, the town council appointed a citizen task force to review data and gather information about the deer issues. This task force made management recommendations to Town Council, which led to the formation of a deer management team based within the police department in 2000 (J. Parkhurst, Virginia Polytechnic Institute and State University, personal communication). In this instance, members of this deer management team are police officers trained to cull deer in urban areas. The team uses a VDGIF Deer Population Reduction Program (DPOP) permit that allows culling to occur on both town-owned and private property (with written permission of the landowner). As with the City of Lynchburg, the Town of Blacksburg successfully met its objective of reducing the number of deer-vehicle collisions while inciting no active protests (N. Lafon, Virginia Department of Game and Inland Fisheries, personal communication).

## **Objectives**

The goal of my study was to gather, analyze, and evaluate information that provides better understanding of how community leaders currently view and manage human-wildlife conflicts, with the intent to develop and implement more cost-effective and proactive conflict resolution strategies in the future. Chapter 2 provides an overview of the methods used for this study. Chapter 3 will describe the results of this study, as related to Objectives 1, 2, and 3 (see below). Chapter 4 synthesizes the results, provides recommendations for future research, and provides specific recommendations relating to the adoption and implementation of community-based co-management strategies for managing human-wildlife conflicts in Virginia (Objective 4).

**Objective 1: To assess the knowledge and perceptions of community leaders in Virginia about the nature, extent, and severity of human-wildlife conflicts in their community, the risks associated with such conflicts, and the priority of such conflicts relative to other community needs.**

Using survey methods, I investigated respondents' general knowledge and attitudes about human-wildlife conflicts. Specifically, participants commented on specific taxonomic groups to be included in the term wildlife and what conceptually defines a human-wildlife conflict; these elements form a filter through which I then interpreted the remainder of their responses. One of my main purposes was to ascertain what community leaders believe constitutes a human-wildlife conflict. Additionally, I wanted to know if these community representatives were aware of wildlife complaints coming from the community, and if so, assess the frequency and the severity of these complaints. To evaluate a community's preparedness to handle human-wildlife

conflicts, I asked participants to comment on whether and how they measure impacts and risks associated with conflicts and whether they understand the potential consequences stemming from those risks. For communities that maintained records of the conflicts they experienced, I asked how and where such records were maintained and what uses, if any, these records provided to the community. To assess the importance of human-wildlife conflicts, participants prioritized human-wildlife conflicts relative to all other issues within the community; they also provided opinions on how they would prioritize alternative management options as means to resolve human-wildlife conflicts (e.g., develop and implement a comprehensive community-wide program, implement an educational program to avoid or reduce conflicts).

**Objective 2: To assess the beliefs and opinions of community leaders in Virginia about their role and responsibilities in managing human-wildlife conflicts.**

For this objective, I investigated the opinions and attitudes that community leaders in Virginia hold regarding their role and responsibility in the management of human-wildlife conflicts. Participants clarified what they believed were the roles communities should play in managing human-wildlife conflicts and whether specific conditions limited their involvement in conflict management. In addition, participants commented on who should be involved in human-wildlife conflict management and to what extent. Specifically, participants defined the degree to which certain agencies or individuals should contribute to the long-term management of human-wildlife conflicts.

**Objective 3: To assess the knowledge, attitudes, and opinions of community leaders in Virginia about community-based co-management as a process for managing human-wildlife conflicts.**

Because many community leaders may not be familiar with the concept of community-based co-management, I first needed to assess their knowledge, opinions, and attitudes regarding this new, alternative management paradigm. By using examples of other co-management relationships that communities already may have with state agencies (but not specifically called co-management agreements *per se*), I assessed leaders' opinions about the types of co-management agreements they may have entered into and their satisfaction with these agreements. I then assessed their willingness to participate in co-management partnerships, and sought their opinions about factors that may limit or inhibit their participation in such management agreements.

**Objective 4: To develop recommendations relative to adoption and implementation of community-based co-management strategies as a means for local governments to resolve human-wildlife conflicts.**

Using information gathered from my analysis of the first 3 objectives and general trends and relationships uncovered during focus group workshops, I examined in greater depth and evaluated how shared human-wildlife conflict management strategies might best be applied to Virginia communities. Recommendations for how best to develop and implement a conflict-resolution protocol (including goals, objectives, and suggested implementation methods) by communities in Virginia are presented.

## **CHAPTER 2: METHODS**

For clarity and concise depiction, Objectives 1, 2, and 3 will be addressed simultaneously in my discussion of the focus groups and the survey instrument. I will discuss Objective 4 separately as it relies entirely on results from the first 3 objectives. Before implementing any of my methods, I first sought and received approval from Virginia Tech's Institutional Review Board (IRB, approval numbers 07-289 and 07-457, focus groups and survey, respectively).

### **Focus Groups**

Focus group workshops were held to appropriately clarify, validate, and frame the issues to be covered later in the survey instrument. Focus groups provide an opportunity to interact with representatives of the intended survey population and to gain relevant information about their knowledge, opinions, and attitudes regarding human-wildlife conflicts. Because no previous data on this subject exist for community leaders in Virginia, the goal was to ensure that issues covered in the survey were appropriate and applicable to this audience. Participants in the focus groups included city and town managers, county administrators, and animal control officers. I attempted to restrict participation primarily to administrative officials to simplify the process and because these individuals serve as an important middle link between field operations (i.e., daily activities of the animal control officer) and local elected officials (another population of interest to my study). Unfortunately, in several cases, administrative officials who agreed to participate in a scheduled focus group ultimately sent an animal control officer in their place. Two focus group meetings were held, the first on July 11, 2007 in Roanoke, Virginia, and the second on July 12, 2007 in Warrenton, Virginia. In addition to being located somewhat centrally in the eastern and western halves of the state, these communities share 2 additional characteristics; 1) they are home to county and regional Cooperative Extension offices, where the

focus group sessions were held, and 2) they are located within approximately 1 to 2 hours of a diverse array of community types from which to draw participants (i.e., rural, suburban, and urban).

I compiled a list of managers/administrators from municipalities within a radius of approximately 30 miles of the meeting site. I identified individuals currently serving in the desired position within local government and obtained their contact information from public websites; I then contacted these individuals to determine their willingness to participate in a focus group. The facilitated discussions focused on gathering and refining information to be presented in the survey. Although my intent was to ask primarily close-ended questions in the survey, I used open-ended question format in the focus groups to maximize exchange and better determine the potential range of responses to each topic area. Participants' comments and ideas on the various topics discussed were recorded on a large note pad and made visible to all during the meeting to ensure that I accurately had captured their views and understood their intents. In addition, with the informed consent of each participant, both discussion sessions were tape recorded; I later transcribed these tapes and used them to verify quotes and impressions at the time of data analysis. A detailed review of the information obtained during the focus groups allowed me to qualitatively identify the important issues and assess participants' comments and impressions on these topics. Based on that information, I developed, refined, and edited the survey instrument.

### **Survey Instrument**

I choose to conduct a mail survey rather than a web-based survey, to minimize response bias created by technical issues that might arise when contacting rural Virginia communities (i.e., software incompatibility or slow internet connection speeds that preclude timely completion of



the survey). I designed a questionnaire using Survey Pro 3.0 (Apian Software, Inc., Seattle, Washington). The survey effort was administered using a modified version of Dillman's Tailored Design Method (Dillman 2000). I mailed a questionnaire to each participant on October 29, 2007. Approximately 2 weeks later, I sent the first "thank you/reminder" postcard to non-respondents (mailed on November 12, 2007). Two and a half weeks later, I mailed a replacement questionnaire to all non-respondents (mailed on November 28, 2007). I modified Dillman's (2000) suggested last contact approach by sending a final "thank you/reminder" postcard to all remaining non-respondents (mailed on December 10, 2007), reminding them of the impending closing date for the survey (which was established as December 14, 2007).

The questionnaire was administered to individuals in 4 different tiers of local government: field operators (animal control officers), administrative officials (city or town managers, county administrators), elected officials (Town or City Councilors, County Board of Supervisors), and Agricultural and Natural Resources Extension Agents with Virginia Cooperative Extension whose official work station was located within the local community.

The questionnaire was administered to all animal control officers, administrative officials, and Extension agents for whom I had contact information. Animal control officers were identified through information gathered from local Extension agents, as well as Internet searches for animal control units in all counties, independent cities, and incorporated towns in Virginia. I identified elected and administrative officials from the 2005-2006 directory published by the Virginia Municipal League (VML) and the Virginia Association of Counties (VACo) (VML/VACo 2005) and verified the information using Internet searches. I then drew a sample of elected officials from that directory. To ensure a representative sample of elected officials, I determined that a random sample of 322 individuals must be selected from the

population of approximately 2000 existing officials of local government in Virginia; this assumed the most conservative estimate of variability among answers (50/50) and allowed me to attain a sampling error of  $\pm 5\%$ . Assuming a 45% response rate, I calculated that I actually would need a sample that contained 700 randomly chosen elected officials to secure the 322 necessary completed and useable questionnaires (as determined from Table 5.1, Dillman 2000:207).

*Questionnaire content and purpose.* – The questionnaire was divided into 4 main sections. The first section investigated respondents' knowledge and attitudes about human-wildlife conflicts (Objective 1). Questions in the second section assessed the opinions and attitudes of community leaders in Virginia regarding their role and responsibility in the management of human-wildlife conflicts (Objective 2). The third section assessed participants' knowledge, opinions, and attitudes regarding new or alternative conflict management paradigms, specifically community-based co-management (Objective 3).

The final section of the questionnaire gathered information on participant demographic characteristics, which I intended to use to define and distinguish differences among participants and better interpret results or make inferences about community leaders. Information gathered in this section included: community type/size, position the individual holds within the community, length of time in their current position, length of time in service to the community, age, and gender.

### **Non-Response Analysis**

Response rates  $>65\%$  generally are assumed to provide reliable results and accurately represent the populations being sampled and reduce concerns about bias arising from non-response (Dolsen and Machlis 1991). Although Dillman's (2000) Tailored Design method often is successful in improving response rates, it alone cannot assure that a sufficient response will be

attained to eliminate issues of non-response. To monitor the effects of non-response bias, I decided to implement a procedure to assess and account for potential non-response bias in cases where response fell below 65%. In such cases, I contacted by telephone a subsample of non-respondents from within each participant subpopulation that fell below my desired response rate (Young 2005). I developed an abbreviated survey instrument to use during my telephone interviews that included 7 questions taken directly from the original mail-back questionnaire, questions that I believe bore directly on the participants' understanding of human-wildlife conflicts in the community. I collapsed the original answer scales on most questions from 5 response options to 3 to facilitate the participant's ability to answer over the phone. I asked several additional questions to ascertain whether the individual recalled receiving the original questionnaire and, if so, their reasons for not completing it; these responses were deemed important to improve future research. Data gathered from non-respondents were compared to those of respondents to determine whether these populations differed significantly in the opinions or views held; I used Chi-square ( $\chi^2$ ) tests for independence, gamma tests, and Fisher's exact test to conduct these analyses.

### **Data Analysis**

Data from completed questionnaires were compiled and entered into Survey Pro 3.0. The resulting Survey Pro 3.0 database was imported into SPSS 12.0.1 for Windows (SPSS Inc., Chicago, Illinois) for data analysis. Respondents were divided *a priori* into 4 subpopulations according to the position they held within local government (i.e., administrative officials, animal control officers, elected officials, and Extension agents).

I categorized respondents into 3 knowledge groups, based upon their response to Question 3 (i.e., how they defined the term "wildlife") (see Appendix B). To be placed in the

“high” knowledge group, respondents must have identified correctly all 7 of the taxonomic groups considered to comprise wildlife. Respondents who failed to include 1 or 2 correct taxonomic groups or selected 1 or 2 “Don’t Know” options were placed in the “average” knowledge group. Those in the “low” knowledge group excluded  $\geq 3$  taxonomic groups or expressed uncertainty for  $\geq 3$  taxonomic groups. Responses to Questions 1A, 1B, and 1C were collapsed into 3 groups. Respondents who disagreed and strongly disagreed with each of these questions I considered as answering correctly; respondents who agreed or strongly agreed answered incorrectly; respondents in the third group chose the neutral response option. I also categorized respondents into 3 concern groups, based on their responses to Questions 23B, 23C, and 23D (i.e., human-wildlife conflict scenarios involving direct harm to humans). To be placed in the “high” concern group, respondents must have indicated that they were “very concerned” about at least 2 of the 3 scenarios. Those in the “low” group indicated “very concerned” about 1 or none of the scenarios presented.

I collapsed respondents’ age categories, originally defined by using the U.S. Census Bureau format, into 3 broad categories (i.e., 18-34 years old, 35-64 years old, and  $> 65$  years old). I also converted my original open-ended response options for both the stated “years of service in current position” and “total years of service in local government” into 3 categories (i.e.,  $< 5$  years, 6-20 years,  $> 20$  years). I collapsed my original community size options into 3 categories, similar to those used by VDOT to describe different categorizations of population centers (i.e.,  $< 10,000$ , 10,000-100,000, and  $> 100,000$ ).

I constructed frequency distributions for all ordinal and nominal descriptive data on knowledge and respondents’ opinions about human-wildlife conflicts and their management in Virginia communities. I constructed contingency tables to examine relationships between

demographic and community characteristics, knowledge, and opinions about human-wildlife conflicts and their management. I examined these relationships using the Chi-square log-likelihood ratio statistic. This measure yields results similar to Pearson's Chi-square, but is more appropriate when expected cell counts are  $< 5$ . I used a probability value ( $p$ -value) of 0.10 to indicate statistically significant relationships.

## CHAPTER 3: FOCUS GROUP RESULTS AND SURVEY RESULTS

### Focus Group Results

The following is a consolidated summary of the discussions that took place with participating individuals at both focus group sessions.

*Task #1: Define “wildlife”.* – When asked to define what the term “wildlife” meant to them, most participants referred to a definition commonly used or adopted by their organization. In many cases, that definition stated that “wildlife” was any species that did not fit the definition of a domesticated animal, which included household animals and livestock species. Some communities placed further limitations on how “wildlife” was defined by including only those species for which the Game Department (i.e., Virginia Department of Game and Inland Fisheries) establishes regulations (e.g., hunting, furbearer, nuisance species). Although most participants initially limited their definitions to include only mammals and birds, when questioned further, many agreed that a more comprehensive definition probably ought to include reptiles, amphibians, and perhaps fish, but not other aquatic insects and invertebrates. Participating animal control agents identified rabies vector species as being a significant concern for them, despite the fact that their official mandate is limited exclusively to domestic species and that they may not have specific authority to deal with wildlife. There appeared to be some uncertainty when participants were asked about the handling of feral species; most agreed that their agents would handle them as “domestic” species. Interestingly, in later discussions, participants correctly included species such as snakes, squirrels, pigeons, and several other common urban species as wildlife even though they were not considered as such earlier.

*Task #2: Establish common ground on human-wildlife interaction.* – The next task was to determine what participants believed constituted a human-wildlife interaction. I purposefully

avoided the use of potentially negative terms (such as human-wildlife “conflict”) so as not to bias participants thinking on this issue, yet most participants immediately described what undisputedly would be considered negative situations. When questioned further on what “interaction” might include, some participants were able to describe some positive interactions, such as the services the community’s Parks and Recreation Department might offer or how an ecotourism-based bird-watching tour might bring visitors into town. However, most participants described the suite of negative interactions they commonly encountered in their communities.

A common theme voiced by participants was that most residents in their community wanted some types of wildlife out of their area, particularly species such as skunks, raccoons, deer, bear, and groundhogs. Participants in Warrenton admitted that their local governments did not actively encourage or sponsor programs that promoted positive relationships between community residents and wildlife. They identified a lack of sufficient personnel and resources as limiting factors for not engaging in these types of programs. Additionally, there was a strong belief among representatives from northern Virginia communities that many current residents are not native to the area, but have come from outside the area, predominantly from the larger metropolitan areas of Northern Virginia and the Washington, D.C. area.

The degree to which records of residents’ wildlife complaints were kept by communities varied, but most participants agreed that some kind of record was maintained in most situations. If a call comes in from a resident to either the 911 center or dispatcher, a record is made and logged into that computer system. Additionally, once a call is referred to animal control or the police, another record is made there of the situation and whatever response was made. Based on such a system, one complaint actually could produce two or more records. Some calls or complaints may not be recorded at all. For example, calls received at the Town Supervisor’s

office theoretically might be rerouted directly to another responsible agency, such as the Department of Game and Inland Fisheries, and no record of receiving such a call would have been made within the community. Participants indicated that records were kept primarily for reference to acknowledge all complaints received and to document the appropriateness or timeliness of a response, not to demonstrate particular conflicts or for any inherent predictive value the data may afford.

Communities varied on how they kept records. In general, smaller rural communities appeared to make less use of newer technological resources or capabilities than did larger metropolitan communities. Hard copy paper records were still being prepared and filed and GIS technologies were only just beginning to assume a prominent role in certain aspects of local governance, especially in zoning and planning departments. Other communities showed some very impressive technological advances. Several participants believed their community would be able to visually represent human-wildlife conflicts using GIS technology, which they currently were not doing. However, it would take time and effort to locate, retrieve, and import such data from other computer records to make this happen. Participants fell into one of three categories on the value of using the data in a predictive way: 1) saw the value, but resources were too limited to utilize it in this manner, 2) also saw the value, but previously had not considered using GIS to manage or assess human-wildlife conflicts, or 3) did not see the value and would not use limited resources on something so low in priority.

When questioned about their perceptions of satisfaction with their community's current handling of human-wildlife conflicts, from the perspective of both residents (external) and representatives of local governance, including themselves (internal), most participants expressed general satisfaction. They believed their constituents must be satisfied because they were not



feeling any noticeable or unusual external pressure regarding human-wildlife conflicts. Given that lack of external pressure, most participants agreed that they and their staff, too, were satisfied. To them, given this lack of external pressure, there was no urgency to change any internal operations related to human-wildlife conflict resolution. One participant noted a need being addressed in their community for a standard operating procedure or protocol to improve efficiency when local offices receive calls about wildlife.

*Task #3: Establish relative importance of human-wildlife conflicts.* – When asked about the suite of issues that were most important to their communities, participants all agreed that human-wildlife interactions were not among the “Top 100” priorities for them. Except for some minor deviations, issues of greatest importance to nearly all communities included development projects, schools, public safety, code enforcement, providing basic services to the community (i.e., water, sewer, electricity), and budget. Participants suggested that human-wildlife interactions were incidental “brushfires” that simply were handled as they arose, and that, overall, nothing was being done proactively to deter or eliminate them.

*Task #4: Examine role of local governance in conflict resolution.* – All the participants foresaw a significant role for their community to play in resolving human-wildlife conflicts. Although participants at the Warrenton session indicated that their communities had not yet been confronted with human-wildlife conflicts serious enough to warrant the direct involvement of local government, all envisioned a day when it would. If and when that day comes, participants believed that some form of a citizen task force approach would be the most likely method to be used when the community was called upon to act on a conflict. For now, community leaders were content to react to human-wildlife “brushfires” as they arise. However, participants expressed a desire to develop and implement community-wide education programs on

minimizing negative human-wildlife interactions, possibly in partnership with Cooperative Extension or the Department of Game and Inland Fisheries.

Based on the level of discussion at the Roanoke session, more participants there had had some prior experience managing a community-wide human-wildlife wildlife conflict. Given that, these participants were adamant that local government must be involved actively in resolving such conflicts. Currently, residents do not allow their local government to engage in “finger pointing” to avoid responsibility in providing a service to the community, even if local government does not hold the authority to resolve the situation. Participants agreed that local governments should be allowed to make decisions about the types of service/response most appropriate to resolve conflicts in their community, but they also must have the support and resources of responsible state agencies. Participants also were concerned that local government may be asked to provide more services and assume more responsibility than they have the resources to handle.

Currently, representatives of local government believe that existing state government policy and structure severely limits or restricts what local government can or can not do in Virginia. For a community to take certain action on an issue, in many cases that action must be approved explicitly by the state legislature first, a process referred to as “The Dillon Rule.” Unless and until such action is approved by the legislature, the community is limited in what actions they can take to resolve an issue. Participants cited this as a real constraint on their ability to properly manage or resolve conflicts in their communities. Some participants also expressed feelings of being restricted by regulations and oversight by the Department of Game and Inland Fisheries. Communities currently are not receiving the knowledge, training or authority to handle some wildlife issues, yet, in their view, the agency is not providing

satisfactory services necessary to resolve issues. From their perspective, the hands of local governance are tied, but residents still are expecting delivery of services.

*Task #5: Determine opinion on concept of shared management responsibilities. –*

Participants at both focus group sessions expressed familiarity with the concept of shared management responsibility. They cited examples of existing agreements, such as where the Virginia Department of Transportation (VDOT) pays the local government to clear snow from state roads within the community or where the Virginia Department of Health relies upon local governments to help to monitor diseases or execute action plans for diseases such as West Nile virus and rabies. Participants generally expressed positive reactions to this sort of management model. If such an approach were suggested as means to manage wildlife concerns, most participants stated they would be receptive to trying it. Although many factors contribute to a community's decision making process, regarding whether to enter into a shared management agreement, one of the most important factors would be its ultimate cost. Most participants agreed that shared management likely could work, but it would require input from both parties involved and not take more resources and manpower away from the already strapped local entities. Again, the Dillon Rule was cited as a potential difficulty that communities would have to overcome if they were to have the necessary flexibility to manage situations appropriately for their community. If such shared management arrangements are to be feasible in Virginia, the issues of legislation and regulatory authority must be resolved.

## **Survey Results**

*Response rates.* – Of an original mailing of 1264 questionnaires, 490 successfully completed and returned survey forms were received from respondents in 4 pre-defined subpopulations. I adjusted my subpopulation sample sizes (administrative officials: n=319;

animal control officers: n=129; elected officials: n=693; Extension agents: n=102) to account for undeliverable or returned packets (n=21) from the United States Postal Service; as a result, my overall adjusted response rate was 39.4%. Response rates among the 4 subpopulations varied widely (administrative officials: 44.2%, n=141; animal control officers: 75.9%, n=98; elected officials: 25.2%, n=175; Extension agents: 74.5%, n=76).

*Non-response results.* – Due to lower than desired response rates to the mail survey from administrative officials (44.2% return) and elected officials (25.2% return), I conducted a non-response analysis. I conducted telephone interviews with 11 randomly selected administrative officials and 48 elected officials, all from among the pool of non-respondents for each group.

In my analysis of telephone responses from administrative officials, response to the question of whether the community they represented had had previous co-management arrangements differed from the response mail survey participants provided ( $\chi^2=5.789$ ,  $df=2$ ,  $p=0.055$ ) (Table 3.1). However, the gamma ( $\gamma$ ) test used to determine strength of relationship suggested that, although the chi-square test result was significant (at  $p=0.1$ ), it was neither strong nor significant ( $\gamma=0.319$ ,  $p=0.186$ ).

Chi-square analysis revealed 7 potential differences between mail survey respondents and telephone respondents among elected officials; 4 of these relationships also produced significant gamma test results (Table 3.2). More non-respondents believed that the term “wildlife” should include domesticated animals than did respondents ( $\chi^2=5.769$ ,  $df=2$ ,  $p=0.056$ ). However, upon further investigation, this relationship was found to be weak ( $\gamma=-0.331$ ,  $p=0.165$ ). When asked if local governments should assume leadership in resolving human-wildlife conflicts in their communities, fewer respondents agreed with that position than did non-respondents ( $\chi^2=5.540$ ,  $df=2$ ,  $p=0.063$ ), but, again, I failed to detect any strength in the relationship ( $\gamma=-0.152$ ,  $p=0.327$ ).

When asked if their community had received any wildlife complaints in the last two fiscal years, a greater proportion of respondents responded positively than did non-respondents ( $\chi^2=5.392$ ,  $df=2$ ,  $p=0.067$ ); as in the previous questions, the apparent difference among these groups was weak ( $\gamma=0.278$ ,  $p=0.048$ ). In contrast, when asked about the frequency with which those complaints were received, respondents were more likely to classify them, over the last two fiscal years, as being infrequent than were non-respondents ( $\chi^2=4.993$ ,  $df=2$ ,  $p=0.082$ ); this relationship similarly was relatively weak ( $\gamma=-0.424$ ,  $p=0.035$ ). Although respondents were more likely to indicate knowledge of previous co-management arrangements than were non-respondents ( $\chi^2=19.186$ ,  $df=2$ ,  $p<0.0005$ ), I found little underlying strength in that relationship ( $\gamma=0.039$ ,  $p=0.757$ ). Respondents and non-respondents clearly seemed to differ relative to their satisfaction with previous co-management arrangements; more non-respondents expressed overall satisfaction with previous co-management relationships than did respondents ( $\chi^2=10.816$ ,  $df=2$ ,  $p=0.004$ ,  $\gamma=0.719$ ,  $p<0.0005$ ). When asked whether shared co-management was an attractive option for them to manage human-wildlife conflicts in their community, fewer respondents than non-respondents found that option to be of interest ( $\chi^2=11.713$ ,  $df=2$ ,  $p=0.003$ ,  $\gamma=-0.613$ ,  $p<0.0005$ ). Upon closer examination, it appears that non-respondents (under the telephone method) were more willing to offer an opinion on this question whereas a higher proportion of respondents (under the mail survey) were reluctant to commit to an opinion (i.e., selected the “neutral” option more often).

After analysis, I concluded that the data I collected on non-respondents’ previous experience with co-management and satisfaction with those agreement could not be compared to the equivalent questions from the mail survey. For these two specific questions of the non-

response analysis the methods I used were too different to allow for a direct comparison and analysis.

Respondents and non-respondents among both the administrative officials and the elected officials did not differ on any of the 5 demographic characteristics investigated (Tables 3.3 and 3.4). Therefore, based on the composite of all results examined above, I concluded that respondents to the mail survey were not different from non-respondents interviewed by telephone (i.e., no non-response bias was detected).

*Characterization of respondents.* – Most respondents in each subpopulation were male (overall: 79.4% male; administrative officials: 83.2% male; animal control officers: 74.2% male; elected officials: 80.1% male; Extension agents: 77.3% male). Animal control officers and Extension agents overall were younger (animal control officers: 68% between 35 and 54; Extension agents: 57.3% between 35 and 54) than administrative or elected officials (administrative officials: 61.1% between 45 and 64; elected officials: 57.2% between 45 and 64) (Figure 3.1). No Extension agents reported being >65 years old, and no animal control officers reported being >75; 34% of elected officials reported being >65.

Most respondents (68.2%) described the community they represented as being “rural,” a pattern that was repeated in each of the 4 subpopulations (administrative officials: 69.5% rural; animal control officers: 52.5%; elected officials: 72.9%; Extension agents: 75.0%) (Figure 3.2). Most administrators (54.7%) and elected officials (56.9%) claimed to represent a “town,” whereas most animal control officers (63.9%) and Extension agents (88.0%) considered themselves “county” representatives. Regarding the size of community served, most animal control officers (67%) and Extension agents (71.1%) represented communities with a population between 10,000 and 100,000 people, whereas most administrators (60.7%) and elected officials

(58.6%) represented communities with a population <10,000 people (Figure 3.3). As would be expected, respondents who claimed to represent a city or a county reported larger community populations (i.e., populations between 10,000 and 100,000 people; 55.7% and 76.3%, respectively); respondents who claimed to represent a town overwhelmingly also reported serving a smaller community (i.e., <10,000 people; 92.8%) (Figure 3.4).

*Knowledge and perceptions of human-wildlife conflicts in Virginia communities. –*

Definition of “wildlife”. – Virtually all administrative officials, animal control officers, elected officials, and Extension agents agreed that mammals, birds, reptiles, amphibians, fish, insects, and mollusks all should be included when defining the term “wildlife” (Table 3.5). However, respondents expressed less certainty about particular taxonomic groups (e.g., “mollusk”), where a higher percentage answered “no” or “don’t know.” This unfamiliarity also is evident by the larger standard deviations associated with response means for these less familiar groups.

Although most respondents disagreed with the statements that “wildlife” included domesticated animals (93% disagree or strongly disagree; n=450) and feral animals (55% disagree or strongly disagree; n=269) (Table 3.6), these opinions were not universal, especially with the feral animal issue. Although animal control officers voiced stronger disagreement than did other subpopulations, the apparent differences I detected among subpopulations ( $G=48.076$ ,  $df=12$ ,  $p<0.0005$ ;  $G=43.061$ ,  $df=12$ ,  $p<0.0005$ , respectively) do not reflect meaningful disparities among the subgroups.

Knowledge of wildlife complaints from community. – I detected a relationship between respondent subpopulation and knowledge about wildlife complaints reported in the community for both fiscal year 2007 and fiscal years 2005/2006 (FY2007:  $G=84.962$ ,  $df=6$ ,  $p<0.0005$ ; FY2005/2006:  $G=91.898$ ,  $df=6$ ,  $p<0.0005$ ). Animal control officers were more likely to indicate

that their community had received wildlife complaints during these periods than were other respondents (animal control: 98% and 99% affirmative; administrative officials: 82% and 85% affirmative; elected officials: 64% and 63% affirmative; Extension agents: 79% and 72% affirmative, respectively); elected officials and extension agents were least certain (Table 3.7).

Respondent subpopulations differed in their opinion about the frequency with which wildlife complaints were being received (Figures 3.5 and 3.6). During both time periods examined (FY 2005/2006 and FY 2007), animal control officers believed wildlife complaints were received more frequently than did other subpopulations (FY2007:  $G=120.410$ ,  $df=12$ ,  $p<0.0005$ ; FY2005/FY2006:  $G=114.747$ ,  $df=12$ ,  $p<0.0005$ ).

Although respondents' opinions on the frequency with which complaints were being received spanned the gradient, most respondents (66%,  $n=248$ ) agreed that the severity of wildlife complaints received during FY2007 would be characterized as "moderate" ( $G=5.296$ ,  $df=6$ ,  $p=0.506$ ) (Table 3.8). This same characterization was found for the 2 previous fiscal periods (FY2005/2006), but here, administrative officials were more likely to have described such complaints as being "insignificant" than were other groups (39%,  $n=46$ ;  $G=15.101$ ,  $df=6$ ,  $p=0.020$ ) (Table 3.8).

Risk assessment of human-wildlife conflicts. – Animal control officers expressed greater concern about the potential risks imposed by each of the 4 possible human-wildlife conflict scenarios presented to them than did other respondent groups (Table 3.9). When asked about their concern of the possibility of human injury or fatality occurring from human-wildlife encounters in their community, animal control officers answered "very concerned" more frequently than did the other 3 subpopulations ( $G=28.908$ ,  $df=6$ ,  $p<0.0005$ ). Similar results were found for concern about human health ( $G=28.908$ ,  $df=6$ ,  $p<0.0005$ ) and personal safety risks



( $G=52.745$ ,  $df=6$ ,  $p<0.0005$ ). However, respondents' overall level of concern about risk fell noticeably across all subpopulations when the focus of the scenario shifted from involving human subjects to personal property (64% [ $n=309$ ] "not concerned" or "somewhat concerned").

Respondents' knowledge of wildlife did not significantly influence the concern they expressed about the 4 possible human-wildlife conflicts. However, as respondents' knowledge about wildlife increased or where respondents answered questions about wildlife correctly, concern in each of the 4 scenarios increased slightly (Figures 3.7, 3.8, 3.9, and 3.10).

Opinions on prioritizing human-wildlife conflicts and how best to manage such conflicts varied by subpopulation. Respondents answered similarly only when reacting to the "deal with human-wildlife conflict 'brushfires' only as they arise" scenario (49% [ $n=232$ ] classified this as "moderate priority,"  $G=5.172$ ,  $df=6$ ,  $p=0.522$ ) (Table 3.10). Overall, animal control officers viewed human-wildlife conflicts as being a higher priority within the community than did any of the other subpopulations (11% [ $n=11$ ] classified them as "high" priority and only 37% [ $n=36$ ] as "low" priority, compared with 5% "high" and 62% "low" for all subpopulations). In general, animal control officers displayed a higher prioritization to the entire suite of questions, except about emphasizing a single-species focus, where Extension agents saw greater benefit than did the other subpopulations ( $G=21.760$ ,  $df=6$ ,  $p=0.001$ ). Animal control officers and Extension agents saw greater value (higher priority) in implementing education programs about wildlife conflicts than did other respondents (23% and 21% "high" priority, respectively, vs. 13% "high" overall). Finally, animal control officers placed higher value (14% "high" priority) on utilizing private contract services to resolve conflicts than did other subpopulations (only 5% "high" priority overall). Taken collectively, though, this suite of questions indicates that respondents

generally view human-wildlife conflicts as being a “low” to “moderate” priority in the community (Table 3.10).

Respondents’ knowledge of wildlife had varying effects on how they prioritized human-wildlife conflicts and the options to resolve such conflicts. Respondents who correctly excluded domestic and feral animals from the term “wildlife” were slightly more likely than respondents who answered incorrectly or chose not to answer that human-wildlife conflicts were a moderate priority in their community (e.g., Figure 3.11). However, regardless of their demonstrated knowledge about wildlife, most respondents indicated that the types of human-wildlife conflict management options I presented would be a low priority to their community, as illustrated in Figures 3.12, 3.13, 3.14, and 3.15.

Human-wildlife conflict scenarios and their severity. – All subpopulations of respondents, except animal control officers, identified “deer eating residents’ ornamental plantings” as being the most severe human-wildlife conflict from among a list of 5 hypothetical wildlife conflict situations (Table 3.11). Animal control officers ranked a “snake entering a residence” as the most severe to them, and deer as the second most severe scenario. Administrative officials and Extension agents ranked the snake scenario as the second most severe to them, whereas elected officials ranked “geese conflicts” as their second most severe scenario.

Community characteristics appeared to influence how some respondents assigned relative severity to each of these conflict scenarios. Rural, suburban, and urban administrative officials all identified different scenarios as being the most severe; rural administrators identified the snake scenario as most severe; suburban administrators identified deer as the most severe; urban administrators identified geese as most severe (Table 3.12). Community type did not affect

animal control officers' opinions as all ranked snakes as the most severe scenario (Table 3.13). Elected officials revealed a slightly different community type effect, as leaders from all types (i.e., rural, suburban, and urban) identified deer as the scenario of greatest concern to them, but suburban elected officials ranked geese as equally severe and urban elected officials ranked snakes as equally severe (Table 3.14). Extension agents from different community types answered differently from one another; rural Extension agents ranked deer as most severe, suburban Extension agents ranked geese as most severe, and urban Extension agents ranked "a bear passing through town" as most severe (Table 3.15).

Record keeping within local government. – Most respondents (70%; n=279, N=400) believed that an official record of wildlife complaints being filed by constituents was being kept by some office of their local government (Table 3.16). Only 53% of respondents (n=151, N=283) stated that that record currently was being kept by the office in which they worked. Animal control officers clearly were at the forefront of knowing about records of complaints and compiling such records within local government (95.6% and 86.0%, respectively). Extension agents were the least certain of whether a record was being made within local government (33% [n=30] "Don't Know"). It appeared that animal control officers (86%, n=80) and extension agents (53%, n=18) were more likely to keep track of complaints within their own offices in most communities.

Once a record of a wildlife complaint was completed in an office of local government, it appears that the majority of those records simply were filed or stored away (66%; n=100, N=151) (Table 3.17). Among the subpopulations, animal control officers were more likely to examine and produce summaries of these records (25%, n=20) than were other groups.

Knowledge of record keeping practices elsewhere in local government offices varied greatly among respondents. Extension agents were the least certain of record keeping practices being conducted in other offices, as most agents (>50%) answered “Don’t Know” when asked about record keeping practices of the police department, dispatch, administrative offices, parks and recreation offices, and public works offices (Table 3.18). Administrative officials were the most knowledgeable about record keeping within local government; very few administrative officials answered “Don’t Know,” except in the case of what records Cooperative Extension maintained (57% uncertain). Elected officials and animal control officers were familiar with what police, dispatch, and animal control maintained, but less certain about central administration, parks and recreation, and public works. Respondents believed that records kept by animal control were paper records and those kept by dispatch were electronic, whereas respondents were split between paper and electronic records for police (Table 3.19). Few respondents knew what type of records Cooperative Extension, administrative offices, parks and recreation, and public works maintained, but those offering an opinion believed they were paper.

Local government response to wildlife complaints. – Based on the responses provided by all subpopulations, representatives of local government nearly always tried to provide some level of response to constituents’ calls about human-wildlife complaints (Table 3.20). However, the type and extent of that response varied substantially by subpopulation. Although most respondents (77%: n=273, N=355) claimed that a response of some type was made in every case, elected officials (11%, n=10) were more likely to indicate that a response was not made, at least occasionally, to callers with wildlife complaints ( $G=19.486$ ,  $df=9$ ,  $p=0.021$ ). Complaints received in administrative offices and by elected officials predominantly were referred to either another local government office or to a government agency outside local government, although

elected officials seemed more hesitant to send constituents away from local resources to agencies outside local government ( $G=28.761$ ,  $df=9$ ,  $p=0.001$ ). Extension agents and animal control officers were more likely than other subpopulations to refer callers to a private sector service provider ( $G=45.457$ ,  $df=9$ ,  $p<0.0005$ ). Callers to local government clearly were being provided advice and/or guidance to sources of self-help information (overall 70% “occasionally” or “very frequently”;  $n=257$ ,  $N=370$ ), but this service was coming most often from Extension agents (93%,  $n=56$ ) and animal control officers (88%,  $n=84$ ) rather than administrative (54%,  $n=65$ ) and elected officials (57%,  $n=52$ ) ( $G=106.466$ ,  $df=9$ ,  $p<0.0005$ ). Of all subpopulations, animal control officers were the most likely to conduct an on-site consultation with a complainant ( $G=67.069$ ,  $df=9$ ,  $p<0.0005$ ).

Geographic Information Systems (GIS) in local government. – Most respondents (64%:  $n=309$ ,  $N=484$ ) indicated that GIS currently is being used somewhere in their local governance (Table 3.21); administrative officials were the most certain about this use ( $G=43.427$ ,  $df=6$ ,  $p<0.0005$ ). Of the respondents who indicated that GIS currently was not in use in their community, most anticipated that GIS use by local government would begin either “within 1 to 5 years” (24%,  $n=20$ ) or “not in the foreseeable future” (66%,  $n=54$ ) (Table 3.22).

Overall, administrative officials were more likely to question the potential benefits that could be derived from using GIS technology to analyze and predict human-wildlife conflicts (Table 3.23). In contrast, animal control officers and Extension agents recognized more potential benefit in using GIS to visually present descriptive characteristics of human-wildlife conflicts ( $G=25.653$ ,  $df=6$ ,  $p<0.0005$ ), track the severity of conflicts over time ( $G=18.628$ ,  $df=6$ ,  $p=0.005$ ), use land use characteristics to explain patterns of human-wildlife conflicts ( $G=21.828$ ,  $df=6$ ,  $p=0.001$ ), and predict areas for potential future conflicts ( $G=15.744$ ,  $df=6$ ,  $p=0.015$ ).

Relative to all potential uses, more respondents (38%, n=177) believed the greatest potential GIS offered was for tracking change in the severity of human-wildlife conflicts over time.

*Roles and responsibilities of communities in managing human-wildlife conflicts.* – Local government role in managing human-wildlife conflicts. – Most respondents (76%; n=373, N=489) agreed that residents currently expect local government will provide services to resolve human-wildlife conflicts in their community (Table 3.24). Animal control officers expressed stronger agreement with this statement than did other respondents ( $G=49.391$ ,  $df=12$ ,  $p<0.0005$ ). Although most respondents (58%, n=282, N=487) agreed that local governments should play an important decision-making role in managing human-wildlife conflicts, Extension agents' sentiments on that issue were stronger than other subpopulations (68% [n=51] agreement;  $G=21.081$ ,  $df=12$ ,  $p=0.049$ ). There was little disagreement among respondents that budget and staff shortages were important constraints on local government's ability to manage human-wildlife conflicts ( $G=16.093$ ,  $df=12$ ,  $p=0.187$ ). Respondents overall agreed (71%, n=340, N=479) that local governments must play a central role in decision-making to resolve conflicts, but elected officials (77%, n=132) and Extension agents (78%, n=58) expressed stronger agreement on this issue than did other groups ( $G=42.564$ ,  $df=12$ ,  $p<0.0005$ ). Although most respondents (54%, n=250, N=481) agreed that local government should assume leadership in managing human-wildlife conflicts, support for this concept was weaker overall; extension agents (66%) expressed greatest agreement ( $G=30.568$ ,  $df=12$ ,  $p=0.002$ ). Most respondents (76%, n=365, N=480), and especially animal control officers (84%, n=80, N=96), believed that local governments should not be expected to take on additional responsibility without being provided additional resources ( $G=29.631$ ,  $df=12$ ,  $p=0.003$ ).

There did not appear to be any relationship between respondents' prioritization of human-wildlife conflicts and their belief that local government should be involved in the resolution of such conflicts. Despite the fact that most respondents believed that local government should play an active role, but should not take on additional responsibilities without additional resources, most still categorized such conflicts as being a "low" to "moderate" priority (Figures 3.16 and 3.17). Animal control officers, as a group, believed such conflicts overall were a higher priority than other leaders did, but, even here their belief on priority did not change their view about local governments' role and/or responsibility.

For select respondents, their opinion on the role of local government in resolving human-wildlife conflicts was shaped, in part, by the level of concern they expressed about perceived risks to both human safety and to personal property. Animal control officers who more frequently expressed a high level of concern for human safety also agreed more often that local government should play a role than did those respondents who expressed less concern (Figure 3.18). The same pattern was evident for concern about human safety and whether local government should not be expected to take on additional responsibilities without being provided additional resources (Figure 3.19).

A slightly different trend was evident when comparing respondents' level of agreement that local government plays an important decision-making role in managing human-wildlife conflicts and their expressed level of concern about perceived risk to property associated with such conflicts. Although the majority of respondents still agreed that local government should play an important role, the overall level of agreement was weaker for property concerns than for human safety concerns (Figures 3.20 and 3.21). Nearly equal proportions of respondents who said "somewhat concerned" vs. "very concerned" about risks to property damage also agreed that

local governments should assume a central decision-making role in managing human-wildlife conflicts. Concern about property damage did not seem to influence respondents' opinion that local government should assume leadership in managing human-wildlife conflicts (Figure 3.22).

Entities having a role in managing human-wildlife conflicts. – Most respondents recognized that each of the agencies or entities presented to them (i.e., Virginia Department of Game and Inland Fisheries [VDGIF], US Fish and Wildlife Service [USFWS], US Department of Agriculture- Animal and Plant Health Inspection Service- Wildlife Services [USDA-APHIS-WS], Virginia Cooperative Extension [VCE], and private wildlife control operators) has at least some level of responsibility for managing human-wildlife conflicts in communities (Table 3.25). Overall, animal control officers indicated that these entities had a much lower level of responsibility than did other subpopulations. In particular, animal control officers believed VDGIF had “none” (10%, n=10) or a “low” (37%, n=36) level of responsibility for long-term resolution of human-wildlife conflicts; other subpopulations recognized greater involvement for VDGIF ( $G=63.238$ ,  $df=9$ ,  $p<0.0005$ ). Similar trends were evident for USFWS ( $G=43.350$ ,  $df=9$ ,  $p<0.0005$ ), USDA-APHIS-WS ( $G=17.544$ ,  $df=9$ ,  $p=0.041$ ), and VCE ( $G=28.309$ ,  $df=9$ ,  $p=0.001$ ). No relationship was evident between subpopulation and their perception of the level of contribution from private wildlife control operators ( $G=5.601$ ,  $df=9$ ,  $p=0.779$ ).

Impediments for local government in managing human-wildlife conflicts. – Although I detected a relationship between respondent subpopulation and one's opinion about the potential needs of local governments to manage human-wildlife conflicts, these differences reflected variations in the strength of respondents' agreement rather than meaningful differences in opinion (Table 3.26). Most respondents agreed that local governments need both technical (83%; n=396; N=480) and financial (84%; n=401; N=479) assistance to manage human-wildlife



conflicts in the community. Extension agents (96%, n=71, N=74) voiced very strong support for technical assistance, as did most animal control officers (74%, n=71, N=96), but a larger minority of officers (7%, n=7), relative to other subpopulations, saw less need in this arena (G=20.451, df=12, p=0.059). Although respondents clearly acknowledged the need for additional financial assistance for local governments to manage human-wildlife conflicts, elected officials and animal control officers expressed stronger sentiment in that regard (G=21.674, df=12, p=0.041). There appeared to be substantial uncertainty among all respondent groups as to whether local governments currently have legislative authority to manage human-wildlife conflicts in their community; Extension agents (49%, n=36, N=73) were the most uncertain about this (G=22.207, df=12, p=0.035).

How one categorized the priority of human-wildlife conflicts did not appear to influence that individual's opinion about the needs of local governments (Figures 3.23, 3.24, and 3.25). Although all groups agreed that communities had important needs in each of these areas (i.e., technical and financial assistance, legislative authority), regardless of the priority they assigned to human-wildlife conflicts.

In a similar pattern, as animal control officers' concern about the risk to human safety increased, so too did their level of agreement regarding community needs. For example, as illustrated in Figure 3.26, animal control officers who expressed high levels of concern for human safety also agreed that local governments need financial assistance. A similar, but less dramatic, pattern was evident (Figure 3.27) regarding community needs and one's expressed concern about the risk for property damage from human-wildlife conflicts.

Although respondents overwhelmingly assigned high levels of importance to each of the impediments that potentially could influence whether they decided to participate in managing

human-wildlife conflicts in their community (Table 3.27), animal control officers assigned greater importance to each of these impediments than did other subpopulations (insufficient expertise or training of community staff:  $G=32.810$ ,  $df=12$ ,  $p=0.001$ ; insufficient budget:  $G=40.497$ ,  $df=12$ ,  $p<0.0005$ ; insufficient personnel or staff:  $G=23.197$ ,  $df=12$ ,  $p=0.026$ ; lack of public support to take action:  $G=18.921$ ,  $df=12$ ,  $p=0.090$ ). Subpopulations did not differ in their rating of importance for “lack of legislative authority” ( $G=16.067$ ,  $df=12$ ,  $p=0.188$ ), “lack of regulatory authority” ( $G=17.779$ ,  $df=12$ ,  $p=0.123$ ), and “public opposition to specific management techniques” ( $G=9.274$ ,  $df=12$ ,  $p=0.662$ ); all were viewed as being at least somewhat important to their decision to participate in co-management.

*Knowledge, perceptions, and opinions about community-based co-management. –*

Knowledge of previous community-based co-management agreements. – Most respondents (62%;  $n=303$ ;  $N=487$ ) agreed that their local government currently partners with a state agency to manage or resolve some type of community issue (Table 3.28). Animal control officers differed from the other subpopulations ( $G=24.315$ ,  $df=12$ ,  $p=0.018$ ) in that only 48% ( $n=46$ ) agreed with this statement, whereas none of the other groups demonstrated <60% agreement. However, respondents were less certain about the exact identity of the specific agency with which their local government maintained an agreement (Table 3.29). Based on their responses, community-based co-management partnerships were more likely to exist with the Virginia Department of Transportation and the Virginia Department of Health. Extension agents overall were least certain (i.e., >58% of agents selecting “Don’t Know” option) about co-management agreements with other agencies, except for those involving VCE, whereas administrative officials were most certain of co-management agreements (i.e., selected “Don’t Know” least often). Animal control officers believed co-management agreements were more likely to exist

with VDGIF than did other respondents (49% vs. 34% overall;  $G=73.117$ ,  $df=6$ ,  $p<0.0005$ ).

Administrative officials also were more likely to suggest (92% vs.  $\leq 50\%$  overall) that additional co-management agreements existed with “other” agencies not highlighted in the survey ( $G=17.346$ ,  $df=6$ ,  $p=0.008$ ).

Satisfaction with co-management agreements. – Most respondents who indicated that their community had had a co-management agreement also expressed that they were either “satisfied” (54-65% overall) or “very satisfied” (7-23% overall) with both the level of cooperation between agencies involved in the agreement (Table 3.30) and the outcome of these agreements (Table 3.31). Administrative officials and elected officials were more likely to express dissatisfaction with the level of cooperation with agencies than were other subpopulations; this was most evident with VDE, where 16% ( $n=4$ ) and 13% ( $n=7$ ), respectively, expressed dissatisfaction. Slightly more animal control officers than other subpopulations expressed dissatisfaction with the level of cooperation evident in their community’s agreements with VDOT ( $G=25.172$ ,  $df=12$ ,  $p=0.014$ ), whereas elected officials tended to be less satisfied with cooperation from VCE ( $G=39.685$ ,  $df=12$ ,  $p<0.0005$ ) (Table 3.30). A noticeable minority of animal control officers (26% [ $n=13$ ], 24% [ $n=12$ ], respectively) expressed dissatisfaction in the level of cooperation with ( $G=23.767$ ,  $df=12$ ,  $p=0.022$ ) and outcomes from VDGIF ( $G=22.785$ ,  $df=4$ ,  $p=0.03$ ). Elected officials expressed somewhat greater dissatisfaction with the outcome of their community’s agreement with VCE than did other subpopulations ( $G=24.798$ ,  $df=12$ ,  $p=0.016$ ) (Table 3.31).

Opinion about the potential for co-management agreements to manage human-wildlife conflicts. – Most respondents agreed that co-management is a realistic (74%,  $n=351$ ,  $N=476$ ) and attractive (63%,  $n=298$ ,  $N=475$ ) option for managing human-wildlife conflicts (Table 3.32).

They also viewed co-management as a potential means for local governments to manage wildlife conflicts in their community (74%, n=353, N=477). Extension agents expressed stronger sentiment that co-management was a realistic way to manage human-wildlife conflicts (G=36.217, df=12, p<0.0005) and offered local government an opportunity to manage conflicts in their community (G=33.583, df=12, p=0.001) than did other respondents. Extension agents and elected officials both displayed stronger agreement about co-management being an attractive option for managing human-wildlife conflicts (G=20.086, df=12, p=0.065). Most respondents agreed that budget constraints (77%, n=364, N=476) and lack of staff training (63%, n=301, N=476) would limit local government's ability to participate in co-management agreements. Although most respondents agreed (70%, n=335, N=476) that staff shortages would limit local government's ability to participate in co-management, more administrative officials and animal control officers agreed strongly with that sentiment (G=24.461, df=12, p=0.018). When asked if local government is willing to partner with other agencies to manage human-wildlife conflicts, 59% (n=279; N=475) of respondents agreed; extension agents were less certain than others about that willingness (G=19.240, df=12, p=0.083). However, when asked if local government is willing to assume responsibility for managing human-wildlife conflicts, few agreed (<25%) and many (45%, n=214, N=475) choose to remain neutral. Elected officials were more likely to agree (35%, n=59), whereas administrative officials (40%, n=55) and animal control agents (30%, n=28) were more likely to disagree, with assuming such responsibilities (G=47.612, df=12, p<0.0005).

One's prioritization of human-wildlife conflicts did not seem to influence opinion about co-management. Figure 3.28 is representative of how respondents reacted to the 3 questions regarding the feasibility of co-management. Regardless of how respondents characterized the

priority of human-wildlife conflicts, most agreed that co-management was a realistic option for managing human-wildlife conflicts. A similar trend was evident when comparing prioritization with the 3 potential impediments communities might face (e.g., Figure 3.29, illustrating prioritization vs. the lack of sufficient staff to become involved in co-management).

Regardless of how they prioritized human-wildlife conflicts, when asked if local government was willing to partner with other state agencies to resolve conflicts, a large proportion of respondents chose not to express an opinion (Figure 3.30). Animal control officers who indicated that human-wildlife conflicts were a “moderate” priority were more likely to agree to partner with other state agencies than animal control officers who assigned a “low” priority to human-wildlife conflicts. Because so few respondents’ expressed an opinion about whether local government should assume a leadership role in managing human-wildlife conflicts, the influence of one’s prioritization could not be assessed accurately (Figure 3.31).

Concern for human safety influenced animal control officers’ and elected officials’ opinions about co-management. When respondents from these subpopulations indicated a high level of concern about human safety arising from human-wildlife conflicts, they also were more likely to express a favorable opinion about co-management (Figure 3.32). That same trend was present when comparing concern for human safety and opinion of whether local government should assume a leadership role in managing human-wildlife conflicts in their community (Figure 3.33). Animal control officers and elected officials who expressed high levels of concern about human safety risks also tended to support assuming leadership more so than did respondents in those same subpopulations who expressed low levels of concern for human safety.

As concern about risks of property damage from human-wildlife conflicts increased, animal control officers and elected officials also were more likely to express a favorable opinion of co-management (Figure 3.34). However, this trend was not as strong as the relationship between concern for human safety and opinion of co-management. Animal control officers and elected officials who indicated higher concern about property damage were more likely to agree that co-management is a realistic option for managing these conflicts (Figure 3.35).

*Influences of demographic characteristics.* – Similar to the comparisons I made between respondent subpopulation and survey questions, I analyzed each question response with regard to demographic characteristics of respondents. No consistent significant trends arose among these characteristics in terms of their relationship to specific questions. Rather, I detected a repeating pattern of association among two sets of demographic characteristics, which will be analyzed further here (i.e., length of time in current position and length of time in local government, and community size and community type). Tables displaying more detailed data are presented in Appendix A.

*Local government experience.* – Although most respondents believed that their community had received wildlife complaints during the last 3 fiscal years, individuals who were serving in their current position and those who had been in a local government career <5 years were less certain than other respondents about whether the community had received complaints (e.g., FY2007 - current position:  $G=15.364$ ,  $df=4$ ,  $p=0.004$ ; career:  $G=39.190$ ,  $df=4$ ,  $p<0.0005$ ) (Tables A.3 and A.4). Respondents who had served in their current position <5 years ( $G=12.558$ ,  $df=4$ ,  $p=0.014$ ) and whose career in local government was <5 years ( $G=12.235$ ,  $df=4$ ,  $p=0.016$ ) expressed the most uncertainty about whether records of wildlife complaints were being kept by local government (Table A.9). Respondents who had <20 years of service in

their current position indicated more frequently than respondents who had served >20 years that no records of wildlife complaints were kept in their office ( $G=8.375$ ,  $df=4$ ,  $p=0.079$ ). Similarly, respondents whose career in local government was <5 years expressed the most uncertainty about whether such records were kept in their office ( $G=18.671$ ,  $df=4$ ,  $p=0.001$ ).

Respondents with <5 years in their current position expressed stronger agreement than those with longer service that local governments must play a central-decision making role in managing human-wildlife conflicts ( $G=16.734$ ,  $df=8$ ,  $p=0.033$ ) (Table A.15). In contrast, respondents with >20 years of service in their current position were less likely to agree ( $G=31.410$ ,  $df=8$ ,  $p<0.0005$ ) that local governments should assume leadership in managing human-wildlife conflicts than were employees with shorter terms of service. Regarding opinion about communities' need for technical assistance to manage human-wildlife conflicts, respondents with >20 years of service in their current position expressed less support than did officials with less time in service ( $G=14.772$ ,  $df=8$ ,  $p=0.064$ ) (Table A.17). Respondents who have served in their current position for >20 years attributed higher importance to the lack of legislative and regulatory authority (legislative:  $G=18.061$ ,  $df=8$ ,  $p=0.021$ ; regulatory:  $G=22.776$ ,  $df=8$ ,  $p=0.004$ ) (Table A.18).

Respondents who served in their current position <5 years (51% [ $n=113$ ] "Don't Know;"  $G=25.061$ ,  $df=4$ ,  $p<0.0005$ ) and in their career <5 years (61% [ $n=63$ ] "Don't Know;"  $G=27.740$ ,  $df=4$ ,  $p<0.0005$ ) were most uncertain about existing or past co-management agreements with any wildlife agency (Table A.19). This same pattern held for most other agencies (e.g., VDOT:  $G=8.576$ ,  $df=4$ ,  $p=0.073$ ;  $G=13.591$ ,  $df=4$ ,  $p=0.009$ ; VDACS:  $G=20.365$ ,  $df=4$ ,  $p<0.0005$ ; VCE:  $G=11.786$ ,  $df=4$ ,  $p=0.019$ ;  $G=10.137$ ,  $df=4$ ,  $p=0.038$ ; VDE:  $G=12.136$ ,  $df=4$ ,  $p=0.016$ ; VDGIF:  $G=11.271$ ,  $df=4$ ,  $p=0.024$ ;  $G=15.112$ ,  $df=4$ ,  $p=0.004$ ).

Respondents who served in their current position or in local government for <5 years voiced stronger agreement than those with longer service that co-management is a realistic way to manage human-wildlife conflicts (position length:  $G=24.483$ ,  $df=8$ ,  $p=0.002$ ) and presents an opportunity for local government to manage these conflicts in their community (career length:  $G=14.236$ ,  $df=8$ ,  $p=0.076$ ) (Table A.22). Respondents who had served in their current position <20 years ( $G=21.343$ ,  $df=8$ ,  $p=0.006$ ) and those whose career in local government has lasted <5 years ( $G=13.392$ ,  $df=8$ ,  $p=0.099$ ) expressed strongest sentiment that co-management is an attractive option for managing human-wildlife conflicts. Respondents whose career in local government was <5 years were more likely to agree that communities would be willing to assume responsibility for managing human-wildlife conflicts ( $G=25.516$ ,  $df=8$ ,  $p=0.001$ ).

Community size and type. – Respondents from rural areas and those from population centers of <10,000 expressed less certainty, compared to those from urban areas or larger population centers, as to whether wildlife complaints had been received within their community (e.g., FY2007 - rural:  $G=11.968$ ,  $df=4$ ,  $p=0.018$ ; <10,000:  $G=37.787$ ,  $df=4$ ,  $p<0.0005$ ) (Table A.3). Although the frequency of wildlife complaints being received by most communities overall was characterized as “occasional,” respondents from population centers of <10,000 believed wildlife complaints were received less frequently than respondents in other population groups in both FY2007 and FY2005/2006 (FY2007:  $G=83.182$ ,  $df=8$ ,  $p<0.0005$ ; FY2005/2006:  $G=100.793$ ,  $df=8$ ,  $p<0.0005$ ) (Table A.5).

Significant relationships also were evident between community size and one’s characterization of the severity of wildlife complaints during both FY2007 and FY2005/2006 (FY2007:  $G=8.179$ ,  $df=4$ ,  $p=0.085$ ; FY2005/2006:  $G=13.652$ ,  $df=4$ ,  $p=0.008$ ) (Table A.6). In both instances, respondents from population centers with <10,000 residents were more likely to



report wildlife complaints as “insignificant,” whereas respondents from larger communities more often selected “moderate.”

Respondents from urban communities expressed greater concern about the risks of human injury or fatality ( $G=17.444$ ,  $df=6$ ,  $p=0.002$ ) and to human health ( $G=9.426$ ,  $df=4$ ,  $p=0.051$ ) associated with human-wildlife conflicts than did respondents from other community types (Table A.7). Similarly, respondents from communities with population  $>100,000$  were more concerned about risks to human health ( $G=17.220$ ,  $df=4$ ,  $p=0.002$ ).

Overall, most respondents characterized the various management options presented to them as being a “low” to “moderate” priority, but respondents from population centers  $>100,000$  viewed these options as higher priorities ( $G=28.366$ ,  $df=4$ ,  $p<0.0005$ ) (Table A.8). Additionally, respondents from these larger population centers viewed the implementation of a community-wide comprehensive resolution program and an education program as higher priorities than did respondents from smaller communities (comprehensive program:  $G=28.340$ ,  $df=4$ ,  $p<0.0005$ ; education program:  $G=26.532$ ,  $df=4$ ,  $p<0.0005$ ). In several cases, respondents who characterized their community as being “urban” responded similarly (comprehensive program:  $G=9.576$ ,  $df=4$ ,  $p=0.048$ ; education program:  $G=8.501$ ,  $df=4$ ,  $p=0.075$ ). Urban respondents viewed developing both a single-species ( $G=8.479$ ,  $df=4$ ,  $p=0.076$ ) and a comprehensive resolution program a higher priority than did their suburban and rural counterparts. Implementing an education program was a higher priority for urban respondents than for non-urban respondents ( $G=8.501$ ,  $df=4$ ,  $p=0.075$ ).

Respondents from rural communities ( $G=16.704$ ,  $df=4$ ,  $p=0.002$ ) and from population centers  $<10,000$  ( $G=43.746$ ,  $df=4$ ,  $p<0.0005$ ) answered “no” or “don’t know” more frequently than other respondents when discussing their knowledge of whether records of wildlife

complaints were being kept either within local government as a whole and within their office specifically (Table A.9). These same respondents were more decisive when responding about the basic services their local government provided (i.e., police, animal control, central dispatch). Those from rural communities and population centers <10,000 often indicated that their government structure did not provide certain services (i.e., parks and recreation, public works). When wildlife complaints were received, respondents from rural areas and from population centers <10,000 were less likely to refer callers to government agencies outside local government ( $G=20.279$ ,  $df=6$ ,  $p=0.002$ ) or to private sector service providers ( $G=15.405$ ,  $df=6$ ,  $p=0.017$ ;  $G=51.657$ ,  $df=6$ ,  $p<0.0005$ ) (Table A.11). These smaller communities also were less likely to provide advice, suggest sources of self-help information ( $G=27.281$ ,  $df=6$ ,  $p<0.0005$ ), or provide an on-site consultation ( $G=18.756$ ,  $df=8$ ,  $p=0.005$ ). Respondents from rural communities indicated more frequently that a caller from their community with a wildlife complaint would receive no response than would one from a suburban or urban community ( $G=12.929$ ,  $df=6$ ,  $p=0.044$ ).

Respondents from populations centers <10,000 ( $G=41.159$ ,  $df=4$ ,  $p<0.0005$ ) believed their community was less likely to be using GIS and were more likely to see less benefit to them from the use of GIS technology (Table A.12). Whereas most respondents overall found the 4 proposed uses of GIS as being “somewhat beneficial,” those from population centers <10,000 replied “not beneficial at all” more often than did respondents from larger populations areas (Table A.14).

Respondents from rural areas and smaller communities displayed different opinions of the roles and responsibilities of local governments in resolving human-wildlife conflicts (Table A.15). Respondents who considered themselves living in a rural community ( $G=24.448$ ,  $df=8$ ,

p=0.002), or a population center of <10,000 individuals (G=29.186, df=8, p<0.0005) expressed less agreement that residents expect local government to provide services to resolve human-wildlife conflicts. Those from urban settings (G=17.129, df=8, p=0.029) expressed stronger agreement that local governments must play a central-decision making role in managing human-wildlife conflicts. Respondents from suburban/urban communities and from population centers of >100,000 were less likely to recognize the contributions of wildlife agencies outside local government than did other respondents (suburban/urban: VDGIF: G=13.670, df=6, p=0.034; USDA-APHIS-WS: G=12.531, df=6, p=0.051; population >100,000: VDGIF: G=20.476, df=6, p=0.002; USFWS: G=11.381, df=6, p=0.077; VCE: G=11.522, df=6, p=0.074) (Table A.16). Respondents from urban communities (35%, n=20, N=58) expressed greater dissent as to whether local communities had legislative authority to resolve human-wildlife conflicts on their own (G=22.692, df=8, p=0.004) (Table A.17). Respondents from urban communities attributed higher importance to issues of insufficient personnel or staff (G=16.939, df=8, p=0.031) and to public opposition (G=14.224, df=8, p=0.076) than did respondents from other community types (Table A.18). Respondents from population centers >100,000 assigned greater importance (G=14.239, df=8, p=0.076) to concerns about the effects of public opposition to specific management techniques than did respondents from smaller communities.

More rural (49%; n=161) and suburban (46%; n=43) respondents, as well as respondents from population centers <10,000 (59%; n=120), believed their community had not yet partnered with a wildlife agency to manage human-wildlife conflicts (community type: G=9.998, df=4, p=0.040; community size: G=33.665, df=4, p<0.0005) (Table A.14). Although most respondents indicated that their community had had an agreement with VDOT, those from population centers of >10,000 (G=33.614, df=4, p<0.0005) were less certain about such agreements. Respondents

from suburban and urban communities and population centers >100,000 were more certain about having an agreement with VDH (community type:  $G=11.535$ ,  $df=4$ ,  $p=0.021$ ; community size:  $G=56.550$ ,  $df=4$ ,  $p<0.0005$ ). Leaders from urban communities and from communities of >10,000 inhabitants were less familiar about partnerships with VDACS, VCE, VDE, and VDGIF (VDACS: community type:  $G=9.094$ ,  $df=4$ ,  $p=0.059$ ; community size:  $G=45.164$ ,  $df=4$ ,  $p<0.0005$ ; VCE: community type:  $G=11.036$ ,  $df=4$ ,  $p=0.026$ ; VDE: community type:  $G=9.580$ ,  $df=4$ ,  $p=0.048$ ; community size:  $G=53.457$ ,  $df=4$ ,  $p<0.0005$ ; VDGIF: community type:  $G=10.628$ ,  $df=4$ ,  $p=0.031$ ; community size:  $G=43.267$ ,  $df=4$ ,  $p<0.0005$ ).

Respondents from population centers >100,000 were more likely to agree strongly that co-management presents local government the opportunity to manage human-wildlife conflicts ( $G=14.985$ ,  $df=8$ ,  $p=0.059$ ) (Table A.22). Respondents from population centers <10,000 agreed most strongly, whereas those from populations >100,000 were more likely to disagree, that a lack of staff training would limit local government's involvement in co-management ( $G=17.486$ ,  $df=8$ ,  $p=0.071$ ). Similarly, respondents from small population centers ( $G=14.079$ ,  $df=8$ ,  $p=0.080$ ), and those from rural communities ( $G=16.200$ ,  $df=8$ ,  $p=0.040$ ), expressed strong agreement that staff shortages would limit local government involvement. Respondents from urban communities appeared more willing to partner with other agencies to manage human-wildlife conflicts ( $G=17.299$ ,  $df=8$ ,  $p=0.027$ ). Respondents from urban communities were more likely to agree that communities would be willing to assume responsibility for managing human-wildlife conflicts ( $G=24.259$ ,  $df=8$ ,  $p=0.002$ ).

## **CHAPTER 4: DISCUSSION, MANAGEMENT RECOMMENDATIONS, AND FUTURE RESEARCH**

### **Discussion**

*Respondents' knowledge of wildlife and wildlife complaints.* – Respondents overall understood what the term “wildlife” means, and many maintained a comprehensive definition of the term “wildlife.” Additionally, very few respondents included feral or domesticated animals in their definition of wildlife, which was encouraging to see that they were making these distinctions. These points are important to our understanding of what community representatives may be thinking when they frame their discussions about human-wildlife conflicts and when trying to interpret other responses to this survey.

It is obvious from my data that community leaders all across Virginia are receiving complaints about wildlife interactions from residents. Animal control officers, given the nature of their position as the community’s first responders to complaints involving animals, reported proportionally more complaints than did other respondents. Because they are closer to these situations on a daily basis, they likely have a more accurate impression of what actually is occurring on the ground in most communities. Aside from this obvious and intuitive distinction among respondents, there were several other indicators in my data that suggest Virginia’s local communities may be reacting differently to these human-wildlife interactions. Respondents who were new (<5 years) in their position or to local government, respondents from rural communities, and respondents from communities <10,000 described fewer conflict issue situations. Respondents new to either their position or to local government may not yet have enough personal experience to adequately form an accurate opinion of such complaints or have enough knowledge about what goes on in all departments of local government. Respondents from rural sectors may be expressing less affirmation about wildlife complaints because their

constituents have a tradition of handling human-wildlife conflicts on their own and would be less likely to report complaints, whereas urban residents are less likely to handle conflicts on their own, resulting in the proportionally higher number of urban respondents indicating they received wildlife complaints.

*Records of human-wildlife conflicts.* – Although wildlife complaints clearly are being registered in Virginia communities, community leaders described the vast majority of these complaints as being infrequent and predominantly insignificant (i.e., not severe). According to most respondents, complaints were not occurring in alarming numbers across the Commonwealth. However, the basis for how these impressions were formed or the validity of such statements has to be suspect.

When asked about record keeping of wildlife complaints, it was apparent that, in most communities, some form of record was being kept by someone in local government. For the most part, complaint records were maintained by animal control, police, or central dispatch. Despite the fact that, in many communities, these three entities reside within the same department, recordkeeping often was not coordinated and separate and distinct systems existed. Other respondents indicated that records were being kept somewhere within local government, but most indicated that such records were not maintained in or routinely reviewed in their own offices. Animal control officers were the only group that regularly kept, compiled, and summarized wildlife complaint records.

When asked more closely about the record-keeping practices of specific departments within local government, respondents who were new to local government and Extension agents expressed more uncertainty than other groups. Respondents new to local government may not have enough exposure to what each department is doing to be able to speak knowledgeably about

their specific operating procedures. Extension agents are on the periphery of local government and may not be familiar enough with the record keeping practices of other departments, but certainly are knowledgeable about the calls/complaints received within their office. Not surprisingly, administrative officials were the most certain about the recordkeeping practices of specific local government departments; these officials should know what happens in all departments and should be knowledgeable about the operating procedures of those departments. Even here, though, it is apparent that very little use, if any, is being made of the data being collected and stored away in most communities. Whether this potential mine of data could be used to bring light to the extent and severity of human-wildlife conflicts in local communities, or to monitor trends and changes in these conflicts, remains an open question. My analysis was not able to examine the specific types of information being collected or assess the adequacy of that data in providing an accurate and consistent means to document such conflicts. Without such data, it would be impossible to evaluate exactly what is happening in Virginia's communities relative to human-wildlife interactions other than through anecdotal accounts and perceptions.

My results also suggest that records of wildlife complaints were less likely to be maintained in rural or smaller communities; whether this was due to these communities receiving fewer complaints overall or other reasons could not be determined. Rural and smaller communities often do not have the resources to provide all the services that larger local governments do (e.g., many smaller communities do not have Parks and Recreation or Animal Control units); here, limited resources are devoted to what are considered essential health and safety services (i.e., police, fire, public works) and to education.

In local governments where records of human-wildlife complaints were being kept, it appeared that paper records predominated; the one exception often cited was the digital

recordings from central dispatch. However, most of these recordings probably are audio tapes or electronic files of the daily exchanges between dispatch operators and callers and none likely have been transcribed or segregated by type of complaint. It would be an immense task to go back and sift through these accumulated registers to extract data pertinent only to human-wildlife interactions. Despite the fact that paper documents (or possibly electronic files) are being collected and retained somewhere within local government, it is apparent that little, if any, use is being made of the recordkeeping effort relative to human-wildlife conflicts. Further, few decision makers knew where that information was located or what it contained. Unless these paper documents were filed in a manner that allowed efficient tracking and retrieval, it probably is very unlikely that any community is going to make use of the data being preserved without investing considerable time, effort, and precious resources to obtain something from them. Again, not knowing the quality of that data, trying to mine this stored data for useful information about human-wildlife conflicts may be a questionable venture in most communities.

*Community response to human-wildlife conflicts.* – Most respondents indicated that, when a resident called local government seeking help or information about a human-wildlife conflict, a response of some type was made to the resident, but this was not the case in all rural or smaller communities. In most communities, a caller was provided either resolution advice or was directed to other sources of self-help information. When calls came directly to animal control officers, they often conducted an on-site consultation, as would be expected from a first responder. Calls directed to extension agents likely produced technical advice or other resource information specific to the needs expressed by community members; agents are trained educators and are responsible for providing sound, science-based information. In rural communities, especially those that do not maintain animal control services, the typical response given to callers



was not clear. I suspect that many callers may have been directed to county government, other state agencies (e.g., VDGIF), or to local private service providers, but this was not assessed directly. However, this assumes that such calls actually exist in rural areas; respondents from rural communities indicated that they received few calls and that most residents took care of problems themselves. If residents know that the local community did not provide such services (i.e., no animal control), they may not attempt to solicit help from the community to begin with.

*Application of Geographic Information Systems technology.* – Geographic Information Systems (GIS) currently are being used in many communities across Virginia. Animal control officers and elected officials tended to be more uncertain about the use of GIS, most likely due to the more removed nature of their position from the use of this technology. Respondents from smaller communities also tended to be uncertain about the use of GIS in their community; perhaps the small size of the budgets and staff in these communities limit the implementation of new technologies. For the few number of communities where GIS currently is not in use, respondents did not foresee its implementation anytime in the near future. Because the communities most likely to not currently be using GIS are the smaller, rural communities, these communities will be the last to see the benefit of using GIS to track wildlife complaints in their community. That may put them at a disadvantage in the future, as they try to catch up to the other larger counties and cities in the state.

Despite not using GIS in their everyday activities, animal control officers and Extension agents perceived the most potential benefit from using this technology to track and analyze wildlife complaint data. Administrative officials had the opposite opinion, perhaps from the perspective of already strapped budgets and not seeing the ability to implement one more program within the community. This could be the same explanation as to why respondents from

smaller communities also perceived the least benefit of using GIS to analyze wildlife complaints. Of the four potential uses of GIS, respondents indicated that they believed tracking the severity of wildlife complaints over time would be the most beneficial use. I believe that being able to track the number and severity of complaints over time is one of the first steps communities must take if they are to identify issues and document whether a problem is growing within the community. Today, there is a need in most local governments for evidence that establishes whether human-wildlife conflicts are an issue and one that is reaching a critical threshold.

*Concern and priorities of community leaders.* – Respondents acknowledged at least some concern for each of the four scenarios presented in the mail survey. Animal control officers, as a group, exhibited more concern than did other representatives of local government. This could be attributed to the fact that they are called upon every day to deal with human-wildlife conflict and it is a focus of their everyday activities. On average, all respondents were more concerned about scenarios that represented a potential danger to human health and safety. Although still demonstrating some concern, respondents displayed less concern about scenarios that posed risk only to one's property. Respondents from urban communities expressed a higher than average level of concern about scenarios that posed a risk to human health and safety. Possible explanations for this trend might be that 1) conflicts of this type are occurring more frequently in these areas due to the high density of inhabitants, or 2) urban individuals are less familiar with wildlife and the natural world (the so-called "nature deficit disorder" [Louv 2006]) and, because of this inexperience or lack of training, could believe risks from wildlife overall are greater. Respondents' concern for human health and safety as a result of human-wildlife conflicts is not misplaced, but steps can be taken to reduce those risks. From a psychological perspective, one way to help alleviate concern is to prepare through educational efforts. Educational efforts on

how to prevent the transmission of diseases, how to treat those diseases, or methods for reducing safety conflicts with specific species (e.g., measures taken by residents to make homes less appealing for bears) allow communities to be ready when situations arise that could pose a threat to human health or safety.

Despite this expressed level of concern, respondents still indicated that human-wildlife conflicts are, at best, a moderate priority in their community. Like the previous trend, animal control officers indicated that human-wildlife conflicts are a slightly higher priority in their role within the community. Most leaders, though, clearly indicated that human-wildlife conflicts would continue to be addressed only once they attained the “brushfire” threshold; these leaders viewed implementing an educational program on resolving conflicts a higher priority than any of the management options presented, especially anything resembling a “proactive” approach. I believe this represents the *status quo* in communities. Most communities appear to handle complaints within existing budget and staff limits as best they can as they come in. If the problem escalates, education is the answer. In most Virginia communities, human-wildlife conflicts have not yet reached a threshold of urgency/immediacy sufficient to move them from an occasional inconvenience to a community-wide priority. Until that threshold is attained, communities likely will continue to respond with only enough effort to contain the immediate conflict and quickly get on to other more pressing issues; there is no apparent desire to understand why the situation has arisen or take proactive steps to assure that other similar situations do not occur again. Because urban respondents assigned higher priority to human-wildlife conflicts than did other respondent groups, that threshold may be closer to being met, and leaders in these communities now may be forced into thinking more broadly about how to handle and prevent these issues as they arise.

When asked to comparatively rank 5 hypothetical conflict scenarios on their relative severity, respondents clearly indicated that deer are at or near the top of their list. This finding is not surprising considering the overabundance of white-tailed deer across Virginia and other eastern states. Deer issues are common in many communities, but some respondents indicated that they considered some of the less common scenarios as the most severe. For example, some respondents from specific community types considered overabundant geese to be the most severe of the 5 scenarios. This may be another indicator of how some respondents considered the potential risks to human health and safety, or property (pets) as being more severe than scenarios that described damage to impersonal belongings (e.g., landscape vegetation).

*Roles and responsibilities of communities in managing human-wildlife conflicts.* – Most respondents acknowledged that residents expect local government will provide services to resolve human-wildlife conflicts and that local government does or should play a decision-making role in resolving those conflicts. Local government leaders want to be seen as fulfilling a role in addressing important issues within their community. However, respondents were hesitant to agree that local government should assume a leadership role in the resolution of these conflicts. Obviously, something is preventing local governments from becoming more involved in the management of human-wildlife conflicts. I found strong agreement that local governments should not be expected to take on additional responsibilities without being provided additional resources. Focus group participants particularly expressed concern about this issue, too. Currently, local governments operate under very tight budgets, and anything that demands new or additional funds stretches an already thin resource. Having to assume control over human-wildlife conflicts, which most respondents deemed of low priority, probably cannot be justified in the face of other mandated community needs. Thus, as long as local leaders have a seat at the

table where management decisions are being made, and without any requisite commitment of assuming financial responsibility, they can be seen as providing their communities a reasonable level of control and management of issues pertinent to residents and in the most cost-efficient manner to the community. For the level of complaints that many communities seem to be experiencing today, this probably is a realistic approach. However, as the number and/or severity of complaints rises, as citizen dissatisfaction increases, or the number of “brushfires” a community deals with merges into a community-wide conflagration (e.g., with deer management issues), leaders will be challenged to assume more or greater leadership. The important question here would seem to be one relating to how long a local community can wait (i.e., avoid/delay proactive initiatives) before acting or how does one determine at what point it becomes more costly to put out the “brushfire” than to avoid the “brushfire?” Without assuming some level of leadership, community leaders will not be able to make such decisions from the sidelines.

Older respondents viewed the expectations local residents place upon local government differently than did leaders with “less life experience,” namely that they did not believe residents expected much of local government relative to resolving human-wildlife conflicts. It is not clear whether this opinion is shaped purely by generational differences, though. Respondents from smaller and rural communities also did not believe that residents placed those expectations upon local government. Human-wildlife conflicts may not yet have reached a point where management is necessary, or residents of the smaller communities recognize that their local government doesn’t have the means to respond (i.e., no animal control unit), so they wouldn’t have such expectations. In those cases, respondents from these communities may be expressing a correct reading of residents’ expectations. Though my data does indicate that a large proportion of older respondents also came from smaller/rural communities, significant

proportions of younger respondents also came from these communities, making it unclear which is the influencing characteristic, age or community characteristics.

The lack of a clearly defined relationship between leaders' perception of the role of local government and their prioritization of human-wildlife conflicts does not necessarily conflict with their opinion that local government should play a role, but instead may reinforce the notion that some critical threshold has not been reached. In communities where conflicts are not frequent or serious enough to warrant leaders' attention (i.e., low priority, low concern), any time or effort afforded to such a "non-issue" probably would be viewed as an inefficient role for local government. In contrast, respondents who indicated a higher level of concern about human safety and property damage also were more likely to express an opinion that local government should play a role in managing human-wildlife conflicts, again indicating that some threshold was about to be crossed or already may have been breached. However, regardless of where on this gradient a respondent might have been, nearly all agreed that local governments should not take on additional responsibilities without additional resources. This clearly defines a limit of their willingness tackle human-wildlife conflict resolution.

Most respondents recognized that other agencies or entities have a role to play in the long-term resolution of human-wildlife conflicts, but these entities were viewed as providing only a low to moderate contribution toward the resolution of human-wildlife conflicts. Given that many of the agencies on the list that respondents reviewed have primary regulatory authority over wildlife and whose involvement in human-wildlife conflicts would be mandatory, the opinion expressed by most community leaders suggests a real need for education on the mission, responsibilities, and roles of these agencies so that leaders will know what resources are available to them and they correctly can utilize the appropriate expertise effectively.

Alternatively, respondents' opinions may be reflecting not a lack of understanding or unfamiliarity with the missions or responsibilities of these agencies, but perhaps indicate some level of dissatisfaction with or recognition of the type of response local government may have received in previous conflicts (i.e., perceived lack of contribution in satisfactorily resolving a past situation). Animal control officers clearly believed that these agencies had less of a contribution to make than did other respondents. Whether these officers believed that the local government should play the largest role in the long-term resolution of human-wildlife conflicts or whether they believed residents should be responsible for resolving the conflicts that occur on or to their property is unclear. Similarly, suburban/urban respondents and those from larger communities believed that human-wildlife conflicts are issues that should be dealt with primarily by local government. Additional research is needed to determine whether this is an issue of educational need and/or lack of understanding about these entities or simply a case of unrealistic expectations.

*Impediments to local government involvement in human-wildlife conflict resolution.* – It is apparent that most representatives of local government carefully weigh the consequences of becoming further involved in managing human-wildlife conflicts. Although concern was evident with each of the potential impediments I raised, issues that affect the “bottom line” of local governance (i.e., financial and personnel resources, need to provide additional training or equipment) clearly were more important to leaders than were concerns over how their constituents would react to how they might make decisions about human-wildlife conflict management. Although there were minor differences among subpopulations and within certain demographic parameters, respondents generally believed that local officials had more experience with and were more confident in local governments' ability to manage these situations.

Interestingly, respondents from urban communities and areas of population >100,000 were more unique in assigning greater importance to public opposition to management techniques, perhaps because animal rights/animal welfare groups are more active in these areas and have the potential to disrupt or derail (via litigation) implementation of management actions they opposed, particularly with issues that are viewed as being controversial. However, as citizen dissatisfaction escalates in response to increasing frequency and/or severity of wildlife damage, wildlife acceptance capacity (WAC) likely will reach and exceed the threshold where affected stakeholders are willing to tolerate and, in fact, request more controversial management actions from community leaders (Riley and Decker 2000, Zinn et al. 2000). Finally, most respondents recognized that local governments currently have limited authority over wildlife issues; this understanding was most evident among animal control officers who must enforce regulatory statutes on daily basis. However, there may be a need for educational training for individuals new to government service or just starting their careers on this point. These individuals apparently lack the experience or understanding to recognize how state authority limits local governments' ability to act in these issues.

*Knowledge, perceptions, and opinions about community-based co-management.* – Local government leaders were familiar with the concept of community-based co-management partnerships and most acknowledged having entered into such agreements with various state agencies. However, the degree of familiarity appeared to decline among subpopulations as one moved farther down the “chain of command” and away from the day-to-day decision-making nexus (i.e., elected officials and administrators were much more knowledgeable about such agreements and with whom they had been created). Obviously, the degree to which one interacts with an agency likely influenced respondents' awareness of existing partnerships (e.g., animal



control officers work most closely with the Conservation Police within VDGIF than with other state entities). In a pattern similar to one observed previously, respondents from smaller, rural communities reported having fewer agreements or less experience with co-management arrangements, particularly with VDGIF. This likely reflects the lower priority these communities gave to human-wildlife conflicts and that these interactions have not risen to a level to warrant creating such agreements or partnerships; both leaders and residents seem to consider these to be issues local folks should handle.

Crucial to the success of any co-management agreement is the cooperation anticipated and received by the parties involved. Respondents indicated that they were satisfied with both the level of cooperation they experienced during previous co-management agreements and the outcome of such agreements. As the option of having local communities enter into co-management agreements continues to move forward, those in the wildlife profession need to recognize that representatives of local government generally have a positive outlook on these agreements and have not yet been discouraged by previous bad experiences they may have encountered. An unfortunate outlier in this profile was the dissatisfaction expressed by animal control officers of their prior relationship with VDGIF. If future agreements of this type are to be successful, the root cause of this dissatisfaction needs to be identified and corrected to enhance the working relationship between these two closely linked parties.

Because most respondents believed that co-management opportunities represented a realistic and attractive option for managing human-wildlife conflicts, this shared responsibility concept appears to be a viable management approach worthy of further examination. This positive outlook suggests that 1) local governments want to be involved in managing human-wildlife issues, and 2) that co-management partnering may be a possible way to accomplish that.

Obviously, more information will be necessary to track how leaders' opinions and attitudes about human-wildlife conflicts and co-management opportunities mature and/or change. One area of special importance will be examining in greater depth and crafting solutions that address the concerns leaders have about impediments that would preclude their participation or impose unrealistic hardships they cannot overcome. Respondents clearly were concerned about the level of staffing, training and equipment needs, and funding expectations associated with any agreement. These same needs were identified as limiting factors earlier when discussing local community involvement in managing human-wildlife conflicts; clearly, these concerns are pervasive regardless of the management paradigm used. Smaller, rural communities may be affected more acutely by the demands of co-management options, given their small staffs and budgets, and many may not be in a position to participate at this time. However, these are the communities that expressed the least concern about and assigned the lowest priority to human-wildlife conflicts; thus, co-management partnerships may not be well suited or appropriate to these communities as they would be in larger urban and suburban communities. Alternatively, the possibility of having several smaller communities enter into regional (i.e., multi-community) partnerships where the demands on any one local government could be lessened needs further examination.

Despite the apparent attraction co-management agreements seemed to offer, it was very clear that not all leaders of local government would be willing to assume leadership for such agreements. My survey did not examine the specific reasons for this hesitancy. Interestingly, elected officials were more inclined than others to suggest that local government should assume a leadership role; these officials are the most likely of all representatives of local government to be directly involved in such processes and would be powerful partners to initiate a new

relationship. This positive attitude could be important to fostering and creating support for such local-state relationships.

Finally, as concern about risks to human safety from human-wildlife conflicts increased, respondents' opinion of co-management opportunities improved, as did their expressed willingness for having local government assume a leadership role. Because these patterns were displayed most often in urban/suburban areas and areas with >100,000 residents, it suggests that a stronger likelihood for co-management agreements likely may exist in these areas. Because my study was not designed to probe these relationships in greater depth, more information needs to be gathered to determine the level of concern at which a local government moves from responding passively to conflicts to one where active involvement in resolution of human-wildlife conflicts occurs in their community.

### **Management Recommendations**

It is important to consider that each of the four subpopulations examined in this study have unique roles and needs within local government. Any management actions should address the specific needs of each group and not treat local government as a whole. The same also is true when considering groups of communities. The needs of and situations in smaller, rural communities are much different than those in larger, urban areas, and should be treated as such.

*Educational outreach.* –

- *Develop educational resources focused on specifics about wildlife behavior, life history and how those can encourage conflicts.* Although respondents displayed some knowledge about wildlife, education designed specifically to enhance knowledge about wildlife and their life history would be of benefit to community leaders, particularly as related to the true risks associated with human-wildlife conflicts. As society continues to

lose connection with nature, leaders must be aware of how wildlife potentially can affect their community, especially regarding transmissible diseases and the economic losses arising from overabundant species. The priority here is to assure that community leaders are making appropriate risk assessments based on sound scientific information, not preconceived ideas, misinformation or, worst of all, out of unsubstantiated fear. It is the role of wildlife managers to provide local government leaders this sound information from which to make decisions most appropriate for their community.

- *Utilize GIS as a tool to demonstrate and analyze human-wildlife conflicts within communities.* Although most respondents recognized that GIS was being used within their community and, in many cases, somewhere within local government, this powerful tool appears to be underutilized. In addition to being a powerful mapping tool, GIS also provides untapped capacity that leaders currently do not appear to recognize or appreciate. To more fully utilize this tool, communities could begin to convert paper records into electronic or digital files that easily would capture important monitoring parameters such as species involved, location, time, date, and event summary. Electronic records easily can be transferred among departments and allow for a more complete database of records with which leaders now could make informed decisions. The ability to generate visual and graphical output for public discussions and reporting is much enhanced with GIS. It is unfortunate that the smaller communities appear to be unable or unwilling to adopt this technology, whether for human-wildlife conflicts or other uses within the community, because they are missing out on a potential management tool for local government. Even among those communities displaying greater use of this technology, it was apparent that few were taking full advantage of sophisticated types of

analyses that are possible related to wildlife-related issues. GIS technology has the capacity to utilize wildlife conflict databases, in conjunction with other available data layers made available to local governments, to examine in detail underlying patterns of wildlife use and to predict areas where future conflicts could be anticipated. Using GIS in this less conventional manner would provide local government tremendous potential benefits in being able to avoid conflicts before they arise to the “brushfire” state. LeLay et al. (2001) outline a process of data collection and weighting that could allow local governments to produce a map of risk for wildlife management based on the input of relative experts, including wildlife managers and residents, among others.

- *Develop clear agency resources detailing agency roles, responsibilities, and limitations in participating in management of human-wildlife conflicts in communities.* Respondents at least recognized some of the potential contributions that certain potential management partners offer in the long-term resolution of human-wildlife conflicts, but it is clear that local government leaders did not fully understand or appreciate the roles these agencies play. Agencies that currently have regulatory authority over wildlife need to better communicate their mission, responsibilities, and goals with local government, and with each other, to ensure that everyone knows these mandates and avoids needless replication. It is crucial that all potential partners clearly understand the roles, responsibilities, and limitations of the other partners so that all resources are being utilized efficiently. This type of cross-communication can be extremely difficult if not facilitated by a single entity. In this case, it should be the responsibility of each agency or entity with some wildlife authority to create information packets, understandable to the professional community that clearly outlines the agency’s mandated role in human-

wildlife conflict resolution. The distribution of these resources could come from Extension offices embedded within communities and often relied upon for sources of information, or from the annual meetings at which local government professionals come together to discuss issues of importance to them (e.g., annual Virginia Municipal League or Virginia Association of Counties conferences).

- *Conduct a cost-benefit analysis for local governments that demonstrates the benefits of addressing human-wildlife conflicts in a proactive manner, both in financial terms and in terms of community collaboration and agreement.* Local governments need to understand the benefits of being prepared to handle human-wildlife conflicts before they become a crisis within a community. The strategy most communities currently have adopted (i.e., dealing with human-wildlife “brushfires” as they arise) may not be either efficient or cost effective. Although co-management may require additional resources (in both time and money) at the onset, the long-term benefits of co-management potentially outweigh those costs. Adoption of a long-term co-management strategy would include the development and implementation of a structured framework that will guide a community’s response to any type of conflict as it arises. The protocol anticipates in advance where potential controversy may arise among resident stakeholders and utilizes proactive management and education components to prevent these issues from escalating needlessly. Local government should be trying to increase capacity within the community to come to agreement on necessary management actions prior to when the situation arises. Potential capacity building activities could include public workshops or informational session sponsored by the locality with speakers invited to discuss issues specific to the community. For instance, a community with a burgeoning coyote

population could invite representatives from VDGIF and USDA-APHIS-Wildlife Services to discuss coyote life history and how that influences successful management efforts. These sessions provide local government the opportunity to engage with residents in an educated discussion of management options. Adopting a proactive approach would allow communities to evaluate and approach potential conflict situations in a non-confrontational environment where decisions are not being made under demanding pressures. This approach also would provide additional opportunity to identify and explore common or shared interests among apparently divergent stakeholders.

*Informational resources.* –

- *Develop specific information packets that address needs identified by community leaders in this and future research.* Regarding management options presented to respondents, local government leaders found educational programs and development of single-species conflict resolution programs to be most acceptable. Informational packets could be developed and distributed to address these options with appropriate audiences, such as residents trying to address wildlife issues on their property or stakeholders involved in larger community-wide wildlife conflicts local governments may be called upon to resolve. Specific topics of these informational packets could include, but are not limited to: species-specific information for conflict resolution; steps to become involved in co-management; a guide to wildlife agencies, their roles and responsibilities; and limitations associated with resolving human-wildlife conflicts. Set up as an educational endeavor, Cooperative Extension is an ideal distributor of such informational packets. The information packets should be developed by wildlife managers familiar with the topic

(e.g., VDGIF game biologist developing a single-species resolution program for game species, such as deer or bear) using the best science available. Coordination of efforts is key to ensuring that information is not being duplicated and that limited agency resources are providing the most needed information to the largest audiences.

- *Develop training sessions focused on providing specific units within local government the information and resources necessary to handle human-wildlife conflicts when they arise.*

Additional information resources include training sessions geared toward specific local government departments and their expected roles and responsibilities in resolving human-wildlife conflicts. Currently, there is no clear source for guidelines on acceptable practices or the appropriate steps to be taken in the resolution of human-wildlife conflicts, but third party sources have worked to consolidate and clarify the vast amount of information currently available (i.e., The Center for Human-Wildlife Conflict Resolution, [www.humanwildlife.org](http://www.humanwildlife.org)). When a “brushfire” occurs, representatives of local government do what they can to ensure resident safety and hopefully attain satisfaction among affected parties, within the limitations of what local government can support.

With training, local government leaders could be provided information and/or guidance that would enable them to adequately address resident issues in more cost-efficient ways, or where to guide residents for proper resolution of their conflict. At first, these training sessions, potentially organized by similar third party sources, could focus on the information needs of the community’s first responders. These individuals expressed the greatest concern and were also the individuals at the focus groups expressing the greatest need for resources specific to the roles they are being asked to fulfill. Only time will tell how long it will take for other community leaders (i.e., administrative and elected



officials) to value the resources and training potentially available to them. Until some threshold is met or exceeded, these other community leaders may not be willing to devote the time or resources necessary to enact more proactive approaches.

### **Future Research**

This study was designed to gather baseline data on the knowledge, attitudes, and opinions of local government leaders in Virginia about human-wildlife conflicts and their management. This study revealed that most leaders are not overly concerned about human-wildlife conflicts, nor do they assign a high priority to such conflicts. I have suggested several educational activities designed to increase the capacity of local government relative to the acknowledgement and management of human-wildlife conflicts. To design appropriate educational activities, it would be useful to know how these local government leaders are forming these opinions and which characteristics would most influence their decision-making. A next step after education would be to evaluate the effectiveness of such outreach. This evaluation would identify where further information may be necessary to build capacity within local government and which localities are adequately prepared to handle human-wildlife conflicts.

Additionally, a more detailed assessment is necessary to identify specific needs of local government. In this study, I presented respondents general constraints that would potentially limit their involvement, but a more detailed examination is necessary to ensure that future outreach truly addresses those needs. The assessment should focus on detailing and quantifying what it would take for local government to readily become a leader in managing their own human-wildlife conflicts. This assessment could result in the development of a toolkit that local government leaders could use when a human-wildlife conflict occurs in their community as means to prevent the conflict from becoming a crisis.

The current economic situation in many communities severely limits their ability to manage conflicts not necessarily considered part of their traditional responsibilities. Future research could work to create innovative solutions for local governments that would not necessarily overexert their already thin resource base. As the current economic environment is not predicted to change drastically in the near future, these innovative solutions are crucial to building the capacity of local government.

The primary goal of this research was to lay the foundation from which to build a comprehensive wildlife conflict resolution plan. Unfortunately, I feel that the results from this study indicate that type of a plan may be premature. Local governments in Virginia are clearly not at a point universally where they are willing or able to consider a proactive approach to managing these conflicts. Until a threshold is met, which currently has not been met in most communities in the Commonwealth, local governments will continue to treat human-wildlife conflicts on a brushfire-by-brushfire basis, content to return these issues to the backburner until they again require immediate triage. Wildlife managers would benefit greatly from additional information on what that threshold is for communities - - does this threshold involve the number of wildlife conflicts, the severity of such conflicts, or some combination of the two, or is it entirely based on the wildlife species and risks involved? Further knowledge of what characteristics local government considers when assigning priority would assist wildlife managers in being able to predict when and where their assistance will be necessary.

While it is crucial to provide local governments with comprehensive information and resources, equally as important is the development of these resources. Without the input of local governments, any resources developed run the risk of not being accepted. Instead these resources will sit on a shelf, unused, while human-wildlife conflicts continue to increase and

become more severe. One method for development of these resources may use model local governments around Virginia (e.g., Blacksburg, Lynchburg, Fairfax county) that already have some form of wildlife program in place. These model communities could serve as partners to develop resources that are appropriate and contextually specific for local government. For example, Blacksburg has a records system that allows for wildlife complaints to be transferred to other departments within the town and to be put into GIS databases for visual representation.

A potentially exciting and unique avenue for future research could explore the interactions of community members who engage in collaborative process in the absence of the stress or conflict usually present when these types of processes are undertaken. Most collaborative processes occur where a time-sensitive decision or some resolution is required; would participants interact any differently if those demands and expectations were removed? It could be especially beneficial to the success of future collaborative efforts if it could be shown that common ground and shared interests become evident easier when tensions are not high.

In future survey research, especially involving these specific groups of local government leaders, I would recommend shortening the length of the survey and making it clear that the content of the survey is not overly taxing or technical. Many non-respondents indicated that they did not complete the survey due to either time constraints or to a misconception that the content would be too technical for them to be able to answer adequately. I believe that gaining the explicit support of the professional organizations of these groups would assure participants that their opinions are truly those that the researcher is searching for. The endorsement of the professional organizations would serve as a potential surrogate for the state-mandated response of other surveys these leaders receive.

## **SUMMARY**

Local governments are being called upon to resolve increasing numbers of human-wildlife conflicts. The growing challenge for local governments in Virginia, as they attempt to respond to such conflicts, is becoming more evident. For example, local Extension agents have expressed a desire for additional educational resources on resolving human-wildlife issues and the number of communities that are working with VDGIF to handle certain overabundant wildlife populations is growing steadily. A goal of my research was to determine the specific needs of local governments relative to human-wildlife conflicts and to identify potential means to address those needs. I believe this research has confirmed what wildlife managers in Virginia have known for a long time (that such conflicts are increasing), but it also has uncovered an even more complex web of motivations than previously expected from these local government leaders.

While confirming that human-wildlife conflicts are occurring in Virginia, my research suggests that most leaders do not view them as being problematic; by most accounts, leaders classified them as being minor and only occasionally warrant special attention. Respondents' preferred method of dealing with conflicts is simply to extinguish the "brushfire" as it occurs rather than devote resources to a more proactive or holistic, preventive management approach. Although this attitude was more typical of the smaller, more rural communities, it prevailed in most other community types as well. From the perspective of these communities, leaders barely have sufficient money and staffing to support the necessary basic community services (e.g., police, public works), let alone attempt to fund some type of larger, more comprehensive wildlife management program, such as those examined in my study. Until the frequency and/or severity of human-wildlife conflicts rises to some as yet undetermined threshold where community

demand for action is surpassed, I believe the current status of local government's response to wildlife conflicts will remain unchanged. Further, unless new resources are identified and made available to assist communities take on a more direct response to conflicts, or some unfortunate, serious or catastrophic conflict with wildlife arises, there is little probability that communities will engage in proactive, comprehensive conflict management planning and avoidance programs of any type.

It is important to note, however, that local government leaders want a role in managing human-wildlife conflicts, just not a leadership role at this time. Respondents recognized the need to forge partnerships to achieve long-term management of human-wildlife conflicts. This suggests that, when the time to partner comes, leaders would be willing to utilize whatever resources they may have available to them at that time to reap potential benefits that may come to their community via partnership building. Although respondents did not express any serious negative opinions about co-management, their responses again suggest that local governments in Virginia currently do not have the capacity to engage in shared management arrangements to achieve proactive human-wildlife management. Rather, local governments require resources, knowledge, and technical support to handle issues that arise in a cost-effective and efficient manner. It probably is unreasonable to expect that local governments can make significant changes in their response to human-wildlife conflicts, given how they prioritize these problems relative to all the other demands they face.

I remain convinced that implementation of a comprehensive, proactive approach to human-wildlife conflict management would be a cost-effective and efficient strategy for communities to adopt over the long-term. However, I believe that local governments currently lack the capacity to plan and vision in the way necessary to accomplish this goal given all the

other more immediate needs and requirements that now demand their attention. In an effort to utilize the information gathered in this study, I believe that wildlife managers and natural resources educators must work to develop the applied tools, in the form of training workshops and community-wide informational meetings, among others, and the networks of professionals and information that local governments so desperately need. Through the development and utilization of these resources, wildlife managers and educators can increase local government's capacity to develop and implement a comprehensive wildlife management plan in the future.

## LITERATURE CITED

- Adams, C. E., K. J. Lindsey, and S. J. Ash. 2006. *Urban Wildlife Management*. CRC Press, Boca Raton, Florida, USA.
- Blackwell, B. F., and G. E. Bernhardt. 2000. Efficacy of aircraft landing lights in stimulating avoidance behavior in birds. *Journal of Wildlife Management* 68:725-732.
- Bruce, F. A. 1999. *Natural Resources and Environmental Management (NREM): Inservice/Resource Needs Assessment*. Virginia Cooperative Extension, Blacksburg, Virginia, USA.
- Bruggers, R. L., R. Owens, and T. Hoffman. 2002. Wildlife damage management research needs: perceptions of scientists, wildlife managers, and stakeholders of the USDA/Wildlife Services program. *International Biodeterioration & Biodegradation* 49:213-223.
- Centers for Disease Control and Prevention [CDCP]. 2006. Browse by Disease | CDC Healthy Pets Healthy People. <[http://www.cdc.gov/healthypets/browse\\_by\\_diseases.htm](http://www.cdc.gov/healthypets/browse_by_diseases.htm)>. Accessed January 2007.
- Chase, L. C., and D. J. Decker. 1998. Citizen attitudes toward elk management and participation in elk management: a case study in Evergreen, Colorado. *Human Dimensions of Wildlife* 3:55-56.
- Chase, L. C., D. J. Decker, and T. B. Lauber. 2004. Public participation in wildlife management: what do stakeholders want? *Society and Natural Resources* 17:629-639.
- Chase, L. C., T. M. Schusler, and D. J. Decker. 2000. Innovations in stakeholder involvement: what's the next step? *Wildlife Society Bulletin* 28:208-217.
- Chase, L. C., W. F. Siemer, and D. J. Decker. 1999. Suburban deer management: a case study in the Village of Cayuga Heights, New York. *Human Dimensions of Wildlife* 4:59-60.
- Chase, L. C., W. F. Siemer, and D. J. Decker. 2002. Designing stakeholder involvement strategies to resolve wildlife management controversies. *Wildlife Society Bulletin* 30:937-950.
- Conover, M. R. 1997. Monetary and intangible valuation of deer in the United States. *Wildlife Society Bulletin* 25:298-305.
- Conover, M. R. 1998. Perceptions of American agricultural producers about wildlife on their farms and ranches. *Wildlife Society Bulletin* 26:597-604.

- Conover, M. R., W. C. Pitt, K. K. Kessler, T. J. DuBow, and W. A. Sanborn. 1995. Review of human injuries, illnesses and economic losses caused by wildlife in the United States. *Wildlife Society Bulletin* 23:407-414.
- Curtis, P. D., D. J. Decker, and T. M. Schusler. 2000. Beyond citizen task forces: the future of community-based deer management. *Proceedings of Vertebrate Pest Conference* 19:175-179.
- Curtis, P. D., R. J. Stout, B. A. Knuth, L. A. Myers, and T. M. Rockwell. 1993. Selecting deer management options in a suburban environment: a case study from Rochester, New York. *Transactions of the North American Wildlife and Natural Resources Conference* 58:102-116.
- Decker, D. J. 1991. Implications of the wildlife acceptance capacity concept for urban wildlife management. Pages 45-53 *in* Proceedings of Symposium on Perspectives in Urban Ecology. Denver Museum of Natural History, Denver, Colorado, March 1990.
- Decker, D. J., T. B. Lauber, and W. F. Siemer. 2002. Human-wildlife conflict management: A practitioner's guide. Northeastern Wildlife Damage Management Research and Outreach Cooperative, Ithaca, New York, USA.
- Decker, D. J., and K. G. Purdy. 1988. Toward a concept of wildlife acceptance capacity in wildlife management. *Wildlife Society Bulletin* 16:53-57.
- Decker, D. J., D. B. Raik, L. H. Carpenter, J. F. Organ, and T. M. Schusler. 2005. Collaboration for community-based wildlife management. *Urban Ecosystems* 8:227-236.
- Decker, D. J., D. B. Raik, and W. F. Siemer. 2004. Community-based deer management: A practitioner's guide. Northeastern Wildlife Damage Management Research and Outreach Cooperative, Ithaca, New York, USA.
- Deyle, R. E., and R. A. Smith. 1998. Local government compliance with state planning mandates: the effects of state implementation in Florida. *Journal of the American Planning Association* 64:457-470.
- Dillman, D. A. 2000. *Mail and Internet Surveys; The Tailored Design Method*. Second edition. John Wiley & Sons, Inc., New York, USA.
- Dolsen, D. E., and G. E. Machlis. 1991. Response rates and mail recreation survey results: how much is enough? *Journal of Leisure Research* 23:272-277.
- Drake, D., J. B. Paulin, P. D. Curtis, D. J. Decker, and G. J. San Julian. 2005. Assessment of negative economic impacts from deer in the northeastern United States. *Journal of Extension* 43. <<http://www.joe.org/joe/2005february/rb5.shtml>>. Accessed November 2006.



- Kellert, S. R. 1980. Americans' attitudes and knowledge of animals. *Transactions of the North American Wildlife and Natural Resources Conference* 45:111-124.
- Kellert, S. R., and T. W. Clark. 1991. The theory and application of a wildlife policy framework. Pages 17-36 *in* W. R. Mangun, editor. *Public Policy Issues in Wildlife Management*. Greenwood Press, New York, New York, USA.
- Koles, M., and D. Muench. 2002. Why people are moving to suburbia (and beyond): examining the Pull Factor in the Fox Valley. *Journal of Extension* 40.  
<<http://www.joe.org/joe/2002december/ab.shtml>>. Accessed November 2006.
- Lauber, T. B., L. C. Chase, and D. J. Decker. 2002. Informing the planning process through citizen participation. Pages 124-142 *in* M. J. Manfredo, editor. *Wildlife Viewing: A Management Handbook*. Oregon State University Press, Corvallis, Oregon, USA.
- LeLay, G., P. Clergeau, and L. Hubert-Moy. 2001. Environmental Auditing: computerized map of risk to manage wildlife species in urban areas. *Environmental Management* 27:451-461.
- Louv, R. 2006. *Last child in the woods: saving our children from nature-deficit disorder*. Algonquin Books, Chapel Hill, North Carolina.
- Madden, F. 2004. Preventing and mitigating human-wildlife conflicts: World Parks Congress recommendation. *Human Dimensions of Wildlife* 9:259-260.
- Manfredo, M. J., T. L. Teel, and A. D. Bright. 2003. Why are public values toward wildlife changing? *Human Dimensions of Wildlife* 8:287-306.
- Mason, P. F. 1992. Bird strike at 140 mph! *Injury* 23:283.
- Messmer, T. A. 2000. The emergence of human-wildlife conflict management: turning challenges into opportunities. *International Biodeterioration & Biodegradation* 45:97-102.
- Moxley, T. 2006a. Town to kill 2 beavers. *Roanoke Times*. 12 January 2006.
- Moxley, T. 2006b. Gnawing concern turns into flood of appeals. *Roanoke Times*. 14 January 2006.
- Moxley, T. 2006c. Beaver pair eradicated from Blacksburg park. *Roanoke Times*.
- Moxley, T. 2006d. Blacksburg beavers killed. *Roanoke Times*. 17 January 2006.
- Peine, J. D. 2001. Nuisance bears in communities: Strategies to reduce conflict. *Human Dimensions of Wildlife* 6:223-237.

- Pillow, J. 2006. Beavers killed for dam building and destruction.
- Raik, D. B., D. J. Decker, and W. F. Siemer. 2006. Capacity building: a new focus for collaborative approaches to community-based suburban deer management? *Wildlife Society Bulletin* 34:525-530.
- Raik, D. B., T. B. Lauber, D. J. Decker, and T. L. Brown. 2005. Managing community controversy in suburban wildlife management: adopting practices that address value differences. *Human Dimensions of Wildlife* 10:109-122.
- Raik, D. B., W. F. Siemer, and D. J. Decker. 2004. Community-based suburban deer management: six case studies of issue evolution, capacity, and intervention. Department of Natural Resources, New York State College of Agriculture and Life Science, Cornell University, Ithaca, New York, USA.
- Redpath, S. M., B. E. Arroyo, F. M. Leckie, P. Bacon, N. Bayfield, R. J. Gutierrez, and S. J. Thirgood. 2004. Using decision modeling with stakeholders to reduce human-wildlife conflict: a raptor-grouse case study. *Conservation Biology* 18:350-359.
- Riley, S. J., and D. J. Decker. 2000. Risk perception as a factor in wildlife stakeholder acceptance capacity for cougars in Montana. *Human Dimensions of Wildlife* 5:50-62.
- Schusler, T. M., L. C. Chase, and D. J. Decker. 2000. Community-based comanagement: sharing responsibility when tolerance for wildlife is exceeded. *Human Dimensions of Wildlife* 5:34-49.
- Servoss, W., R. M. Engeman, S. Fairaizl, J. L. Cummings, and N. P. Groninger. 2000. Wildlife hazard assessment for Phoenix Sky Harbor International Airport. *International Biodeterioration & Biodegradation* 42:111-127.
- Shanahan, J. E., W. F. Siemer, and A. F. Pleasant. 2001. Community attitudes about deer management in the Village of Cayuga Heights, New York. Department of Natural Resources, New York State College of Agriculture and Life Sciences, Cornell University, Ithaca, New York, USA.
- Siemer, W. F., L. C. Chase, and D. J. Decker. 2000. Empowering local communities to co-manage deer. *Proceedings of Ninth Wildlife Damage Management Conference* 9:142-157.
- State Farm Insurance. 2005. *Midwestern States Among Most Dangerous for Vehicles Striking Deer*. <[http://www.statefarm.com/about/media/media\\_archive/deer.asp](http://www.statefarm.com/about/media/media_archive/deer.asp)>. Accessed January 2007.
- State Farm Insurance. 2006. *Deer-Vehicle Collisions on the Rise State Farm® Reports 6% Increase in Claims*. <[http://www.statefarm.com/about/media/media\\_releases/deer.asp](http://www.statefarm.com/about/media/media_releases/deer.asp)>. Accessed January 2007.

- Sullivan, T. L., and T. A. Messmer. 2003. Perceptions of deer-vehicle collision management by state wildlife agency and department of transportation administrators. *Wildlife Society Bulletin* 31:163-173.
- Treves, A., R. B. Wallace, L. Naughton-Treves, and A. Morales. 2006. Co-managing human-wildlife conflicts: a review. *Human Dimensions of Wildlife* 11:383-396.
- VML, VACo Directory [VML/VACo]. 2005. Virginia Municipal League, Richmond, Virginia, and Virginia Association of Counties, Richmond, Virginia, USA.
- WDBJ7. 2006. Accidents involving deer on the rise.  
<<http://www.wdbj7.com/Global/story.asp?s=5689050>>. Accessed December 2006.
- West, B. C., and J. A. Parkhurst. 2002. Interactions between deer damage, deer density, and stakeholder attitudes in Virginia. *Wildlife Society Bulletin* 30:139-147.
- Whittaker, D., and R. L. Knight. 1998. Understanding wildlife responses to humans. *Wildlife Society Bulletin* 26:312-317.
- Wywialowski, A. P. 1994. Agricultural producers' perceptions of wildlife-caused losses. *Wildlife Society Bulletin* 22:370-382.
- York, D. L., J. L. Cummings, R. M. Engeman, and K. L. Wedemeyer. 2000. Hazing and movements of Canada geese near Elmendorf Air Force Base in Anchorage, Alaska. *International Biodeterioration & Biodegradation* 45:103-110.
- Young, J. 2005. Mail surveys of general practice physicians: response rates and non-response bias. *Swiss Medical Weekly* 135:187-188.
- Zinn, H. C., M. J. Manfredo, and J. J. Vaske. 2000. Social psychological bases for stakeholder acceptance capacity. *Human Dimensions of Wildlife* 5:20-33.

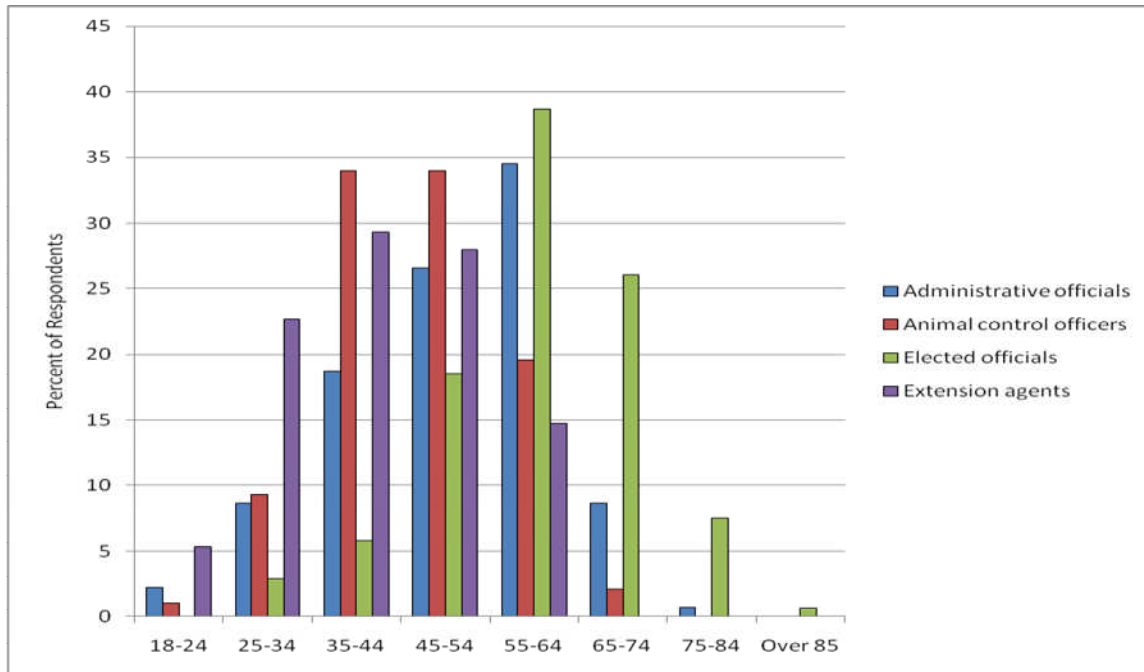


Figure 3. 1. Age of respondent, categorized by subpopulation group, from a mail survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.

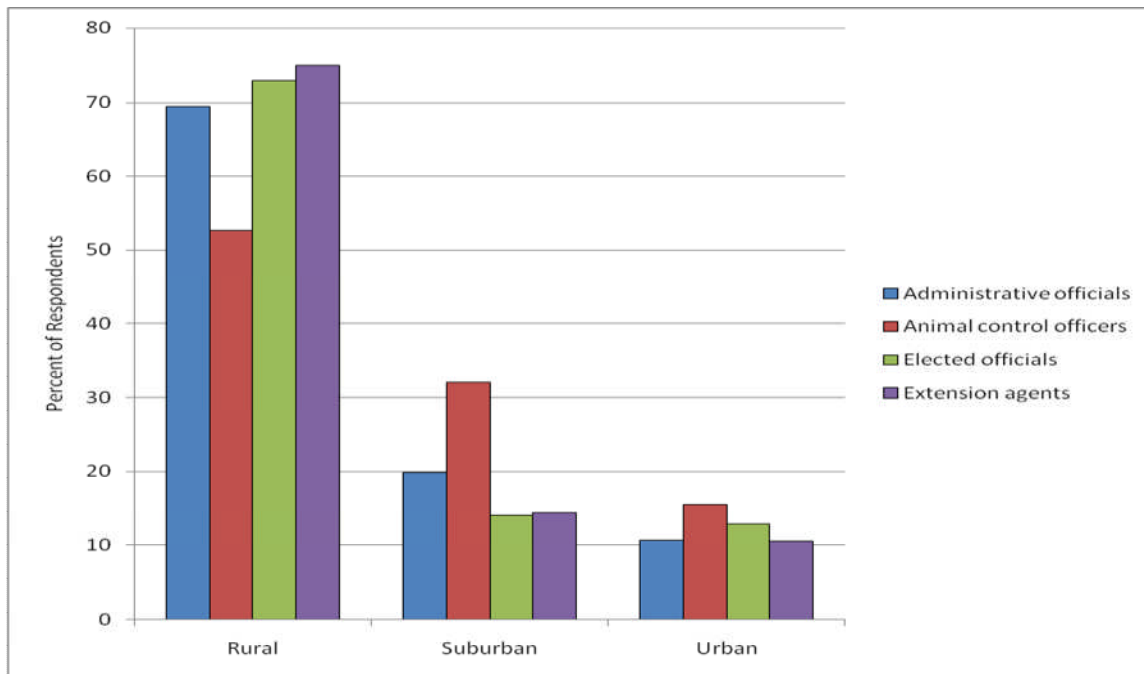
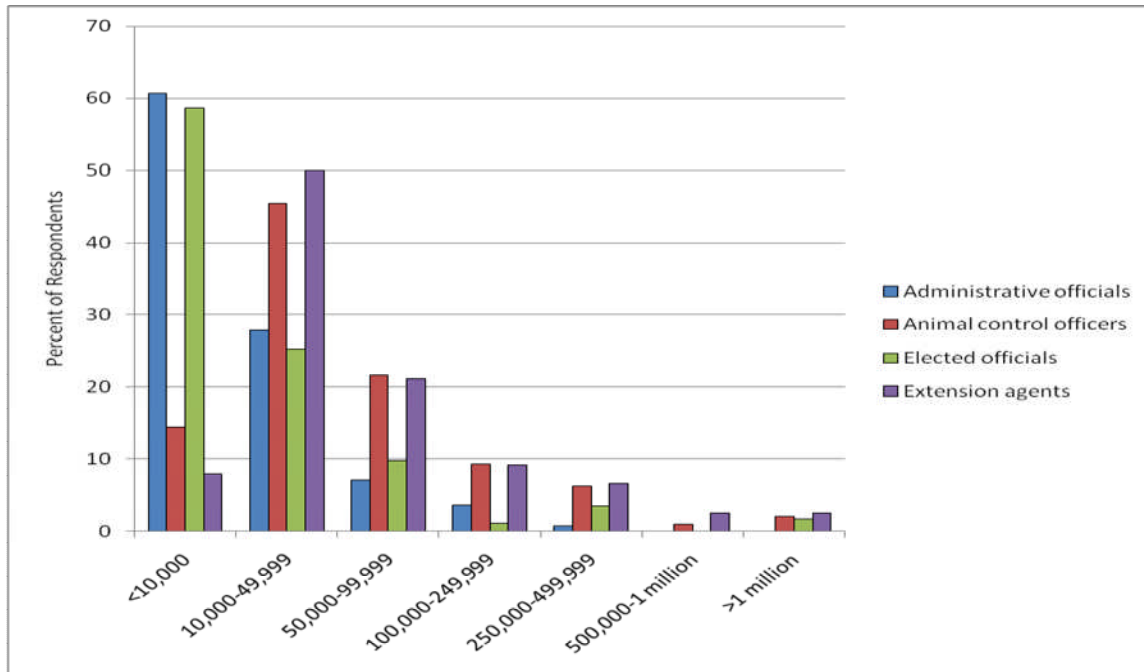
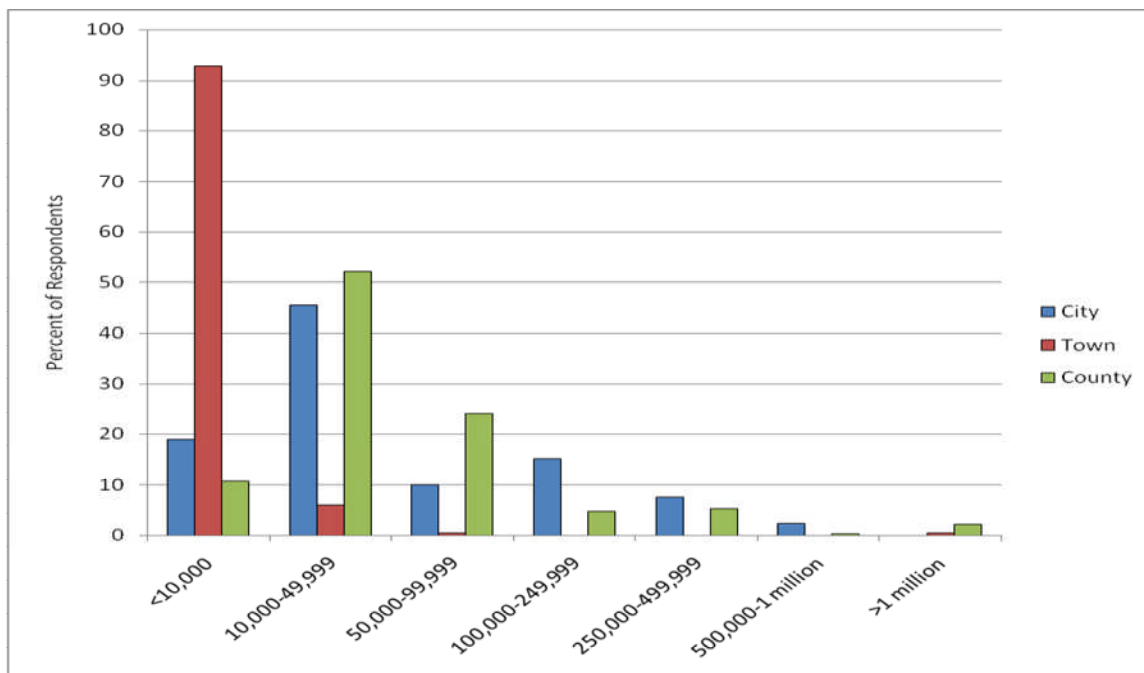


Figure 3. 2. Respondents' description of the type of community they served, categorized by subpopulation group, from a mail survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.



**Figure 3. 3. Respondents' characterization of the size of community they served, categorized by subpopulation group, from a mail survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**



**Figure 3. 4. Respondents' characterization of the size of community served, as compared to their stated opinion of type of community they represent, from a mail survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

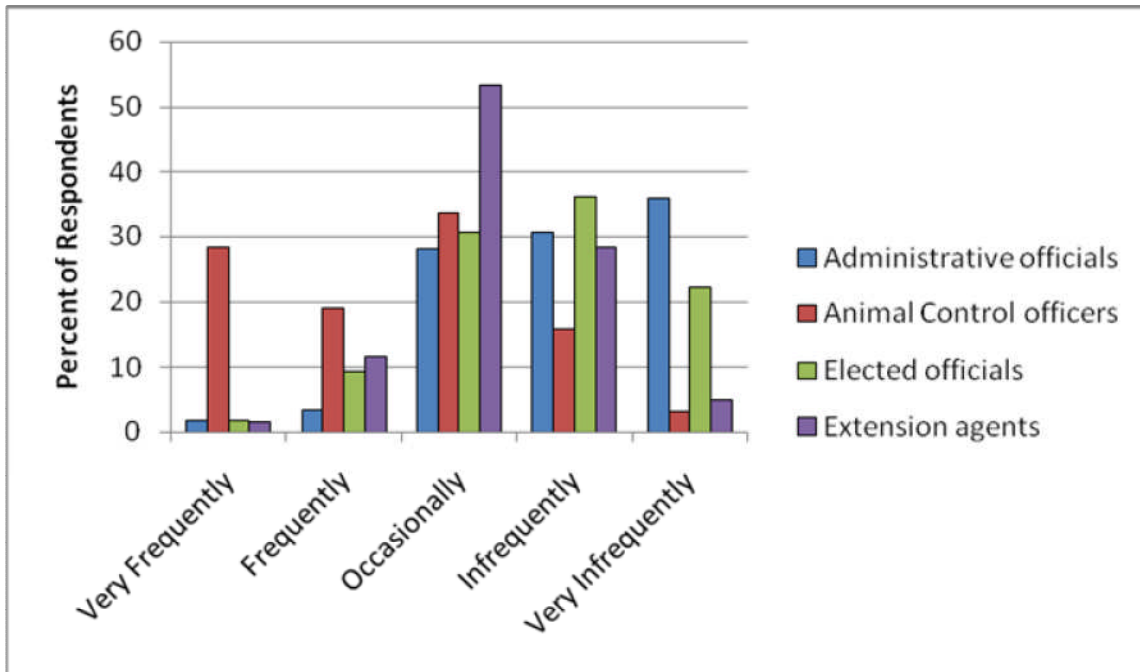


Figure 3. 5. Reported frequency of wildlife complaints received during FY2007, categorized by respondent subpopulation, in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008 ( $G=120.410$ ,  $df=12$ ,  $p<0.0005$ ).

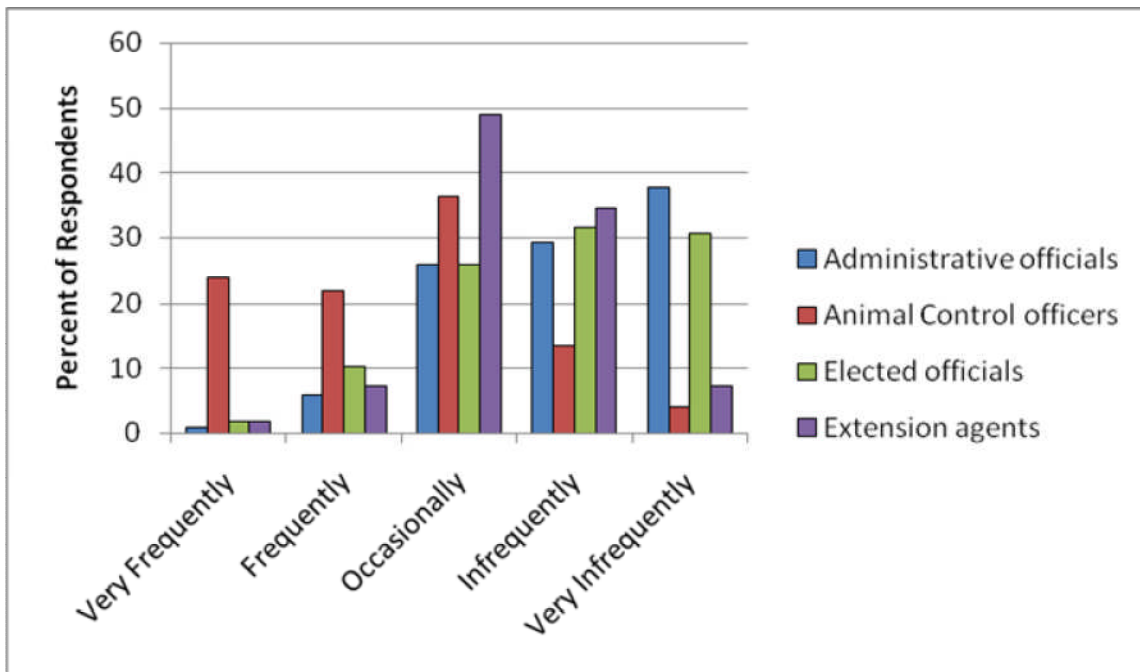
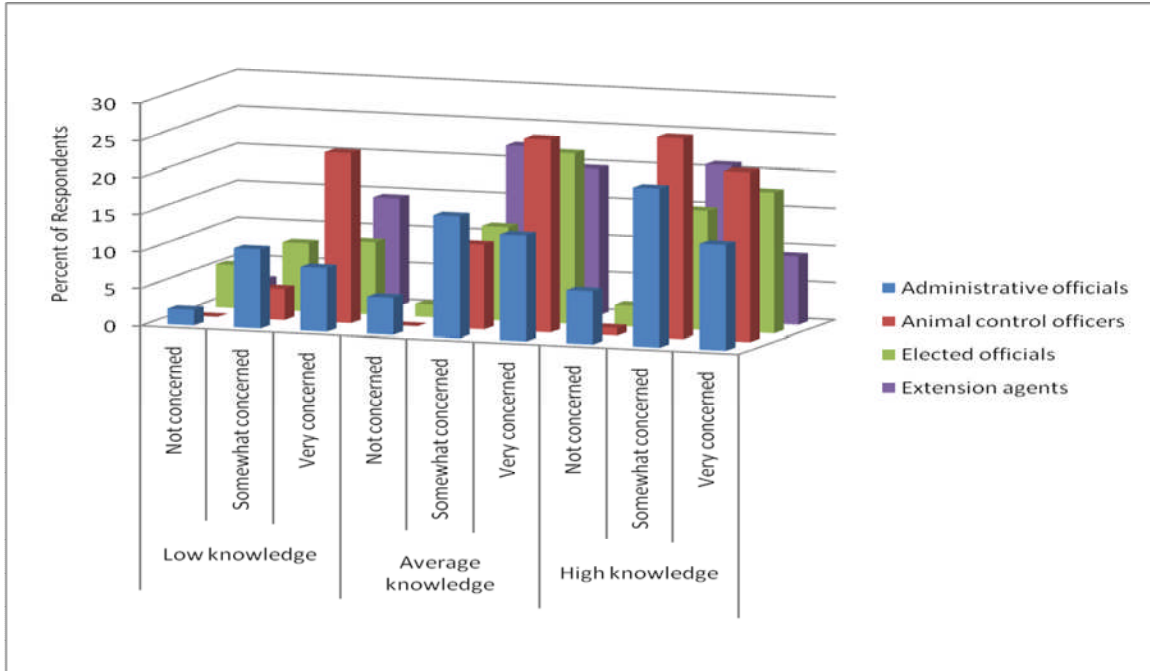
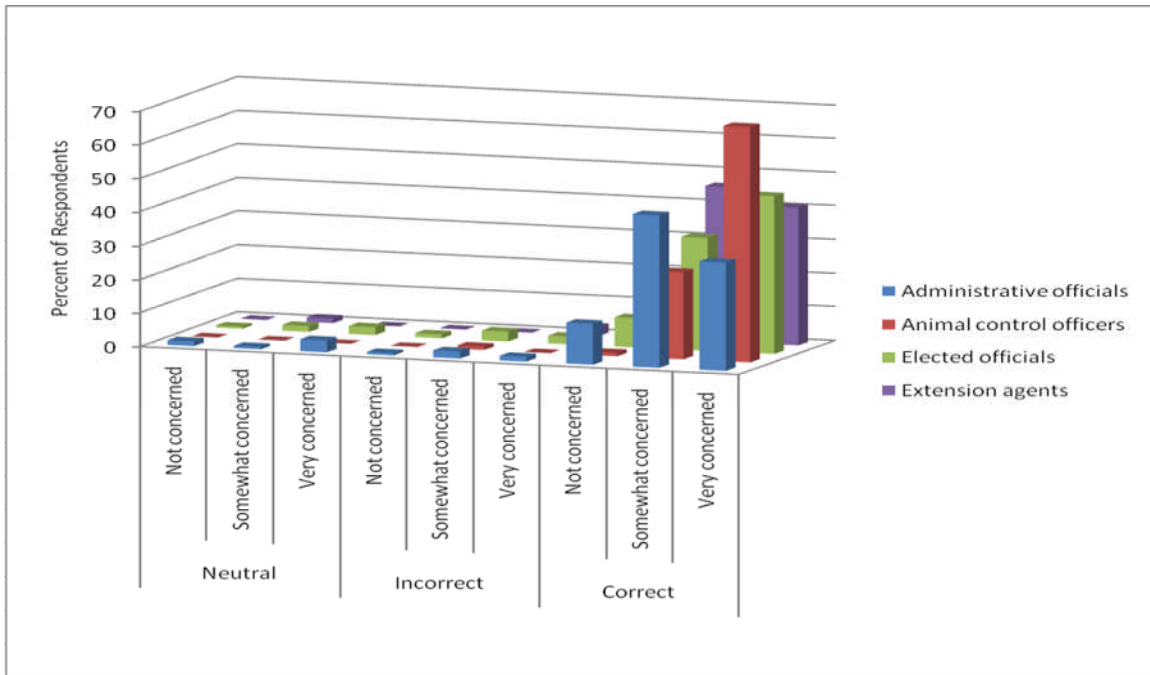


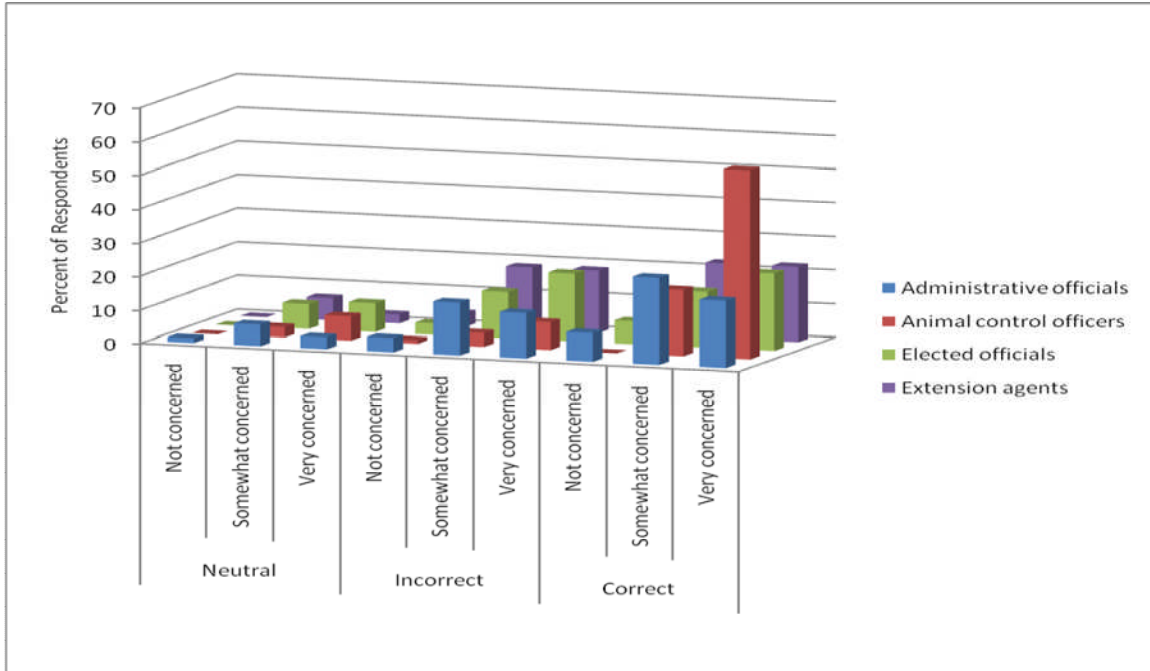
Figure 3. 6. Reported frequency of wildlife complaints received during FY2005 and FY2006, categorized by respondent subpopulation, in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008 ( $G=114.747$ ,  $df=12$ ,  $p<0.0005$ ).



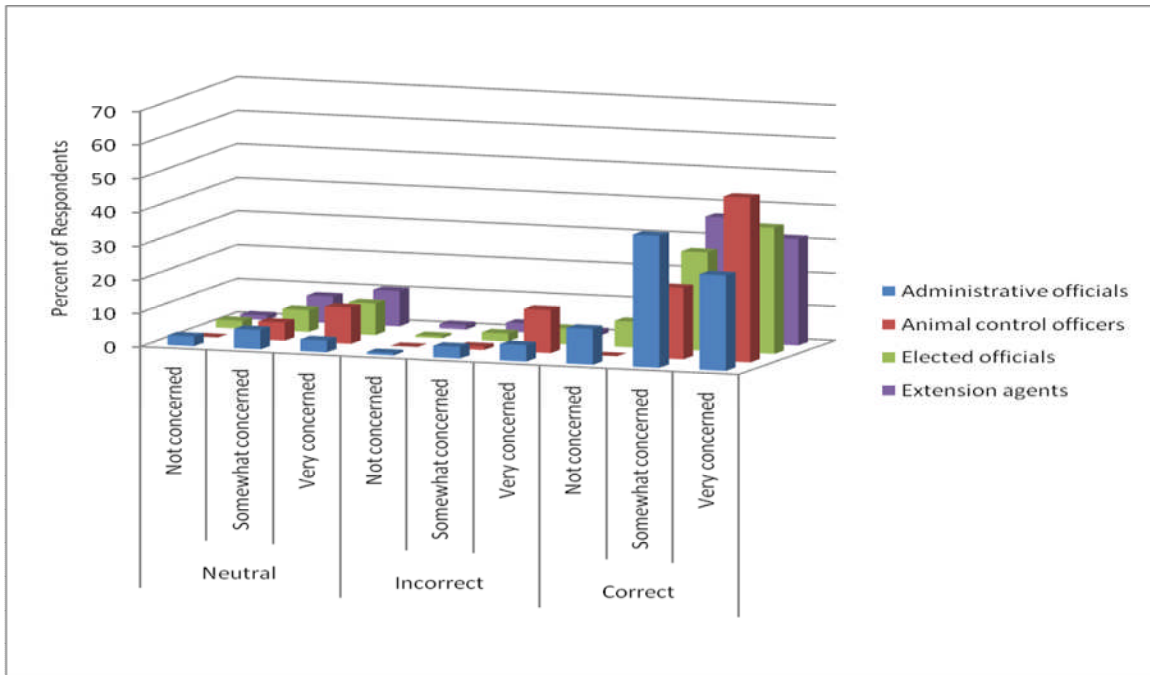
**Figure 3. 7. Respondents' concern about risks to human health associated with human-wildlife conflicts, categorized by one's level of knowledge of taxonomic group inclusion in the term "wildlife."**



**Figure 3. 8. Respondents' concern about risks to human health associated with human-wildlife conflicts, categorized by one's opinion on whether to include domestic animals in the definition of "wildlife."**



**Figure 3. 9. Respondents’ concern about risks to human health associated with human-wildlife conflicts, categorized by one’s opinion on whether to include feral animals in the definition of “wildlife.”**



**Figure 3. 10. Respondents’ concern about risks to human health associated with human-wildlife conflicts, categorized by one’s opinion on whether such interactions always refer to a negative situation.**



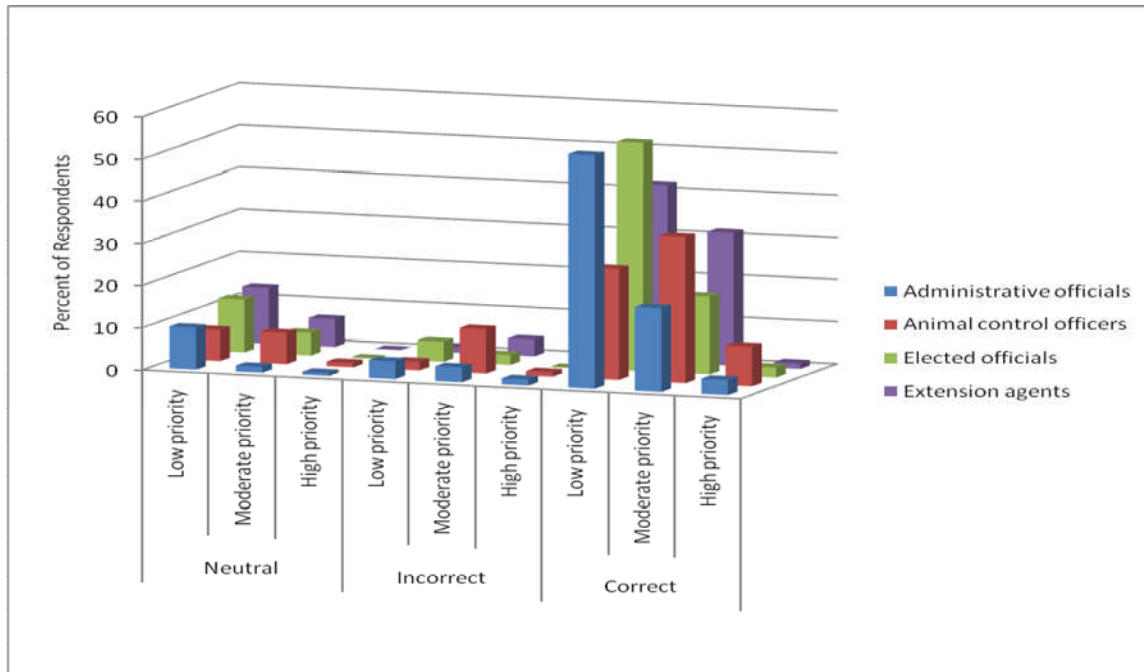


Figure 3. 11. Respondents' prioritization of human-wildlife conflicts, categorized by one's opinion on whether such interactions always refer to a negative situation.

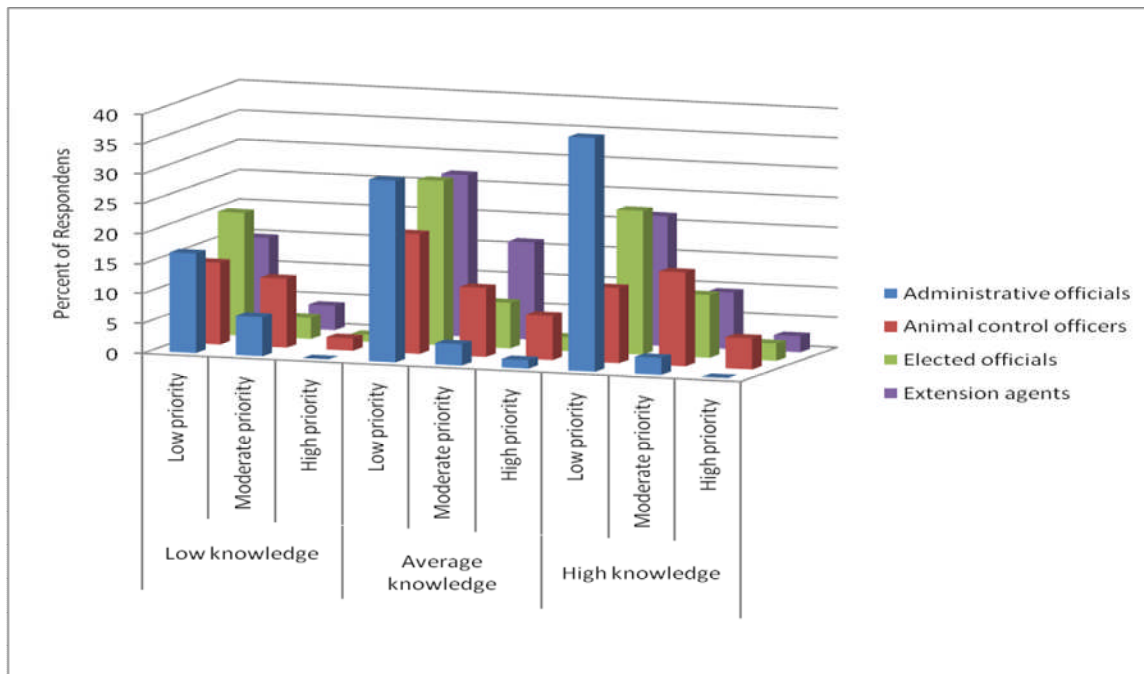
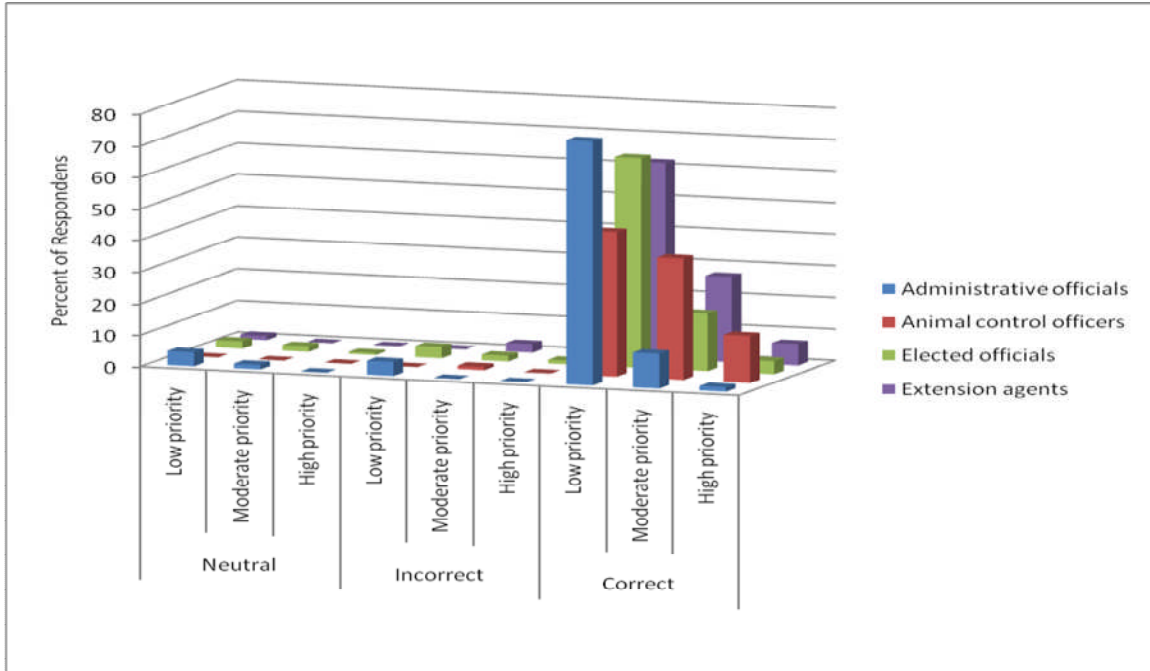
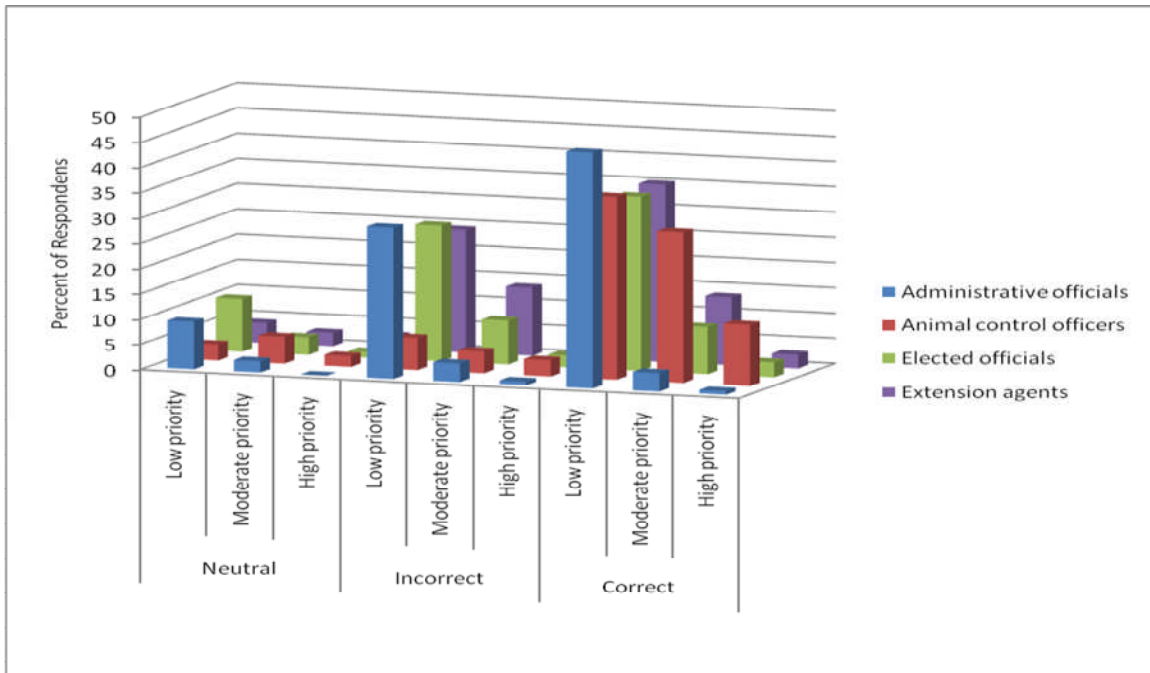


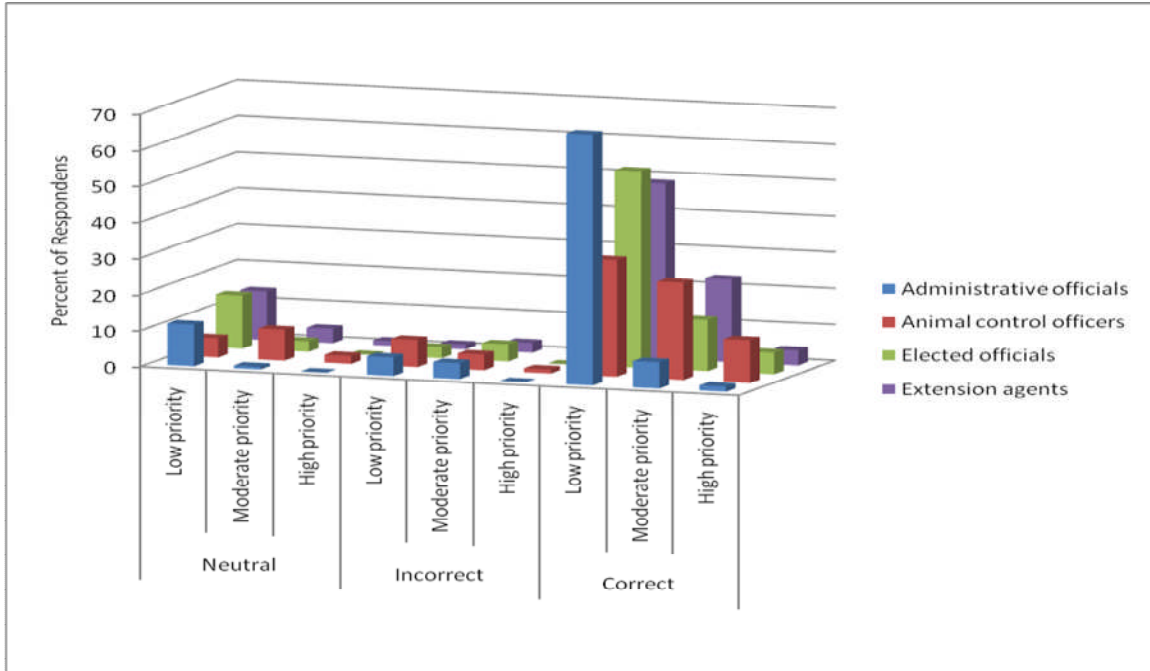
Figure 3. 12. Respondents' prioritization of developing and implementing a comprehensive wildlife conflict resolution program, categorized by one's level of knowledge of taxonomic group inclusion in the term "wildlife."



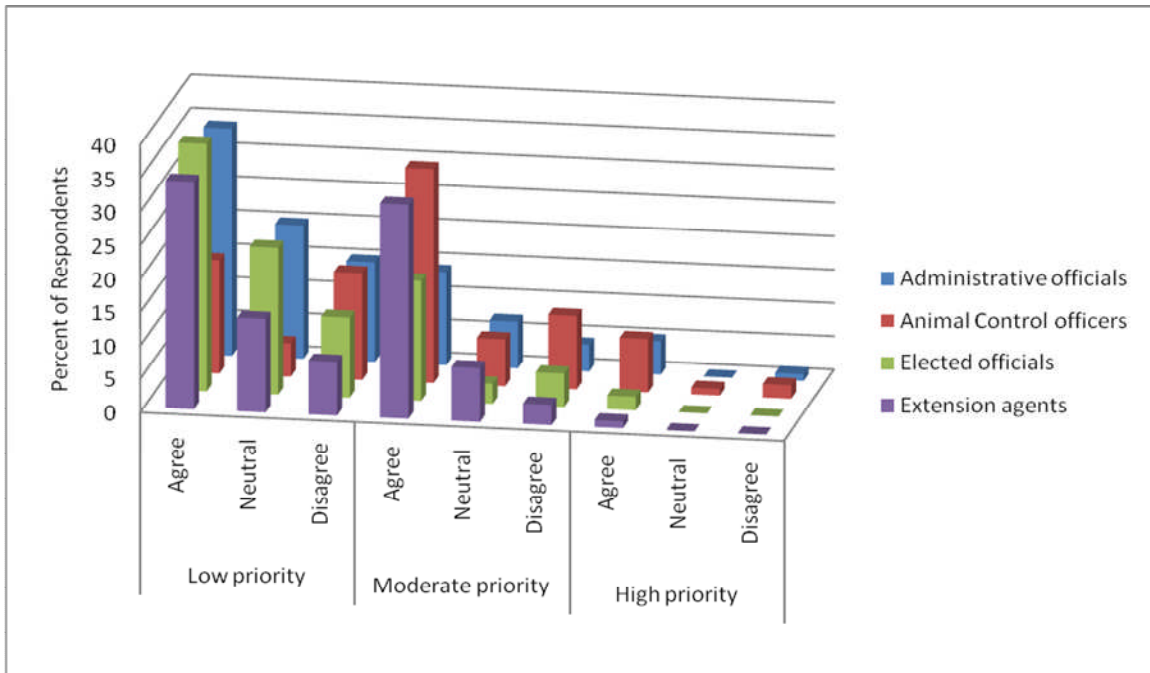
**Figure 3. 13. Respondents’ prioritization of developing and implementing a comprehensive wildlife conflict resolution program, categorized by one’s opinion on whether to include domestic animals in the definition of “wildlife.”**



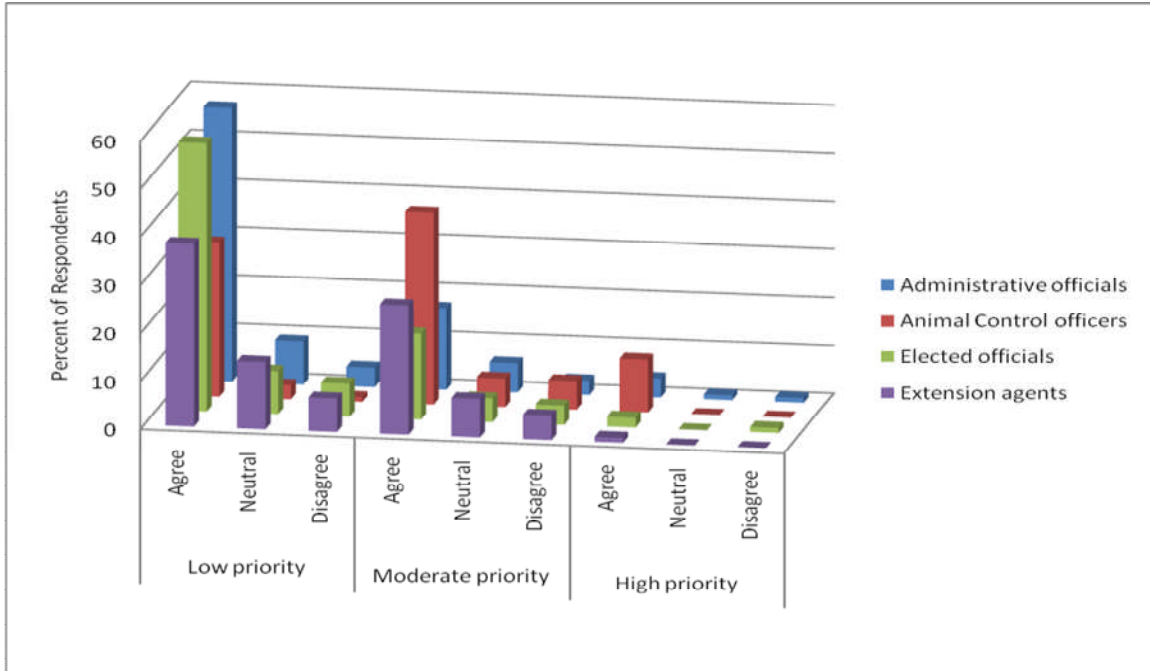
**Figure 3. 14. Respondents’ prioritization of developing and implementing a comprehensive wildlife conflict resolution program, categorized by one’s opinion on whether to include feral animals in the definition of “wildlife.”**



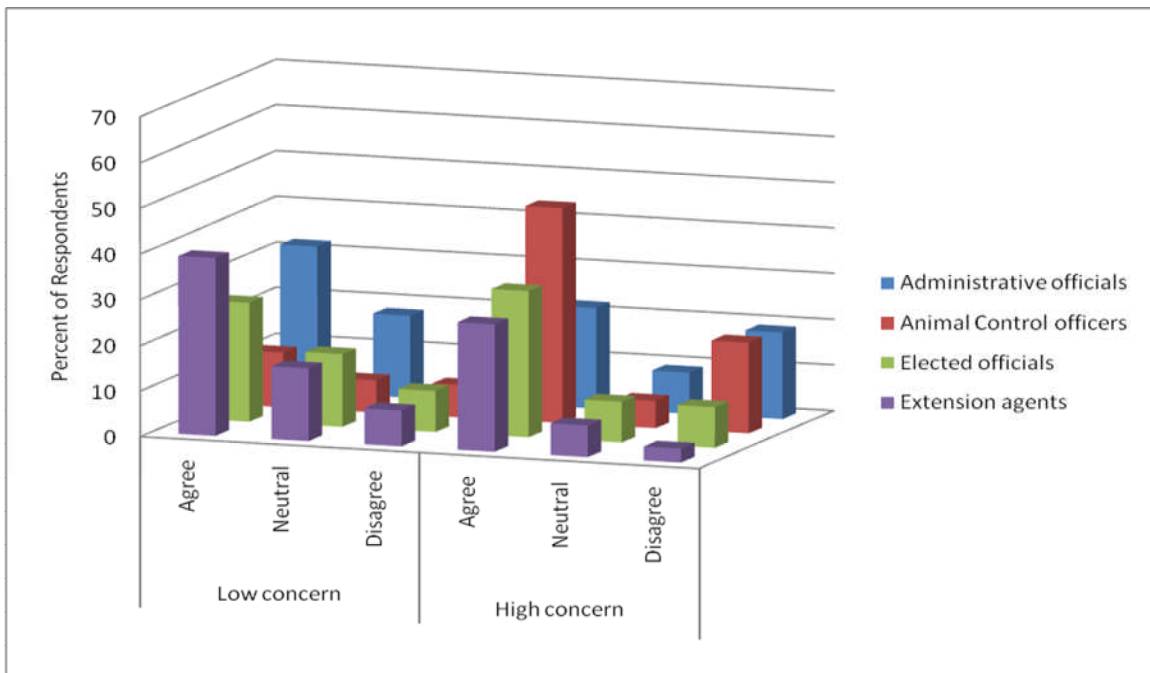
**Figure 3. 15. Respondents' prioritization of developing and implementing a comprehensive wildlife conflict resolution program, categorized by one's opinion on whether human-wildlife interactions always refer to a negative situation.**



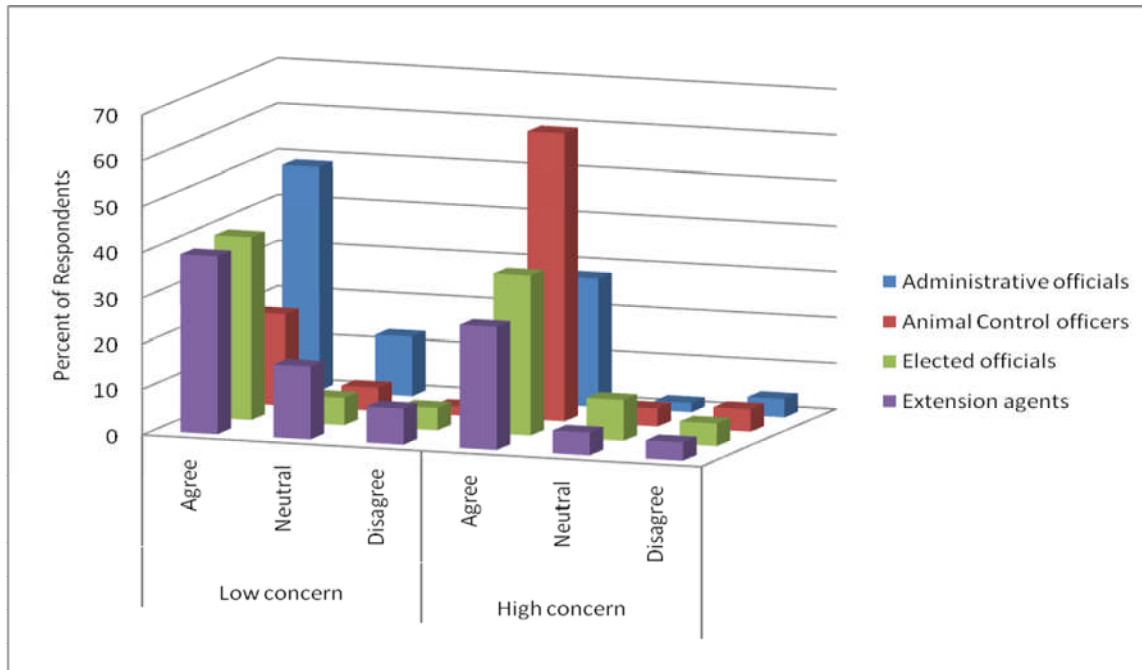
**Figure 3. 16. Respondents' agreement or disagreement that local government plays an important decision-making role in managing human-wildlife interactions, categorized by one's prioritization of human-wildlife conflicts.**



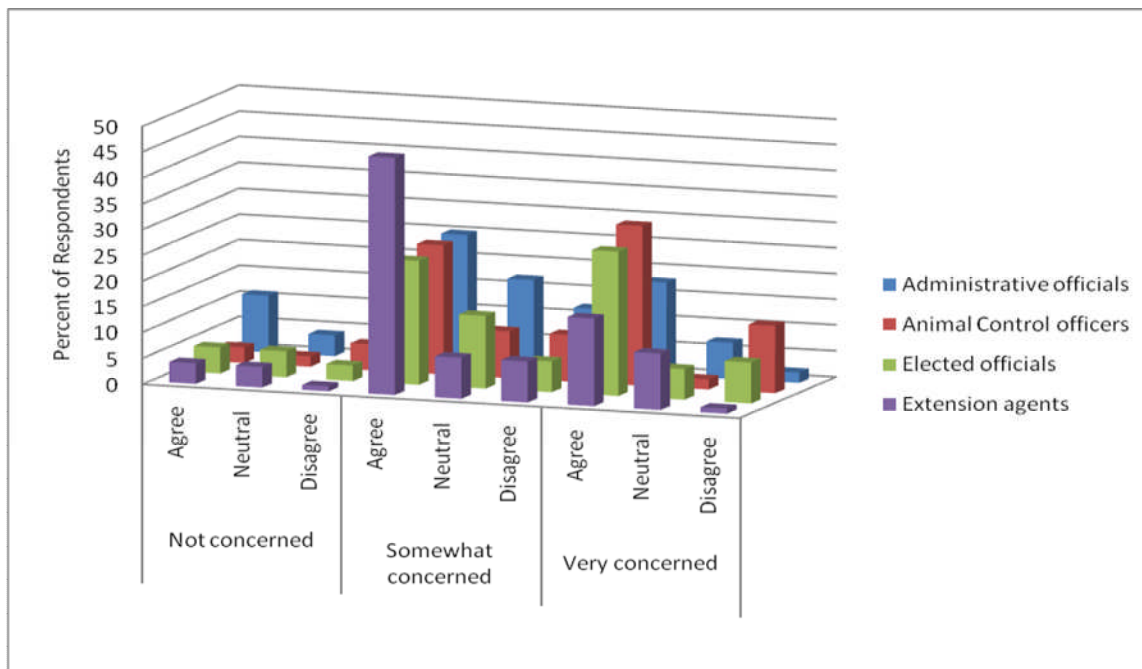
**Figure 3. 17. Respondents' agreement or disagreement that local government should not be expected to take on additional responsibilities without receiving additional resources, categorized by one's prioritization of human-wildlife conflicts.**



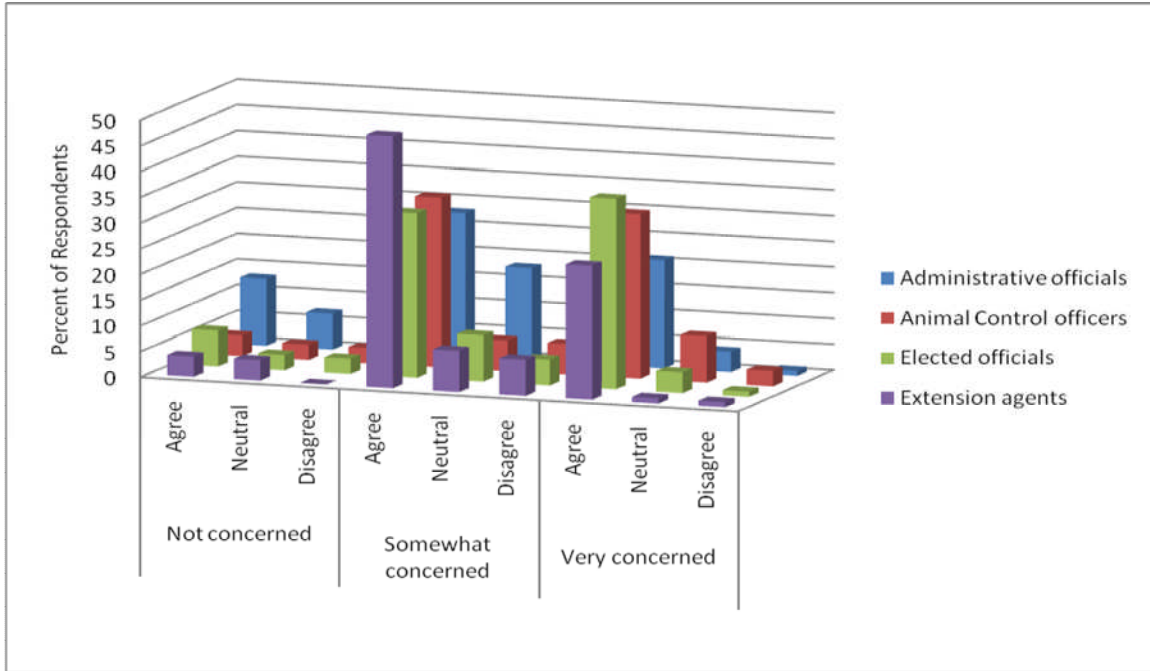
**Figure 3. 18. Respondents' agreement or disagreement that local government plays an important decision-making role in the management of human-wildlife conflicts, categorized by their expressed level of concern about the risk to human safety from such conflicts.**



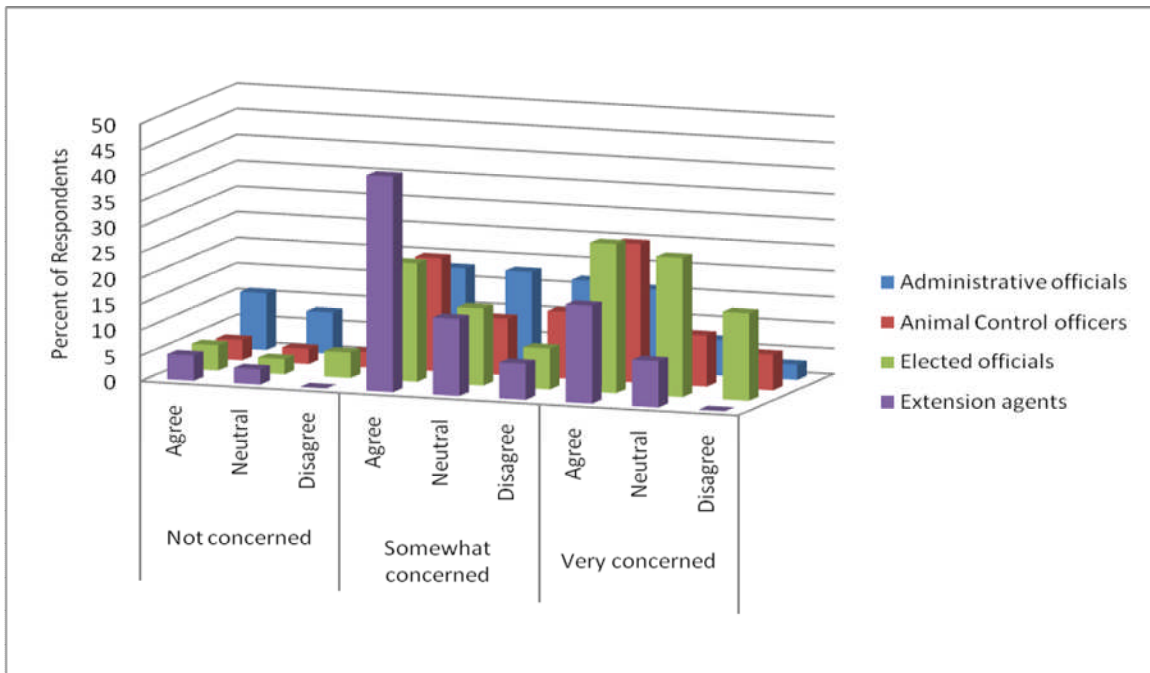
**Figure 3. 19. Respondents' agreement or disagreement that local government should not be expected to take on additional responsibilities without being provided additional resources, categorized by their expressed level of concern about the risk to human safety from such conflicts.**



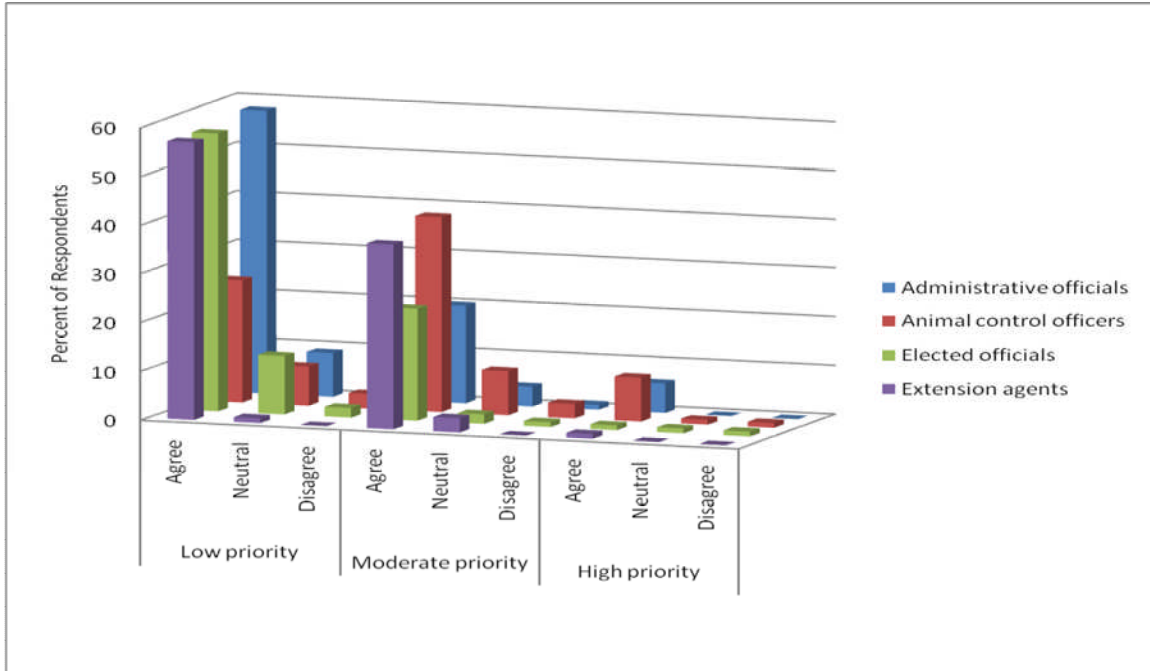
**Figure 3. 20. Respondents' agreement or disagreement that local government plays an important decision-making role in the management of human-wildlife conflicts, categorized by one's expressed concern about the risk of property damage from such conflicts.**



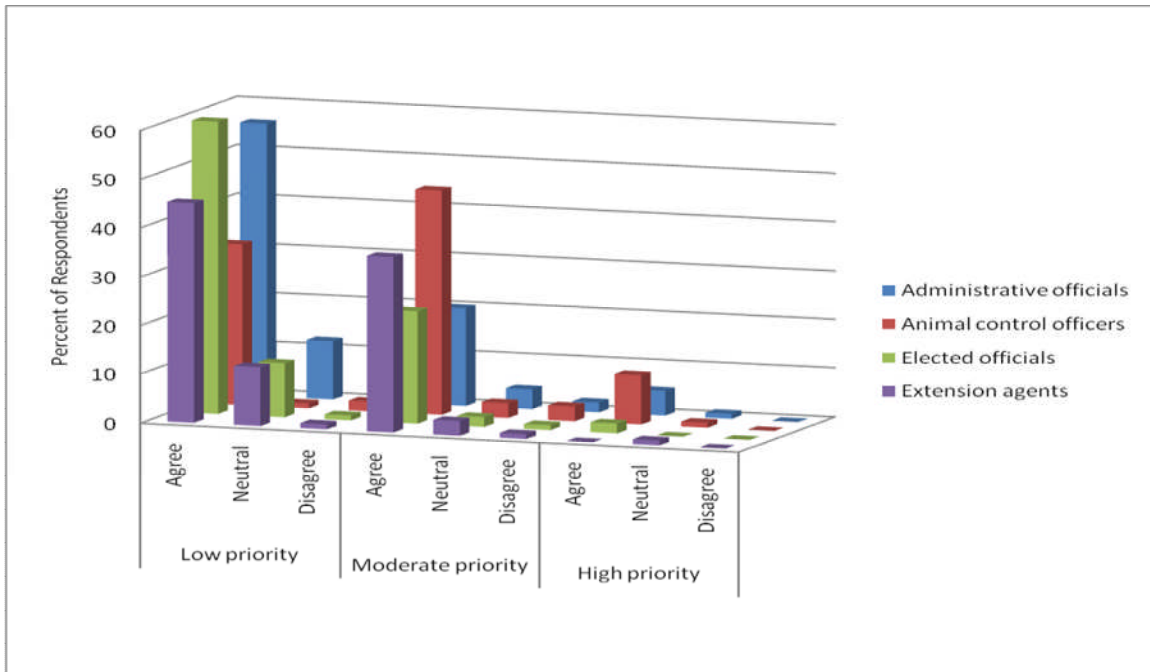
**Figure 3. 21. Respondents' agreement or disagreement that local governments should play a central decision-making role in the management of human-wildlife conflict, categorized by one's expressed level of concern about the risk of property damage from such conflicts.**



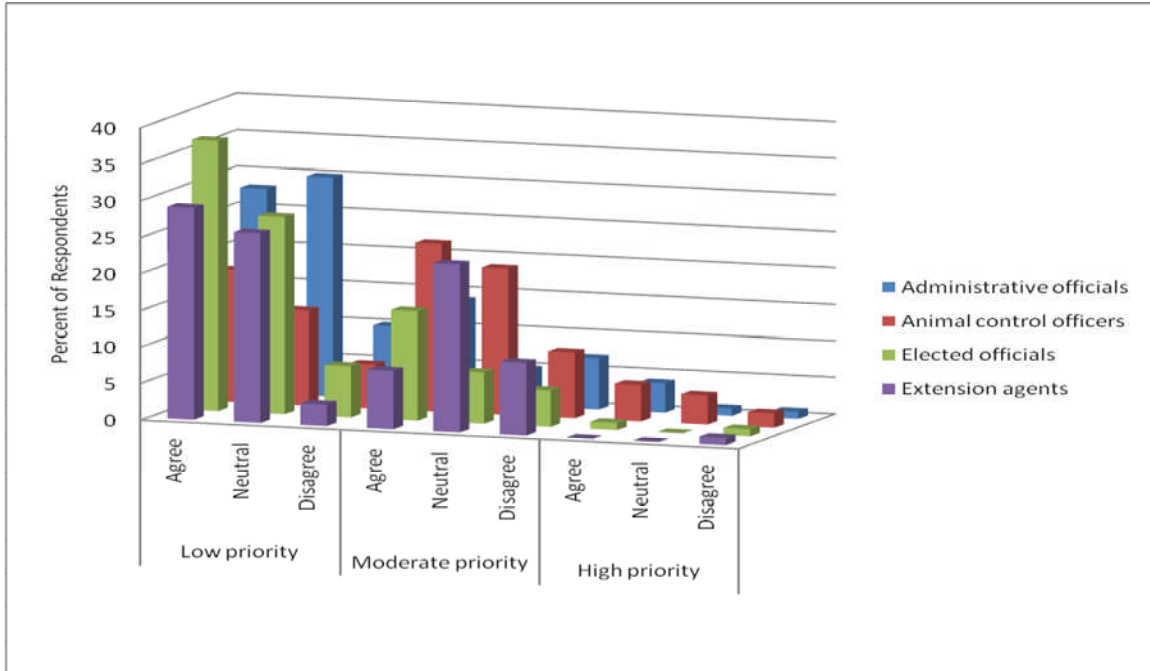
**Figure 3. 22. Respondents' agreement or disagreement that local government should assume leadership in the management of human-wildlife conflict, categorized by one's expressed level of concern about the risk of property damage from such conflicts.**



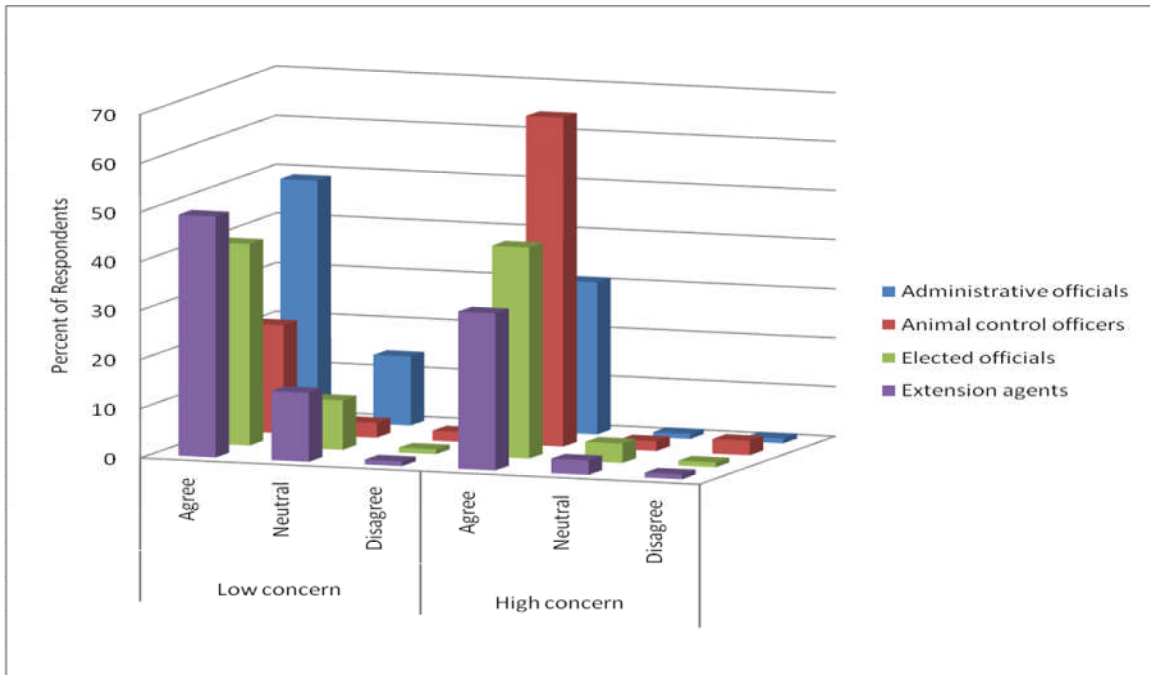
**Figure 3. 23. Respondents' agreement or disagreement that local governments require technical assistance to manage human-wildlife conflicts, categorized by one's prioritization of human-wildlife conflicts.**



**Figure 3. 24. Respondents' agreement or disagreement that local governments require financial assistance to manage human-wildlife conflicts, categorized by one's prioritization of human-wildlife conflicts.**

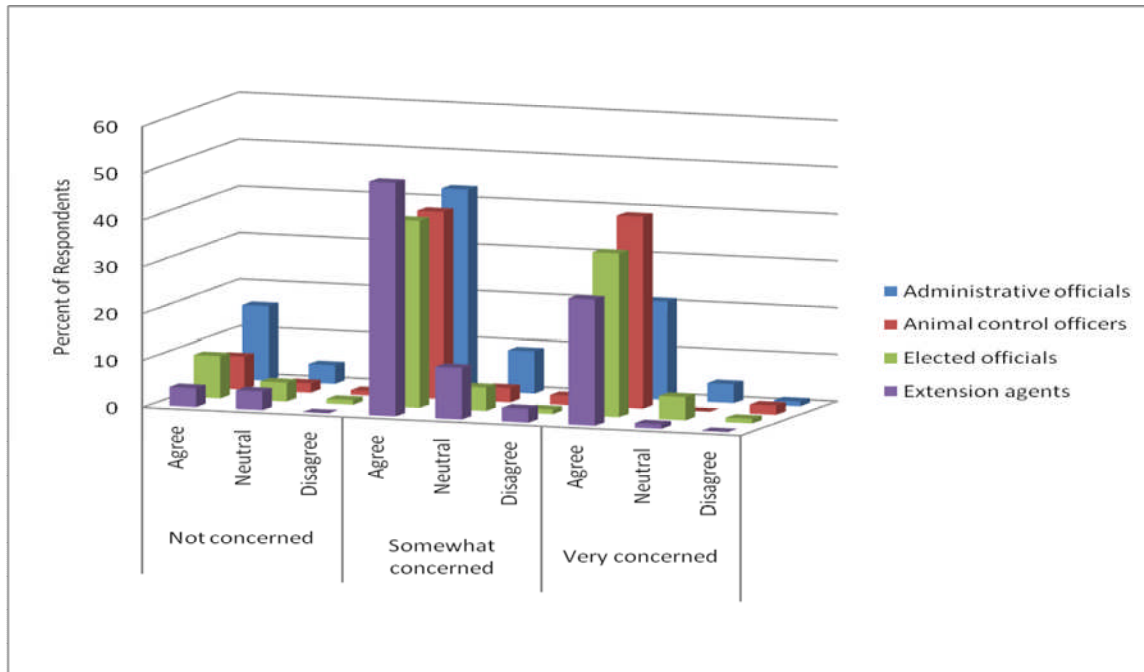


**Figure 3. 25. Respondents' agreement or disagreement that local governments lack the legislative authority necessary to manage human-wildlife conflict, categorized by one's prioritization of human-wildlife conflicts.**

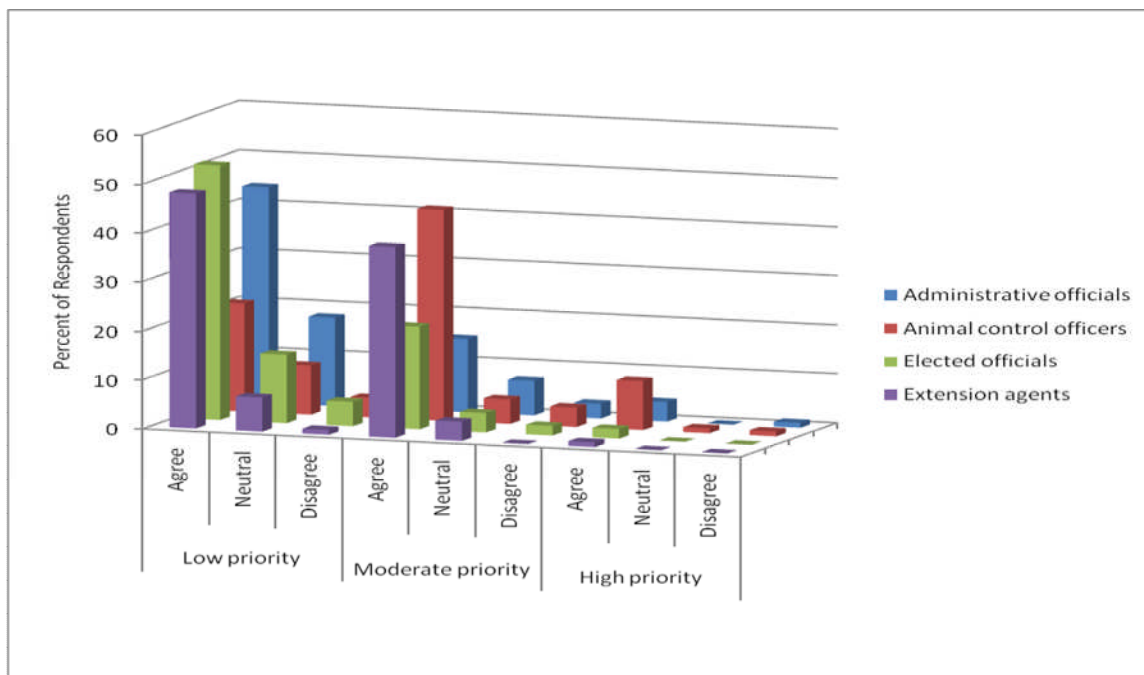


**Figure 3. 26. Respondents' agreement or disagreement that local government needs financial assistance to manage human-wildlife conflicts, categorized by one's expressed level of concern about the risks to human safety from such conflicts.**





**Figure 3. 27. Respondents' agreement or disagreement that local government needs financial assistance to manage human-wildlife conflicts, categorized by one's expressed level of concern about the risk of property damage from such conflicts.**



**Figure 3. 28. Respondents' agreement or disagreement that co-management is a realistic option for managing human-wildlife conflicts, categorized by one's prioritization of human-wildlife conflicts.**

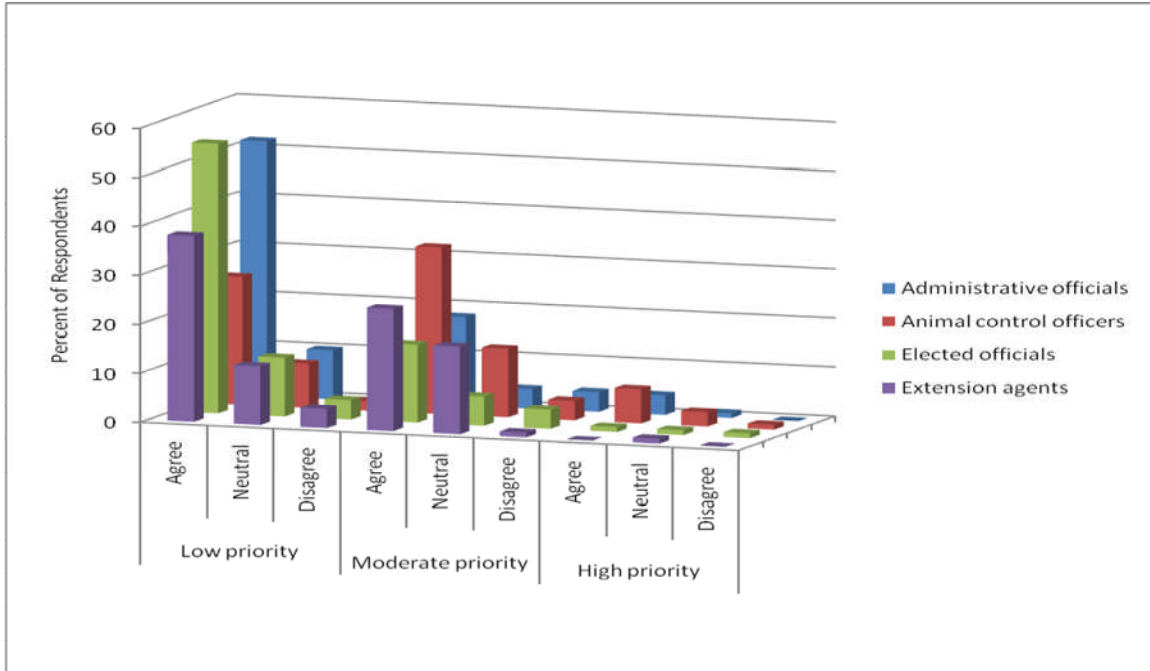


Figure 3. 29. Respondents' agreement or disagreement that insufficient staff numbers would likely limit local government's participation in co-management, categorized by one's prioritization of human-wildlife conflicts.

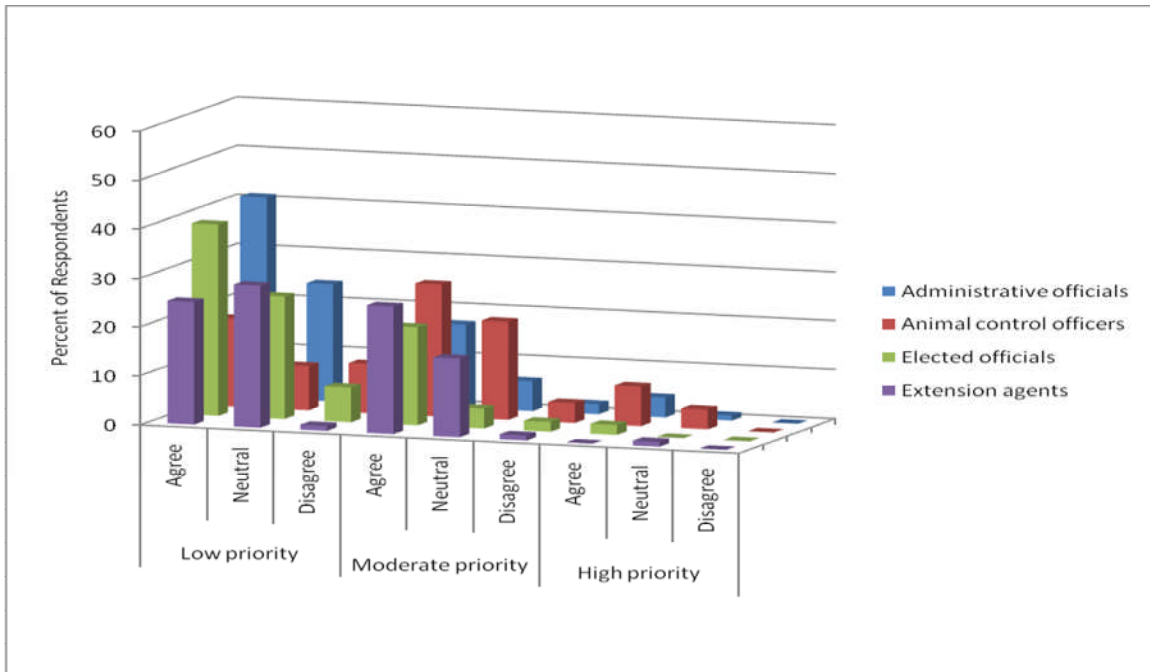
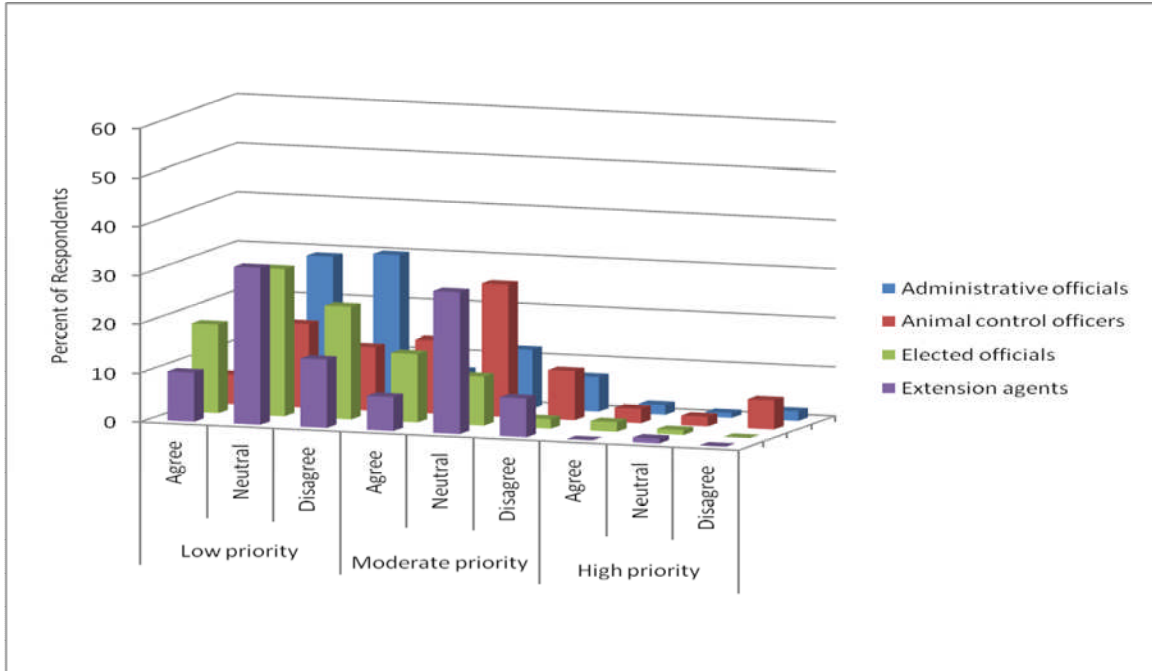
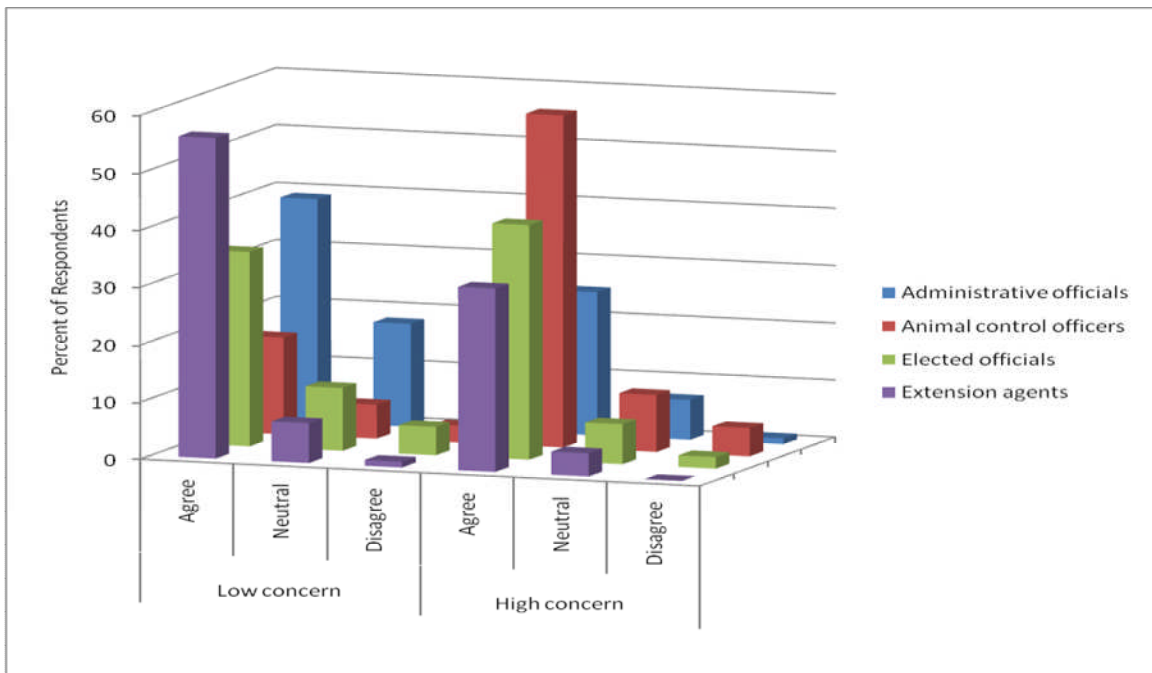


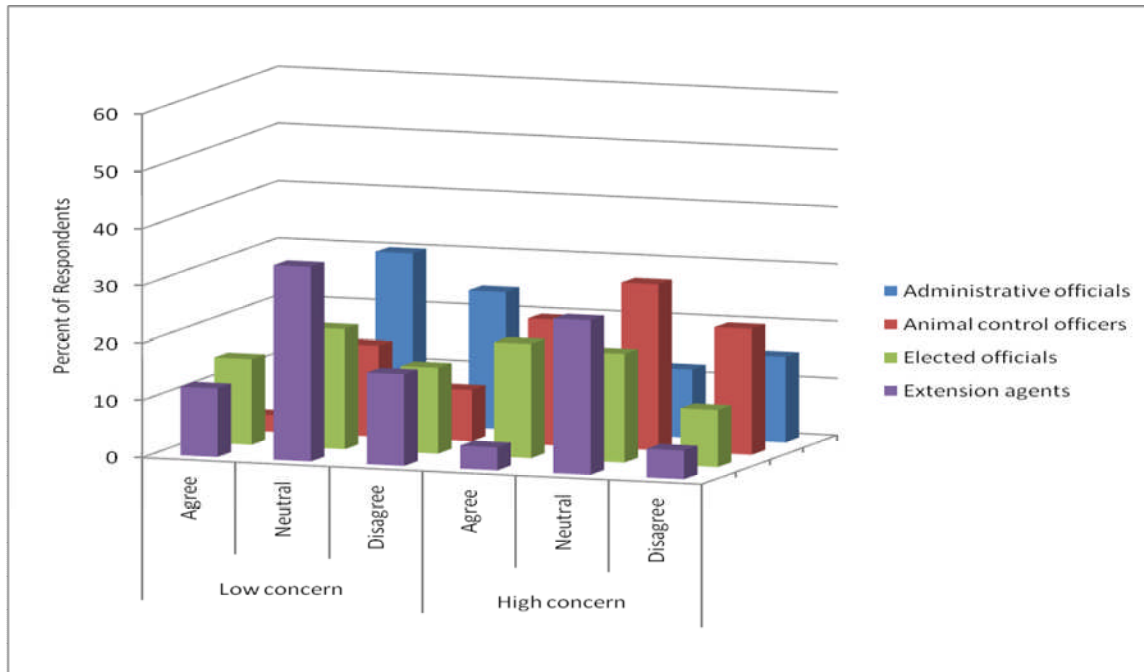
Figure 3. 30. Respondents' agreement or disagreement that local government is willing to partner with other state agencies, categorized by one's prioritization of human-wildlife conflicts.



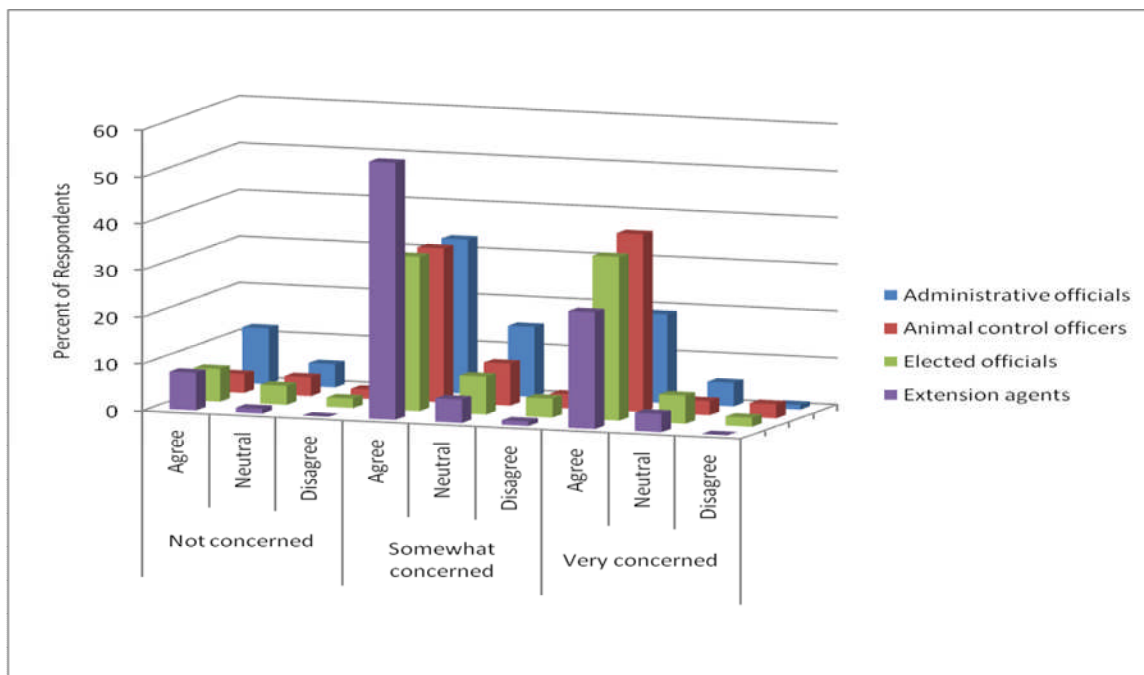
**Figure 3. 31. Respondents' agreement or disagreement that local government is willing to assume responsibility in the management of human-wildlife conflicts, categorized by one's prioritization of human-wildlife conflicts.**



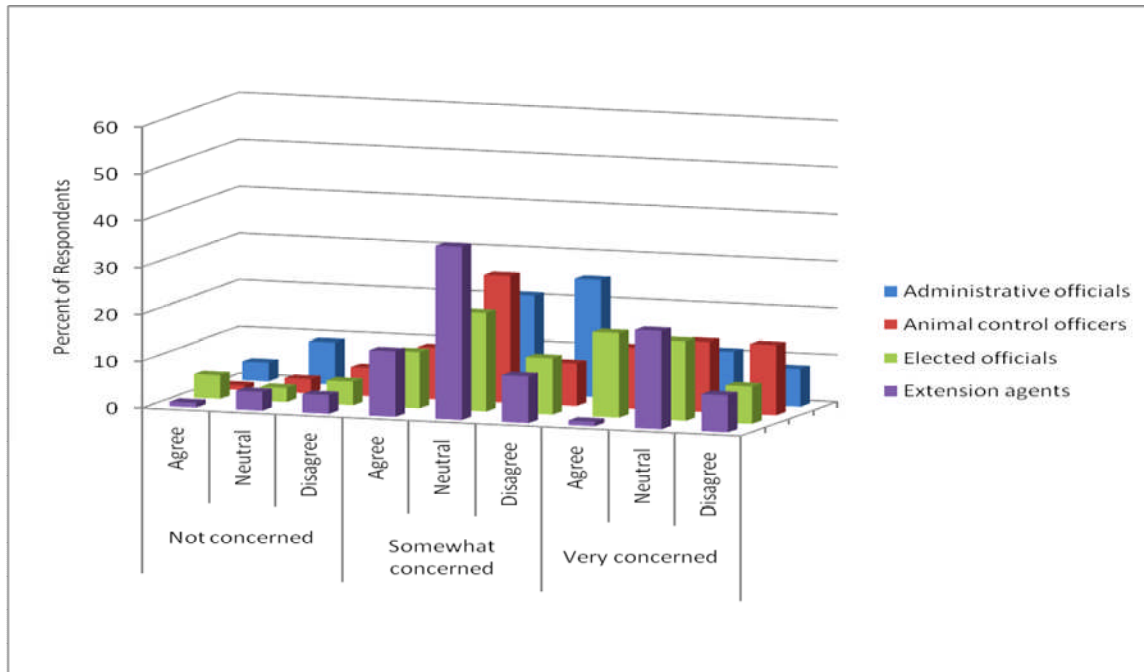
**Figure 3. 32. Respondents' agreement or disagreement that co-management is a realistic option for managing human-wildlife conflicts, categorized by the expressed level of concern about the risk to human safety from such conflicts.**



**Figure 3. 33. Respondents' agreement or disagreement that local government is willing to assume responsibility in the management of human-wildlife conflicts, categorized by the expressed level of concern about the risk to human safety from such conflicts.**



**Figure 3. 34. Respondents' agreement or disagreement that co-management is a realistic option for managing human-wildlife conflicts, categorized by one's expressed concern about the risk of property damage from such conflicts.**



**Figure 3. 35. Respondents’ agreement or disagreement that local government is willing to assume responsibility in the management of human-wildlife conflicts, categorized by one’s expressed concern about the risk of property damage from such conflicts.**

**Table 3. 1. Analysis comparing responses and opinions of respondents vs. non-respondents among administrative officials to a survey about human-wildlife conflicts in Virginia communities, conducted during winter of 2007-2008.**

<b>Question</b>	<b>Survey (N=141)</b>	<b>Phone (N=11)</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>p- value</b>	<b>Gamma</b>	<b>p- value</b>
The term “wildlife” includes domesticated animals. <sup>a</sup>	90.0	100.0	1.212	2	0.545	--	--
Residents expect local government to provide services to resolve human-wildlife interactions. <sup>b</sup>	70.2	72.7	0.319	2	0.852	--	--
Budget and staff limit local government’s ability to manage human-wildlife conflicts. <sup>b</sup>	75.9	90.0	1.181	2	0.554	--	--
Local governments should assume leadership in resolving human-wildlife conflicts. <sup>b</sup>	44.9	54.5	0.380	2	0.827	--	--
Has your local government received wildlife complaints in the last two fiscal years? <sup>c</sup>	82.0	72.7	1.869	2	0.393	--	--
Best estimate of frequency of wildlife complaints. <sup>d</sup>	66.7	62.5	0.672	2	0.715	--	--
Best estimate of overall severity of wildlife complaints. <sup>e</sup>	60.2	85.7	1.890	2	0.389	--	--
Has your community participated in co-management agreements? <sup>c</sup>	62.9	36.4	5.789	2	0.055	0.319	0.186
How would you rate your overall satisfaction with current co-management agreements? <sup>f</sup>	38.0	75.0	2.817	2	0.245	--	--
My local government is willing to partner with other agencies to resolve human-wildlife conflicts. <sup>b</sup>	61.6	63.6	0.891	2	0.640	--	--
Shared management is an attractive option for managing human-wildlife conflicts. <sup>b</sup>	61.3	63.6	0.995	2	0.608	--	--

<sup>a</sup> Percent indicating “Disagree”

<sup>b</sup> Percent indicating “Agree”

<sup>c</sup> Percent indicating “Yes”

<sup>d</sup> Percent indicating “Infrequently”

<sup>e</sup> Percent indicating “Moderate”

<sup>f</sup> Percent indicating “Satisfied”

**Table 3. 2. Analysis comparing responses and opinions of respondents vs. non-respondents among elected officials to a survey about human-wildlife conflicts in Virginia communities, conducted during winter of 2007-2008.**

<b>Question</b>	<b>Survey (N=175)</b>	<b>Phone (N=48)</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>p-value</b>	<b>Gamma</b>	<b>p-value</b>
The term “wildlife” includes domesticated animals. <sup>a</sup>	89.1	80.9	5.769	2	0.056	-0.331	0.165
Residents expect local government to provide services to resolve human-wildlife interactions. <sup>b</sup>	71.3	81.3	1.994	2	0.369	--	--
Budget and staff limit local government’s ability to manage human-wildlife conflicts. <sup>b</sup>	75.3	83.8	1.738	2	0.419	--	--
Local governments should assume leadership in resolving human-wildlife conflicts. <sup>b</sup>	56.7	68.8	5.540	2	0.063	-0.152	0.327
Has your local government received wildlife complaints in the last two fiscal years? <sup>c</sup>	63.7	45.8	5.392	2	0.067	0.278	0.048
Best estimate of frequency of wildlife complaints. <sup>d</sup>	58.3	33.3	4.993	2	0.082	-0.424	0.035
Best estimate of overall severity of wildlife complaints. <sup>e</sup>	69.8	76.2	0.999	2	0.607	--	--
Has your community participated in co-management agreements? <sup>c</sup>	62.9	52.1	19.186	2	<0.0005	0.039	0.757
How would you rate your overall satisfaction with current co-management agreements? <sup>f</sup>	41.8	80.0	10.816	2	0.004	0.719	<0.0005
My local government is willing to partner with other agencies to resolve human-wildlife conflicts. <sup>b</sup>	62.9	77.1	3.462	2	0.177	--	--
Shared management is an attractive option for managing human-wildlife conflicts. <sup>b</sup>	60.6	87.2	11.713	2	0.003	-0.613	<0.0005

<sup>a</sup> Percent indicating “Disagree”

<sup>b</sup> Percent indicating “Agree”

<sup>c</sup> Percent indicating “Yes”

<sup>d</sup> Percent indicating “Infrequently”

<sup>e</sup> Percent indicating “Moderate”

<sup>f</sup> Percent indicating “Satisfied”

**Table 3. 3. Analysis comparing demographic characteristics of respondent vs. non-respondent administrative and elected officials to a survey about human-wildlife conflicts in Virginia communities, conducted during winter of 2007-2008.**

Demographic Characteristic		Survey (N=141) (N=175)	Phone (N=11) (N=48)	X <sup>2</sup>	df	p-value
Gender <sup>a</sup>	<i>Administrative</i>	83.2	100.0	2.187	1	0.139
	<i>Elected</i>	80.1	83.3	0.250	1	0.617
Age <sup>b</sup>	<i>Administrative</i>	34.5	54.5	4.814	6	0.568
	<i>Elected</i>	38.7	40.4	2.291	6	0.891
Community description <sup>c</sup>	<i>Administrative</i>	69.5	63.6	0.349	2	0.840
	<i>Elected</i>	72.9	74.5	0.184	2	0.912
Community type <sup>d</sup>	<i>Administrative</i>	54.7	54.5	0.170	2	0.919
	<i>Elected</i>	56.9	52.1	1.718	2	0.423

<sup>a</sup> Percent indicating “Male”

<sup>b</sup> Percent indicating “55-64”

<sup>c</sup> Percent indicating “Rural”

<sup>d</sup> Percent indicating “Town”

**Table 3. 4. Analysis of responses about length of service (in years) of respondent vs. non-respondent administrative and elected officials in a survey about human-wildlife conflicts in Virginia communities, conducted during winter of 2007-2008.**

Demographic Characteristic	Mean		t	df	p-value	
	Survey	Phone				
Current position length	<i>Administrative</i>	8.9447 (n=141)	10.4391 (n=11)	-0.518	150	0.605
	<i>Elected</i>	7.5012 (n=175)	7.6354 (n=48)	-0.128	219	0.899



**Table 3. 5. Relationships between respondent subpopulation and opinion on whether a taxonomic group belonged in the definition of wildlife, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Species group	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	s <sup>b</sup>	G <sup>c</sup>	df	p-value
		1	2	3					
Mammals							7.798	6	0.253
<i>Administrative officials</i>	141	92(130)	3(4)	5(7)	1.1	0.46			
<i>Animal Control</i>	98	96(94)	2(2)	2(2)	1.1	0.32			
<i>Elected officials</i>	173	92(160)	3(6)	4(7)	1.1	0.43			
<i>Extension agents</i>	76	99(75)	0(0)	1(1)	1.0	0.23			
TOTAL	488	94(459)	2(12)	3(17)					
Birds							9.762	6	0.135
<i>Administrative officials</i>	140	98(137)	1(2)	1(1)	1.0	0.21			
<i>Animal Control</i>	98	98(96)	2(2)	0(0)	1.0	0.14			
<i>Elected officials</i>	173	95(165)	5(8)	0(0)	1.1	0.21			
<i>Extension agents</i>	76	100(76)	0(0)	0(0)	1.0	0.00			
TOTAL	487	97(474)	2(12)	1(1)					
Reptiles							6.023	6	0.421
<i>Administrative officials</i>	141	96(136)	1(2)	2(3)	1.1	0.31			
<i>Animal Control</i>	98	94(92)	5(5)	1(1)	1.1	0.30			
<i>Elected officials</i>	173	92(159)	6(11)	2(3)	1.1	0.35			
<i>Extension agents</i>	76	95(72)	4(3)	1(1)	1.1	0.30			
TOTAL	488	94(459)	4(21)	2(8)					
Amphibians							8.379	6	0.212
<i>Administrative officials</i>	140	93(130)	4(5)	4(5)	1.1	0.41			
<i>Animal Control</i>	94	87(82)	9(8)	4(4)	1.2	0.48			
<i>Elected officials</i>	171	95(145)	11(19)	4(7)	1.2	0.49			
<i>Extension agents</i>	76	83(63)	12(9)	5(4)	1.2	0.53			
TOTAL	481	87(420)	9(41)	4(20)					
Fish							1.803	6	0.937
<i>Administrative officials</i>	140	81(113)	16(22)	4(5)	1.2	0.50			
<i>Animal Control</i>	96	79(76)	18(17)	3(3)	1.2	0.50			
<i>Elected officials</i>	173	82(141)	16(28)	2(4)	1.2	0.46			
<i>Extension agents</i>	76	79(60)	20(15)	1(1)	1.2	0.45			
TOTAL	485	80(390)	17(82)	3(13)					

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Standard deviation

<sup>c</sup> Log-likelihood ratio test statistic

**Table 3. 5. continued**

Species group	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	s <sup>b</sup>	G <sup>c</sup>	df	p-value
		1	2	3					
Insects							4.412	6	0.621
<i>Administrative officials</i>	141	49(69)	43(60)	9(12)	1.6	0.64			
<i>Animal Control</i>	95	42(40)	46(44)	12(11)	1.7	0.67			
<i>Elected officials</i>	172	51(88)	38(65)	11(19)	1.6	0.68			
<i>Extension agents</i>	76	43(33)	49(37)	8(6)	1.6	0.66			
TOTAL	484	48(230)	43(206)	10(48)					
Mollusks							8.597	6	0.198
<i>Administrative officials</i>	141	54(76)	27(38)	19(27)	1.7	0.78			
<i>Animal Control</i>	96	52(50)	25(24)	23(22)	1.7	0.82			
<i>Elected officials</i>	172	52(90)	24(41)	24(41)	1.7	0.83			
<i>Extension agents</i>	76	47(36)	39(30)	13(10)	1.7	0.70			
TOTAL	485	52(252)	27(133)	21(100)					

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Standard deviation

<sup>c</sup> Log-likelihood ratio test statistic

**Table 3. 6. Relationships between respondent subpopulation and response to wildlife knowledge questions, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
The term “wildlife” includes domesticated animals, such as household pets or livestock animals								48.076	12	<0.0005
<i>Administrative officials</i>	140	1(1)	4(5)	6(8)	41(58)	49(68)	4.3			
<i>Animal Control</i>	97	1(1)	0(0)	0(0)	21(20)	78(76)	4.8			
<i>Elected officials</i>	174	2(4)	4(7)	5(8)	47(81)	43(74)	4.2			
<i>Extension agents</i>	76	0(0)	3(2)	1(1)	38(29)	58(44)	4.5			
TOTAL	487	1(6)	3(14)	3(17)	39(188)	54(262)				
Feral animals, like dogs, cats, or pigs that have been turned loose or abandoned, are considered wildlife								43.061	12	<0.0005
<i>Administrative officials</i>	140	7(10)	27(38)	11(16)	32(45)	22(31)	3.4			
<i>Animal Control</i>	97	2(2)	11(11)	10(10)	35(34)	41(40)	4.0			
<i>Elected officials</i>	175	7(12)	31(54)	16(28)	30(53)	16(28)	3.2			
<i>Extension agents</i>	76	1(1)	39(30)	9(7)	25(19)	25(19)	3.3			
TOTAL	488	5(25)	27(133)	13(61)	31(151)	24(118)				
The term “human-wildlife interaction” always refers to a negative situation								11.693	12	0.471
<i>Administrative officials</i>	141	1(2)	8(11)	12(17)	49(69)	30(42)	4.0			
<i>Animal Control</i>	96	1(1)	13(12)	16(15)	52(50)	19(18)	3.8			
<i>Elected officials</i>	172	1(2)	6(11)	18(31)	48(83)	26(45)	3.9			
<i>Extension agents</i>	76	0(0)	5(4)	20(15)	54(41)	21(16)	3.9			
TOTAL	485	1(5)	8(38)	16(78)	50(243)	25(121)				

<sup>a</sup> Based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 7. Relationships between respondent subpopulation and knowledge about wildlife complaints made in their community, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Local government received wildlife complaints in most recent fiscal year (i.e., 7/1/06 to 6/30/07)						84.962	6	<0.0005
<i>Administrative officials</i>	139	82(114)	14(19)	4(6)	1.2			
<i>Animal Control</i>	97	98(95)	1(1)	1(1)	1.0			
<i>Elected officials</i>	171	64(109)	23(39)	13(23)	1.5			
<i>Extension agents</i>	76	79(60)	0(0)	21(16)	1.4			
TOTAL	483	78(378)	12(59)	10(46)				
Local government received wildlife complaints in previous two fiscal years (i.e., FY 2005 and FY2006)						91.898	6	<0.0005
<i>Administrative officials</i>	138	85(117)	9(13)	6(8)	1.2			
<i>Animal Control</i>	96	99(95)	0(0)	1(1)	1.0			
<i>Elected officials</i>	171	63(108)	18(30)	19(33)	1.6			
<i>Extension agents</i>	76	72(55)	0(0)	28(21)	1.6			
TOTAL	481	78(375)	9(43)	13(63)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 8. Relationships between respondent subpopulation and opinion on severity of wildlife complaints in their community, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Severity of wildlife complaints in FY2007						5.296	6	0.506
<i>Administrative officials</i>	113	34(38)	60(68)	6(7)	1.7			
<i>Animal Control</i>	94	28(26)	65(61)	7(7)	1.8			
<i>Elected officials</i>	106	24(25)	70(74)	7(7)	1.8			
<i>Extension agents</i>	60	20(12)	75(45)	5(3)	1.9			
TOTAL	373	27(101)	66(248)	6(24)				
Severity of wildlife complaints in FY2005 and FY2006						15.010	6	0.020
<i>Administrative officials</i>	117	39(46)	58(68)	3(3)	1.6			
<i>Animal Control</i>	95	24(23)	67(64)	8(8)	1.8			
<i>Elected officials</i>	108	31(34)	63(68)	6(6)	1.7			
<i>Extension agents</i>	55	16(9)	80(44)	4(2)	1.9			
TOTAL	375	30(112)	65(244)	5(19)				

<sup>a</sup> Based on scaled responses: 1=Insignificant, 2=Moderate, 3=Severe

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 9. Relationships between respondent subpopulation and expressed level of concern in reaction to hypothetical conflict scenarios in their community, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Widespread property damage						17.476	6	0.008
<i>Administrative officials</i>	140	20(28)	53(74)	27(38)	2.1			
<i>Animal Control</i>	96	10(10)	45(43)	45(43)	2.3			
<i>Elected officials</i>	173	13(22)	45(78)	42(73)	2.3			
<i>Extension agents</i>	76	9(7)	62(47)	29(22)	2.2			
TOTAL	485	14(67)	50(242)	36(176)				
Human injury or fatality						28.908	6	<0.0005
<i>Administrative officials</i>	140	14(20)	43(60)	43(60)	2.3			
<i>Animal Control</i>	96	2(2)	26(25)	72(69)	2.7			
<i>Elected officials</i>	174	10(17)	41(72)	49(85)	2.4			
<i>Extension agents</i>	76	14(11)	43(33)	42(32)	2.3			
TOTAL	486	10(50)	39(190)	51(246)				
Human health risk						36.902	6	<0.0005
<i>Administrative officials</i>	140	14(20)	49(68)	37(52)	2.2			
<i>Animal Control</i>	96	1(1)	27(26)	72(69)	2.7			
<i>Elected officials</i>	174	10(18)	38(66)	52(90)	2.4			
<i>Extension agents</i>	76	9(7)	47(36)	43(33)	2.3			
TOTAL	486	9(46)	40(196)	50(244)				
Personal safety risk						52.745	6	<0.0005
<i>Administrative officials</i>	140	21(30)	45(63)	34(47)	2.1			
<i>Animal Control</i>	96	2(2)	24(23)	74(71)	2.7			
<i>Elected officials</i>	174	14(25)	39(67)	47(82)	2.3			
<i>Extension agents</i>	76	21(16)	46(35)	33(25)	2.1			
TOTAL	486	15(73)	39(188)	46(225)				

<sup>a</sup> Based on scaled responses: 1=Not concerned, 2=Somewhat concerned, 3=Very concerned

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 10. Relationships between respondent subpopulation and prioritization of alternative human-wildlife conflict management strategies, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Priority of human-wildlife conflicts						42.977	6	<0.0005
<i>Administrative officials</i>	141	70(98)	25(35)	6(8)	1.4			
<i>Animal Control</i>	97	37(36)	52(50)	11(11)	1.7			
<i>Elected officials</i>	171	71(122)	26(45)	2(4)	1.3			
<i>Extension agents</i>	76	57(43)	42(32)	1(1)	1.5			
TOTAL	485	62(299)	33(162)	5(24)				
Developing comprehensive community-wide resolution program						47.536	6	<0.0005
<i>Administrative officials</i>	138	86(119)	12(17)	1(2)	1.2			
<i>Animal Control</i>	95	46(44)	39(37)	15(14)	1.7			
<i>Elected officials</i>	171	72(123)	22(37)	6(11)	1.4			
<i>Extension agents</i>	74	64(47)	30(22)	7(5)	1.4			
TOTAL	478	70(333)	24(113)	7(32)				
Developing single-species resolution program						21.760	6	0.001
<i>Administrative officials</i>	139	67(93)	24(33)	9(13)	1.4			
<i>Animal Control</i>	95	62(59)	28(27)	9(9)	1.5			
<i>Elected officials</i>	171	57(98)	36(62)	6(11)	1.5			
<i>Extension agents</i>	76	38(29)	53(40)	9(7)	1.7			
TOTAL	481	58(279)	34(162)	8(40)				
Handling "brushfires" as they arise						5.172	6	0.522
<i>Administrative officials</i>	137	40(55)	53(72)	7(10)	1.7			
<i>Animal Control</i>	93	38(35)	47(44)	15(14)	1.8			
<i>Elected officials</i>	171	44(76)	46(78)	10(17)	1.7			
<i>Extension agents</i>	73	37(27)	52(38)	11(8)	1.7			
TOTAL	474	41(193)	49(232)	10(49)				
Implementing an educational program						36.057	6	<0.0005
<i>Administrative officials</i>	137	64(87)	29(40)	7(10)	1.4			
<i>Animal Control</i>	94	34(32)	43(40)	23(22)	1.9			
<i>Elected officials</i>	171	57(97)	35(59)	9(15)	1.5			
<i>Extension agents</i>	75	35(26)	44(33)	21(16)	1.9			
TOTAL	477	51(242)	36(172)	13(63)				

<sup>a</sup> Based on scaled responses: 1=Low, 2=Moderate, 3=High

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 10. continued**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Contract with private service provider on "as needed" basis						26.465	6	<0.0005
<i>Administrative officials</i>	138	80(110)	19(26)	1(2)	1.2			
<i>Animal Control</i>	95	53(50)	34(32)	14(13)	1.6			
<i>Elected officials</i>	171	73(124)	23(40)	4(7)	1.3			
<i>Extension agents</i>	76	68(52)	28(21)	4(3)	1.4			
TOTAL	480	70(336)	25(119)	5(25)				

<sup>a</sup> Based on scaled responses: 1=Low, 2=Moderate, 3=High

<sup>b</sup> Log-likelihood ratio test statistic



**Table 3. 11. Rankings of severity over 5 commonly encountered human-wildlife conflict scenarios based on weighted averages, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. (1 = most severe, 5 = least severe)<sup>1</sup>**

Scenario	Ranking (weighted average)			
	Administrative officials	Animal Control officers	Elected officials	Extension agents
Deer	1(2.5)	2(2.8)	1(2.7)	1(3.4)
Bear	5(3.5)	4(3.3)	4(3.2)	5(3.6)
Snake	2(2.6)	1(2.5)	4(3.2)	2(3.0)
Geese	3(3.1)	5(3.4)	2(3.0)	4(3.1)
Coyotes	4(3.3)	3(3.1)	2(3.0)	2(3.0)

**Table 3. 12. Rankings of severity over 5 commonly encountered human-wildlife conflict scenarios based on weighted averages, as provided by administrative officials and categorized by community type, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. (original scale: 1 = most severe, 5 = least severe) Rural: N=71; Suburban: N=23; Urban: N=13**

Scenario	Ranking (weighted average)		
	R <sup>a</sup>	S <sup>a</sup>	U <sup>a</sup>
Deer	2(2.6)	1(2.0)	2(2.2)
Bear	4(3.4)	5(3.6)	5(4.2)
Snake	1(2.5)	2(2.8)	3(2.7)
Geese	5(3.4)	3(3.0)	1(2.0)
Coyotes	3(3.1)	4(3.6)	4(4.0)

<sup>a</sup> Respondent community description: R = Rural, S = Suburban, U = Urban

**Table 3. 13. Rankings of severity over 5 commonly encountered human-wildlife conflict scenarios based on weighted averages, as provided by animal control officers and categorized by community type, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. (1 = most severe, 5 = least severe) Rural: N=31; Suburban: N=20; Urban: N=12**

Scenario	Ranking (weighted average)		
	R <sup>a</sup>	S <sup>a</sup>	U <sup>a</sup>
Deer	2(2.5)	2(3.0)	3(3.0)
Bear	4(3.3)	5(3.5)	2(2.9)
Snake	1(2.4)	1(2.4)	1(2.8)
Geese	5(3.7)	3(3.1)	5(3.3)
Coyotes	3(3.2)	3(3.1)	3(3.0)

<sup>a</sup> Respondent community description: R = Rural, S = Suburban, U = Urban

<sup>1</sup> Survey Question #4:

We now want you to rank the following set of 5 commonly encountered human-wildlife conflict situations in terms of their perceived severity to your community. Please order this set of 5 potential conflict situations from the most severe (1) to the least severe (5), using the numbers 1 through 5 only once.

- Deer eating residents' ornamental plantings
- A bear passing through town
- A snake entering a residence
- Canada geese making a town park or recreational area unpleasant
- Coyotes preying on household pets

**Table 3. 14. Rankings of severity over 5 commonly encountered human-wildlife conflict scenarios based on weighted averages, as provided by elected officials and categorized by community type, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. (1 = most severe, 5 = least severe) Rural: N=73; Suburban: N=15; Urban: N=16**

Scenario	Ranking (weighted average)		
	R <sup>a</sup>	S <sup>a</sup>	U <sup>a</sup>
Deer	1(2.6)	1(2.7)	1(2.8)
Bear	4(3.2)	4(3.1)	4(3.0)
Snake	5(3.3)	3(3.0)	1(2.8)
Geese	3(3.2)	1(2.7)	3(2.9)
Coyotes	2(2.8)	5(3.5)	5(3.3)

<sup>a</sup> Respondent community description: R = Rural, S = Suburban, U = Urban

**Table 3. 15. Rankings of severity over 5 commonly encountered human-wildlife conflict scenarios based on weighted averages, as provided by Extension agents and categorized by community type, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008. (1 = most severe, 5 = least severe) Rural: N=48; Suburban: N=11; Urban: N=7**

Scenario	Ranking (weighted average)		
	R <sup>a</sup>	S <sup>a</sup>	U <sup>a</sup>
Deer	1(2.3)	2(2.2)	4(3.1)
Bear	5(3.7)	4(3.7)	1(2.6)
Snake	3(2.9)	3(3.1)	2(2.9)
Geese	4(3.3)	1(2.0)	5(3.4)
Coyotes	2(2.8)	5(4.0)	3(3.0)

<sup>a</sup> Respondent community description: R = Rural, S = Suburban, U = Urban

**Table 3. 16. Relationships between respondent subpopulation and knowledge about wildlife complaint records kept within local government, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Is an official record of wildlife complaints kept by local government?						86.517	6	<0.0005
<i>Administrative officials</i>	123	63(78)	31(38)	6(7)	1.4			
<i>Animal Control</i>	96	96(92)	3(3)	1(1)	1.1			
<i>Elected officials</i>	121	64(77)	13(16)	23(28)	1.6			
<i>Extension agents</i>	60	53(32)	13(8)	33(20)	1.8			
TOTAL	400	70(279)	16(65)	14(56)				
Is a wildlife complaint record kept in your office?						90.946	6	<0.0005
<i>Administrative officials</i>	80	43(34)	58(46)	0(0)	1.6			
<i>Animal Control</i>	93	86(80)	14(13)	0(0)	1.1			
<i>Elected officials</i>	77	25(19)	64(49)	12(9)	1.9			
<i>Extension agents</i>	34	53(18)	47(16)	0(0)	1.5			
TOTAL	284	53(151)	44(124)	3(9)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 17. Actions taken with records maintained in a respondents' office within local government, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>
		1	2	3	4	
What is done with records maintained in your office?						
<i>Administrative officials</i>	34	59(20)	15(5)	21(7)	6(2)	1.7
<i>Animal Control</i>	80	64(51)	25(20)	3(2)	9(7)	1.6
<i>Elected officials</i>	19	74(14)	16(3)	0(0)	11(2)	1.5
<i>Extension agents</i>	18	83(15)	0(0)	11(2)	6(1)	1.4
TOTAL	151	66(100)	19(28)	7(11)	8(12)	

<sup>a</sup> Based on scaled responses: 1=Records filed or stored, 2=Records sorted, compiled, and summarized, 3=Records transferred to another department, 4=Other

**Table 3. 18. Relationships between respondent subpopulation and knowledge about record keeping practices in specific local government offices, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Local Government Office	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
Police							44.891	9	<0.0005
<i>Administrative officials</i>	78	69(54)	12(9)	19(15)	0(0)	1.5			
<i>Animal Control</i>	93	56(52)	30(28)	12(11)	2(2)	1.6			
<i>Elected officials</i>	76	71(54)	11(8)	18(14)	0(0)	1.5			
<i>Extension agents</i>	33	24(8)	18(6)	55(18)	3(1)	2.4			
TOTAL	280	60(168)	18(51)	21(58)	1(3)				
Animal Control							32.638	9	<0.0005
<i>Administrative officials</i>	79	73(58)	5(4)	9(7)	13(10)	1.6			
<i>Animal Control</i>	93	85(79)	12(11)	3(3)	0(0)	1.2			
<i>Elected officials</i>	74	91(67)	5(4)	4(3)	4(3)	1.3			
<i>Extension agents</i>	34	79(27)	3(1)	18(6)	0(0)	1.4			
TOTAL	283	82(231)	7(20)	7(19)	5(13)				
Dispatch							65.497	9	<0.0005
<i>Administrative officials</i>	80	68(54)	13(10)	13(10)	8(6)	1.6			
<i>Animal Control</i>	93	87(81)	10(9)	3(3)	0(0)	1.2			
<i>Elected officials</i>	77	58(45)	16(12)	21(16)	5(4)	1.7			
<i>Extension agents</i>	31	23(7)	16(5)	58(18)	3(1)	2.4			
TOTAL	281	67(187)	13(36)	17(47)	4(11)				
Cooperative Extension							84.794	9	<0.0005
<i>Administrative officials</i>	77	4(3)	29(22)	57(44)	10(8)	2.7			
<i>Animal Control</i>	92	7(6)	48(44)	41(38)	4(4)	2.4			
<i>Elected officials</i>	77	13(10)	22(17)	60(46)	5(4)	2.6			
<i>Extension agents</i>	34	56(19)	38(13)	0(0)	6(2)	1.6			
TOTAL	280	14(38)	34(96)	46(128)	6(18)				
Administrative							49.808	9	<0.0005
<i>Administrative officials</i>	77	31(24)	56(43)	10(8)	3(2)	1.8			
<i>Animal Control</i>	92	12(11)	53(49)	30(28)	4(4)	2.3			
<i>Elected officials</i>	77	23(18)	25(19)	48(37)	4(3)	2.3			
<i>Extension agents</i>	34	21(7)	21(7)	53(18)	6(2)	2.4			
TOTAL	280	21(60)	42(118)	33(91)	4(11)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know, 4=N/A

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 18. continued**

Local Government Office	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
Parks and Recreation							30.549	9	<0.0005
<i>Administrative officials</i>	77	9(7)	56(43)	18(14)	17(13)	2.4			
<i>Animal Control</i>	92	7(6)	57(52)	32(29)	5(5)	2.4			
<i>Elected officials</i>	77	12(9)	32(25)	43(33)	13(10)	2.6			
<i>Extension agents</i>	33	3(1)	33(11)	58(19)	6(2)	2.7			
TOTAL	279	8(23)	47(131)	34(95)	11(30)				
Public Works							43.589	9	<0.0005
<i>Administrative officials</i>	77	10(8)	65(50)	12(9)	13(10)	2.3			
<i>Animal Control</i>	92	5(5)	58(53)	33(30)	4(4)	2.4			
<i>Elected officials</i>	77	12(9)	31(24)	49(38)	8(6)	2.5			
<i>Extension agents</i>	34	6(2)	29(10)	53(18)	12(4)	2.7			
TOTAL	280	9(24)	49(137)	34(95)	9(24)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know, 4=N/A

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 19. Respondents' knowledge of the type of records kept by specific local government offices, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Local Government Office	N	% Response (n) <sup>a</sup>			
		1	2	3	4
<b>Police</b>					
<i>Administrative officials</i>	43	56(24)	23(10)	2(1)	19(8)
<i>Animal Control</i>	42	19(8)	76(32)	0(0)	5(2)
<i>Elected officials</i>	45	29(13)	22(10)	0(0)	49(22)
<i>Extension agents</i>	10	40(4)	0(0)	0(0)	60(6)
<b>TOTAL</b>	<b>140</b>	<b>35(49)</b>	<b>37(52)</b>	<b>1(1)</b>	<b>27(38)</b>
<b>Animal Control</b>					
<i>Administrative officials</i>	45	62(28)	16(7)	0(0)	22(10)
<i>Animal Control</i>	59	68(40)	24(14)	3(2)	5(3)
<i>Elected officials</i>	55	40(22)	16(9)	0(0)	44(24)
<i>Extension agents</i>	25	40(10)	4(1)	0(0)	56(14)
<b>TOTAL</b>	<b>184</b>	<b>54(100)</b>	<b>17(31)</b>	<b>1(2)</b>	<b>28(51)</b>
<b>Dispatch</b>					
<i>Administrative officials</i>	46	24(11)	59(27)	4(2)	13(6)
<i>Animal Control</i>	76	14(11)	80(61)	0(0)	5(4)
<i>Elected officials</i>	42	7(3)	50(21)	0(0)	43(18)
<i>Extension agents</i>	8	13(1)	25(2)	0(0)	63(5)
<b>TOTAL</b>	<b>172</b>	<b>15(26)</b>	<b>65(111)</b>	<b>1(2)</b>	<b>19(33)</b>
<b>Cooperative Extension</b>					
<i>Administrative officials</i>	3	33(1)	0(0)	0(0)	67(2)
<i>Animal Control</i>	8	38(3)	13(1)	0(0)	50(4)
<i>Elected officials</i>	12	42(5)	17(2)	0(0)	42(5)
<i>Extension agents</i>	17	82(14)	6(1)	6(1)	6(1)
<b>TOTAL</b>	<b>40</b>	<b>58(23)</b>	<b>10(4)</b>	<b>3(1)</b>	<b>30(12)</b>
<b>Administrative</b>					
<i>Administrative officials</i>	19	84(16)	5(1)	5(1)	5(1)
<i>Animal Control</i>	13	31(4)	23(3)	0(0)	46(6)
<i>Elected officials</i>	16	44(7)	31(5)	0(0)	25(4)
<i>Extension agents</i>	7	43(3)	29(2)	0(0)	29(2)
<b>TOTAL</b>	<b>55</b>	<b>55(30)</b>	<b>20(11)</b>	<b>2(1)</b>	<b>24(13)</b>
<b>Parks and Recreation</b>					
<i>Administrative officials</i>	4	100(4)	0(0)	0(0)	0(0)
<i>Animal Control</i>	6	33(2)	17(1)	0(0)	50(3)
<i>Elected officials</i>	9	22(2)	22(2)	0(0)	56(5)
<i>Extension agents</i>	3	33(1)	0(0)	0(0)	67(2)
<b>TOTAL</b>	<b>22</b>	<b>41(9)</b>	<b>14(3)</b>	<b>0(0)</b>	<b>45(10)</b>
<b>Public Works</b>					
<i>Administrative officials</i>	5	80(4)	20(1)	0(0)	0(0)
<i>Animal Control</i>	8	13(1)	13(1)	0(0)	75(6)
<i>Elected officials</i>	10	20(2)	30(3)	0(0)	50(5)
<i>Extension agents</i>	3	33(1)	0(0)	0(0)	67(2)
<b>TOTAL</b>	<b>26</b>	<b>31(8)</b>	<b>19(5)</b>	<b>0(0)</b>	<b>50(13)</b>

<sup>a</sup> Based on scaled responses: 1=Paper, 2=Electronic, 3=Other, 4=Don't Know

**Table 3. 20. Relationships between respondent subpopulation and opinion about local government's response to wildlife complaints, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
Referred to another local government office							39.851	9	<0.0005
<i>Administrative officials</i>	125	15(19)	23(29)	40(50)	22(27)	2.7			
<i>Animal Control</i>	95	29(28)	28(27)	35(33)	7(7)	2.7			
<i>Elected officials</i>	101	8(8)	20(20)	42(42)	31(31)	2.3			
<i>Extension agents</i>	59	7(4)	34(20)	47(28)	12(7)	2.8			
TOTAL	380	16(59)	25(96)	40(153)	19(72)				
Referred to government agency outside local government							28.761	9	0.001
<i>Administrative officials</i>	123	12(15)	28(34)	39(48)	21(26)	2.7			
<i>Animal Control</i>	95	7(7)	25(24)	56(53)	12(11)	2.7			
<i>Elected officials</i>	94	24(23)	31(29)	34(32)	11(10)	2.3			
<i>Extension agents</i>	59	3(2)	27(16)	54(32)	15(9)	2.8			
TOTAL	371	13(47)	28(103)	44(165)	15(56)				
Referred to private sector provider							45.457	9	<0.0005
<i>Administrative officials</i>	123	55(68)	30(37)	11(14)	3(4)	1.6			
<i>Animal Control</i>	95	24(23)	25(24)	39(37)	12(11)	2.4			
<i>Elected officials</i>	90	54(49)	24(22)	19(17)	2(2)	1.7			
<i>Extension agents</i>	58	24(14)	45(26)	28(16)	3(2)	2.1			
TOTAL	366	42(154)	30(109)	23(84)	5(19)				
Provided advice or sources of self-help information							106.466	9	<0.0005
<i>Administrative officials</i>	122	21(26)	25(31)	43(52)	11(13)	2.4			
<i>Animal Control</i>	96	3(3)	9(9)	50(48)	38(36)	3.2			
<i>Elected officials</i>	92	24(22)	20(18)	48(44)	9(8)	2.4			
<i>Extension agents</i>	60	3(2)	3(2)	30(18)	63(38)	3.5			
TOTAL	370	14(53)	16(60)	44(162)	26(95)				
On-site consultation							67.069	9	<0.0005
<i>Administrative officials</i>	111	37(41)	22(24)	35(39)	6(7)	2.1			
<i>Animal Control</i>	95	14(13)	18(17)	39(37)	29(28)	2.8			
<i>Elected officials</i>	91	38(35)	22(20)	33(30)	7(6)	2.1			
<i>Extension agents</i>	59	12(7)	54(32)	31(18)	3(2)	2.3			
TOTAL	356	27(96)	26(93)	35(124)	12(43)				

<sup>a</sup> Means based on scaled responses: 1=Never, 2=Very Infrequently, 3=Occasionally, 4=Very Frequently

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 20. continued**

Question	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
No response							19.486	9	0.021
<i>Administrative officials</i>	119	76(91)	18(21)	4(5)	2(2)	1.3			
<i>Animal Control</i>	91	82(75)	12(11)	2(2)	3(3)	1.3			
<i>Elected officials</i>	88	65(57)	23(20)	11(10)	1(1)	1.5			
<i>Extension agents</i>	57	88(50)	11(6)	2(1)	0(0)	1.3			
TOTAL	355	77(273)	16(58)	5(18)	2(6)				

<sup>a</sup> Means based on scaled responses: 1=Never, 2=Very Infrequently, 3=Occasionally, 4=Very Frequently

<sup>b</sup> Log-likelihood ratio test statistic



**Table 3. 21. Relationship between respondent subpopulation and knowledge of GIS capabilities in the community, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Is GIS technology currently being used by your local government?						43.427	6	<0.0005
<i>Administrative officials</i>	139	70(97)	24(34)	6(8)	1.4			
<i>Animal Control</i>	96	57(55)	14(13)	29(28)	1.7			
<i>Elected officials</i>	173	58(101)	18(32)	23(40)	1.7			
<i>Extension agents</i>	76	74(56)	4(3)	22(17)	1.5			
TOTAL	484	64(309)	17(82)	19(93)				

<sup>a</sup> Means based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 22. Relationship between respondent subpopulation and opinion about anticipated timeframe for beginning GIS use in the community, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	Median	G <sup>b</sup>	df	p-value
		1	2	3	4					
GIS implementation timeframe								8.942	9	0.443
<i>Administrative officials</i>	33	3(1)	12(4)	33(11)	52(17)	3.3	4			
<i>Animal Control</i>	14	7(1)	7(1)	14(2)	71(10)	3.5	4			
<i>Elected officials</i>	32	0(0)	3(1)	19(6)	78(25)	3.8	4			
<i>Extension agents</i>	3	0(0)	0(0)	33(1)	67(2)	3.5	4			
TOTAL	82	2(2)	7(6)	24(20)	66(54)					

<sup>a</sup> Means based on scaled responses: 1=Within 6 months, 2=Within 6 months to 1 year, 3=Within 1 to 5 years, 4=Not in foreseeable future

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 23. Relationships between respondent subpopulation and opinion about perceived benefits of GIS, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Visual presentation of descriptive characteristics						25.653	6	<0.0005
<i>Administrative officials</i>	136	27(37)	49(67)	24(32)	2.0			
<i>Animal Control</i>	91	7(6)	62(56)	32(29)	2.3			
<i>Elected officials</i>	168	17(29)	53(89)	30(50)	2.1			
<i>Extension agents</i>	76	7(5)	66(50)	28(21)	2.2			
TOTAL	471	16(77)	56(262)	28(132)				
Tracking severity over time						18.628	6	0.005
<i>Administrative officials</i>	136	23(31)	46(62)	32(43)	2.1			
<i>Animal Control</i>	90	10(9)	44(40)	46(41)	2.4			
<i>Elected officials</i>	168	13(22)	52(88)	35(58)	2.2			
<i>Extension agents</i>	76	5(4)	49(37)	46(35)	2.4			
TOTAL	470	14(66)	48(227)	38(177)				
Using descriptive land use patterns to explain human-wildlife conflict patterns						21.828	6	0.001
<i>Administrative officials</i>	136	26(35)	48(65)	26(36)	2.0			
<i>Animal Control</i>	90	7(6)	53(48)	40(36)	2.3			
<i>Elected officials</i>	168	18(30)	51(85)	32(53)	2.1			
<i>Extension agents</i>	76	9(7)	47(36)	43(33)	2.3			
TOTAL	470	17(78)	50(234)	34(158)				
Using patterns to predict future conflicts						15.744	6	0.015
<i>Administrative officials</i>	136	27(37)	51(70)	21(29)	1.9			
<i>Animal Control</i>	90	13(12)	50(45)	37(33)	2.2			
<i>Elected officials</i>	166	15(25)	55(91)	30(50)	2.2			
<i>Extension agents</i>	76	13(10)	49(37)	38(29)	2.3			
TOTAL	468	18(84)	52(243)	30(141)				

<sup>a</sup> Means based on scaled responses: 1=Not beneficial, 2=Somewhat beneficial, 3=Very beneficial

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 24. Relationships between respondent subpopulation and opinion about expected community response to human-wildlife conflicts, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Local government plays an important decision-making role in managing human-wildlife interactions								21.081	12	0.049
<i>Administrative officials</i>	140	6(8)	48(67)	27(38)	16(23)	3(4)	2.6			
<i>Animal Control</i>	97	13(13)	44(43)	13(13)	22(21)	7(7)	2.7			
<i>Elected officials</i>	174	7(13)	50(87)	25(44)	13(22)	5(8)	2.6			
<i>Extension agents</i>	76	11(8)	57(43)	22(17)	8(6)	3(2)	2.4			
TOTAL	487	9(42)	49(240)	23(112)	15(72)	4(21)				
Residents expect that local government will provide services to help resolve human-wildlife interactions								49.319	12	<0.0005
<i>Administrative officials</i>	141	13(19)	57(80)	15(21)	13(19)	1(2)	2.3			
<i>Animal Control</i>	98	41(40)	52(51)	4(4)	2(2)	1(1)	1.7			
<i>Elected officials</i>	174	12(21)	59(103)	14(25)	12(21)	2(4)	2.3			
<i>Extension agents</i>	76	16(12)	62(47)	14(11)	7(5)	1(1)	2.2			
TOTAL	489	19(92)	57(281)	12(61)	10(47)	2(8)				
Budget and staff shortages limit local government's ability to manage human-wildlife interactions								16.093	12	0.187
<i>Administrative officials</i>	141	32(45)	44(62)	18(26)	4(5)	2(3)	2.0			
<i>Animal Control</i>	98	33(32)	53(52)	9(9)	3(3)	2(2)	1.9			
<i>Elected officials</i>	174	25(44)	50(87)	16(27)	6(11)	3(5)	2.1			
<i>Extension agents</i>	76	20(15)	61(46)	16(12)	4(3)	0(0)	2.0			
TOTAL	489	28(136)	51(247)	15(74)	4(22)	2(10)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 24. continued**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Local governments must play a central decision-making role								42.564	12	<0.0005
<i>Administrative officials</i>	136	8(11)	54(73)	29(40)	9(12)	0(0)	2.4			
<i>Animal Control</i>	96	23(22)	46(44)	18(17)	8(8)	5(5)	2.3			
<i>Elected officials</i>	173	22(38)	54(94)	16(27)	6(10)	2(4)	2.1			
<i>Extension agents</i>	74	8(6)	70(52)	13(10)	8(6)	0(0)	2.2			
TOTAL	479	16(77)	55(263)	20(94)	8(36)	2(9)				
Local governments should assume leadership								30.568	12	0.002
<i>Administrative officials</i>	138	7(9)	38(53)	33(46)	16(22)	6(8)	2.8			
<i>Animal Control</i>	96	9(9)	44(42)	23(22)	15(14)	9(9)	2.7			
<i>Elected officials</i>	173	15(26)	42(72)	27(46)	13(23)	3(6)	2.5			
<i>Extension agents</i>	74	5(4)	61(45)	27(20)	7(5)	0(0)	2.4			
TOTAL	481	10(48)	44(212)	28(134)	13(64)	5(23)				
Local governments should not take on additional responsibilities without additional resources								29.631	12	0.003
<i>Administrative officials</i>	138	41(57)	36(50)	15(21)	5(7)	2(3)	1.9			
<i>Animal Control</i>	96	46(44)	38(36)	9(9)	4(4)	3(3)	1.8			
<i>Elected officials</i>	172	32(55)	43(74)	14(25)	9(15)	2(3)	2.1			
<i>Extension agents</i>	74	16(12)	50(37)	22(16)	12(9)	0(0)	2.3			
TOTAL	480	35(168)	41(197)	15(71)	7(35)	2(9)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 25. Relationships between respondent subpopulation and opinion about the perceived level of contribution various organizations provide to the long-term resolution of human-wildlife conflicts, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Contributing Agency	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
Virginia Department of Game and Inland Fisheries							63.238	9	<0.0005
<i>Administrative officials</i>	138	1(2)	12(16)	41(57)	46(63)	3.3			
<i>Animal Control</i>	97	10(10)	37(36)	33(32)	20(19)	2.6			
<i>Elected officials</i>	169	2(3)	10(17)	34(58)	54(91)	3.4			
<i>Extension agents</i>	75	1(1)	12(9)	33(25)	53(40)	3.4			
TOTAL	479	3(16)	16(78)	36(172)	44(213)				
US Fish and Wildlife Service							43.350	9	<0.0005
<i>Administrative officials</i>	137	3(4)	28(38)	45(61)	25(34)	2.9			
<i>Animal Control</i>	93	17(16)	40(37)	28(26)	15(14)	2.4			
<i>Elected officials</i>	169	4(7)	18(31)	44(75)	33(56)	3.1			
<i>Extension agents</i>	75	7(5)	21(16)	52(39)	20(15)	2.9			
TOTAL	474	7(32)	26(122)	42(201)	25(119)				
USDA-Animal and Plant Health Inspection Service- Wildlife Services							17.544	9	0.041
<i>Administrative officials</i>	136	6(8)	46(62)	35(48)	13(18)	2.6			
<i>Animal Control</i>	94	18(17)	41(39)	30(28)	11(10)	2.3			
<i>Elected officials</i>	167	9(15)	42(70)	38(64)	11(18)	2.5			
<i>Extension agents</i>	75	12(9)	27(20)	44(33)	17(13)	2.7			
TOTAL	472	10(49)	40(191)	37(173)	13(59)				
Virginia Cooperative Extension							28.309	9	0.001
<i>Administrative officials</i>	135	13(17)	39(52)	39(52)	10(14)	2.5			
<i>Animal Control</i>	93	16(15)	48(45)	30(28)	5(5)	2.3			
<i>Elected officials</i>	167	9(15)	37(62)	40(67)	14(23)	2.6			
<i>Extension agents</i>	75	1(1)	37(28)	56(42)	5(4)	2.7			
TOTAL	470	10(48)	40(187)	40(189)	10(46)				
Private wildlife control operators							5.601	9	0.779
<i>Administrative officials</i>	134	16(22)	43(58)	34(46)	6(8)	2.3			
<i>Animal Control</i>	95	17(16)	37(35)	39(37)	7(7)	2.4			
<i>Elected officials</i>	168	15(25)	40(68)	38(64)	7(11)	2.4			
<i>Extension agents</i>	75	9(7)	41(31)	37(28)	12(9)	2.5			
TOTAL	472	15(70)	41(192)	37(175)	7(35)				

<sup>a</sup> Means based on scaled responses: 1=None, 2=Low, 3=Moderate, 4=High

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 26. Relationships between respondent subpopulation and opinion of local government's needs to manage human-wildlife conflicts, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Local governments need technical assistance								20.451	12	0.059
<i>Administrative officials</i>	138	25(34)	59(81)	14(19)	2(3)	1(1)	2.0			
<i>Animal Control</i>	96	22(21)	52(50)	19(18)	6(6)	1(1)	2.1			
<i>Elected officials</i>	172	22(38)	59(101)	15(25)	3(6)	1(2)	2.0			
<i>Extension agents</i>	74	30(22)	66(49)	4(3)	0(0)	0(0)	1.7			
TOTAL	480	24(115)	59(281)	14(65)	3(15)	1(4)				
Local governments need financial assistance								21.674	12	0.041
<i>Administrative officials</i>	138	32(44)	49(67)	16(22)	3(4)	1(1)	1.9			
<i>Animal Control</i>	96	40(38)	50(48)	5(5)	3(3)	2(2)	1.8			
<i>Elected officials</i>	171	38(65)	46(79)	13(23)	1(2)	1(2)	1.8			
<i>Extension agents</i>	74	19(14)	62(46)	16(12)	3(2)	0(0)	2.0			
TOTAL	479	34(161)	50(240)	13(62)	2(11)	1(5)				
Local governments do not have legislative authority								22.207	12	0.035
<i>Administrative officials</i>	137	17(23)	30(41)	36(49)	18(24)	0(0)	2.5			
<i>Animal Control</i>	96	22(21)	24(23)	36(35)	14(13)	4(4)	2.5			
<i>Elected officials</i>	172	22(37)	31(54)	34(58)	12(21)	1(2)	2.4			
<i>Extension agents</i>	73	8(6)	29(21)	49(36)	14(10)	0(0)	2.7			
TOTAL	478	18(87)	29(139)	37(178)	14(68)	1(6)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 27. Relationships between respondent subpopulation and opinion on the importance of factors that could affect one's decision to participate in co-management, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Insufficient expertise/training								32.810	12	0.001
<i>Administrative officials</i>	138	4(5)	13(18)	11(15)	36(50)	36(50)	3.9			
<i>Animal Control</i>	96	6(6)	3(3)	3(3)	32(31)	55(53)	4.3			
<i>Elected officials</i>	169	10(17)	4(7)	9(15)	38(64)	39(66)	3.9			
<i>Extension agents</i>	75	4(3)	4(3)	4(3)	49(37)	39(29)	4.2			
TOTAL	478	6(31)	6(31)	8(36)	38(182)	41(198)				
Insufficient budget								40.497	12	<0.0005
<i>Administrative officials</i>	139	8(11)	6(9)	8(11)	35(48)	43(60)	4.0			
<i>Animal Control</i>	96	5(5)	3(3)	2(2)	29(28)	60(58)	4.4			
<i>Elected officials</i>	169	11(19)	4(7)	7(11)	30(50)	49(82)	4.0			
<i>Extension agents</i>	75	3(2)	1(1)	17(13)	51(38)	28(21)	4.0			
TOTAL	479	8(37)	4(20)	8(37)	34(164)	46(221)				
Insufficient personnel/staff								23.197	12	0.026
<i>Administrative officials</i>	138	6(8)	5(7)	5(7)	30(42)	54(74)	4.2			
<i>Animal Control</i>	95	7(7)	0(0)	4(4)	25(24)	63(60)	4.4			
<i>Elected officials</i>	168	8(14)	6(10)	7(12)	36(60)	43(72)	4.0			
<i>Extension agents</i>	74	4(3)	3(2)	7(5)	43(32)	43(32)	4.2			
TOTAL	475	7(32)	4(19)	6(28)	33(158)	50(238)				
Lack of legislative authority								16.067	12	0.188
<i>Administrative officials</i>	137	5(7)	8(11)	20(28)	26(35)	41(56)	3.9			
<i>Animal Control</i>	96	7(7)	2(2)	13(12)	30(29)	48(46)	4.1			
<i>Elected officials</i>	169	9(16)	8(13)	12(20)	28(48)	43(72)	3.9			
<i>Extension agents</i>	75	4(3)	4(3)	16(12)	37(28)	39(29)	4.0			
TOTAL	477	7(33)	6(29)	15(72)	29(140)	43(203)				
Lack of regulatory authority								17.779	12	0.123
<i>Administrative officials</i>	137	5(7)	8(11)	20(28)	26(35)	41(56)	3.9			
<i>Animal Control</i>	96	7(7)	2(2)	10(10)	28(27)	52(50)	4.2			
<i>Elected officials</i>	169	10(17)	8(13)	12(21)	27(46)	43(72)	3.9			
<i>Extension agents</i>	75	4(3)	4(3)	13(10)	36(27)	43(32)	4.1			
TOTAL	477	7(34)	6(29)	14(69)	28(135)	44(210)				

<sup>a</sup> Means based on scaled responses: 1=Very unimportant, 2=Somewhat unimportant, 3=Neither, 4=Somewhat important, 5=Very important

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 27. continued**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Lack of public support for action								18.921	12	0.090
<i>Administrative officials</i>	138	2(3)	14(19)	20(27)	41(57)	23(32)	3.7			
<i>Animal Control</i>	96	5(5)	5(5)	19(18)	32(31)	39(37)	3.9			
<i>Elected officials</i>	169	5(9)	14(23)	20(34)	36(61)	25(42)	3.6			
<i>Extension agents</i>	75	5(4)	7(5)	15(11)	48(36)	25(19)	3.8			
TOTAL	478	4(21)	11(52)	19(90)	39(185)	27(130)				
Public opposition to specific management techniques								9.472	12	0.662
<i>Administrative officials</i>	138	4(5)	9(12)	14(20)	52(72)	21(29)	3.8			
<i>Animal Control</i>	96	3(3)	10(10)	11(11)	43(41)	32(31)	3.9			
<i>Elected officials</i>	169	6(10)	11(18)	14(24)	44(75)	25(42)	3.7			
<i>Extension agents</i>	75	3(2)	16(12)	16(12)	43(32)	23(17)	3.7			
TOTAL	478	4(20)	11(52)	14(67)	46(220)	25(119)				

<sup>a</sup> Means based on scaled responses: 1=Very unimportant, 2=Somewhat unimportant, 3=Neither, 4=Somewhat important, 5=Very important

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 28. Relationship between respondent subpopulation and knowledge about community involvement in co-management programs, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
My local government partners with state agencies to manage or resolve broad-based community issues								24.315	12	0.018
<i>Administrative officials</i>	141	6(9)	64(90)	15(21)	11(16)	4(5)	2.4			
<i>Animal Control</i>	96	5(5)	43(41)	33(32)	15(14)	4(4)	2.7			
<i>Elected officials</i>	174	9(16)	56(97)	23(40)	6(11)	6(10)	2.4			
<i>Extension agents</i>	76	7(5)	53(40)	30(23)	9(7)	1(1)	2.5			
TOTAL	487	7(35)	55(268)	24(116)	10(48)	4(20)				

<sup>a</sup> Based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic



**Table 3. 29. Relationships between respondent subpopulation and knowledge of community-based co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Agency	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Any wildlife agency						46.024	6	<0.0005
<i>Administrative officials</i>	134	11(15)	67(90)	25(34)	2.1			
<i>Animal Control</i>	97	16(16)	44(43)	39(38)	2.2			
<i>Elected officials</i>	174	14(24)	44(77)	42(73)	2.3			
<i>Extension agents</i>	75	13(10)	20(15)	67(50)	2.5			
TOTAL	485	13(65)	46(225)	40(195)				
VA Department of Transportation						89.246	6	<0.0005
<i>Administrative officials</i>	140	45(63)	30(55)	16(22)	1.7			
<i>Animal Control</i>	96	29(28)	15(14)	56(54)	2.3			
<i>Elected officials</i>	175	56(98)	15(26)	29(51)	1.7			
<i>Extension agents</i>	76	26(25)	7(5)	61(46)	2.3			
TOTAL	487	44(214)	21(100)	36(173)				
VA Department of Public Health						76.910	6	<0.0005
<i>Administrative officials</i>	140	39(54)	42(59)	19(27)	1.8			
<i>Animal Control</i>	96	55(53)	7(7)	38(36)	1.8			
<i>Elected officials</i>	175	40(70)	17(30)	43(75)	2.0			
<i>Extension agents</i>	76	29(28)	5(4)	58(44)	2.2			
TOTAL	487	42(205)	21(100)	37(182)				
VA Department of Agriculture and Consumer Services						77.388	6	<0.0005
<i>Administrative officials</i>	140	14(19)	54(76)	32(45)	2.2			
<i>Animal Control</i>	96	39(37)	14(13)	48(46)	2.1			
<i>Elected officials</i>	175	22(39)	21(36)	57(100)	2.4			
<i>Extension agents</i>	76	30(23)	12(9)	58(44)	2.3			
TOTAL	487	24(118)	28(134)	48(235)				
VA Cooperative Extension						42.451	6	<0.0005
<i>Administrative officials</i>	140	29(40)	42(59)	29(41)	2.0			
<i>Animal Control</i>	96	26(25)	20(19)	54(52)	2.3			
<i>Elected officials</i>	175	36(63)	21(36)	43(76)	2.1			
<i>Extension agents</i>	76	55(42)	20(15)	25(19)	1.7			
TOTAL	487	35(170)	26(129)	39(188)				

<sup>a</sup> Means based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 29. continued**

Agency	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
VA Department of Education						72.915	6	<0.0005
<i>Administrative officials</i>	140	19(26)	51(72)	30(42)	2.1			
<i>Animal Control</i>	96	24(23)	22(21)	54(52)	2.3			
<i>Elected officials</i>	184	32(59)	27(49)	41(76)	2.1			
<i>Extension agents</i>	76	24(18)	5(4)	71(54)	2.5			
TOTAL	487	26(126)	30(146)	46(224)				
VA Department of Game and Inland Fisheries						73.117	6	<0.0005
<i>Administrative officials</i>	140	30(42)	43(60)	27(38)	2.0			
<i>Animal Control</i>	95	49(47)	13(12)	38(36)	1.9			
<i>Elected officials</i>	175	35(61)	20(35)	45(79)	2.1			
<i>Extension agents</i>	76	22(17)	5(4)	72(55)	2.5			
TOTAL	486	34(167)	23(111)	43(208)				
Other agency <sup>c</sup>						17.346	6	0.008
<i>Administrative officials</i>	12	92(11)	8(1)	0(0)	1.1			
<i>Animal Control</i>	2	50(1)	50(1)	0(0)	1.5			
<i>Elected officials</i>	4	0(0)	75(3)	25(1)	2.3			
<i>Extension agents</i>	2	50(1)	0(0)	50(1)	2.0			
TOTAL	20	65(13)	25(5)	10(2)				

<sup>a</sup> Means based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

<sup>c</sup> Other includes: US Department of Agriculture, US Fish and Wildlife Service, VA Department of Corrections, VA Department of Forestry, VA Department of Taxation, VA Department of Conservation and Recreation, and county governments

**Table 3. 30. Relationships between respondent subpopulation and expressed satisfaction on cooperation within past or existing community-based co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Agency	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
VA Department of Transportation								25.172	12	0.014
<i>Administrative officials</i>	62	10(6)	0(0)	11(7)	60(37)	19(12)	3.8			
<i>Animal Control</i>	26	4(1)	12(3)	19(5)	54(14)	12(3)	3.6			
<i>Elected officials</i>	93	6(6)	5(5)	13(12)	56(52)	19(18)	3.8			
<i>Extension agents</i>	23	0(0)	0(0)	39(9)	57(13)	4(1)	3.7			
TOTAL	204	6(13)	4(8)	16(33)	56(116)	17(34)				
VA Department of Public Health								14.839	12	0.250
<i>Administrative officials</i>	54	6(3)	4(2)	15(8)	57(31)	19(10)	3.8			
<i>Animal Control</i>	53	0(0)	0(0)	15(8)	62(33)	19(10)	3.9			
<i>Elected officials</i>	67	3(2)	7(5)	13(9)	64(43)	12(8)	3.8			
<i>Extension agents</i>	24	8(2)	0(0)	29(7)	63(15)	8(2)	3.8			
TOTAL	198	4(7)	4(7)	16(32)	62(122)	15(30)				
VA Department of Agriculture and Consumer Services								9.865	12	0.628
<i>Administrative officials</i>	20	0(0)	5(1)	25(5)	55(11)	15(3)	3.8			
<i>Animal Control</i>	37	3(1)	8(3)	16(6)	59(22)	14(5)	3.7			
<i>Elected officials</i>	37	8(3)	5(2)	16(6)	62(23)	8(3)	3.6			
<i>Extension agents</i>	22	0(0)	0(0)	14(3)	68(15)	18(4)	4.1			
TOTAL	116	3(4)	5(6)	17(20)	61(71)	13(15)				
VA Cooperative Extension								39.685	12	<0.0005
<i>Administrative officials</i>	41	2(1)	5(2)	5(2)	63(26)	24(10)	4.0			
<i>Animal Control</i>	24	0(0)	0(0)	33(8)	67(16)	0(0)	3.7			
<i>Elected officials</i>	60	5(3)	3(2)	2(1)	70(42)	20(12)	4.0			
<i>Extension agents</i>	39	0(0)	0(0)	8(3)	54(21)	38(15)	4.3			
TOTAL	164	2(4)	2(4)	9(14)	64(105)	23(37)				

<sup>a</sup> Means based on scaled responses: 1=Very Unsatisfied, 2=Unsatisfied, 3=Neutral, 4=Satisfied, 5=Very Satisfied

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 30. continued**

Agency	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
VA Department of Education								13.602	12	0.327
<i>Administrative officials</i>	26	4(1)	12(3)	15(4)	62(16)	8(2)	3.6			
<i>Animal Control</i>	19	0(0)	5(1)	26(5)	63(12)	5(1)	3.7			
<i>Elected officials</i>	54	7(4)	6(3)	11(6)	65(35)	11(6)	3.7			
<i>Extension agents</i>	18	0(0)	0(0)	33(6)	50(9)	17(3)	3.8			
TOTAL	117	4(5)	6(7)	18(21)	62(72)	10(12)				
VA Department of Game and Inland Fisheries								23.767	12	0.022
<i>Administrative officials</i>	41	7(3)	0(0)	12(5)	54(22)	27(11)	3.9			
<i>Animal Control</i>	50	10(5)	16(8)	18(9)	40(20)	16(8)	3.4			
<i>Elected officials</i>	57	4(2)	4(2)	9(5)	70(40)	14(8)	3.9			
<i>Extension agents</i>	16	0(0)	6(1)	19(3)	56(9)	19(3)	3.9			
TOTAL	164	6(10)	7(11)	13(22)	55(91)	18(30)				
Other <sup>c</sup>								2.683	3	0.443
<i>Administrative officials</i>	9	11(1)	0(0)	11(1)	56(5)	22(2)	3.8			
<i>Animal Control</i>	1	0(0)	0(0)	0(0)	0(0)	100(1)	5.0			
<i>Elected officials</i>	-	-	-	-	-	-	--			
<i>Extension agents</i>	-	-	-	-	-	-	--			
TOTAL	10	10(1)	0(0)	10(1)	50(5)	30(3)				

<sup>a</sup> Means based on scaled responses: 1=Very Unsatisfied, 2=Unsatisfied, 3=Neutral, 4=Satisfied, 5=Very Satisfied

<sup>b</sup> Log-likelihood ratio test statistic

<sup>c</sup> Other includes: US Department of Agriculture, US Fish and Wildlife Service, VA Department of Corrections, VA Department of Forestry, VA Department of Taxation, VA Department of Conservation and Recreation, and county governments

**Table 3. 31. Relationships between respondent subpopulation and expressed satisfaction on outcome from existing or past community-based co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Agency	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
VA Department of Transportation								12.206	12	0.429
<i>Administrative officials</i>	62	8(5)	3(2)	15(9)	58(36)	16(10)	3.7			
<i>Animal Control</i>	27	4(1)	11(3)	19(5)	52(14)	15(4)	3.6			
<i>Elected officials</i>	92	8(7)	4(4)	17(16)	55(51)	15(14)	3.7			
<i>Extension agents</i>	22	0(0)	9(2)	36(8)	50(11)	5(1)	3.5			
TOTAL	203	6(13)	5(11)	19(38)	55(112)	14(29)				
VA Department of Public Health								12.515	12	0.405
<i>Administrative officials</i>	54	6(3)	4(2)	17(9)	59(32)	15(8)	3.7			
<i>Animal Control</i>	52	2(1)	4(2)	12(6)	65(34)	17(9)	3.9			
<i>Elected officials</i>	65	3(2)	6(4)	15(10)	65(42)	11(7)	3.7			
<i>Extension agents</i>	23	0(0)	0(0)	35(8)	61(14)	4(1)	3.7			
TOTAL	194	3(6)	4(8)	17(33)	63(122)	13(25)				
VA Department of Agriculture and Consumer Services								11.511	12	0.486
<i>Administrative officials</i>	21	0(0)	5(1)	38(8)	52(11)	5(1)	3.6			
<i>Animal Control</i>	35	6(2)	3(1)	14(5)	69(24)	9(3)	3.7			
<i>Elected officials</i>	37	8(3)	3(1)	22(8)	62(23)	5(2)	3.5			
<i>Extension agents</i>	21	0(0)	0(0)	14(3)	76(16)	10(2)	4.0			
TOTAL	114	4(5)	3(3)	21(24)	65(74)	7(8)				
VA Cooperative Extension								24.798	12	0.016
<i>Administrative officials</i>	40	0(0)	5(2)	13(5)	56(23)	25(10)	4.0			
<i>Animal Control</i>	24	0(0)	0(0)	38(9)	54(13)	8(2)	3.7			
<i>Elected officials</i>	60	5(3)	0(0)	15(9)	67(40)	13(8)	3.8			
<i>Extension agents</i>	38	0(0)	0(0)	8(3)	63(24)	29(11)	4.2			
TOTAL	162	2(3)	1(2)	16(26)	62(100)	19(31)				

<sup>a</sup> Means based on scaled responses: 1=Very Unsatisfied, 2=Unsatisfied, 3=Neutral, 4=Satisfied, 5=Very Satisfied

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 31. continued**

Agency	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
VA Department of Education								15.091	12	0.237
<i>Administrative officials</i>	25	4(1)	8(2)	24(6)	56(14)	8(2)	3.6			
<i>Animal Control</i>	19	0(0)	0(0)	42(8)	47(9)	11(2)	3.7			
<i>Elected officials</i>	54	9(5)	4(2)	15(8)	59(32)	13(7)	3.6			
<i>Extension agents</i>	16	0(0)	0(0)	38(6)	56(9)	6(1)	3.7			
TOTAL	114	5(6)	4(4)	25(28)	56(64)	11(12)				
VA Department of Game and Inland Fisheries								22.785	12	0.030
<i>Administrative officials</i>	41	7(3)	0(0)	12(5)	56(23)	24(10)	3.9			
<i>Animal Control</i>	49	8(4)	16(8)	20(10)	45(22)	10(5)	3.3			
<i>Elected officials</i>	57	4(2)	2(1)	18(10)	61(35)	16(9)	3.8			
<i>Extension agents</i>	16	0(0)	6(1)	31(5)	50(8)	13(2)	3.7			
TOTAL	163	6(9)	6(10)	18(30)	54(88)	16(26)				
Other <sup>c</sup>								9.870	8	0.274
<i>Administrative officials</i>	10	20(2)	0(0)	10(1)	50(5)	20(2)	3.5			
<i>Animal Control</i>	2	50(1)	0(0)	0(0)	50(1)	0(0)	2.5			
<i>Elected officials</i>	3	67(2)	33(1)	0(0)	0(0)	0(0)	1.3			
<i>Extension agents</i>	-	-	-	-	-	-	--			
TOTAL	15	33(5)	7(1)	7(1)	40(6)	13(2)				

<sup>a</sup> Means based on scaled responses: 1=Very Unsatisfied, 2=Unsatisfied, 3=Neutral, 4=Satisfied, 5=Very Satisfied

<sup>b</sup> Log-likelihood ratio test statistic

<sup>c</sup> Other includes: US Department of Agriculture, US Fish and Wildlife Service, VA Department of Corrections, VA Department of Forestry, VA Department of Taxation, VA Department of Conservation and Recreation, and county governments

**Table 3. 32. Relationships between respondent subpopulation and opinions about future community-based co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	Response N <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Shared management is a realistic way to manage human-wildlife conflicts								36.217	12	<0.0005
<i>Administrative officials</i>	138	20(28)	43(60)	26(36)	7(9)	4(5)	2.3			
<i>Animal Control</i>	94	16(15)	59(55)	16(15)	5(5)	4(4)	2.2			
<i>Elected officials</i>	169	22(38)	53(89)	18(30)	7(12)	0(0)	2.1			
<i>Extension agents</i>	75	13(10)	75(56)	11(8)	1(1)	0(0)	2.0			
TOTAL	476	19(91)	55(260)	19(89)	6(27)	2(9)				
Shared management presents local government an opportunity to manage human-wildlife conflicts								33.583	12	0.001
<i>Administrative officials</i>	138	10(14)	59(82)	25(34)	4(6)	1(2)	2.3			
<i>Animal Control</i>	94	15(14)	54(51)	21(20)	4(4)	5(5)	2.3			
<i>Elected officials</i>	170	14(24)	59(100)	21(36)	6(10)	0(0)	2.2			
<i>Extension agents</i>	75	11(8)	80(60)	9(7)	0(0)	0(0)	2.0			
TOTAL	477	13(60)	61(293)	20(97)	4(20)	1(7)				
Shared management is an attractive option for managing human-wildlife conflicts								20.086	12	0.065
<i>Administrative officials</i>	137	15(20)	47(64)	28(39)	7(10)	3(4)	2.4			
<i>Animal Control</i>	94	12(11)	48(45)	33(31)	3(3)	4(4)	2.4			
<i>Elected officials</i>	170	18(31)	42(72)	32(55)	5(9)	2(3)	2.3			
<i>Extension agents</i>	74	9(7)	65(48)	24(18)	1(1)	0(0)	2.3			
TOTAL	475	15(69)	48(229)	30(143)	5(23)	2(11)				
Budget constraints would likely limit involvement in shared management of human-wildlife conflicts								17.268	12	0.140
<i>Administrative officials</i>	137	32(44)	47(64)	12(17)	7(9)	2(3)	2.0			
<i>Animal Control</i>	95	25(24)	49(47)	18(17)	4(4)	3(3)	2.1			
<i>Elected officials</i>	171	25(42)	53(90)	19(32)	3(5)	1(1)	2.0			
<i>Extension agents</i>	74	18(13)	54(40)	19(14)	9(7)	0(0)	2.2			
TOTAL	476	26(123)	51(241)	17(80)	5(25)	1(7)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table 3. 32. continued**

Question	N	Response N <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Lack of staff training would likely limit involvement in shared management of human-wildlife conflicts								13.024	12	0.367
<i>Administrative officials</i>	138	20(28)	45(62)	19(26)	14(20)	1(2)	2.3			
<i>Animal Control</i>	94	21(20)	39(37)	21(20)	15(14)	3(3)	2.4			
<i>Elected officials</i>	170	16(27)	49(83)	22(38)	12(21)	1(1)	2.3			
<i>Extension agents</i>	74	11(8)	49(36)	30(22)	11(8)	0(0)	2.4			
TOTAL	476	17(83)	46(218)	22(106)	13(63)	1(6)				
Staff shortages would likely limit involvement in shared management of human-wildlife conflicts								24.461	12	0.018
<i>Administrative officials</i>	138	23(32)	51(71)	14(20)	9(13)	1(2)	2.1			
<i>Animal Control</i>	95	24(23)	43(41)	25(24)	5(5)	2(2)	2.2			
<i>Elected officials</i>	170	16(28)	55(94)	19(33)	9(15)	0(0)	2.2			
<i>Extension agents</i>	73	10(7)	53(39)	32(23)	5(4)	0(0)	2.3			
TOTAL	476	19(90)	51(245)	21(100)	8(37)	1(4)				
Local government is willing to partner with other agencies to manage human-wildlife conflicts								19.240	12	0.083
<i>Administrative officials</i>	138	13(18)	49(67)	31(43)	5(7)	2(3)	2.4			
<i>Animal Control</i>	94	12(11)	41(39)	33(31)	13(12)	1(1)	2.5			
<i>Elected officials</i>	170	14(23)	49(84)	28(48)	7(12)	2(3)	2.3			
<i>Extension agents</i>	71	6(4)	46(33)	48(34)	3(2)	0(0)	2.5			
TOTAL	475	12(56)	47(223)	33(156)	7(33)	1(7)				
Local government is willing to assume responsibility for managing human-wildlife conflicts								47.612	12	<0.0005
<i>Administrative officials</i>	138	1(1)	18(25)	41(57)	28(39)	12(16)	3.3			
<i>Animal Control</i>	94	6(6)	18(17)	46(43)	17(16)	13(12)	3.1			
<i>Elected officials</i>	170	7(12)	28(47)	41(69)	19(33)	5(9)	2.9			
<i>Extension agents</i>	73	0(0)	16(12)	62(45)	22(16)	0(0)	3.1			
TOTAL	475	4(19)	21(101)	45(214)	22(104)	8(37)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic



## **APPENDIX A: Demographic Comparisons**

**Table A. 1. Significant relationships between demographic characteristics and respondents' opinion of which species groups belonged in the definition of wildlife, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Species group <i>Demographic characteristic</i>	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	s <sup>b</sup>	G <sup>c</sup>	Df	p-value
		1	2	3					
Mammals									
<b>Age</b>							23.118	4	<0.0005
18-34	51	98(50)	2(1)	0(0)	1.0	0.14			
35-64	358	96(345)	1(4)	3(9)	1.1	0.33			
Over 65	73	81(59)	8(6)	11(8)	1.3	0.66			
TOTAL	482	94(454)	2(11)	4(17)					
<b>Community Description</b>							11.059	4	0.026
Rural	328	92(302)	3(11)	5(15)	1.1	0.45			
Suburban	94	97(91)	1(1)	2(2)	1.1	0.31			
Urban	60	100(60)	0(0)	0(0)	1.0	0.00			
TOTAL	482	94(453)	2(12)	4(17)					
<b>Community Size</b>							9.447	4	0.051
Over 100,000	51	100(51)	0(0)	0(0)	1.0	0.00			
10,000 to 100,000	228	95(217)	2(5)	3(6)	1.1	0.35			
Less than 10,000	206	91(188)	3(7)	5(11)	1.1	0.48			
TOTAL	485	94(456)	2(12)	4(17)					
<b>Length in current position</b>							9.463	4	0.051
Less than 5 years	224	97(218)	1(3)	1(3)	1.0	0.26			
5 to 20 years	211	92(194)	4(8)	4(9)	1.1	0.44			
Over 20 years	50	90(45)	2(1)	8(4)	1.2	0.56			
TOTAL	485	94(457)	2(12)	3(16)					
<b>Length of career</b>							8.032	4	0.090
Less than 5 years	104	97(101)	1(1)	2(2)	1.1	0.29			
5 to 20 years	229	95(218)	3(6)	2(5)	1.1	0.33			
Over 20 years	135	90(122)	2(3)	7(10)	1.2	0.54			
TOTAL	468	94(441)	2(10)	4(17)					

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Standard deviation

<sup>c</sup> Log-likelihood ratio test statistic

**Table A. 1. continued**

Species group <i>Demographic characteristic</i>	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	s <sup>b</sup>	G <sup>c</sup>	df	p-value
		1	2	3					
Reptiles									
<b>Age</b>							9.283	4	0.054
18-34	51	90(46)	6(3)	4(2)	1.1	0.45			
35-64	358	96(342)	4(14)	1(2)	1.1	0.24			
Over 65	73	90(66)	4(3)	5(4)	1.2	0.49			
TOTAL	482	94(454)	4(20)	2(8)					
<b>Length in current position</b>							8.115	4	0.087
Less than 5 years	224	95(212)	4(10)	1(2)	1.2	0.28			
5 to 20 years	211	94(199)	3(6)	3(6)	1.1	0.37			
Over 20 years	50	90(45)	10(5)	0(0)	1.1	0.30			
TOTAL	485	94(456)	4(21)	2(8)					
Amphibians									
<b>Age</b>							9.859	4	0.043
18-34	51	84(43)	10(5)	6(3)	1.2	0.54			
35-64	353	89(314)	8(30)	3(9)	1.3	0.41			
Over 65	71	83(59)	6(4)	11(8)	1.3	0.66			
TOTAL	475	88(416)	8(39)	4(20)					
Fish									
<b>Gender</b>							7.178	2	0.028
Male	378	79(297)	19(70)	3(11)	1.2	0.49			
Female	97	90(87)	8(8)	2(2)	1.1	0.39			
TOTAL	475	81(384)	16(78)	3(13)					

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Standard deviation

<sup>c</sup> Log-likelihood ratio test statistic

**Table A. 1. continued**

Species group <i>Demographic characteristic</i>	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	s <sup>b</sup>	G <sup>c</sup>	Df	p-value
		1	2	3					
Insects									
<b>Gender</b>							4.987	2	0.083
Male	379	45(171)	44(168)	11(40)	1.7	0.66			
Female	95	58(55)	34(32)	8(8)	1.5	0.65			
TOTAL	474	48(226)	42(200)	10(48)					
<b>Age</b>							11.966	4	0.018
18-34	51	45(23)	47(24)	8(4)	1.6	0.63			
35-64	355	50(176)	43(151)	8(28)	1.1	0.63			
Over 65	72	39(28)	39(28)	22(16)	1.8	0.77			
TOTAL	478	47(227)	42(203)	10(48)					
Mollusks									
<b>Gender</b>							4.821	2	0.090
Male	380	50(190)	29(110)	21(80)	1.7	0.79			
Female	95	61(58)	19(18)	20(19)	1.6	0.81			
TOTAL	475	52(248)	27(128)	21(99)					
<b>Age</b>							14.867	4	0.005
18-34	51	40(25)	31(16)	20(10)	1.7	0.78			
35-64	355	54(193)	28(100)	17(62)	1.6	0.76			
Over 65	73	42(31)	19(14)	38(28)	2.0	0.90			
TOTAL	479	52(249)	27(130)	21(100)					

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Standard deviation

<sup>c</sup> Log-likelihood ratio test statistic

**Table A. 2. Significant relationships between demographic characteristics and response to knowledge questions, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
The term "wildlife" includes domesticated animals, such as household pets or livestock animals										
<b>Community Size</b>								26.985	8	0.001
Over 100,000	50	0(0)	4(2)	0(0)	34(17)	62(31)	4.5			
10,000 to 100,000	228	1(3)	3(6)	1(3)	33(76)	61(140)	4.5			
Less than 10,000	206	1(3)	3(6)	7(14)	46(95)	43(88)	4.3			
TOTAL	484	1(6)	3(14)	4(17)	39(188)	54(259)				
<b>Length in current position</b>								14.919	8	0.061
Less than 5 years	223	2(4)	4(8)	4(10)	43(95)	48(106)	4.3			
5-20 years	210	1(1)	3(6)	3(6)	35(73)	59(124)	4.5			
Over 20 years	51	2(1)	0(0)	0(0)	35(18)	63(32)	4.6			
TOTAL	484	1(6)	3(14)	3(16)	38(186)	54(262)				
Feral animals, like dogs, cats, or pigs that have been turned loose or abandoned, are considered wildlife										
<b>Age</b>								15.081	8	0.058
18-34	50	0(0)	20(10)	18(9)	34(17)	28(14)	3.7			
35-64	358	5(19)	27(98)	12(44)	29(104)	26(93)	3.4			
Over 65	74	8(6)	31(23)	11(8)	36(27)	14(10)	3.2			
TOTAL	482	5(25)	27(131)	13(61)	31(148)	24(117)				
<b>Community Size</b>								18.768	8	0.016
Over 100,000	50	0(0)	26(13)	10(5)	36(18)	28(14)	3.7			
10,000 to 100,000	229	4(10)	25(57)	12(27)	29(66)	30(69)	3.6			
Less than 10,000	206	7(15)	31(63)	14(28)	32(66)	17(34)	3.2			
TOTAL	485	5(25)	27(133)	12(60)	31(150)	24(117)				

<sup>a</sup> Based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 2. continued**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Feral animals, like dogs, cats, or pigs that have been turned loose or abandoned, are considered wildlife										
<hr/>										
<b>Demographic characteristic</b>										
<b>Length in current position</b>								14.220	8	0.076
Less than 5 years	223	8(17)	29(65)	13(28)	30(67)	21(46)	3.3			
5-20 years	211	4(8)	26(54)	13(28)	31(65)	27(56)	2.8			
Over 20 years	51	0(0)	27(14)	6(3)	35(18)	31(16)	3.7			
TOTAL	485	5(25)	27(133)	12(59)	31(150)	24(118)				
<hr/>										
The term "human-wildlife interaction" always refers to a negative situation										
<b>Age</b>								15.850	8	0.045
18-34	51	0(0)	2(1)	22(11)	45(23)	31(16)	4.1			
35-64	355	1(3)	8(29)	13(45)	54(190)	25(88)	3.9			
Over 65	73	3(2)	10(7)	25(18)	41(30)	22(16)	3.7			
TOTAL	479	1(5)	8(37)	15(74)	51(243)	25(120)				
<hr/>										
<b>Length of career</b>								19.717	8	0.011
Less than 5 years	102	1(1)	3(4)	17(17)	54(55)	25(25)	4.0			
5 to 20 years	227	1(1)	5(12)	19(44)	46(104)	29(66)	4.0			
Over 20 years	136	1(2)	14(19)	12(16)	54(74)	18(25)	3.7			
TOTAL	465	1(4)	8(35)	17(77)	50(233)	25(116)				

<sup>a</sup> Based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 3. Significant relationships between demographic characteristics and self-reported knowledge of wildlife complaints in their community during FY2007, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Local government received wildlife complaints in most recent fiscal year (i.e., 7/1/06 to 6/30/07)								
<b>Age</b>						24.994	4	<0.0005
18-34	51	69(35)	4(2)	27(14)	1.6			
35-64	355	82(291)	11(40)	7(24)	1.3			
Over 65	71	68(48)	21(15)	11(8)	1.4			
TOTAL	477	78(374)	12(57)	10(46)				
<b>Community description</b>						11.968	4	0.018
Rural	327	75(245)	14(47)	11(35)	1.4			
Suburban	92	87(80)	5(5)	8(7)	1.2			
Urban	58	88(51)	9(5)	3(2)	1.2			
TOTAL	477	79(376)	12(57)	9(44)				
<b>Community size</b>						37.787	4	<0.0005
Over 100,000	51	86(44)	2(1)	12(6)	1.3			
10,000 to 100,000	226	87(196)	5(12)	8(18)	1.2			
Less than 10,000	203	67(137)	22(45)	10(21)	1.4			
TOTAL	480	79(377)	12(58)	9(45)				
<b>Length in current position</b>						15.364	4	0.004
Less than 5 years	220	73(160)	13(28)	15(32)	1.4			
5 to 20 years	210	81(171)	12(26)	6(13)	1.2			
Over 20 years	51	88(45)	10(5)	2(1)	1.1			
TOTAL	481	78(376)	12(59)	10(46)				
<b>Length of career</b>						39.190	4	<0.0005
Less than 5 years	102	62(63)	13(13)	25(26)	1.6			
5 to 20 years	226	83(187)	13(30)	4(9)	1.2			
Over 20 years	134	87(116)	9(12)	4(6)	1.2			
TOTAL	462	79(366)	12(55)	9(41)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 4. Significant relationships between demographic characteristics and self-reported knowledge of wildlife complaints in their community during FY2005 and 2006, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	Demographic characteristic	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
			1	2	3				
Local government received wildlife complaints in previous two fiscal years (i.e., FY 2005 and FY2006)	<b>Gender</b>						4.683	2	0.096
	Male	373	80(298)	9(32)	12(43)	1.3			
	Female	99	72(71)	8(8)	20(20)	1.5			
	TOTAL	472	78(369)	8(40)	13(63)				
	<b>Age</b>						24.184	4	<0.0005
	18-34	51	63(32)	6(3)	31(16)	1.7			
	35-64	353	83(293)	7(26)	10(34)	1.3			
	Over 65	71	65(46)	17(12)	18(13)	1.5			
	TOTAL	475	78(371)	9(41)	13(63)				
	<b>Community description</b>						13.404	4	0.009
	Rural	325	74(241)	10(34)	15(50)	1.4			
	Suburban	92	90(83)	4(4)	5(5)	1.2			
	Urban	58	83(48)	9(5)	9(5)	1.3			
	TOTAL	475	78(372)	9(43)	13(60)				
	<b>Community size</b>						32.724	4	<0.0005
	Over 100,000	51	86(44)	2(1)	12(6)	1.3			
	10,000 to 100,000	224	87(194)	4(9)	9(21)	1.2			
	Less than 10,000	203	67(135)	16(33)	17(35)	1.5			
	TOTAL	478	78(373)	9(43)	13(62)				
	<b>Length in current position</b>						23.323	4	<0.0005
	Less than 5 years	219	71(155)	9(19)	21(45)	1.5			
	5 to 20 years	209	84(175)	10(20)	7(14)	1.2			
	Over 20 years	50	88(44)	8(4)	4(2)	1.2			
	TOTAL	478	78(374)	9(43)	13(61)				
	<b>Length of career</b>						45.723	4	<0.0005
	Less than 5 years	101	56(57)	11(11)	33(33)	1.8			
	5 to 20 years	227	85(194)	9(20)	6(13)	1.2			
	Over 20 years	132	85(112)	8(10)	8(10)	1.2			
	TOTAL	460	79(363)	9(41)	12(56)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic



**Table A. 5. Significant relationships between demographic characteristics and reported frequency of wildlife complaints received during FY2007 and FY2005 and 2006, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008**

Question <i>Demographic characteristic</i>	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Frequency of wildlife complaints in FY2007										
<b>Age</b>								13.889	8	0.085
18-34	35	3(1)	6(2)	46(16)	23(8)	23(8)	3.6			
35-64	290	9(27)	12(36)	33(96)	28(80)	18(51)	3.3			
Over 65	48	4(2)	2(1)	33(16)	35(17)	25(12)	3.8			
TOTAL	373	8(30)	10(39)	34(128)	28(105)	19(71)				
-----										
<b>Community description</b>								39.601	8	<0.0005
Rural	244	3(8)	8(20)	34(84)	32(78)	22(54)	3.6			
Suburban	80	19(15)	19(15)	28(22)	23(18)	13(10)	2.9			
Urban	51	18(9)	8(4)	45(23)	20(10)	10(5)	3.0			
TOTAL	375	9(32)	10(39)	34(129)	28(106)	18(69)				
-----										
<b>Community size</b>								83.182	8	<0.0005
Over 100,000	44	36(16)	16(7)	34(15)	7(3)	7(3)	2.3			
10,000 to 100,000	196	7(14)	12(24)	40(78)	30(59)	11(21)	3.3			
Less than 10,000	136	1(2)	5(7)	26(36)	32(44)	35(47)	3.9			
TOTAL	376	9(32)	10(38)	34(129)	28(106)	19(71)				
-----										
Frequency of wildlife complaints in FY2005 and FY2006										
<b>Community description</b>								35.813	8	<0.0005
Rural	241	3(7)	7(18)	32(78)	32(77)	25(61)	3.7			
Suburban	83	14(12)	19(16)	31(26)	17(14)	18(15)	3.1			
Urban	48	17(8)	17(8)	33(16)	17(8)	17(8)	3.0			
TOTAL	372	7(27)	11(42)	32(120)	27(99)	23(84)				
-----										
<b>Community size</b>								100.793	8	<0.0005
Over 100,000	44	34(15)	25(11)	24(11)	7(3)	9(4)	2.3			
10,000 to 100,000	195	5(10)	13(26)	38(75)	31(60)	12(24)	3.3			
Less than 10,000	134	1(2)	3(4)	25(34)	28(37)	43(57)	4.1			
TOTAL	373	7(27)	11(41)	32(120)	27(100)	23(85)				

<sup>a</sup> Based on scaled responses: 1=Very Frequently, 2=Frequently, 3=Occasionally, 4=Infrequently, 5=Very Infrequently

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 6. Significant relationships between demographic characteristics and self-reported impression of severity of wildlife complaints received during FY2007 and FY2005 and 2006, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Severity of wildlife complaints in FY2007								
<b>Community size</b>								
Over 100,000	44	16(7)	73(32)	11(5)	2.0	8.179	4	0.085
10,000 to 100,000	193	25(48)	68(132)	7(13)	1.8			
Less than 10,000	135	34(46)	61(83)	4(6)	1.7			
TOTAL	372	27(101)	66(247)	6(24)				
Severity of wildlife complaints in FY2005 and FY2006								
<b>Community size</b>								
Over 100,000	44	18(8)	70(31)	11(5)	1.9	13.652	4	0.008
10,000 to 100,000	194	26(50)	69(134)	5(10)	1.8			
Less than 10,000	135	40(54)	57(77)	3(4)	1.6			
TOTAL	373	30(112)	65(242)	5(19)				

<sup>a</sup> Based on scaled responses: 1=Insignificant, 2=Moderate, 3=Severe

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 7. Significant relationships between demographic characteristics and expressed level of concern in reaction to hypothetical conflict scenarios in their community, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question <i>Demographic Characteristic</i>	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Widespread property damage								
<b><i>Length in current position</i></b>						9.005	4	0.061
Less than 5 years	223	15(33)	48(106)	38(84)	2.2			
5 to 20 years	208	15(31)	48(99)	38(78)	2.2			
Over 20 years	51	6(3)	69(35)	25(13)	2.2			
TOTAL	482	14(67)	50(240)	36(175)				
<b><i>Length of career</i></b>						15.654	4	0.004
Less than 5 years	104	13(14)	45(47)	41(43)	2.3			
5 to 20 years	225	17(38)	45(101)	38(86)	2.2			
Over 20 years	135	9(12)	64(87)	27(36)	2.2			
TOTAL	464	14(64)	51(235)	36(165)				
Human injury or fatality								
<b><i>Community description</i></b>						17.444	4	0.002
Rural	327	10(32)	44(144)	46(151)	2.4			
Suburban	93	13(12)	34(32)	53(49)	2.4			
Urban	60	10(6)	18(11)	72(43)	2.6			
TOTAL	480	10(50)	39(187)	51(243)				
Human health risk								
<b><i>Community description</i></b>						9.426	4	0.051
Rural	327	10(34)	43(142)	46(151)	2.4			
Suburban	93	10(9)	34(32)	56(52)	2.5			
Urban	60	3(2)	33(20)	63(38)	2.6			
TOTAL	480	9(45)	40(194)	50(241)				
<b><i>Community size</i></b>						17.220	4	0.002
Over 100,000	50	4(2)	30(15)	66(33)	2.6			
10,000 to 100,000	228	6(13)	43(98)	51(117)	2.5			
Less than 10,000	205	15(31)	40(82)	45(92)	2.3			
TOTAL	483	10(46)	40(195)	50(242)				

<sup>a</sup> Based on scaled responses: 1=Not concerned, 2=Somewhat concerned, 3=Very concerned

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 7. continued**

Question <i>Demographic Characteristic</i>	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Personal safety risk <i>Community description</i>						8.706	4	0.069
Rural	327	15(49)	41(134)	44(144)	2.3			
Suburban	93	20(19)	30(28)	49(46)	2.3			
Urban	60	7(4)	40(24)	53(32)	2.5			
TOTAL	480	15(72)	39(186)	46(222)				

<sup>a</sup> Based on scaled responses: 1=Not concerned, 2=Somewhat concerned, 3=Very concerned

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 8. Significant relationships between demographic characteristics and prioritization of alternative human-wildlife conflict management strategies, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	Demographic Characteristic	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
			1	2	3				
Priority of human-wildlife conflicts	<b>Age</b>						7.957	4	0.093
	18-34	50	54(27)	46(23)	0(0)	1.5			
	35-64	356	63(225)	32(113)	5(18)	1.4			
	Over 65	73	60(44)	34(25)	5(4)	1.5			
	TOTAL	479	62(296)	34(161)	5(22)				
<hr/>	<b>Community size</b>						28.366	4	<0.0005
	Over 100,000	50	36(18)	52(26)	12(6)	1.8			
	10,000 to 100,000	227	58(131)	38(86)	4(10)	1.5			
	Less than 10,000	205	73(150)	23(48)	3(7)	1.3			
	TOTAL	482	62(299)	33(160)	5(23)				
<hr/>	<b>Length of career</b>						9.624	4	0.047
	Less than 5 years	104	63(65)	33(34)	5(5)	1.4			
	5 to 20 years	226	59(133)	38(86)	3(7)	1.4			
	Over 20 years	135	65(88)	26(35)	9(12)	1.4			
	TOTAL	465	62(286)	33(155)	5(24)				
Developing comprehensive community-wide resolution program	<b>Community description</b>						9.576	4	0.048
	Rural	323	74(239)	21(67)	5(17)	1.3			
	Suburban	91	60(55)	33(30)	7(6)	1.5			
	Urban	59	63(37)	25(15)	12(7)	1.5			
	TOTAL	473	70(331)	24(112)	6(30)				
<hr/>	<b>Community size</b>						28.340	4	<0.0005
	Over 100,000	50	46(23)	38(19)	16(8)	1.7			
	10,000 to 100,000	225	66(148)	29(65)	5(12)	1.4			
	Less than 10,000	201	80(161)	14(29)	5(11)	1.3			
	TOTAL	476	70(332)	24(113)	7(31)				

<sup>a</sup> Based on scaled responses: 1=Low, 2=Moderate, 3=High

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 8. continued**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Developing single-species resolution program								
<b>Community description</b>						8.479	4	0.076
Rural	326	61(199)	31(102)	8(25)	1.5			
Suburban	91	57(52)	36(33)	7(6)	1.5			
Urban	59	42(25)	42(25)	15(9)	1.7			
TOTAL	476	58(276)	34(160)	8(40)				
Handling "brushfires" as they arise								
<b>Length in current position</b>						10.861	4	0.028
Less than 5 years	219	37(81)	56(122)	7(16)	1.7			
5 to 20 years	203	43(87)	43(87)	14(29)	1.7			
Over 20 years	49	49(24)	43(21)	8(4)	1.6			
TOTAL	471	41(192)	49(230)	10(49)				
Implementing an educational program								
<b>Gender</b>						7.398	2	0.025
Male	374	53(197)	36(135)	11(42)	1.6			
Female	94	44(41)	34(32)	22(21)	1.8			
TOTAL	468	51(238)	36(167)	13(63)				
<b>Community description</b>						8.501	4	0.075
Rural	323	53(171)	36(117)	11(35)	1.6			
Suburban	91	45(41)	40(36)	15(14)	1.7			
Urban	58	48(28)	28(16)	24(14)	1.8			
TOTAL	472	51(240)	36(169)	13(63)				
<b>Community size</b>						26.532	4	<0.0005
Over 100,000	50	28(14)	44(22)	28(14)	2.0			
10,000 to 100,000	223	47(104)	38(85)	15(34)	1.7			
Less than 10,000	202	61(124)	31(63)	7(15)	1.5			
TOTAL	475	51(242)	36(170)	13(63)				

<sup>a</sup> Based on scaled responses: 1=Low, 2=Moderate, 3=High

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 9. Significant relationships between demographic characteristics and self-reported knowledge of wildlife complaint records kept within local government, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Is an official record of wildlife complaints made in any local government office?								
<b>Community description</b>						16.704	4	0.002
Rural	259	63(164)	20(53)	16(42)	1.5			
Suburban	85	81(69)	11(9)	8(7)	1.3			
Urban	53	81(43)	6(3)	13(7)	1.3			
TOTAL	397	70(276)	16(65)	14(56)				
<b>Community Size</b>						43.746	4	<0.0005
Over 100,000	45	87(39)	4(2)	9(4)	1.2			
10,000 to 100,000	203	78(158)	8(16)	14(29)	1.4			
Less than 10,000	150	53(80)	31(47)	15(23)	1.6			
TOTAL	398	70(277)	16(65)	14(56)				
<b>Length in current position</b>						12.558	4	0.014
Less than 5 years	175	62(109)	18(32)	19(34)	1.6			
5 to 20 years	178	77(137)	15(27)	8(14)	1.3			
Over 20 years	45	73(33)	13(6)	13(6)	1.4			
TOTAL	398	70(279)	16(65)	14(54)				
<b>Length of career</b>						12.235	4	0.016
Less than 5 years	69	57(39)	16(11)	28(19)	1.7			
5 to 20 years	199	72(144)	17(34)	11(21)	1.4			
Over 20 years	119	74(88)	15(18)	11(13)	1.4			
TOTAL	387	70(271)	16(63)	14(53)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know, 4=N/A

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 9. continued**

	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Is a record made in your office?								
<b>Gender</b>						15.089	2	0.001
Male	221	48(106)	50(110)	2(5)	1.5			
Female	60	70(42)	23(14)	7(4)	1.4			
TOTAL	281	53(148)	44(124)	3(9)				
<b>Length in current position</b>						8.375	4	0.079
Less than 5 years	112	56(63)	38(42)	6(7)	1.5			
5 to 20 years	138	51(70)	48(66)	1(2)	1.5			
Over 20 years	34	53(18)	47(16)	0(0)	1.5			
TOTAL	284	53(151)	44(124)	3(9)				
<b>Length of career</b>						18.671	4	0.001
Less than 5 years	40	40(16)	48(19)	13(5)	1.7			
5 to 20 years	147	60(88)	39(57)	1(2)	1.4			
Over 20 years	89	48(43)	52(46)	0(0)	1.5			
TOTAL	276	53(147)	44(122)	3(7)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know, 4=N/A

<sup>b</sup> Log-likelihood ratio test statistic



**Table A. 10. Significant relationships between demographic characteristics and their self-reported knowledge of record keeping practices in specific local government offices, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Local Government Office	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
<b>Police</b>									
<b>Length in current position</b>							12.049	6	0.061
Less than 5 years	109	66(72)	17(18)	17(19)	0(0)	1.5			
5 to 20 years	138	57(78)	22(30)	21(29)	1(1)	1.7			
Over 20 years	33	55(18)	9(3)	30(10)	6(2)	1.9			
TOTAL	280	60(168)	18(51)	21(58)	1(3)				
<hr/>									
<b>Length of career</b>							18.516	6	0.005
Less than 5 years	38	63(24)	8(3)	29(11)	0(0)	1.7			
5 to 20 years	147	56(82)	27(39)	18(26)	0(0)	1.6			
Over 20 years	87	66(57)	10(9)	22(19)	2(2)	1.6			
TOTAL	272	60(163)	19(51)	21(56)	1(2)				
<hr/>									
<b>Animal Control</b>									
<b>Community Size</b>							35.060	6	<0.0005
Over 100,000	39	85(33)	10(4)	5(2)	0(0)	1.2			
10,000 to 100,000	163	90(146)	5(8)	5(8)	1(1)	1.2			
Less than 10,000	79	63(50)	10(8)	11(9)	15(12)	1.8			
TOTAL	281	81(229)	7(20)	7(19)	5(13)				
<hr/>									
<b>Length of career</b>							13.637	6	0.034
Less than 5 years	40	83(33)	0(0)	15(6)	3(1)	1.4			
5 to 20 years	147	82(121)	10(14)	5(7)	3(5)	1.3			
Over 20 years	88	80(70)	7(6)	7(5)	8(7)	1.4			
TOTAL	275	81(224)	7(20)	7(18)	5(13)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know, 4=N/A

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 10. continued**

Local Government Office	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
Dispatch									
<b>Gender</b>							6.586	3	0.086
Male	218	69(151)	12(26)	14(31)	5(10)	1.5			
Female	60	57(34)	15(9)	27(16)	2(1)	1.7			
TOTAL	278	67(185)	13(35)	17(47)	4(11)				
<b>Community Size</b>							16.083	6	0.013
Over 100,000	38	61(23)	16(6)	21(8)	3(1)	1.7			
10,000 to 100,000	161	70(113)	13(21)	16(26)	1(1)	1.5			
Less than 10,000	80	61(49)	11(9)	16(13)	11(9)	1.8			
TOTAL	279	66(185)	13(36)	17(47)	4(11)				
<b>Length of career</b>							11.092	6	0.086
Less than 5 years	38	55(21)	8(3)	34(13)	3(1)	1.8			
5 to 20 years	146	70(102)	13(19)	14(21)	3(4)	1.5			
Over 20 years	89	64(57)	16(14)	13(12)	7(6)	1.6			
TOTAL	273	66(180)	13(36)	17(46)	4(11)				
Cooperative Extension									
<b>Community Description</b>							14.888	6	0.021
Rural	167	18(30)	31(51)	46(76)	6(10)	2.4			
Suburban	68	4(3)	49(33)	43(29)	4(3)	2.5			
Urban	42	12(5)	29(12)	48(20)	12(5)	2.6			
TOTAL	277	14(38)	35(96)	45(125)	6(18)				
<b>Community Size</b>							15.222	6	0.019
Over 100,000	39	21(8)	38(15)	36(14)	5(2)	2.3			
10,000 to 100,000	161	17(27)	34(54)	45(73)	4(7)	2.4			
Less than 10,000	78	4(3)	35(27)	50(39)	12(9)	2.7			
TOTAL	278	14(38)	35(96)	45(126)	6(18)				
<b>Length of career</b>							20.707	6	0.002
Less than 5 years	40	28(11)	18(7)	55(22)	0(0)	2.3			
5 to 20 years	146	12(18)	40(58)	43(63)	5(7)	2.4			
Over 20 years	86	9(8)	34(29)	45(39)	12(10)	2.6			
TOTAL	272	14(37)	35(94)	46(124)	6(17)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know, 4=N/A

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 10. continued**

Local Government Office	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
Administrative									
<b>Community Description</b>							11.815	6	0.066
Rural	167	23(39)	39(65)	32(54)	5(9)	2.2			
Suburban	68	22(15)	53(36)	25(17)	0(0)	2.0			
Urban	42	14(6)	40(17)	40(17)	5(2)	2.4			
TOTAL	277	22(60)	43(118)	32(88)	4(11)				
<b>Length of career</b>							22.089	6	0.001
Less than 5 years	40	15(6)	23(9)	60(24)	3(1)	2.5			
5 to 20 years	146	19(28)	45(65)	33(48)	3(5)	2.2			
Over 20 years	86	28(24)	50(43)	19(16)	3(3)	2.0			
TOTAL	272	21(58)	43(117)	32(88)	3(9)				
Parks and Recreation									
<b>Community Description</b>							11.898	6	0.064
Rural	166	5(9)	44(73)	37(61)	14(23)	2.6			
Suburban	68	10(7)	56(38)	26(18)	7(5)	2.3			
Urban	42	17(7)	45(19)	33(14)	5(2)	2.3			
TOTAL	276	8(23)	47(130)	34(93)	11(30)				
<b>Community Size</b>							19.688	6	0.003
Over 100,000	39	23(9)	46(18)	28(11)	3(1)	2.1			
10,000 to 100,000	160	5(8)	49(78)	38(60)	9(14)	2.5			
Less than 10,000	78	8(6)	45(35)	28(22)	19(15)	2.6			
TOTAL	277	8(23)	47(131)	34(93)	11(30)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know, 4=N/A

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 10. continued**

Local Government Office	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
Public Works									
<b>Community Description</b>							20.250	6	0.002
Rural	167	7(12)	46(76)	34(57)	13(22)	2.5			
Suburban	68	7(5)	63(43)	28(19)	1(1)	2.2			
Urban	42	17(7)	40(17)	40(17)	2(1)	2.3			
TOTAL	277	9(24)	49(136)	34(93)	9(24)				
<b>Length in current position</b>							17.800	6	0.007
Less than 5 years	110	15(16)	45(49)	31(34)	10(11)	2.4			
5 to 20 years	137	6(8)	48(66)	39(54)	7(9)	2.5			
Over 20 years	33	0(0)	67(22)	21(7)	12(4)	2.5			
TOTAL	280	9(24)	49(137)	34(95)	9(24)				
<b>Length of career</b>							11.850	6	0.065
Less than 5 years	40	10(4)	40(16)	45(18)	5(2)	2.5			
5 to 20 years	146	10(14)	45(65)	37(54)	9(13)	2.5			
Over 20 years	86	7(6)	64(55)	22(19)	7(6)	2.3			
TOTAL	272	9(24)	50(136)	33(91)	8(21)				

<sup>a</sup> Based on scaled responses: 1=Yes, 2=No, 3=Don't Know, 4=N/A

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 11. Significant relationships between demographic characteristics and office response to wildlife complaints, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
Referred to another local government office							11.963	6	0.063
<b>Age</b>									
18-34	37	19(7)	30(11)	38(14)	14(5)	2.5			
35-64	296	12(49)	26(77)	40(117)	18(53)	2.6			
Over 65	44	5(2)	16(7)	48(21)	32(14)	3.1			
TOTAL	377	15(58)	25(95)	40(152)	19(72)				
Referred to government agency outside local government							13.363	6	0.038
<b>Age</b>									
18-34	37	14(5)	22(8)	38(14)	27(10)	2.8			
35-64	293	11(31)	29(85)	46(135)	14(42)	2.6			
Over 65	38	29(11)	21(8)	42(16)	8(3)	2.3			
TOTAL	368	13(47)	27(101)	45(165)	15(55)				
<b>Community Size</b>							20.279	6	0.002
Over 100,000	44	11(5)	30(13)	45(20)	14(6)	2.6			
10,000 to 100,000	187	10(18)	26(48)	54(101)	11(20)	2.7			
Less than 10,000	138	17(24)	30(41)	31(43)	22(30)	2.6			
TOTAL	369	13(47)	28(102)	44(164)	15(56)				
Referred to private sector provider							15.405	6	0.017
<b>Community Description</b>									
Rural	236	48(114)	29(68)	20(47)	3(7)	1.8			
Suburban	81	31(25)	33(27)	30(24)	6(5)	2.1			
Urban	47	32(15)	30(14)	26(12)	13(6)	2.2			
TOTAL	364	42(154)	30(109)	23(83)	5(18)				
<b>Community Size</b>							51.657	6	<0.0005
Over 100,000	44	16(7)	34(15)	43(19)	7(3)	2.4			
10,000 to 100,000	185	35(64)	31(57)	26(49)	8(15)	2.1			
Less than 10,000	135	61(83)	27(36)	11(15)	1(1)	1.5			
TOTAL	364	42(154)	30(108)	23(83)	5(19)				

<sup>a</sup> Means based on scaled responses: 1=Never, 2=Very Infrequently, 3=Occasionally, 4=Very Frequently

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 11. continued**

Question	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
Provided advice or sources of self-help information									
<b>Community Size</b>							27.281	6	<0.0005
Over 100,000	44	7(3)	14(6)	32(14)	48(21)	3.2			
10,000 to 100,000	188	13(24)	15(29)	41(78)	30(57)	2.9			
Less than 10,000	136	18(25)	18(25)	51(69)	13(17)	2.6			
TOTAL	368	14(52)	16(60)	44(161)	26(95)				
<b>Length in current position</b>							11.056	6	0.087
Less than 5 years	157	13(21)	15(23)	50(78)	22(35)	2.8			
5 to 20 years	166	16(27)	20(33)	36(59)	28(47)	2.8			
Over 20 years	45	9(4)	9(4)	53(24)	29(13)	3.0			
TOTAL	368	14(52)	16(60)	44(161)	26(95)				
On-site consultation									
<b>Community Description</b>							18.756	6	0.005
Rural	237	24(56)	34(81)	33(79)	9(21)	2.3			
Suburban	82	29(24)	22(18)	33(27)	16(13)	2.4			
Urban	45	36(16)	9(4)	38(17)	18(8)	2.4			
TOTAL	364	26(96)	28(103)	34(123)	12(42)				
No response									
<b>Community Description</b>							12.929	6	0.044
Rural	229	74(170)	17(39)	7(17)	1(3)	1.4			
Suburban	80	83(66)	14(11)	1(1)	3(2)	1.2			
Urban	44	82(36)	18(8)	0(0)	0(0)	1.2			
TOTAL	353	77(272)	16(58)	5(18)	1(5)				
<b>Length in current position</b>							11.610	6	0.071
Less than 5 years	150	77(116)	19(29)	3(5)	0(0)	1.3			
5 to 20 years	160	74(119)	16(25)	7(11)	3(5)	1.4			
Over 20 years	44	84(37)	9(4)	5(2)	2(1)	1.3			
TOTAL	354	77(272)	16(58)	5(18)	2(6)				

<sup>a</sup> Means based on scaled responses: 1=Never, 2=Very Infrequently, 3=Occasionally, 4=Very Frequently

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 12. Significant relationships between demographic characteristics and self-reported knowledge of GIS capabilities in the community, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Is GIS technology currently being used by your local government?								
<b>Age</b>						11.482	4	0.022
18-34	51	73(37)	10(5)	18(9)	1.5			
35-64	355	66(234)	17(60)	17(61)	1.5			
Over 65	73	48(35)	22(16)	30(22)	1.8			
TOTAL	479	64(306)	17(81)	19(92)				
<b>Community Size</b>						41.159	4	<0.0005
Over 100,000	51	76(39)	4(2)	20(10)	1.4			
10,000 to 100,000	226	72(162)	9(20)	19(44)	1.5			
Less than 10,000	204	52(107)	29(60)	18(37)	1.7			
TOTAL	481	64(308)	17(82)	19(91)				

<sup>a</sup> Means based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 13. Significant relationships between demographic characteristics and the anticipated timeframe for beginning GIS use in the community, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
GIS implementation timeframe									
<b>Length of career</b>							15.366	6	0.018
Less than 5 years	18	0(0)	11(2)	28(5)	61(11)	3.5			
5 to 20 years	38	3(1)	11(4)	11(4)	76(29)	3.6			
Over 20 years	22	0(0)	0(0)	50(11)	50(11)	3.5			
TOTAL	78	1(1)	8(6)	26(20)	65(51)				

<sup>a</sup> Means based on scaled responses: 1=Within 6 months, 2=Within 6 months to 1 year, 3=Within 1 to 5 years, 4=Not in foreseeable future

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 14. Significant relationships between demographic characteristics and perceived benefits of GIS, as assessed in a survey of human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Visual presentation of descriptive characteristics								
<b>Community Size</b>						33.602	4	<0.0005
Over 100,000	49	2(1)	55(27)	43(21)	2.4			
10,000 to 100,000	220	10(23)	60(131)	30(66)	2.2			
Less than 10,000	199	27(53)	51(102)	22(44)	2.0			
TOTAL	468	16(77)	56(260)	28(131)				
Tracking severity over time								
<b>Community Size</b>						34.277	4	<0.0005
Over 100,000	49	0(0)	47(23)	53(26)	2.5			
10,000 to 100,000	219	10(22)	47(102)	43(95)	2.3			
Less than 10,000	199	22(43)	51(101)	28(55)	2.1			
TOTAL	467	14(65)	48(226)	38(176)				
Using descriptive land use patterns to explain human-wildlife conflict patterns								
<b>Community Size</b>						22.091	4	<0.0005
Over 100,000	49	4(2)	47(23)	49(24)	2.5			
10,000 to 100,000	219	13(28)	50(110)	37(81)	2.2			
Less than 10,000	199	24(48)	50(99)	26(52)	2.0			
TOTAL	467	17(78)	50(232)	34(157)				
Using patterns to predict future conflicts								
<b>Community Size</b>						26.656	4	<0.0005
Over 100,000	49	6(3)	39(19)	55(27)	2.5			
10,000 to 100,000	219	15(32)	53(116)	32(71)	2.2			
Less than 10,000	197	25(49)	53(105)	22(43)	2.0			
TOTAL	465	18(84)	52(240)	30(141)				

<sup>a</sup> Means based on scaled responses: 1=Not beneficial, 2=Somewhat beneficial, 3=Very beneficial

<sup>b</sup> Log-likelihood ratio test statistic



**Table A. 15. Relationships among demographic characteristics and response to human-wildlife conflict knowledge questions, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Residents expect that local government will provide services to help resolve human-wildlife interactions										
<b>Age</b>								22.002	8	0.005
18-34	51	20(10)	51(26)	24(12)	6(3)	0(0)	2.2			
35-64	359	21(75)	58(210)	10(35)	9(32)	2(7)	2.1			
Over 65	73	7(5)	58(42)	19(14)	15(11)	1(1)	2.5			
TOTAL	483	19(90)	58(278)	13(61)	10(46)	2(8)				
<b>Community Description</b>								24.448	8	0.002
Rural	329	15(48)	57(187)	15(50)	11(37)	2(7)	2.3			
Suburban	94	30(28)	54(51)	9(8)	6(6)	1(1)	2.0			
Urban	60	25(15)	65(39)	3(2)	7(4)	0(0)	1.9			
TOTAL	483	19(91)	57(277)	12(60)	10(47)	2(8)				
<b>Community Size</b>								29.186	8	<0.0005
Over 100,000	51	37(19)	55(28)	6(3)	2(1)	0(0)	1.7			
10,000 to 100,000	229	20(46)	60(137)	11(26)	7(16)	2(4)	2.1			
Less than 10,000	206	13(26)	55(114)	16(32)	15(30)	2(4)	2.4			
TOTAL	486	19(91)	57(279)	13(61)	10(47)	2(8)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 15. continued**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Local governments must play a central decision-making role										
<b>Age</b>								17.347	8	0.027
18-34	50	8(4)	48(24)	32(16)	12(6)	0(0)	2.5			
35-64	352	16(58)	55(195)	18(64)	8(29)	2(6)	2.2			
Over 65	72	19(14)	56(40)	19(14)	1(1)	4(3)	2.2			
TOTAL	474	16(76)	55(259)	20(94)	8(36)	2(9)				
<b>Community Description</b>								17.129	8	0.029
Rural	323	16(53)	53(172)	20(63)	10(31)	1(4)	2.3			
Suburban	92	15(14)	53(49)	23(21)	5(5)	3(3)	2.3			
Urban	58	17(10)	67(39)	16(9)	0(0)	0(0)	2.0			
TOTAL	473	16(77)	55(260)	20(93)	8(36)	1(7)				
<b>Length in current position</b>								16.734	8	0.033
Less than 5 years	219	17(38)	57(125)	19(41)	7(15)	0(0)	2.2			
5 to 20 years	206	17(35)	53(110)	19(40)	7(14)	3(7)	2.3			
Over 20 years	51	8(4)	51(26)	25(13)	12(6)	4(2)	2.5			
TOTAL	476	16(77)	55(261)	20(94)	7(35)	2(9)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 15. continued**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Local governments should assume leadership										
<b>Age</b>								15.040	8	0.058
18-34	50	4(2)	46(23)	44(22)	6(3)	0(0)	2.5			
35-64	353	11(39)	44(155)	26(91)	14(49)	5(19)	2.6			
Over 65	73	10(7)	42(31)	29(21)	14(10)	5(4)	2.6			
TOTAL	476	10(48)	44(209)	28(134)	13(62)	5(23)				
<b>Length in current position</b>								18.187	8	0.020
Less than 5 years	220	12(27)	47(103)	27(60)	11(25)	2(5)	2.5			
5 to 20 years	207	9(19)	43(89)	27(55)	16(33)	5(11)	2.7			
Over 20 years	51	4(2)	35(18)	37(19)	10(5)	14(7)	2.9			
TOTAL	478	10(48)	44(210)	28(134)	13(63)	5(23)				
<b>Length of career</b>								31.410	8	<0.0005
Less than 5 years	101	16(16)	55(56)	21(21)	8(8)	0(0)	2.2			
5 to 20 years	223	9(21)	40(89)	30(66)	17(38)	4(9)	2.7			
Over 20 years	136	6(8)	43(58)	29(40)	13(17)	10(13)	2.8			
TOTAL	460	10(45)	44(203)	28(127)	14(63)	5(22)				
Local governments should not take on additional responsibilities without additional resources										
<b>Community Size</b>								17.880	8	0.022
Over 100,000	49	33(16)	49(24)	4(2)	10(5)	4(2)	2.0			
10,000 to 100,000	225	40(90)	34(76)	18(40)	8(17)	1(2)	2.0			
Less than 10,000	203	31(62)	47(95)	14(29)	6(13)	2(4)	2.0			
TOTAL	477	35(168)	41(195)	15(71)	7(35)	2(8)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 16. Relationships among demographic characteristics and perceived level of contribution by various organizations to the long-term resolution of human-wildlife conflicts, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Contributing Agency	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
Virginia Department of Game and Inland Fisheries									
<b>Gender</b>							6.912	3	0.075
Male	373	2(9)	15(57)	36(136)	46(171)	3.3			
Female	96	7(7)	21(20)	33(32)	39(37)	3.0			
TOTAL	469	3(16)	16(77)	36(168)	44(208)				
<b>Community Description</b>							13.670	6	0.034
Rural	323	2(8)	14(44)	36(116)	48(155)	3.3			
Suburban	93	4(4)	22(20)	43(40)	31(29)	3.0			
Urban	58	5(3)	22(13)	26(15)	47(27)	3.1			
TOTAL	474	3(15)	16(77)	36(171)	45(211)				
<b>Community Size</b>							20.476	6	0.002
Over 100,000	49	6(3)	29(14)	41(20)	24(12)	2.8			
10,000 to 100,000	226	4(8)	19(42)	31(70)	47(106)	3.2			
Less than 10,000	202	2(4)	10(21)	41(82)	47(95)	3.3			
TOTAL	477	3(15)	16(77)	36(172)	45(213)				
US Fish and Wildlife Service									
<b>Community Size</b>							11.381	6	0.077
Over 100,000	48	10(5)	33(16)	39(19)	17(8)	2.6			
10,000 to 100,000	223	9(20)	26(57)	40(90)	25(56)	2.8			
Less than 10,000	201	3(6)	24(49)	45(91)	27(55)	3.0			
TOTAL	472	7(31)	26(122)	42(200)	25(119)				
<b>Length of career</b>							15.099	6	0.020
Less than 5 years	101	6(6)	14(14)	49(49)	32(32)	3.1			
5 to 20 years	221	5(12)	28(62)	44(98)	22(49)	2.8			
Over 20 years	132	8(11)	30(40)	34(45)	27(36)	2.8			
TOTAL	454	6(29)	26(116)	42(192)	26(117)				

<sup>a</sup> Means based on scaled responses: 1=None, 2=Low, 3=Moderate, 4=High

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 16. continued**

Agency	N	% Response (n) <sup>a</sup>				Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4				
USDA-Animal and Plant Health Inspection Service- Wildlife Services									
<i>Community Description</i>							12.531	6	0.051
Rural	320	10(33)	38(120)	37(119)	15(48)	2.6			
Suburban	90	12(11)	49(44)	31(28)	8(7)	2.3			
Urban	57	5(3)	46(26)	44(25)	5(3)	2.5			
TOTAL	467	10(47)	41(190)	37(172)	12(58)				
<i>Length of career</i>							11.698	6	0.069
Less than 5 years	101	12(12)	31(31)	45(45)	13(13)	2.6			
5 to 20 years	219	7(16)	44(96)	37(81)	12(26)	2.5			
Over 20 years	132	13(17)	45(59)	28(37)	14(19)	2.4			
TOTAL	452	10(45)	41(186)	36(163)	13(58)				
Virginia Cooperative Extension									
<i>Community Size</i>							11.522	6	0.074
Over 100,000	48	10(5)	48(23)	42(20)	0(0)	2.3			
10,000 to 100,000	223	10(23)	39(86)	41(92)	10(22)	2.5			
Less than 10,000	197	10(19)	39(77)	39(77)	12(24)	2.5			
TOTAL	468	10(47)	40(186)	40(189)	10(46)				

<sup>a</sup> Means based on scaled responses: 1=None, 2=Low, 3=Moderate, 4=High

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 17. Relationships among demographic characteristics and respondents' opinion about local government's needs to manage human-wildlife conflicts, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Local governments need technical assistance										
<b>Age</b>								17.974	8	0.021
18-34	50	20(10)	54(27)	26(13)	0(0)	0(0)	2.1			
35-64	353	25(90)	60(211)	11(40)	3(10)	1(2)	1.9			
Over 65	72	17(12)	57(41)	17(12)	7(5)	3(2)	2.2			
TOTAL	475	24(112)	59(279)	14(65)	3(15)	1(4)				
<b>Length in current position</b>								14.772	8	0.064
Less than 5 years	220	22(49)	63(138)	13(29)	1(3)	1(1)	2.0			
5 to 20 years	206	29(59)	52(108)	14(28)	4(8)	1(3)	2.0			
Over 20 years	51	14(7)	63(32)	16(8)	8(4)	0(0)	2.2			
TOTAL	477	24(115)	58(278)	14(65)	3(15)	1(4)				
Local governments do not have legislative authority										
<b>Community Description</b>								22.692	8	0.004
Rural	321	19(60)	33(106)	36(115)	12(37)	1(3)	2.4			
Suburban	93	20(19)	25(23)	44(41)	11(10)	0(0)	2.5			
Urban	58	14(8)	17(10)	34(20)	33(19)	2(1)	2.9			
TOTAL	472	18(87)	29(139)	37(176)	14(66)	1(4)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 18. Relationships among demographic characteristics and opinion on the importance of factors that could affect one's decision to participate in co-management, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value	
		1	2	3	4	5					
Insufficient expertise/training	<b>Gender</b>							12.677	4	0.013	
	Male	375	7(25)	7(28)	8(30)	40(150)	38(142)				4.0
	Female	94	5(5)	2(2)	6(6)	30(28)	56(53)				4.3
	TOTAL	469	6(30)	6(30)	8(36)	38(178)	42(195)				
Insufficient personnel/staff	<b>Community Description</b>							16.939	8	0.031	
	Rural	323	7(24)	3(11)	5(17)	33(105)	51(166)				4.2
	Suburban	92	8(7)	8(7)	10(9)	34(31)	41(38)				3.9
	Urban	57	0(0)	2(1)	4(2)	37(21)	58(33)				4.5
	TOTAL	472	7(31)	4(19)	6(28)	33(157)	50(237)				
Lack of legislative authority	<b>Gender</b>							9.074	4	0.059	
	Male	373	8(28)	7(27)	16(60)	29(109)	40(149)				3.9
	Female	95	5(5)	2(2)	11(10)	29(28)	53(50)				4.2
	TOTAL	468	7(33)	6(29)	15(70)	29(137)	43(199)				
-----	<b>Age</b>							26.235	8	0.001	
	18-34	51	2(1)	8(4)	39(20)	25(13)	25(13)				3.7
	35-64	353	7(25)	6(20)	12(44)	30(106)	45(158)				4.0
	Over 65	68	10(7)	7(5)	9(6)	29(20)	44(30)				3.9
	TOTAL	472	7(33)	6(29)	15(70)	29(139)	43(201)				
-----	<b>Length in current position</b>							18.061	8	0.021	
	Less than 5 years	218	6(14)	7(16)	20(43)	29(64)	37(81)				3.8
	5 to 20 years	205	8(17)	6(13)	11(23)	28(57)	46(95)				4.0
	Over 20 years	51	4(2)	0(0)	10(5)	35(18)	51(26)				4.3
	TOTAL	474	7(33)	6(29)	15(71)	29(139)	43(202)				

<sup>a</sup> Means based on scaled responses: 1=Very unimportant, 2=Somewhat unimportant, 3=Neither, 4=Somewhat important, 5=Very important

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 18. continued**

Question	N	% Response (n) <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Lack of regulatory authority										
<b>Gender</b>								88.483	4	0.075
Male	373	8(29)	7(27)	15(57)	28(105)	42(155)	3.9			
Female	95	5(5)	2(2)	11(10)	28(27)	54(51)	4.2			
TOTAL	468	7(34)	6(29)	14(67)	28(132)	44(206)				
<b>Age</b>								28.742	8	<0.0005
18-34	51	2(1)	10(5)	37(19)	24(12)	27(14)	3.7			
35-64	353	7(24)	5(19)	12(43)	29(102)	47(165)	4.0			
Over 65	68	13(9)	7(5)	7(5)	29(20)	43(29)	3.8			
TOTAL	472	7(34)	6(29)	14(67)	28(134)	44(208)				
<b>Length in current position</b>								22.776	8	0.004
Less than 5 years	218	6(13)	7(15)	20(44)	28(62)	39(84)	3.9			
5 to 20 years	205	9(19)	7(14)	9(19)	26(54)	48(99)	4.0			
Over 20 years	51	4(2)	0(0)	10(5)	35(18)	51(26)	4.3			
TOTAL	474	7(34)	6(29)	14(68)	28(134)	44(209)				
Public opposition to specific management techniques										
<b>Community Description</b>								14.224	8	0.076
Rural	326	4(12)	11(36)	15(50)	44(143)	26(85)	3.8			
Suburban	91	7(6)	15(14)	13(12)	47(43)	18(16)	3.5			
Urban	58	2(1)	3(2)	9(5)	57(33)	29(17)	4.1			
TOTAL	475	4(19)	11(52)	14(57)	46(219)	25(118)				
<b>Community Size</b>								14.239	8	0.076
Over 100,000	49	4(2)	10(5)	8(4)	37(18)	41(20)	4.0			
10,000 to 100,000	224	3(6)	13(30)	15(33)	49(109)	21(46)	3.7			
Less than 10,000	203	6(12)	8(17)	15(30)	45(91)	26(53)	3.8			
TOTAL	476	4(20)	11(52)	14(67)	46(218)	25(119)				

<sup>a</sup> Means based on scaled responses: 1=Very unimportant, 2=Somewhat unimportant, 3=Neither, 4=Somewhat important, 5=Very important

<sup>b</sup> Log-likelihood ratio test statistic



**Table A. 19. Relationships between demographic characteristics and self-reported knowledge of co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Agency	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
Previous shared management with a wildlife agency								
<b>Age</b>						14.044	4	0.007
18-34	51	8(4)	31(16)	61(31)	2.5			
35-64	355	16(56)	46(165)	38(134)	2.2			
Over 65	73	7(5)	52(38)	41(30)	2.3			
TOTAL	479	14(65)	46(219)	41(195)				
<b>Community Description</b>						9.998	4	0.040
Rural	327	11(37)	49(161)	39(129)	2.3			
Suburban	93	18(17)	46(43)	35(33)	2.2			
Urban	59	19(11)	31(18)	51(30)	2.3			
TOTAL	479	14(65)	46(222)	40(192)				
<b>Community Size</b>						33.665	4	<0.0005
Over 100,000	50	22(11)	18(9)	60(30)	2.4			
10,000 to 100,000	228	15(35)	41(94)	43(99)	2.3			
Less than 10,000	204	9(18)	59(120)	32(66)	2.2			
TOTAL	482	13(64)	46(223)	40(195)				
<b>Length in current position</b>						25.061	4	<0.0005
Less than 5 years	222	10(22)	39(87)	51(113)	2.4			
5 to 20 years	210	14(29)	54(113)	32(68)	2.2			
Over 20 years	50	26(13)	50(25)	24(12)	2.0			
TOTAL	482	13(64)	47(225)	40(193)				
<b>Length of career</b>						27.740	4	<0.0005
Less than 5 years	103	8(8)	31(32)	61(63)	2.5			
5 to 20 years	226	12(26)	51(116)	37(84)	2.3			
Over 20 years	135	19(26)	50(68)	30(41)	2.1			
TOTAL	464	13(60)	47(216)	41(188)				

<sup>a</sup> Means based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 19. continued**

Agency	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
VA Department of Transportation								
<b>Age</b>						8.396	4	0.078
18-34	51	45(23)	8(4)	47(24)	2.0			
35-64	356	43(153)	23(81)	34(122)	1.9			
Over 65	74	47(35)	19(14)	34(25)	1.9			
TOTAL	481	44(211)	21(99)	36(171)				
<b>Community Size</b>						33.614	4	<0.0005
Over 100,000	50	50(25)	6(3)	44(22)	1.9			
10,000 to 100,000	228	43(97)	14(33)	43(98)	2.0			
Less than 10,000	206	44(91)	31(64)	25(51)	1.8			
TOTAL	484	44(213)	21(100)	35(171)				
<b>Length in current position</b>						8.576	4	0.073
Less than 5 years	223	46(102)	16(36)	38(85)	1.9			
5 to 20 years	210	46(96)	23(49)	31(65)	1.9			
Over 20 years	51	31(16)	27(14)	41(21)	2.1			
TOTAL	484	44(214)	20(99)	35(171)				
<b>Length of career</b>						13.591	4	0.009
Less than 5 years	103	51(53)	11(11)	38(39)	1.9			
5 to 20 years	227	45(103)	20(46)	34(78)	1.9			
Over 20 years	136	38(51)	29(40)	33(45)	2.0			
TOTAL	466	44(207)	21(97)	35(162)				

<sup>a</sup> Means based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 19. continued**

Agency	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
VA Department of Public Health								
<b>Community Description</b>						11.535	4	0.021
Rural	329	38(125)	23(75)	39(129)	2.0			
Suburban	92	51(47)	21(19)	28(26)	1.8			
Urban	60	52(31)	10(6)	38(23)	1.9			
TOTAL	481	42(203)	21(100)	37(178)				
<b>Community Size</b>						56.550	4	<0.0005
Over 100,000	50	66(33)	2(1)	32(16)	1.7			
10,000 to 100,000	228	48(110)	12(28)	39(90)	1.9			
Less than 10,000	206	29(60)	34(71)	36(75)	2.1			
TOTAL	484	42(203)	21(100)	37(181)				
<b>Length of career</b>						10.169	4	0.038
Less than 5 years	103	35(36)	16(16)	50(51)	2.2			
5 to 20 years	227	44(101)	21(48)	34(78)	1.9			
Over 20 years	136	44(60)	25(34)	31(42)	1.9			
TOTAL	466	42(197)	21(98)	37(171)				

<sup>a</sup> Means based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 19. continued**

Agency	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
VA Department of Agriculture and Consumer Services								
<b>Community Description</b>						9.094	4	0.059
Rural	329	24(78)	29(96)	47(155)	2.2			
Suburban	92	25(23)	33(30)	42(39)	2.2			
Urban	60	27(16)	13(8)	60(36)	2.3			
TOTAL	481	24(117)	28(134)	48(230)				
<b>Community Size</b>						45.164	4	<0.0005
Over 100,000	50	36(18)	10(5)	54(27)	2.2			
10,000 to 100,000	228	29(65)	18(41)	54(122)	2.3			
Less than 10,000	206	16(33)	43(88)	41(85)	2.3			
TOTAL	484	24(116)	28(134)	48(234)				
<b>Length in current position</b>						11.334	4	0.023
Less than 5 years	223	20(45)	25(55)	55(123)	2.4			
5 to 20 years	210	30(63)	29(60)	41(87)	2.1			
Over 20 years	51	18(9)	35(18)	47(24)	2.3			
TOTAL	484	24(117)	27(133)	48(234)				
<b>Length of career</b>						20.365	4	<0.0005
Less than 5 years	103	21(22)	18(19)	60(62)	2.4			
5 to 20 years	227	29(66)	25(56)	46(105)	2.2			
Over 20 years	136	18(25)	40(55)	41(56)	2.2			
TOTAL	466	24(113)	28(130)	48(223)				

<sup>a</sup> Means based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 19. continued**

Agency	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
VA Cooperative Extension								
<b>Community Description</b>						11.036	4	0.026
Rural	329	35(115)	27(89)	38(125)	2.0			
Suburban	92	40(37)	32(29)	28(26)	1.9			
Urban	60	27(16)	18(11)	55(33)	2.3			
TOTAL	481	35(168)	27(129)	38(184)				
<b>Community Size</b>						56.963	4	<0.0005
Over 100,000	50	42(21)	16(8)	42(21)	2.0			
10,000 to 100,000	228	46(106)	15(34)	39(88)	1.9			
Less than 10,000	206	20(41)	42(87)	38(78)	2.2			
TOTAL	484	35(168)	27(129)	39(187)				
<b>Length in current position</b>						11.786	4	0.019
Less than 5 years	223	30(67)	24(54)	46(102)	2.2			
5 to 20 years	210	41(87)	27(56)	32(67)	1.9			
Over 20 years	51	29(15)	35(18)	35(18)	2.1			
TOTAL	484	35(169)	26(128)	39(187)				
<b>Length of career</b>						10.137	4	0.038
Less than 5 years	103	31(32)	18(19)	50(52)	2.2			
5 to 20 years	227	37(83)	26(60)	37(84)	2.0			
Over 20 years	136	35(48)	32(44)	32(44)	2.0			
TOTAL	466	35(163)	26(123)	39(180)				

<sup>a</sup> Means based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 19. continued**

Agency	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
VA Department of Education								
<b>Age</b>						9.235	4	0.055
18-34	51	24(12)	14(7)	63(32)	2.4			
35-64	356	25(90)	31(109)	44(157)	2.2			
Over 65	74	30(22)	26(19)	45(33)	2.2			
TOTAL	481	26(124)	28(135)	46(222)				
<b>Community Description</b>						9.580	4	0.048
Rural	329	22(74)	30(100)	47(155)	2.3			
Suburban	92	35(32)	28(26)	37(34)	2.0			
Urban	60	30(18)	18(11)	52(31)	2.2			
TOTAL	481	26(124)	28(137)	46(220)				
<b>Community Size</b>						53.457	4	<0.0005
Over 100,000	50	32(16)	10(5)	58(29)	2.3			
10,000 to 100,000	228	31(70)	17(38)	53(120)	2.2			
Less than 10,000	206	19(39)	45(93)	36(74)	2.2			
TOTAL	484	26(125)	28(136)	(223)46				
<b>Length of career</b>						12.136	4	0.016
Less than 5 years	103	28(29)	17(18)	54(56)	2.3			
5 to 20 years	227	26(59)	28(64)	46(104)	2.2			
Over 20 years	136	24(32)	38(51)	39(53)	2.2			
TOTAL	466	26(120)	29(133)	46(213)				

<sup>a</sup> Means based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 19. continued**

Agency	N	% Response (n) <sup>a</sup>			Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3				
VA Department of Game and Inland Fisheries								
<b>Community Description</b>						10.628	4	0.031
Rural	328	31(102)	26(85)	43(141)	2.1			
Suburban	92	43(40)	21(19)	36(33)	1.9			
Urban	60	38(23)	12(7)	50(30)	2.1			
TOTAL	480	34(165)	23(111)	43(204)				
<b>Community Size</b>						43.267	4	<0.0005
Over 100,000	50	38(19)	10(5)	52(26)	2.1			
10,000 to 100,000	228	39(90)	13(29)	48(109)	2.1			
Less than 10,000	205	27(56)	38(77)	35(72)	2.1			
TOTAL	483	34(165)	23(111)	43(207)				
<b>Length in current position</b>						11.271	4	0.024
Less than 5 years	222	32(71)	20(45)	48(106)	2.2			
5 to 20 years	210	40(84)	22(47)	38(79)	2.0			
Over 20 years	51	23(11)	35(18)	43(22)	2.2			
TOTAL	483	34(166)	23(110)	43(207)				
<b>Length of career</b>						15.112	4	0.004
Less than 5 years	102	30(31)	15(15)	55(56)	2.3			
5 to 20 years	227	38(87)	21(48)	41(92)	2.0			
Over 20 years	136	31(42)	32(44)	37(50)	2.1			
TOTAL	465	34(160)	23(107)	43(198)				

<sup>a</sup> Means based on scaled responses: 1=Yes, 2=No, 3=Don't Know

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 20. Relationships between demographic characteristics and satisfaction with cooperation with co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Agency	N	Response N <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
VA Department of Transportation										
<b>Gender</b>								12.510	4	0.014
Male	161	7(11)	4(6)	14(22)	62(100)	14(22)	3.7			
Female	39	5(2)	5(2)	28(11)	33(13)	28(11)	3.7			
TOTAL	200	7(13)	4(8)	17(33)	57(113)	17(33)				
<b>Length in current position</b>								17.537	8	0.025
Less than 5 years	97	10(10)	4(4)	13(13)	57(55)	15(15)	3.6			
5 to 20 years	92	2(2)	4(4)	21(19)	52(48)	21(19)	3.9			
Over 20 years	15	7(1)	0(0)	7(1)	87(13)	0(0)	3.7			
TOTAL	204	6(13)	4(8)	16(33)	57(116)	17(34)				
<b>Length of career</b>								19.155	8	0.014
Less than 5 years	51	16(8)	4(2)	14(7)	53(27)	14(7)	3.5			
5 to 20 years	97	1(1)	6(6)	19(18)	54(52)	21(20)	3.9			
Over 20 years	50	6(3)	0(0)	16(8)	64(32)	14(7)	3.8			
TOTAL	198	6(12)	4(8)	17(33)	56(111)	17(34)				
VA Department of Public Health										
<b>Gender</b>								10.058	4	0.039
Male	156	3(4)	3(5)	13(20)	67(104)	15(23)	3.9			
Female	39	8(3)	5(2)	28(11)	41(16)	18(7)	3.6			
TOTAL	195	4(7)	4(7)	16(31)	62(120)	15(30)				
<b>Community Size</b>								13.822	4	0.087
Over 100,000	32	6(2)	6(2)	13(4)	63(20)	13(4)	3.7			
10,000 to 100,000	105	2(2)	2(2)	23(24)	57(60)	16(17)	3.8			
Less than 10,000	59	5(3)	5(3)	5(3)	69(41)	15(9)	3.9			
TOTAL	196	4(7)	4(7)	16(31)	62(121)	15(30)				
<b>Length of career</b>								18.684	8	0.017
Less than 5 years	33	15(5)	0(0)	15(5)	58(19)	12(4)	3.5			
5 to 20 years	98	2(2)	5(5)	14(14)	66(65)	12(12)	3.8			
Over 20 years	60	0(0)	3(2)	20(12)	55(33)	22(13)	4.0			
TOTAL	191	4(7)	4(7)	16(31)	61(117)	15(29)				

<sup>a</sup> Means based on scaled responses: 1=Very Unsatisfied, 2=Unsatisfied, 3=Neutral, 4=Satisfied, 5=Very Satisfied

<sup>b</sup> Log-likelihood ratio test statistic



**Table A. 20. continued**

<b>Agency</b>	<b>N</b>	<b>Response N<sup>a</sup></b>					<b>Mean<sup>a</sup></b>	<b>G<sup>b</sup></b>	<b>df</b>	<b>p-value</b>
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>				
VA Department of Agriculture and Consumer Services										
								15.810	4	0.045
VA Department of Education										
								17.710	8	0.024
VA Department of Game and Inland Fisheries										
								15.760	4	0.003

<sup>a</sup> Means based on scaled responses: 1=Very Unsatisfied, 2=Unsatisfied, 3=Neutral, 4=Satisfied, 5=Very Satisfied

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 21. Relationships between demographic characteristics and satisfaction with outcome of co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Agency	N	Response N <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
VA Department of Transportation										
<b>Gender</b>								11.297	4	0.023
Male	161	7(11)	6(10)	17(28)	59(95)	11(17)	3.6			
Female	38	5(2)	3(1)	26(10)	37(14)	29(11)	3.8			
TOTAL	199	7(13)	6(11)	19(38)	55(109)	14(28)				
<b>Length in current position</b>								19.781	8	0.011
Less than 5 years	96	10(10)	3(3)	19(18)	55(53)	13(12)	3.6			
5 to 20 years	92	2(2)	9(8)	21(19)	50(46)	18(17)	3.7			
Over 20 years	15	7(1)	0(0)	7(1)	87(13)	0(0)	3.7			
TOTAL	203	6(13)	5(11)	19(38)	55(112)	14(29)				
<b>Length of career</b>								18.735	8	0.016
Less than 5 years	51	16(8)	2(1)	22(11)	51(26)	10(5)	3.4			
5 to 20 years	97	1(1)	8(8)	22(21)	52(50)	18(17)	3.8			
Over 20 years	49	6(3)	4(2)	12(6)	63(31)	14(7)	3.8			
TOTAL	197	6(12)	6(11)	19(38)	54(107)	15(29)				
VA Department of Public Health										
<b>Gender</b>								8.143	4	0.086
Male	153	2(3)	3(5)	16(24)	67(103)	12(18)	3.8			
Female	38	8(3)	8(3)	21(8)	45(17)	18(7)	3.6			
TOTAL	191	3(6)	4(8)	17(32)	63(120)	13(25)				
<b>Age</b>								13.485	8	0.096
18-34	18	11(2)	0(0)	28(5)	61(11)	0(0)	3.4			
35-64	149	2(3)	3(5)	16(24)	64(95)	15(22)	3.9			
Over 65	25	4(1)	12(3)	16(4)	56(14)	12(3)	3.6			
TOTAL	192	3(6)	4(8)	17(33)	63(120)	13(25)				
<b>Length of career</b>								26.925	8	0.001
Less than 5 years	34	15(5)	0(0)	24(8)	59(20)	3(1)	3.4			
5 to 20 years	95	1(1)	5(5)	14(13)	69(66)	11(10)	3.8			
Over 20 years	58	0(0)	5(3)	19(11)	53(31)	22(13)	3.9			
TOTAL	187	3(6)	4(8)	17(32)	63(117)	13(24)				

<sup>a</sup> Means based on scaled responses: 1=Very Unsatisfied, 2=Unsatisfied, 3=Neutral, 4=Satisfied, 5=Very Satisfied

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 21. continued**

Agency	N	Response N <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
VA Department of Agriculture and Consumer Services										
<i>Community Description</i>								13.660	8	0.091
Rural	74	4(3)	0(0)	23(17)	68(50)	5(4)	3.7			
Suburban	24	8(2)	13(3)	13(3)	58(14)	8(2)	3.5			
Urban	15	0(0)	0(0)	20(3)	67(10)	13(2)	3.9			
TOTAL	113	4(5)	3(3)	20(23)	65(74)	7(8)				
VA Department of Game and Inland Fisheries										
<i>Community Size</i>								16.852	8	0.032
Over 100,000	21	0(0)	14(3)	14(3)	57(12)	14(3)	3.7			
10,000 to 100,000	88	7(6)	8(7)	18(16)	57(50)	10(9)	3.6			
Less than 10,000	52	6(3)	0(0)	17(9)	50(26)	27(14)	3.9			
TOTAL	161	6(9)	6(10)	17(28)	55(88)	16(26)				
Other <sup>c</sup>										
<i>Length of career</i>								8.053	4	0.090
Less than 5 years	-	-	-	-	-	-	--			
5 to 20 years	6	50(3)	17(1)	17(1)	17(1)	0(0)	2.0			
Over 20 years	9	22(2)	0(0)	0(0)	56(5)	22(2)	3.6			
TOTAL	15	33(5)	7(1)	7(1)	40(6)	13(2)				

<sup>a</sup> Means based on scaled responses: 1=Very Unsatisfied, 2=Unsatisfied, 3=Neutral, 4=Satisfied, 5=Very Satisfied

<sup>b</sup> Log-likelihood ratio test statistic

<sup>c</sup> Other includes: US Department of Agriculture, US Fish and Wildlife Service, VA Department of Corrections, VA Department of Forestry, VA Department of Taxation, VA Department of Conservation and Recreation, and county governments

**Table A. 22. Relationships between subpopulation membership and opinions of future co-management arrangements, as assessed in a survey about human-wildlife conflicts in Virginia communities conducted during winter of 2007-2008.**

Question	N	Response N <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Shared management is a realistic way to manage human-wildlife conflicts										
<b>Length in current position</b>								24.483	8	0.002
Less than 5 years	219	23(50)	52(114)	20(43)	4(8)	2(4)	2.1			
5 to 20 years	204	19(39)	54(111)	18(37)	8(16)	1(1)	2.2			
Over 20 years	50	4(2)	68(34)	16(8)	4(2)	8(4)	2.4			
TOTAL	473	19(91)	55(259)	19(88)	5(26)	2(9)				
Shared management presents local government an opportunity to manage human-wildlife conflicts										
<b>Gender</b>								8.812	4	0.066
Male	376	12(44)	64(241)	19(71)	4(16)	1(4)	2.2			
Female	95	17(16)	49(47)	27(26)	3(3)	3(3)	2.3			
TOTAL	471	13(60)	61(288)	21(97)	4(19)	1(7)				
<b>Community Size</b>								14.985	8	0.059
Over 100,000	51	18(9)	63(32)	14(7)	6(3)	0(0)	2.1			
10,000 to 100,000	223	11(24)	65(146)	17(37)	4(10)	3(6)	2.2			
Less than 10,000	201	13(27)	56(113)	26(53)	3(7)	1(1)	2.2			
TOTAL	475	13(60)	61(291)	20(97)	4(20)	1(7)				
<b>Length of career</b>								14.236	8	0.076
Less than 5 years	101	19(19)	56(57)	21(21)	3(3)	1(1)	2.1			
5 to 20 years	221	10(22)	62(136)	24(53)	4(9)	1(1)	2.2			
Over 20 years	135	12(16)	63(85)	16(21)	6(8)	4(5)	2.3			
TOTAL	457	12(57)	61(278)	21(95)	4(20)	2(7)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 22. continued**

Question	N	Response N <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Shared management is an attractive option for managing human-wildlife conflicts										
<b>Age</b>								20.642	8	0.008
18-34	48	8(4)	38(18)	54(26)	0(0)	0(0)	2.5			
35-64	353	15(54)	50(177)	26(93)	5(19)	3(10)	2.3			
Over 65	90	12(11)	36(32)	27(24)	4(4)	1(1)	2.3			
TOTAL	473	15(69)	48(227)	30(143)	5(23)	2(11)				
<b>Length in current position</b>								21.343	8	0.006
Less than 5 years	218	17(37)	41(90)	37(80)	3(6)	2(5)	2.3			
5 to 20 years	204	14(29)	53(108)	25(52)	6(12)	1(3)	2.3			
Over 20 years	50	6(3)	60(30)	20(10)	8(4)	6(3)	2.5			
TOTAL	472	15(69)	48(228)	30(142)	5(22)	2(11)				
<b>Length of career</b>								13.392	8	0.099
Less than 5 years	100	21(21)	42(42)	34(34)	2(2)	1(1)	2.2			
5 to 20 years	220	11(24)	52(115)	30(67)	4(8)	3(6)	2.4			
Over 20 years	135	15(20)	47(63)	28(38)	8(11)	2(3)	2.4			
TOTAL	455	14(65)	48(220)	31(139)	5(21)	2(10)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 22. continued**

Question	N	Response N <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Lack of staff training would likely limit involvement in shared management of human-wildlife conflicts										
<b>Age</b>								21.746	8	0.005
18-34	50	16(8)	32(16)	46(23)	6(3)	0(0)	2.4			
35-64	352	18(63)	46(163)	19(68)	15(52)	2(6)	2.4			
Over 65	72	17(12)	53(38)	21(15)	10(7)	0(0)	2.2			
TOTAL	474	18(83)	46(217)	22(106)	13(62)	1(6)				
<b>Community Size</b>								17.486	8	0.025
Over 100,000	51	12(6)	47(24)	20(10)	20(10)	2(1)	2.5			
10,000 to 100,000	221	16(36)	43(95)	25(55)	16(35)	0(0)	2.4			
Less than 10,000	202	20(41)	49(98)	20(40)	9(18)	2(5)	2.3			
TOTAL	474	18(83)	46(217)	22(105)	13(63)	1(6)				
<b>Length in current position</b>								14.458	8	0.071
Less than 5 years	219	21(47)	39(85)	26(56)	13(29)	1(2)	2.3			
5 to 20 years	204	15(30)	51(105)	20(41)	12(24)	2(4)	2.4			
Over 20 years	50	12(6)	52(26)	16(8)	20(10)	0(0)	2.4			
TOTAL	473	18(83)	46(216)	22(105)	13(63)	1(6)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 22. continued**

Question	N	Response N <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Staff shortages would likely limit involvement in shared management of human-wildlife conflicts										
<b>Community Description</b>								14.079	8	0.080
Rural	321	21(68)	53(170)	19(62)	6(19)	1(2)	2.1			
Suburban	91	16(15)	49(45)	23(21)	9(8)	2(2)	2.3			
Urban	60	12(7)	45(27)	27(16)	17(10)	0(0)	2.5			
TOTAL	472	19(90)	51(242)	21(99)	8(37)	1(4)				
<b>Community Size</b>								16.200	8	0.040
Over 100,000	51	14(7)	41(21)	29(15)	12(6)	4(2)	2.5			
10,000 to 100,000	222	20(44)	47(105)	23(51)	9(21)	1(1)	2.2			
Less than 10,000	201	19(38)	59(118)	17(34)	5(10)	1(1)	2.1			
TOTAL	474	19(89)	51(244)	21(100)	8(37)	1(4)				
<b>Length in current position</b>								13.749	8	0.089
Less than 5 years	218	20(43)	47(102)	25(55)	8(17)	1(1)	2.2			
5 to 20 years	195	21(40)	59(116)	16(31)	9(17)	1(1)	2.1			
Over 20 years	50	12(6)	52(26)	26(13)	6(3)	4(2)	2.4			
TOTAL	473	19(89)	52(244)	21(99)	8(37)	1(4)				
<b>Length of career</b>								13.488	8	0.096
Less than 5 years	101	12(12)	50(50)	29(29)	9(9)	1(1)	2.4			
5 to 20 years	219	21(45)	53(117)	19(41)	8(17)	0(0)	2.1			
Over 20 years	135	21(28)	52(70)	19(25)	7(9)	2(3)	2.2			
TOTAL	456	19(85)	52(237)	21(95)	8(35)	1(4)				
Local government is willing to partner with other agencies to manage human-wildlife conflicts										
<b>Community Description</b>								17.299	8	0.027
Rural	321	10(31)	48(154)	33(106)	7(24)	2(6)	2.4			
Suburban	90	16(14)	37(33)	41(37)	7(6)	0(0)	2.4			
Urban	60	18(11)	57(34)	20(12)	3(2)	2(1)	2.1			
TOTAL	471	12(56)	47(221)	33(155)	7(32)	1(7)				

<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic

**Table A. 22. continued**

Question	N	Response N <sup>a</sup>					Mean <sup>a</sup>	G <sup>b</sup>	df	p-value
		1	2	3	4	5				
Local government is willing to assume responsibility for managing human-wildlife conflicts										
<b>Gender</b>								11.326	4	0.023
Male	375	4(14)	24(90)	43(162)	22(81)	7(28)	3.1			
Female	94	5(5)	10(9)	53(50)	22(21)	10(9)	3.2			
TOTAL	469	4(19)	21(99)	45(212)	22(102)	8(37)				
<b>Age</b>								14.969	8	0.060
18-34	50	2(1)	16(8)	66(33)	14(7)	2(1)	3.0			
35-64	351	4(13)	21(75)	42(149)	23(81)	9(33)	3.1			
Over 65	72	7(5)	22(16)	44(32)	22(16)	4(3)	2.9			
TOTAL	473	4(19)	21(99)	45(214)	22(104)	8(37)				
<b>Community Description</b>								24.259	8	0.002
Rural	320	3(10)	18(58)	50(159)	22(71)	7(22)	3.1			
Suburban	91	3(3)	33(30)	27(25)	23(21)	13(12)	3.1			
Urban	60	10(6)	20(12)	47(28)	18(11)	5(3)	2.9			
TOTAL	471	4(19)	21(100)	45(212)	22(103)	8(37)				
<b>Length in current position</b>								16.360	8	0.038
Less than 5 years	218	5(10)	18(40)	54(117)	17(38)	6(13)	3.0			
5 to 20 years	204	4(8)	24(49)	39(80)	24(49)	9(18)	3.1			
Over 20 years	52	2(1)	21(11)	35(18)	31(16)	12(6)	3.3			
TOTAL	472	4(19)	21(100)	46(215)	22(103)	8(37)				
<b>Length of career</b>								25.516	8	0.001
Less than 5 years	101	5(5)	20(20)	58(59)	16(16)	1(1)	2.9			
5 to 20 years	219	5(10)	21(47)	44(97)	22(48)	8(17)	3.1			
Over 20 years	135	1(2)	21(29)	37(50)	27(37)	13(17)	3.3			
TOTAL	455	4(17)	21(96)	45(206)	22(101)	8(35)				

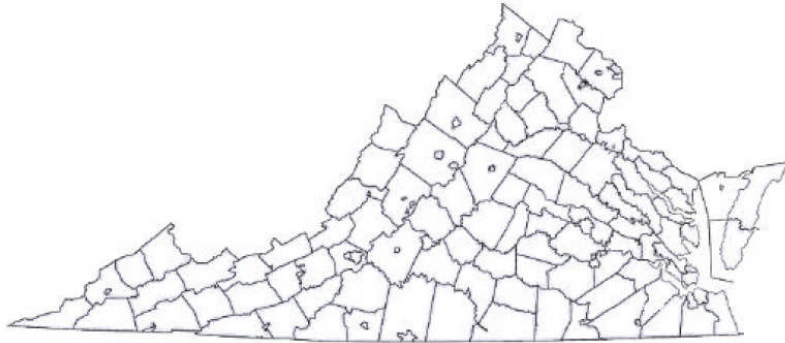
<sup>a</sup> Means based on scaled responses: 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly Disagree

<sup>b</sup> Log-likelihood ratio test statistic



## **APPENDIX B: Mail Questionnaire**

***Humans and Wildlife:  
A Community Profile Now and For the Future***



Please place your completed questionnaire in the enclosed business reply envelope (no postage necessary) and mail to:

Regina Elsner  
Department of Fisheries and Wildlife Sciences  
Virginia Tech  
100 Cheatham Hall  
Blacksburg, VA 24061-0321

This number is used only to ensure that you do not receive duplicate mailings. *Your name will never be connected to your answers or this survey.*



1. Please indicate the level of your agreement or disagreement with each of the following statements by placing a check in the appropriate box.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The term "wildlife" includes domesticated animals, such as household pets or livestock animals .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feral animals, like dogs, cats, or pigs that have been turned loose or abandoned, are considered wildlife .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The term "human-wildlife interaction" always refers to a negative situation .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local government plays an important decision-making role in managing human-wildlife interactions .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Residents in my community expect that local government will provide services to help resolve human-wildlife interactions .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My local government partners with state agencies to manage or resolve broad-based community issues .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Budget and staff shortages limit local government's ability to manage human-wildlife interactions .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Please indicate what you believe is the level of contribution the following organizations make toward the long-term resolution of human interactions with wildlife.

	None	Low	Moderate	High
Virginia Department of Game and Inland Fisheries .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
US Fish and Wildlife Service .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
USDA- Animal and Plant Health Inspection Service- Wildlife Services .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Cooperative Extension .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Private wildlife control operators .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Please indicate whether each of the following groups of animals is included in the term "wildlife."

	Don't		
	Yes	No	Know
Mammals .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Birds .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reptiles .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amphibians .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insects .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mollusks .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. An individual's personal beliefs often influence that person's opinion on what constitutes a conflict. Please rank the following set of 5 common, yet hypothetical, conflict situations in order of their severity under each of several possible criteria: economic costs, risk to personal health and safety, and political complexity. In the final column, please provide your assessment of the overall severity of these situations. Under each column, order the situations from least severe (1) to most severe (5) in the boxes provided. An example is provided for the criteria "personal inconvenience."

	Personal Inconvenience (example)	Economic Costs	Health and Safety	Political Complexity	Overall
Deer eating residents' ornamental plantings .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
A bear passing through town .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
A snake entering a residence .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Canada geese making a town park or recreational area unpleasant .....	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Coyotes preying on household pets	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

5. During the most recent fiscal year (i.e., 7/1/06 to 6/30/07), did your local government receive complaints about wildlife from residents of your community?

- Yes (Go to #6)    No (Go to #8)    Don't Know (Go to #8)

6. Please provide your best estimate of the frequency with which these wildlife complaints were received.

- Very frequently (more than 1 per day)  
 Frequently (about 1 per day)  
 Occasionally (about 2-3 per week)  
 Infrequently (about 2-3 per month)  
 Very infrequently (less than 1 per month)

Continue to #7.

7. When considering the nature of all wildlife complaints received in the last year only (i.e., from 7/1/06 to 6/30/07) from residents of your community, how would you characterize the overall severity of those complaints?

- Insignificant    Moderate    Severe

Continue to #8.

8. During the preceding 2 fiscal years, (i.e., FY 2005 and 2006), did your local government receive complaints about wildlife from residents of your community?

- Yes (Go to #9)  
 No (If no here and no or don't know to #5, go to #16; If no here, but yes to #5, go to #11)  
 Don't Know (If don't know here and no or don't know to #5, go to #16; If don't know here, but yes to #5, go to #11)

9. Please provide your best estimate of the frequency with which the wildlife complaints noted in #8 were received.

- Very frequently (more than 1 per day)  
 Frequently (about 1 per day)  
 Occasionally (about 2-3 per week)  
 Infrequently (about 2-3 per month)  
 Very infrequently (less than 1 per month)

Continue to #10.

10. When considering the nature of all wildlife complaints received during the preceding 2 fiscal years (i.e., FY 2005 and 2006) from residents of your community, how would you characterize the overall severity of those complaints?

- Insignificant    Moderate    Severe

Continue to #11.

In the next series of questions, please consider a resident of your community who contacts local government for assistance with a wildlife complaint.

11. Is an official record made for each complaint?

- Yes (Go to #12)
- No (Go to #15)
- Don't Know (Go to #15)

12. To the best of your knowledge, check the appropriate boxes for each of the following possible locations of where a wildlife complaint record might be kept and the form in which that record is kept.

	Is a record kept here?				Type of record			
	Yes	No	Don't Know		Paper	Electronic	Other	Don't Know
			N/A					
Police .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Animal Control .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dispatch .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooperative Extension .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Administrative office .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parks and Recreation .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public Works .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Continue to #13.

13. Is a wildlife complaint record made in your office?

- Yes (Go to #14)
- No (Go to #15)
- Don't Know (Go to #15)

14. What is done with the records maintained in your office?

- Records simply filed or stored
- Records sorted, compiled, and summarized by type of complaint
- Records transferred to another department
- Other: \_\_\_\_\_

Continue to #15.

15. How frequently does your office make the following responses to a wildlife complaint?

	Very infrequently	Occasionally	Very frequently
Caller referred to another office or department within local government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Caller referred to an agency outside local government . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Caller referred to private sector service provider . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Caller provided advice or other sources of self-help information . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On-site consultation conducted . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No response is given . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify) . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Relative to other community issues, how would you characterize the priority assigned to human-wildlife conflicts in your community?

- Low
- Moderate
- High

17. Given that all local governments must make decisions about how best to allocate limited resources, how would you prioritize the community's need to allocate resources to the following situations?

	Priority Level		
	Low	Moderate	High
Develop and implement a comprehensive community-wide human-wildlife conflict resolution program . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop and implement only a single species human-wildlife conflict resolution program (e.g., deer control) . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deal with human-wildlife conflict "brushfires" only as they arise . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Implement a proactive education program to avoid or reduce human-wildlife conflicts . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contract with a private service provider on an "as needed" basis to resolve human-wildlife conflicts in the community . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. In some cases, human-wildlife conflicts become so severe that a community's residents demand that local government become involved and take some action to resolve the situation. A recent example here in Virginia has been the push for local governments to employ citizen involvement techniques to develop and implement deer management strategies. Given the possibility that a human-wildlife conflict of that magnitude might arise in your community, please indicate your level of agreement or disagreement with each of the following statements.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Local governments must play a central decision-making role regarding the management or resolution of human-wildlife conflicts in their communities .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local governments need technical assistance to manage or resolve human-wildlife conflicts .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local governments need financial assistance to manage or resolve human-wildlife conflicts .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local governments currently do not have legislative authority to take management actions appropriate to their communities to resolve human-wildlife conflicts .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local governments should assume leadership in resolving their residents' human-wildlife conflicts .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local governments should not be expected to take on additional responsibilities without being provided additional resources .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Geographic Information Systems (GIS) use computer databases to visually present many different types of information on maps or satellite photos of an area. This technology often is used by zoning and planning departments to review development projects. Emergency service departments also use this software to track calls and route response teams. To the best of your knowledge, is GIS technology currently being used by any of your local government's departments?

- Yes (Go to #21)
- No (Go to #20)
- Don't Know (Go to #21)

20. When do you anticipate that your community will begin to use GIS technology?

- Within the next 6 months
- Within 6 months to 1 year
- Within 1 to 5 years
- Not in the foreseeable future

Continue to #21.



21. In your opinion, how beneficial are the following uses of GIS technology in assisting your local government in dealing with human-wildlife conflicts?

	Not beneficial at all	Somewhat beneficial	Very beneficial
Visual presentation of descriptive characteristics (i.e., season, location, species) of conflicts .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tracking severity of complaints over time .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Presenting descriptive characteristics in relation to other aspects of the surrounding community (e.g., land use) to explain patterns .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Using the visual information to predict future conflicts .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. Has your local government ever worked with a wildlife agency to design and implement citizen involvement techniques as a means to resolve human-wildlife conflict in the community?

Yes    No    Don't Know

23. Consider each of the following potential human-wildlife conflict situations. For each listed situation, please indicate how concerned you are that the residents of your community would expect their local government to manage the negative outcomes of that human-wildlife interaction.

	Not at all concerned	Somewhat concerned	Very concerned
Widespread property damage caused by overabundant wildlife .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Human injury or fatality resulting from interaction with wildlife .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potential health danger to the community posed by wildlife .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potential personal safety risk to the community posed by aggressive wildlife .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. Many factors potentially could affect a local government's decision to manage human-wildlife interactions. As a representative of your community, if you were to manage a human-wildlife conflict in your community, how important would each of the following be in making the decision to become involved?

	Very unimportant	Somewhat unimportant	Neither unimportant nor important	Somewhat important	Very important
Insufficient expertise/training of community responders .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insufficient budget .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of public support for action .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public opposition to specific management techniques .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insufficient personnel/staff .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of legislative authority .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of regulatory authority .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The following series of questions relates to a concept sometimes referred to as "*shared management*" or "*community-based co-management*." In these types of arrangements, authority and responsibility are shared by local government and other partners, such as state or federal agencies or private organizations. Effective shared management arrangements provide mutual benefit to all parties involved. An example in Virginia might be the working agreements between Virginia Department of Transportation (VDOT) and local government on the removal of snow on state roads by local government.

25. Please indicate, to the best of your knowledge, if your local government previously has or currently is engaged in a shared management agreement with the following agencies:

	Yes	No	Don't Know
Virginia Department of Transportation (VDOT) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Public Health (VDPH) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Agriculture and Consumer Services (VDACS) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Cooperative Extension (VCE) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Education (VDE) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Game and Inland Fisheries (VDGIF) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Please specify) _____ .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you answered "Yes" to any of the above, please continue to #26. If not, skip to #28.

26. For each of the agencies listed in #24 for which your local government had an agreement in place, how would you rate your satisfaction with the level of cooperation between the outside agency and your local government?

	N/A	Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied
Virginia Department of Transportation (VDOT) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Public Health (VDPH) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Agriculture and Consumer Services (VDACS) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Cooperative Extension (VCE) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Education (VDE) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Game and Inland Fisheries (VDGIF) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Please specify) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Continue to #27.

27. How would you rate your satisfaction with the outcome of the partnership between the outside agency and your local government?

	N/A	Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied
Virginia Department of Transportation (VDOT) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Public Health (VDPH) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Agriculture and Consumer Services (VDACS) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Cooperative Extension (VCE) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Education (VDE) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Department of Game and Inland Fisheries (VDGIF) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Please specify) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Continue to #28.

28. We want you now to consider hypothetically this same type of shared agreement for managing wildlife conflicts in your community. Please indicate your level of agreement or disagreement with each of the following statements.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Shared management is a realistic way to manage or resolve human-wildlife conflicts in my community . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Budget constraints likely would limit my local government's ability to participate in a shared management agreement for managing or resolving human-wildlife conflicts . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shared management presents an opportunity for local government to deal with human-wildlife conflicts . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My local government is willing to partner with other agencies to manage or resolve human-wildlife conflicts in my community . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of proper training among staff likely would limit my local government's ability to participate in a shared management agreement for managing or resolving human-wildlife conflicts . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My local government is willing to assume responsibility for managing or resolving human-wildlife conflicts in my community . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Staffing shortages likely would limit my local government's ability to participate in a shared management agreement for managing or resolving human-wildlife conflicts . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shared management is an attractive option for managing or resolving human-wildlife conflicts in my community . . . . .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please let us know a little more about you and your community. We will use this information only to make comparisons among broad categories of people and/or communities. Your responses to this survey are strictly confidential. Your name and position will not be revealed or associated with your responses.

Are you...

- Male  Female

What is your age?

- 18 to 24  35 to 44  55 to 64  75 to 84
- 25 to 34  45 to 54  65 to 74  85 or over

Which term do you believe best describes the community that you represent?

- Rural  Suburban  Urban

What size community do you represent?

- An area with over 1 million people
- An area with between 500,000 and 1 million people
- An area with between 250,000 and 499,999 people
- An area with between 100,000 and 249,999 people
- An area with between 50,000 and 99,999 people
- An area with between 10,000 and 49,999 people
- An area with less than 10,000 people

What kind of local government do you represent?

- City  Town  County

What is the official title of your current position?

- Member of Board of Supervisors (elected)  Member of City/Town Council (elected)  City Manager  County Administrator  Cooperative Extension Agent
- Town Manager  Animal Control Officer

Other: \_\_\_\_\_

How long have you held your current position in local government? \_\_\_\_\_years

Over your entire career, how long have you worked in or for local government? ..... \_\_\_\_\_years

**Thank you for completing this survey! Your opinions are valuable to us and will help us better manage human-wildlife conflicts in Virginia.**

If you have any additional comments, please write them in the space below.

Questions? Email Regina at [human-wildlife@vt.edu](mailto:human-wildlife@vt.edu) or call Regina at 1-540-231-0961

## **APPENDIX C: Cover Letters and Postcards**

October 2007

Dear Representative of Local Government,

In 1999, a comprehensive, statewide needs assessment was conducted by Virginia Cooperative Extension to identify and characterize specific issues that were of special concern to local governments in Virginia. High on that list were concerns about the growing number of human-wildlife interactions and the fact that communities currently were not well prepared to deal effectively with them. In response to these stated needs, we have initiated a long-term effort to help communities anticipate and respond proactively to such conflicts. A necessary initial phase of this effort is to precisely define the current situation for communities and to identify specific needs. This survey will provide the data that will allow us to properly assist communities to better manage human-wildlife interactions before they become crises.

We are asking for your help as we attempt to improve understanding of human-wildlife interactions that presently are occurring in Virginia's communities and determine what communities may need to more effectively manage these issues. To accomplish this, we are seeking input from representatives of local government who would be most involved in these issues, namely members of City or Town Council, members of Boards of Supervisors, city and town managers, county administrators, municipal animal control officers, and locally-based Cooperative Extension agents. Human-wildlife conflicts have the potential to affect all levels of local government, and implications that arise from these issues certainly differ at each level of government. Thus, we need to interact with representatives at all levels of local government if we are to accurately evaluate current conditions across the Commonwealth.

Your answers on the survey will remain completely confidential and will be compiled only into broad categories in which no individual's answers can be identified. The tracking number on the front cover of the survey is there only to track response and ensure that participants do not receive additional, unnecessary mailings. Once you return a completed questionnaire, your name will be deleted permanently from the mailing list and never connected to your answers in any way.


This survey is voluntary. Based on pre-tests with a few of your peers, this survey should take approximately 15 minutes to complete. However, if we are to respond meaningfully to what communities previously stated is a real need, we encourage you to take just a few moments to share your experiences and offer recommendations on how human-wildlife interactions should be managed in your community. Once you are finished, please indicate in the comment section of the survey if you would like to receive a copy of our results.

If you have any questions or comments about this study, we would be happy to talk to you. You can contact Regina by phone at (540) 231-0961 or you can email her at [human-wildlife@vt.edu](mailto:human-wildlife@vt.edu). Thank you very much for taking the time to help with this important study.

Sincerely,



Regina Elsner  
Graduate Research Assistant



James A. Parkhurst  
Associate Professor, Wildlife Sciences

November 2007

Dear Representative of Local Government,

We are writing to remind you to help in an important study being conducted by Virginia Tech. You were sent an original copy of the survey about a month ago to complete and return to us. According to our records, we have not received that survey back from you. If you have returned it, please disregard this message.

In 1999, a comprehensive, statewide needs assessment was conducted by Virginia Cooperative Extension to identify and characterize specific issues that were of special concern to local governments in Virginia. High on that list were concerns about the growing number of human-wildlife interactions and the fact that communities currently were not well prepared to deal effectively with them. In response to these stated needs, we have initiated a long-term effort to help communities anticipate and respond proactively to such conflicts. A necessary initial phase of this effort is to precisely define the current situation for communities and to identify specific needs. This survey will provide the data that will allow us to properly assist communities to better manage human-wildlife interactions before they become crises.


We are asking for your help as we attempt to improve understanding of human-wildlife interactions that presently are occurring in Virginia's communities and determine what communities may need to more effectively manage these issues. To accomplish this, we are seeking input from representatives of local government who would be most involved in these issues, namely members of City or Town Council, members of Boards of Supervisors, city and town managers, county administrators, municipal animal control officers, and locally-based Cooperative Extension agents. Human-wildlife conflicts have the potential to affect all levels of local government, and implications that arise from these issues certainly differ at each level of government. Thus, we need to interact with representatives at all levels of local government if we are to accurately evaluate current conditions across the Commonwealth.

Your answers on the survey will remain completely confidential and will be compiled only into broad categories in which no individual's answers can be identified. The tracking number on the front cover of the survey is there only to track response and ensure that participants do not receive additional, unnecessary mailings. Once you return a completed questionnaire, your name will be deleted permanently from the mailing list and never connected to your answers in any way.

This survey is voluntary. However, if we are to respond meaningfully to what communities previously stated is a real need, we encourage you to take just a few moments to share your experiences and offer recommendations on how human-wildlife interactions should be managed in your community. Once you are finished, please indicate in the comment section of the survey if you would like to receive a copy of our results.

If you have any questions or comments about this study, we would be happy to talk to you. You can contact Regina by phone at (540) 231-0961 or you can email her at [human-wildlife@vt.edu](mailto:human-wildlife@vt.edu). Thank you very much for taking the time to help with this important study.

Sincerely,



Regina Elsner  
Graduate Research Assistant



James A. Parkhurst  
Associate Professor, Wildlife Sciences





VIRGINIA POLYTECHNIC INSTITUTE  
AND STATE UNIVERSITY

**Department of Fisheries and Wildlife Sciences**

College of Natural Resources  
Mail Code 0321, Blacksburg, Virginia 24061  
(540) 231-5573 Fax: (540) 231-7580

October 2007

Last week, we sent you a questionnaire that asked about human-wildlife interactions in your community. This note is just a quick reminder to encourage you to complete this questionnaire. If you already have completed and returned it to us, please accept our sincere appreciation. If not, please do so today! If by some chance you did not receive the questionnaire or it got misplaced, we'll be sending out a second copy shortly.

You are a critical part of our research effort. It is very important that we hear from as many representatives of local government as possible. Without your response, our results will be incomplete and may not represent accurately the state of human-wildlife interactions in Virginia and how communities are trying to cope with these issues.

If you have any questions, please contact me at 540-231-0961 or email me at [human-wildlife@vt.edu](mailto:human-wildlife@vt.edu).

Thank you!  
Regina Elsner  
Graduate Research Assistant

*A Land-Grant University - The Commonwealth Is Our Campus  
An Equal Opportunity/Affirmative Action Institution*



VIRGINIA POLYTECHNIC INSTITUTE  
AND STATE UNIVERSITY

**Department of Fisheries and Wildlife Sciences**

College of Natural Resources  
Mail Code 0321, Blacksburg, Virginia 24061  
(540) 231-5573 Fax: (540) 231-7580

December 2007

Over the last month, we sent you two questionnaires that asked about human-wildlife interactions in your community. If you would like to have your opinions included in this study, please complete and return the survey to me by December 14, 2007. If you have already completed and returned it to us, please accept our sincere appreciation. If you did not receive these questionnaires or they got misplaced, please contact me and I will send you another copy.

You are a critical part of our research effort. It is very important that we hear from as many representatives of local government as possible. Without your response, our results will be incomplete and may not represent accurately the state of human-wildlife interactions in Virginia and how communities are trying to cope with these issues.

If you have any questions, please contact me at 540-231-0961 or email me at [human-wildlife@vt.edu](mailto:human-wildlife@vt.edu).

Thank you!  
Regina Elsner  
Graduate Research Assistant

*A Land-Grant University - The Commonwealth Is Our Campus  
An Equal Opportunity/Affirmative Action Institution*

## **APPENDIX D: Non-response Questionnaire**

Group \_\_\_\_\_  
Date \_\_\_\_\_

Tracking # \_\_\_\_\_

**Hello, my name is Regina. I'm a graduate student in the Department of Fisheries and Wildlife Sciences at Virginia Tech and I am part of a research team investigating human-wildlife interactions in Virginia communities. I am calling as a follow-up to a questionnaire that was mailed out in the past month and a half.**

**I would like to ask you a few questions about human-wildlife interactions in your community. Would you be willing to speak with me for the next 10-15 minutes?**

1. For each of the following four statements, please indicate whether you "Agree," "Have No Opinion," or "Disagree" with the statement, as most appropriate to your case:

The term "wildlife" includes domesticated animals, such as household pets or livestock animals      AGREE      NO OPINION      DISAGREE

Residents in my community expect that local government will provide services to help resolve human-wildlife interactions      AGREE      NO OPINION      DISAGREE

Budget and staff shortages limit local government's ability to manage human-wildlife interactions      AGREE      NO OPINION      DISAGREE

Local governments should assume leadership in resolving their residents' human-wildlife conflicts      AGREE      NO OPINION      DISAGREE

2. During the most recent fiscal year (i.e., 2006/2007), did your local government receive complaints about wildlife from residents of your community?

YES (go to #2A)      NO (skip to #3)      DON'T KNOW (skip to #3)

A. What is your best estimate of the frequency with which these wildlife complaints were received during this most recent fiscal period, where the response options are "Frequently," "Occasionally," or "Infrequently?"

Frequently      Occasionally      Infrequently

B. When considering the nature of all wildlife complaints received in this last fiscal year from residents of your community, how would you characterize the overall severity of those complaints, using the response options of "Insignificant," "Moderate," or "Severe?"

Insignificant      Moderate      Severe

**Shared management or community-based co-management is one possible way to manage human-wildlife conflicts. In these types of arrangements, authority and responsibility are shared by local government and other partners, such as state or federal agencies or private organizations. Effective shared management arrangements provide mutual benefit to all parties involved. One example among many in Virginia might be the working agreements between Virginia Department of Transportation (VDOT) and local government on the removal of snow on state roads by local government.**

Group \_\_\_\_\_  
Date \_\_\_\_\_

Tracking # \_\_\_\_\_

3. Does your community currently participate in any of these types of arrangements?  
YES (go to #3A)      NO (go to #4)      DON'T KNOW (go to #4)

A. With what agencies or organizations do these arrangements exist?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

B. Using the response options of "Unsatisfied," "Neutral," or "Satisfied," how would you rate your overall satisfaction, in general, with the arrangements you currently have?  
Unsatisfied                  Neutral                  Satisfied

4. For each of the next two statements, please indicate whether you "Agree," "Have No Opinion," or "Disagree."

My local government is willing to partner with other agencies to resolve human-wildlife conflicts in my community.

AGREE      NO OPINION      DISAGREE

Shared management is an attractive option for managing or resolving human-wildlife conflicts in my community.

AGREE      NO OPINION      DISAGREE

**Now I would like to collect some very basic demographic information to help us analyze and categorize our results.**

5. What is your age? \_\_\_\_\_

6. Using the terms "Rural," "Suburban," or "Urban," how would describe the community that you represent?

Rural                  Suburban                  Urban

7. How long have you held your current position in local government? \_\_\_\_\_ years/months

**I would now like to ask you a couple of questions regarding the questionnaire that was mailed out to local government representatives. With these questions, I am simply trying to understand why some questionnaires were not returned to improve future research.**

8. Did you receive a copy of the mailed questionnaire?  
YES (go to #9)      NO (go to #10)      DON'T KNOW (go to #10)

Group \_\_\_\_\_  
Date \_\_\_\_\_

Tracking # \_\_\_\_\_

9. May I ask why you chose not to complete the questionnaire or what reasons you had for not completing and returning it?

---

---

---

---

10. Do you have any other comments or questions you would like to share with me at this time?

---

---

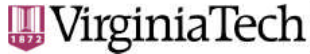
---

---

**Would you like to receive a copy of the result from this study?      YES      NO**

**Thank you for your time. Have a good day.**

## **APPENDIX E: IRB Approvals**



**Office of Research Compliance**  
 Institutional Review Board  
 2000 Kraft Drive, Suite 2000 (0497)  
 Blacksburg, Virginia 24061  
 540/231-4991 Fax 540/231-0959  
 e-mail moored@vt.edu  
 www.irb.vt.edu


FWAD0000572( expires 1/20/2010)  
 IRB # is IRB00000667

DATE: May 24, 2007

MEMORANDUM

TO: James A. Parkhurst  
 Steve L. McMullin  
 Regina Rohde

Approval date: 5/23/2007  
 Continuing Review Due Date: 5/8/2008  
 Expiration Date: 5/22/2008

FROM: David M. Moore 

SUBJECT: **IRB Expedited Approval:** "Knowledge, Attitudes, and Opinions about Human-Wildlife Conflicts Held by Community Leaders in Virginia", IRB # 07-289

This memo is regarding the above-mentioned protocol. The proposed research is eligible for expedited review according to the specifications authorized by 45 CFR 46.110 and 21 CFR 56.110. As Chair of the Virginia Tech Institutional Review Board, I have granted approval to the study for a period of 12 months, effective May 23, 2007.

As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.
3. Report promptly to the IRB of the study's closing (i.e., data collecting and data analysis complete at Virginia Tech). If the study is to continue past the expiration date (listed above), investigators must submit a request for continuing review prior to the continuing review due date (listed above). It is the researcher's responsibility to obtain re-approval from the IRB before the study's expiration date.
4. If re-approval is not obtained (unless the study has been reported to the IRB as closed) prior to the expiration date, all activities involving human subjects and data analysis must cease immediately, except where necessary to eliminate apparent immediate hazards to the subjects.

**Important:**

If you are conducting **federally funded non-exempt research**, this approval letter must state that the IRB has compared the OSP grant application and IRB application and found the documents to be consistent. Otherwise, this approval letter is invalid for OSP to release funds. Visit our website at <http://www.irb.vt.edu/pages/newstudy.htm#OSP> for further information.

cc: File  
 Department Reviewer: James A. Parkhurst

*Invent the Future*

VIRGINIA POLYTECHNIC INSTITUTE UNIVERSITY AND STATE UNIVERSITY  
 An equal opportunity, affirmative action institution






**Office of Research Compliance**  
Carmen T. Green, IRB Administrator  
2000 Kraft Drive, Suite 2000 (0497)  
Blacksburg, Virginia 24061  
540/231-4358 Fax 540/231-0959  
e-mail [ctgreen@vt.edu](mailto:ctgreen@vt.edu)  
[www.irb.vt.edu](http://www.irb.vt.edu)  
FWA00000572( expires 1/20/2010)  
IRB # is IRB00000667

DATE: September 21, 2007

MEMORANDUM

TO: James A. Parkhurst  
Steve L. McMullin  
Regina Elsner

FROM: Carmen Green 

SUBJECT: **IRB Exempt Approval:** "Knowledge, Attitudes, and Opinions About Human-Wildlife Conflicts Held By Community Leaders in Virginia", IRB # 07-457

I have reviewed your request to the IRB for exemption for the above referenced project. I concur that the research falls within the exempt status. Approval is granted effective as of September 19, 2007.

As an investigator of human subjects, your responsibilities include the following:

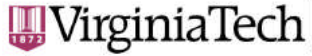
1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

cc: File

*Invent the Future*

VIRGINIA POLYTECHNIC INSTITUTE UNIVERSITY AND STATE UNIVERSITY

*An equal opportunity, affirmative action institution*




**Office of Research Compliance**  
 Institutional Review Board  
 2000 Kraft Drive, Suite 2000 (0497)  
 Blacksburg, Virginia 24061  
 540/231-4991 Fax 540/231-0959  
 e-mail moored@vt.edu  
 www.irb.vt.edu  
FWA00000572 (expires 1/20/2010)  
 IRB # is 00000000000000000000000000000000

DATE: December 11, 2007

MEMORANDUM

TO: James A. Parkhurst  
 Steve L. McMullin  
 Regina Elsner

FROM: Carmen Green 

SUBJECT: **IRB Amendment 2 Approval:** "Knowledge, Attitudes, and Opinions About Human-Wildlife Conflicts Held By Community Leaders in Virginia", IRB # 07-457

This memo is regarding the above referenced protocol which was previously granted approval by the IRB on September 19, 2007. You subsequently requested permission to amend your IRB application. Approval has been granted for requested protocol amendment, effective as of December 11, 2007.

As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

cc: File


*Invent the Future*

VIRGINIA POLYTECHNIC INSTITUTE UNIVERSITY AND STATE UNIVERSITY  
*An equal opportunity, affirmative action institution*

DATE: May 23, 2008

MEMORANDUM

TO: James A. Parkhurst  
Steve L. McMullin  
Regina Elsner

FROM: David M. Moore 

Approval date: 5/23/2008  
Continuing Review Due Date: 5/8/2009  
Expiration Date: 5/22/2009

SUBJECT: **IRB Expedited Continuation 1:** "Knowledge, Attitudes, and Opinions about Human-Wildlife Conflicts Held by Community Leaders in Virginia", IRB # 07-289

This memo is regarding the above referenced protocol which was previously granted expedited approval by the IRB. The proposed research is eligible for expedited review according to the specifications authorized by 45 CFR 46.110 and 21 CFR 56.110. Pursuant to your request, as Chair of the Virginia Tech Institutional Review Board, I have granted approval for extension of the study for a period of 12 months, effective as of May 23, 2008.

Approval of your research by the IRB provides the appropriate review as required by federal and state laws regarding human subject research. As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.
3. Report promptly to the IRB of the study's closing (i.e., data collecting and data analysis complete at Virginia Tech). If the study is to continue past the expiration date (listed above), investigators must submit a request for continuing review prior to the continuing review due date (listed above). It is the researcher's responsibility to obtain re-approval from the IRB before the study's expiration date.
4. If re-approval is not obtained (unless the study has been reported to the IRB as closed) prior to the expiration date, all activities involving human subjects and data analysis must cease immediately, except where necessary to eliminate apparent immediate hazards to the subjects.

cc: File  
Department Reviewer: James A. Parkhurst

*Invent the Future*