PUMA CONCOLOR COUGUAR IN THE ADIRONDACK PARK:
Resident and Visitor Perspectives

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Finally, we are very grateful for the support and insight of the Wildlife Conservation Society's Adirondack and North America Program staff and the extensive commentary of Dr. Karen Hébert on the drafts of this report.

FOREWORD

In peopled landscapes, carnivores are often among the first species to disappear as they become victims of persecution and land-use change. This story rings true in the northeastern United States where most wide-ranging carnivores including wolverines, wolves, mountain lions, and lynx experienced severe population declines or complete extirpation from the ecosystem over the last 150 years. But there are signs of recovery in some species. Lynx range appears to be expanding from Maine into New Hampshire and Vermont, and genetic analyses support the notion that coyotes seem to occupy the niche that wolves once held (Ray 2009). But mountain lions have remained a species whose eastern existence in the past, present and future has raised and continues to raise many questions.

In the late 1990s, the Wildlife Conservation Society (WCS) mapped reports of mountain lions submitted to the New York State Department of Conservation between 1900 and 2000 (Jenkins and Keal 2004). While we were able to dismiss many accounts and others seemed to appear clustered in time or space as one might imagine a released individual mountain lion's activities, some very plausible reports remained. In 2011, a mountain lion hit by a car in Milford, Connecticut, was identified as the same individual from a population in South Dakota. Ultimately we learned this individual also traveled through the Adirondacks. This begs the question: if one can make it, why not more?

Given the patterns of carnivore recovery - particularly that of mountain lions - ongoing elsewhere across the country, we decided to take a pro-active approach to the potential return of mountain lions to the Adirondack landscape. We chose to pursue a human dimensions study to provide a preliminary understanding of Adirondack residents' and visitors' perceptions of possible natural recolonization of mountain lions in northern New York. We see this study as providing a baseline of data by which we can work with state agencies to consider proactive outreach about mountain lions in the region, providing a comparison point to perceptions in some future time should mountain lions establish a population. Living with carnivores in close proximity in the highly populated eastern United States is something new, something different, and not without challenges.

The Wildlife Conservation Society saves wildlife and wild places worldwide through science, conservation action and inspiring people to value nature. In the Northern Appalachian-Acadian region, we are partners in the Staying Connected Initiative, a collaboration of 21 member organizations that operates with a mission to conserve, restore, and sustain critical landscape connections for the benefit of nature and people. As such, WCS is interested in understanding opportunities for large, wide-ranging species to persist and travel throughout the region.

Information is fundamental to understanding and provides the basis for designing actions and building long-lasting support for wildlife. If we have data to inform how people might react to the presence of mountain lions should they eventually recolonize the Adirondacks and the Northern Forest, the collective conservation and wildlife management community will be better able to foster long-term coexistence.

ABOUT THE AUTHORS

As a master's student at the Yale University School of Forestry and Environmental Studies, Elizabeth McGovern combined a background in ecology with social science techniques to advance conservation of wildlife in human-dominated landscapes. While a student, she developed policy alternatives for managing grizzly bear depredation in Wyoming, mitigation strategies for wind energy developers in raptor habitat in the southwestern United States, and prioritization tools for preserving land to protect biodiversity in a changing climate with competing land uses in the Greater Yellowstone Ecosystem. In these and other projects, Ms. McGovern has worked to balance human economic and social needs with the demands of functional ecosystems to reduce and reframe conflict. Ms. McGovern grew up in Bucks County, Pennsylvania with regular visits to her grandparents in Peru, New York. She currently lives in Merriam, Kansas with her partner Bill Cooke and their dog Junebug.

As the Livelihoods and Conservation Coordinator for WCS's North America Program, Dr. Heidi Kretser uses tools and perspectives from the social sciences to achieve greater conservation impact by understanding the human dimensions of natural resource policy and management issues. She has used this approach to understand and resolve complex conservation questions pertaining to human-wildlife conflicts, the impacts of low-density rural development on wildlife, best practices for engaging local people in conservation projects across North America, effective communication strategies to reduce demand for and purchase of wildlife trade items by the U.S. military serving abroad, aligning state wildlife and public health messaging on bats and collaborative approaches to build capacity and achieve conservation outcomes across diverse constituents. Dr. Kretser serves as Adjunct Assistant Professor at Cornell University's Department of Natural Resources. Dr. Kretser is widely published and her work has been featured in the New York Times, the Wall Street Journal, National Public Radio, and a variety of regional media outlets. She completed her Ph.D. in the Human Dimensions Research Unit at Cornell University and holds a master's degree from the Yale School of Forestry. Dr. Kretser grew up in Vermontville, NY, in the Adirondack Park, graduated from Saranac Lake High School and lives in Saranac Lake with her husband, Andy Keal – co-owner of Nori's Village Market, and children Leena and Owen. She has yet to see a mountain lion in the Adirondack Park.

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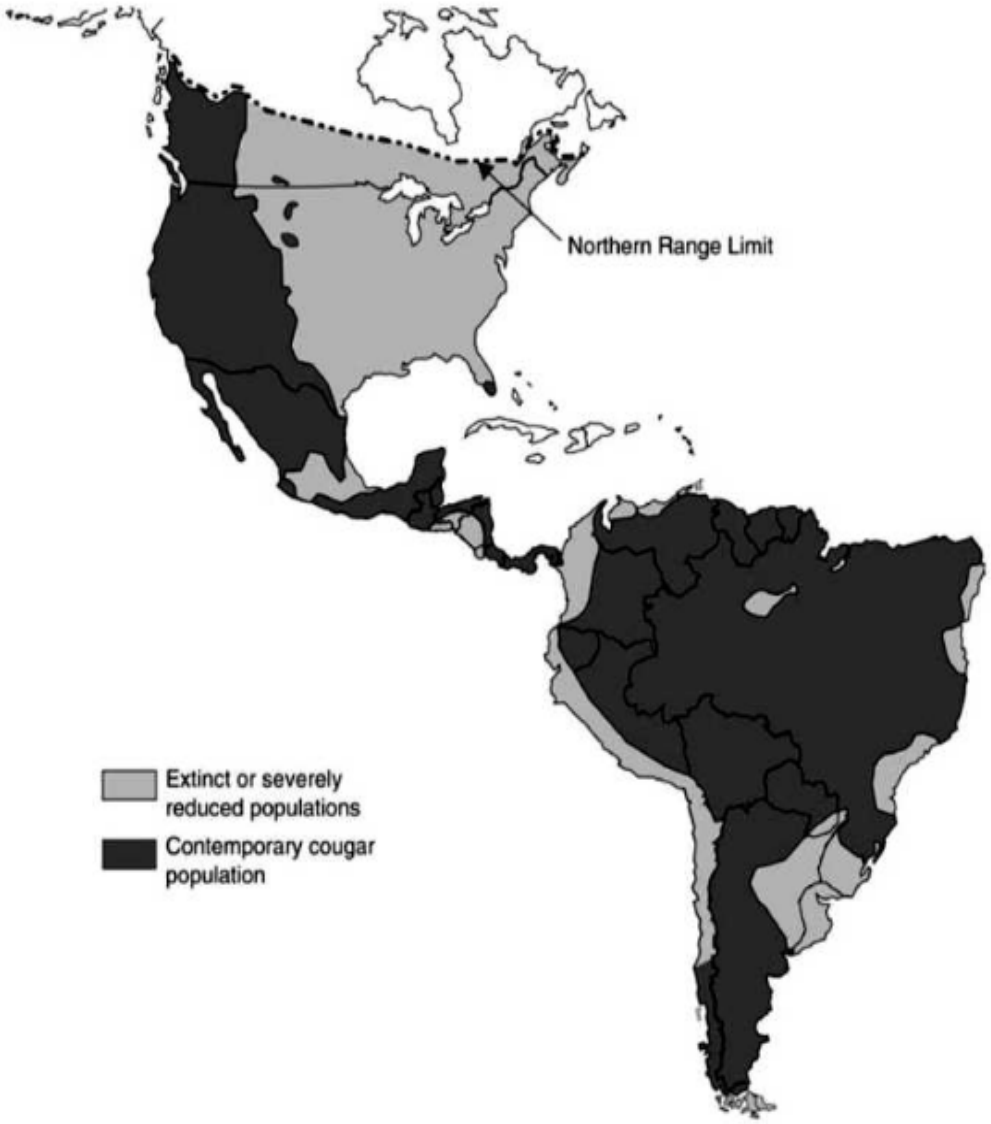


Figure 1: Current and historical range for *Puma concolor* (Hornocker and Negri 2009)

INTRODUCTION

Purpose of this paper

In 2011, a car driving on the Wilbur Cross Parkway near Milford, Connecticut hit and killed a healthy young male cougar showing no evidence of a captive life (DEEP 2011). Genetic analysis indicated that the cougar's DNA matched that of the expanding cougar population in the Black Hills of South Dakota. Paw print comparisons and DNA analysis of scat found in Wisconsin and Minnesota showed that the same individual had moved through those states in 2009 and 2010 (DEEP 2011). This incident inspired retired New York State Department of Environmental Conservation (DEC) Colonel Dave Eggleston, DEC Biologist Kevin Hynes, and DEC Environmental Conservation Officer Louis Gerrain to send hair and photographs of footprints from a cougar that was seen by Colonel Eggleston's wife, Cindy Eggleston, near their home in Lake George in December of 2010, to the Forest Service for analysis (Kerwin 2012). Analysis from the United States Department of Agriculture's Forest Service Rocky Mountain Research Station Wildlife Genetics Laboratory confirmed that the same animal hit on the road in Connecticut had travelled through the Adirondacks as well (Kerwin 2012). Although the connection between the Connecticut cougar and the Adirondack cougar received little coverage in the media, staff of the Wildlife Conservation Society's Adirondack Program (WCS) recognized that if one confirmed mountain lion successfully travelled from South Dakota to the Adirondacks, then perhaps more individuals have made or will make the same journey. Similar to cougar expansions into the Dakotas, Illinois, Minnesota, Michigan, Louisiana, and other states, perhaps this one confirmed wild individual is a signal for a potential future natural recolonization of mountains lions to the Adirondack Park (Davenport, Nielsen, and Mangun 2010; Larue et al. 2012; Dodson 2007; Leberg et al. 2004).

Before this event, natural recolonization of mountain lions in the Adirondacks was not considered in the scientific literature. Natural recolonizations of predators may have social as well as biological impacts, as predators are seen as a threat to life or livelihood by some stakeholders and an almost sacred symbol of the wilderness by others (Bruskotter and Shelby 2010; Larue et al. 2012; Davenport, Nielsen, and Mangun 2010; Kellert et al. 1996). The presence of large mammalian predators on a landscape can bring ecotourism, trophy hunting, livestock depredation and a great deal of outside interest from national organizations (Kellert et al. 1996), Still, predators and humans have been shown to coexist successfully even in relatively high densities with appropriate management (Linnell, Swenson, and Anderson 2001). To understand the potential social impacts of a natural mountain lion recolonization in the Adirondacks, WCS conducted a survey of Adirondack Park residents and visitors in the summer of 2013. Our goal was to collect information to provide a baseline understanding of attitudes towards a potential mountain lion population in the Adirondack Park. Specifically, we wanted to examine what residents and visitors know about mountain lions, their attitudes toward completely natural versus human-assisted restoration of mountain lion populations in the park, and what level of risk they perceive from mountain lions for themselves, their children, and their livestock or pets. We also wanted to examine whether the survey results could inform future communication about mountain lions in the Adirondacks either from the NGO community or the DEC, and leverage WCS's ability to work with wildlife managers and the conservation community across the northeastern United States.

Puma concolor in North America

At the time of European contact with the New World, mountain lions (*Puma concolor couguar,* also known in the United States as cougars, panthers, painters, or catamounts) were found from

coast to coast and from Canada to the tip of Argentina (Figure 1). Mountain lions in the eastern United States were described by some of the earliest European colonists (Bolgiano and Roberts 2005; Terrie 1993). Mountain lions are an exclusively new-world species of large, solitary predators (Iriarte et al. 1990; Fuller and Kittredge 1996). Adult animals average 140lbs, although animals up to 200lbs have been recorded, and are up to 9 feet long from nose to tail (Robinette, Gashwiler, and Morris 1961). Their prey is 60-80% mule deer (*Odocoileus hemionus*) or white-tailed deer (*Odocoileus virginianus*), depending on which prey species is in their range, and they hunt frequently – the average mountain lion will kill 30-40 deer per year (Laundré 2013; Caso et al. 2008; Iriarte et al. 1990). Mountain lions are territorial, and the size of an individual's home range is primarily a function of prey density (Thompson and Jenks 2005). Females have two to three kits at a time, and these stay with and learn from their mother for two years, at which point they are almost her equal in size (Robinette, Gashwiler, and Morris 1961). After leaving their mothers, young mountain lions can disperse widely in search of their own territory, with males traveling the farthest, generally up to 200km (Sweanor, Logan, and Hornocker 2000; Beier 1995). Mountain lions can be found in a wide range of environments, from arid mountains to dense forests (Caso et al. 2008; Laundré 2013). Currently, the entire species *Puma concolor* is listed as being native to more than 20 countries and as having a low conservation threat, though the global population is declining; the International Union for the Conservation of Nature (IUCN) lists them as a species of Least Concern (Caso et al. 2008). The single North American subspecies, *Puma concolor couguar*[1], is listed in Appendix I of CITES - threatened with extinction.

Cougars in the Adirondack Park

The Adirondack Park covers more than 24,000 km^2 of northern New York State, larger than any other park in the lower 48 states. Although once home to grey wolves (*Canus lupus*) and mountain lions, today both are considered regionally extinct (Terrie 1993; Laundré 2013; Enck and Brown 2002). White settlers exterminated the eastern cougar in the Adirondack Mountains in upstate New York through a system of paid bounties offered initially by local and then by state governments, including Hamilton County in 1811 and the State of New York starting in 1871 (Terrie 1993). People considered cougars to be a threat to the safety of humans, livestock, and game species of interest to humans. The indiscriminate bounty system, which did not target particular "problem" animals or age classes, helped ensure that they are no longer found in much of their historic range (Terrie 1993). The last bounty on a mountain lion in New York State was paid in 1894, though the animals were generally considered to have been extirpated in 1885 (Terrie 1993).

Whether remnant populations in isolated areas survived this campaign has been a subject of much debate over the years, and sightings were frequent enough that the subspecies was listed in the

[1] A note on taxonomy: The nomenclature of mountain lions remains complicated. Although they have been long classified as a subspecies distinct from those found in the western United States, genetic analysis of museum specimens suggests that they are all the same subspecies, *Puma concolor couguar* (Culver 2005). This is recognized by IUCN, among others, but the US Fish and Wildlife Service retains the older classifications and describes the Eastern Cougar is a separate, now extinct subspecies which uses the identical scientific name *Puma concolor couguar* (Caso et al. 2008; McCollough 2011). This has important implications for discussions of reintroducing mountain lions to the eastern United States (Cardoza and Langlois 2002). Throughout this document, the scientific name *Puma concolor couguar* and the terms "eastern cougar," "eastern mountain lion," or "eastern puma" are used to refer to North American cougars found in the eastern United States rather than referring exclusively to a genetically or morphologically distinct subspecies.

first year of the Endangered Species Act of 1973 (McCollough 2011). Several studies examined the question, but in 2011 an assessment determined that although there were sighting of animals described as cougars, there was no evidence of a wild, breeding population outside of Florida (Cardoza and Langlois 2002; Maehr et al. 2003; McCollough 2011). The United States Fish and Wildlife Service (USFWS) proposed that other species of cat, including bobcat (*Lynx rufus*) and lynx (*Lynx canadensis*), and potentially released or escaped captive mountain lions were sources of some sightings (McCollough 2011; Bolgiano and Roberts 2005; Cardoza and Langlois 2002). Several states allow the sale and possession of mountain lions as pets or for educational purposes, and the exact number of animals kept by private individuals in the United States for these purposes is unknown (Cardoza and Langlois 2002). In 2000, the United States Department of Agriculture estimated the number of captive mountain lions at a minimum of 101 animals in Arkansas alone (Bolgiano and Roberts 2005).

In the Adirondacks, from 1934 to 2000, 168 mountain lion sightings were reported to the New York State Department of Environmental Conservation (Jenkins and Keal 2004). Most of these were unconfirmed, and not every sighting was reported to the DEC (Van Arsdale 2008). Presently, evidence indicates that mountain lions are increasing in numbers in the western United States and Canada, and that they may be recolonizing their former range in the east (Bertrand 2006; Bertrand et al. 2006; Gerson 1988; Lemelin 2009; Larue et al. 2012; Mallory et al. 2012; Bolgiano and Roberts 2005; Rosatte 2011; Jenkins and Keal 2004). Mountain lions have been credibly spotted in the Midwestern United States in increasing numbers, including in Illinois, Minnesota, Michigan, Louisiana, and Wisconsin (Davenport, Nielsen, and Mangun 2010; Larue et al. 2012; Dodson 2007; Leberg et al. 2004). Canadian cougars are also moving westward from their stronghold in British Columbia; there is now scientific evidence for established populations in Ontario and Quebec and there have been confirmed sightings as far east as New Brunswick (Bertrand et al. 2006; Gerson 1988; Lemelin 2009; Mallory et al. 2012; Rosatte 2011). Ontario and Quebec offer protected status to their new mountain lion populations (Mallory et al. 2012; Rosatte 2011).

Mountain lions have demonstrated their ability to disperse across long distances in several studies that followed tagged or radio-collared animals. A 2005 study of young mountain lion dispersal documented a radio-collared male from the South Dakota Black Hills population hit by a train in Oklahoma – the straight-line distance was 663 miles, covered over the course of 266 days, and it included crossing major highways and large rivers (Thompson and Jenks 2005). A female cougar from a different population in Utah traveled over 800 miles in one year (Stoner et al. 2008). Several studies of mountain lion dispersal show ability to cross barriers and traverse uninhabitable areas (Stoner et al. 2008; Sweanor, Logan, and Hornocker 2000; Thompson and Jenks 2005, 2010), which supports the idea that mountain lions from populations to the west or the north at least reach the Adirondack Park, but it does not guarantee a viable population in the immediate future. Males generally disperse farther and faster than females, which can have overlapping territories and are frequently more tolerant of each other, so a breeding population might not be achieved for many years after the arrival of the first, mostly male, transient individuals (Kellert et al. 1996; Larue et al. 2012; Davenport, Nielsen, and Mangun 2010; Thompson and Jenks 2010).

All this seems to suggest that there is the possibility for a natural recolonization of the Adirondack Park by mountain lions from the western United States and from Canada, though the time-frame is highly uncertain. Whether individual animals of unknown origin pass through the Adirondack Park is of little long-term ecological significance – it is the possibility of a self-sustaining, breeding population that drives much of the scientific interest in mountain lions in the Park. Two major habitat assessments have been conducted. The first, completed in 1981, compared the habitats in

the western United States where mountain lions were found to what existed in the Adirondack Park (Brocke 1981). Brocke (1981) determined that there were too many roads to allow a healthy population of cougars to thrive – the number of animals killed in vehicle collisions would quickly deplete the population. In 2011, another analysis compared the Adirondack Park with the Black Hills in South Dakota, an area with a booming population of mountain lions that did not exist in 1981 (Laundré 2013). Laundré concluded that, given that the Black Hills population thrived relatively close to roads, mortality due to vehicle collisions would not be the limiting factor that Brocke had expected. According to Laundré (2013), the only thing preventing mountain lions from returning would be whether humans could tolerate them, as the geographic area and prey population were modeled to be sufficient to support 150 to 350 animals within about 70% of the Adirondack Park.

Although the ecological ability of the Adirondack Park to support a viable population of mountain lions continues to be explored, the need for information about the human community's opinions toward transient or resident cougars is clear. The current study, conducted through the Wildlife Conservation Society's Adirondack Program, was the first to explore the beliefs and attitudes of Adirondack residents and visitors toward a natural or human-assisted return of cougars to the Park.

Wildlife Values Orientation

The concept of a Wildlife Values Orientation is based in the idea that there are relationships between broad values, such as protectionist or utilitarian approaches to nature, and attitudes and behaviors relating to wildlife (Zinn and Pierce 2002; Purdy and Decker 1989; Larue et al. 2012; Kaltenborn and Bjerke 2002; Bjerke and Kaltenborn 1999). Understanding a community or individual's Wildlife Values Orientation allows managers and researchers to better predict what kinds of wildlife management projects would be acceptable and to whom (Zinn and Pierce 2002). The Wildlife Attitudes and Values Scale (WAVS) has been developed and extensively tested by the Human Dimensions Research Unit at Cornell University to create quantitative measures of these values (Butler, Shanahan, and Decker 2003; Purdy and Decker 1989). WAVS is a set of 18 questions designed to yield scores reflecting aspects of a respondent's wildlife values orientation in four major areas – Social benefits, Traditional Conservation (utilitarian), Communications Benefits, and Problem Tolerance (Butler et al., 2003).

The first three areas measure perceived benefits to humans from wildlife - social benefits from the existence of wildlife; Traditional conservation benefits from sustainable consumptive use of wildlife, often hunting or trapping, but also through economic activity associated with wildlife; and Communications benefits from enjoyment of talking and learning about wildlife (Butler, Shanahan, and Decker 2003; Purdy and Decker 1989). The fourth area, Problem tolerance, measures the respondent's willingness to accept certain potential harms associated with wildlife, including property damage, disease transmission, and threats to human safety (Purdy and Decker 1989). In all cases, a higher score indicates that they value that benefit more or that they are more willing to accept those potential problems. A person with a low problem tolerance and low social benefit score might be expected to be less supportive of an initiative to improve habitat for a game species, for instance than a person with a high traditional conservation score and higher problem tolerance. These scores can then be used to describe the world view of a human population more comprehensively than single answers to single questions – knowing communities' Wildlife Values Orientation would be more useful in predicting public attitudes toward a proposal than simply what proportion are hunters or hikers, for instance (Butler, Shanahan, and Decker 2003; Zinn et al. 1998; Teel and Manfredo 2010; Fulton, Manfredo, and Lipscomb 1996). This also allows

wildlife managers to distinguish between a true majority of stakeholders and the most vocal subset to determine what is in the interests of the human community (Purdy and Decker 1989).

Risk Perception

The ability of stakeholders to accept the presence of a species is tied to the level of risk perceived from that animal by those stakeholders, among other factors (Kellert 1985; Riley and Decker 2000a). Animals that are perceived to have great potential risk and few benefits are not tolerated as well as animals that pose little risk and provide significant aesthetic or economic benefits (Riley and Decker 2000a). These risks can be to human safety, to livestock and other domestic animals, and to property, and can be measured as cognitive risk (actual probability of an event occurring) and affective risk (worry or dread associated with an event (Riley and Decker 2000a; Carpenter, Decker, and Lipscomb 2000). Unpredictable events, such as mountain lion attacks, are frequently perceived as higher risk and as provoking more dread despite their infrequent occurrence (Riley and Decker 2000a; Beier 1991). Even populations with a long history of living with a species may not accurately gauge the risks it may pose (Riley and Decker 2000a, 2000b).

Media can play a significant role in how wildlife-related risks are portrayed, the level of risk perceived by stakeholders, and the types of interventions available to wildlife managers (Siemer et al. 2009; Jacobson et al. 2012; Destefano and Deblinger 2005). Understanding which types of risks each group of stakeholders focuses on can allow for more effective, targeted environmental education efforts and tools for the community (Zinn and Pierce 2002; Thornton and Quinn 2010; Riley and Decker 2000a, 2000b; Gore et al. 2009; Carpenter, Decker, and Lipscomb 2000). Understanding who is concerned about what can allow managers to provide better information to their wide variety of constituents to address their concerns and help them share the landscape with wildlife (Gore and Kahler 2012), whether it involves guidance for keeping children safe from potential predators or choosing ornamental plant species that are less appealing to herbivores. Surveying can be a more effective way of understanding the interest of all groups within a community, particularly those, like women, who do not otherwise participate in wildlife management decision making (Gore and Kahler 2012).

Goals of the Study

Understanding how Adirondack residents and visitors think about wildlife through WAVS, what they believe about the current status of mountain lions in the park, what they know about mountain lions generally, what risks they perceive if mountain lions were to return, and what management actions they currently support helps to inform a broad range of future policies and potential interventions. It is now clearly possible for mountain lions to reach the Adirondack Park on their own, and at least possible for the habitat within the park to support them although there is no evidence for a breeding population within the park now. With this study, WCS lays the groundwork for realizing the social implications of the restoration of this important aspect of the Adirondack wilderness.

METHODOLOGY

The Adirondack Park

Created in 1892 by the state legislature, the Adirondack Park is a sprawling temperate-to-boreal landscape, 43% of which is publicly owned by the State of New York (APA 2003). More than 130,000 people live within the "blue line" of the Park boundary (APA 2011), with an estimated additional 45,000 seasonal residents (APA 2008). Major local industries include tourism and forestry. Seven to ten million people are estimated to visit the Adirondack Park each year, mostly in the summer and early fall (Dawson 2012). The State University of New York conducted a survey of visitor experiences published in 2012. In that study, 90% reported viewing natural features as an activity of their visit; 78% listed hiking or walking, 75% viewed wildlife, and 15% backpacked and camped (Dawson 2012).

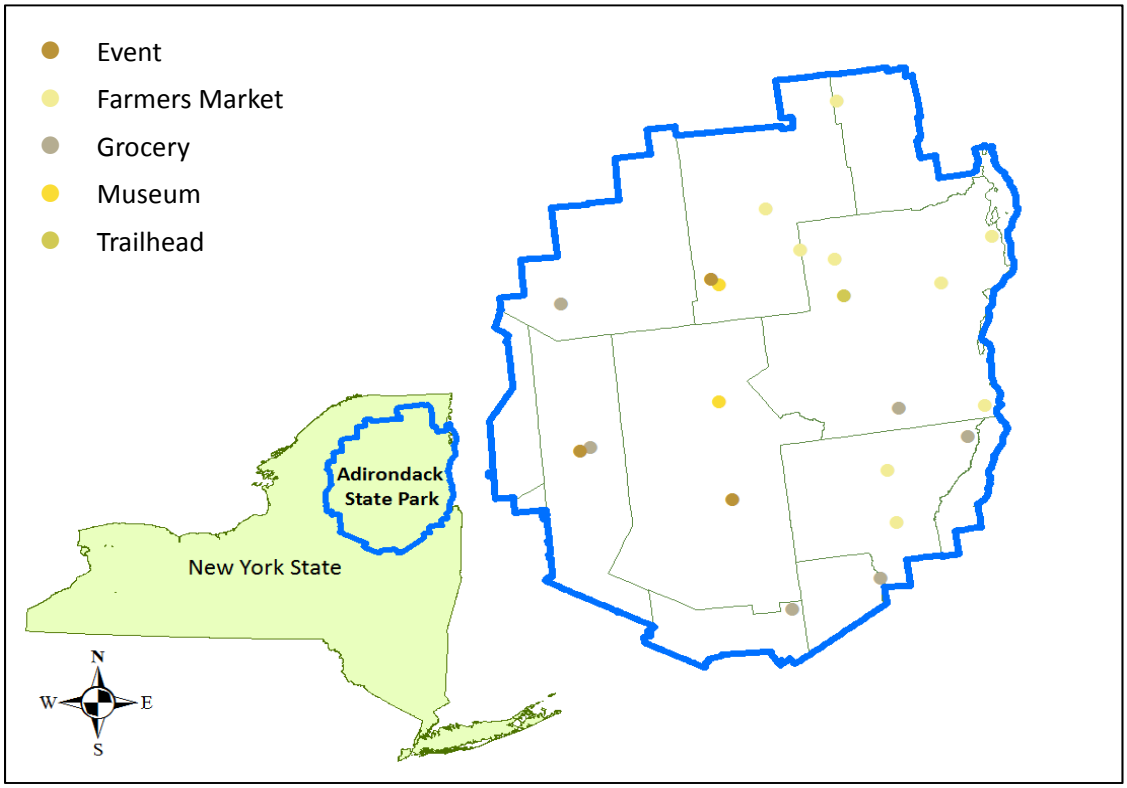


Figure 2: Map of survey locations by location type. All surveys were conducted between June 25th and August 17th, 2013. A total of 315 people were surveyed.

The Adirondack Park has a diversity of habitats, some not found farther south, that provide home to more than 190 birds, 54 mammals and 35 amphibians and reptiles. These include suites of boreal birds including common loons (*Gavia immer*) and gray jays (*Perisoreus canadensis*), American marten (*Martes americana*), as well as common species such as white-tailed deer, foxes (*Vulpes vulpes* and *Urocyon cinereoargenteus*), fisher (*Martes pennanti*), bobcat, beaver (*Castor canadensis*), mink (*Neovison vison*), black bear (*Ursus americanus*), and eastern coyote (*Canis latrans "var"*) (Terrie 1993; Jenkins and Keal 2004). In recent years, moose (*Alces alces*), which had been locally extinct, have reestablished a population within the park, though their current

population status is uncertain (Jenkins and Keal 2004). Several carnivores present at the Park's founding are missing from the ecosystem, including wolf (*Canis lupus*), cougar, and lynx (Terrie 1993; Laundré 2013). Wolf reintroduction was considered but determined to be socially unacceptable, and a lynx reintroduction was attempted but failed (Wilson and Bruskotter 2009; Enck and Brown 2002; Hoving et al. 2005; Terrie 1993).

Survey

Wildlife Conservation Society staff designed a survey containing five major sections (Appendix). The first section asked 18 Wildlife Values Orientation (WVO) questions (Purdy and Decker 1989; Butler, Shanahan, and Decker 2003) to understand how respondents generally value wildlife (e.g. protectionist to utilitarian). Respondents indicated agreement to these statements on a five-point Likert scale. The second section included questions on the respondents' beliefs about the presence of mountain lions in the Adirondacks. We asked how common mountain lions are in the Adirondacks currently (Davenport, Nielsen, and Mangun 2010), as well as whether each respondent had personally seen a mountain lion, and noted the descriptions of their sightings. The third section assessed how knowledgeable the respondent was about mountain lions using true/false questions (Enck and Brown 2002). We also included statements with a 5-point scale of agreement on perceived attributes of mountain lions (Riley 1998). We measured risk posed by mountain lions cognitively through a risk ladder developed by Riley (1998, Riley and Decker 2000b) and affectively through questions about behavior relating to outdoor recreation, children, pets, and livestock. In the fourth section we asked about management preferences, and finally we included demographic questions. The survey was revised and refined through discussion with WCS staff, as well as with key informants. Key informants are people who are particularly knowledgeable about the study topic (Babbie 2010).

Sampling Methodology

One researcher (McGovern) orally administered the survey to English-speaking adults across the Adirondack Park from June 25th to August 17th, 2013 (Figure 2, above). There were a total of 23 sampling locations of five types – museums (Adirondack Museum and the Wild Center), events (Tupper Lake Woodsman's Days, Old Forge Gun Show, and Speculator Craft Fair), grocery stores, farmer's markets, and the state's most-visited trailhead, the High Peaks Information Center at the Adirondack Loj at Heart Lake. We employed a non-random convenience sample and roughly stratified according to population. In addition to the survey, conversations with two groups of key stakeholders were recorded to provide additional perspectives. These groups were the Franklin County Federation of Fish and Game Clubs and wildlife biologists from the NYS Department of Environmental Conservation's Region 5 office in Ray Brook, New York.

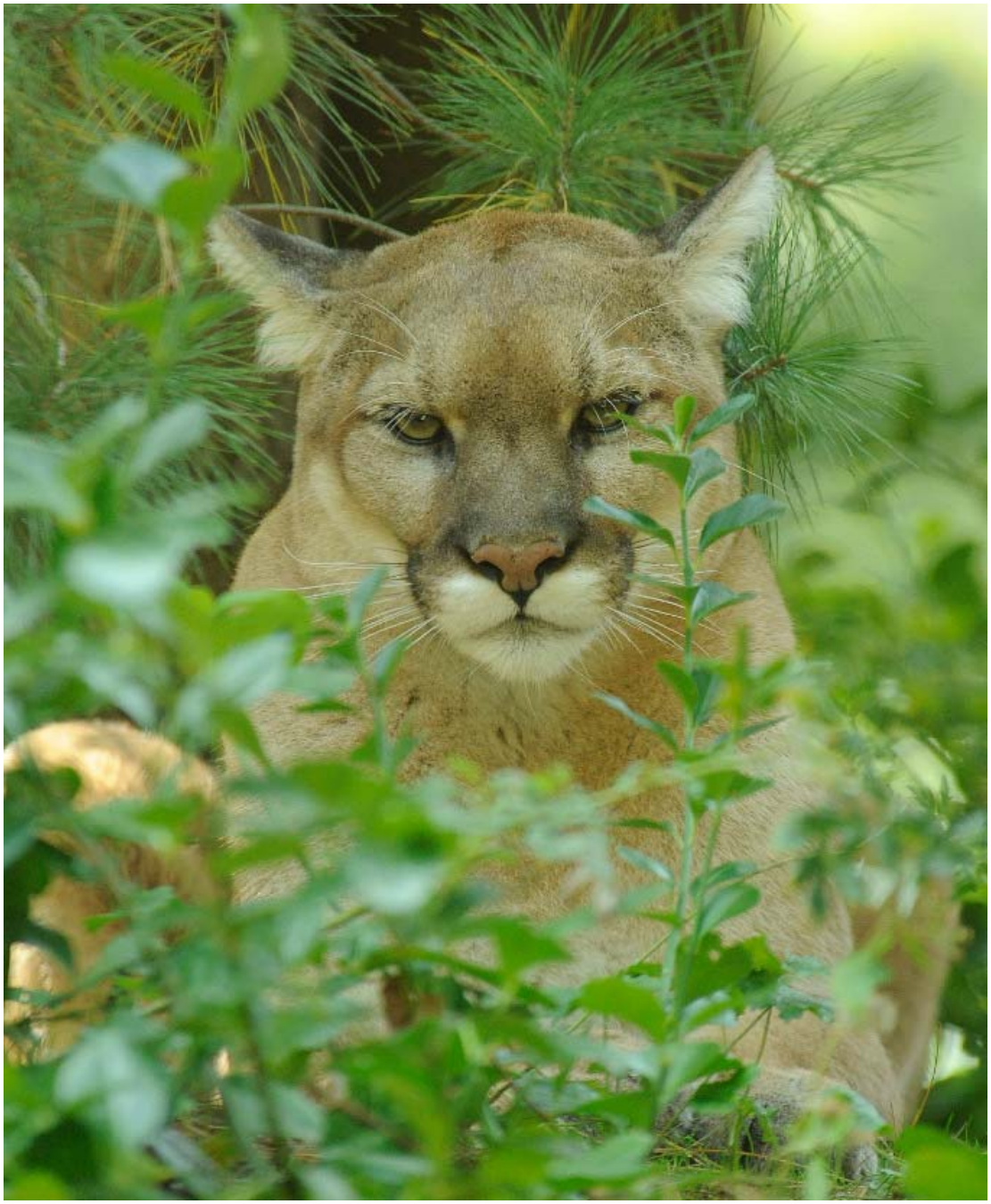
Empire State Poll

In January and February of 2014, two questions from the original Adirondack survey were included in the Cornell University Survey Research Institute's Empire State Poll (ESP). The ESP is an annual telephone survey of New York State residents and uses a randomized sampling frame, allowing the 800 responses gathered each year to represent the state as a whole.

Statistical Analyses

All statistical analyses were conducted using IBM SPSS 21.0 (IBM 2012) and Minitab 16 (Minitab 2010). Demographic responses were compared using Chi-Square analyses for categorical data and two-sample T tests or Analysis of Variance (ANOVA) tests for continuous data. When significant differences were detected using ANOVA, post-hoc analysis using Tukey tests revealed the direction of the relationships.

Principal components factor analysis with varimax rotation was used to identify the primary components of the Wildlife Attitudes and Values Scale items of the survey. The Eigen value criterion was >1 for including components in the analysis, and the alpha for the Bartlett's Test of Sphericity was $p<0.05$ (Butler, Shanahan, and Decker 2003; Enck and Brown 2002). WAVS scores for each component were tabulated by averaging each respondent's responses to questions in that component. Average WAVS scores were then compared between groups using independent T-tests.



RESULTS

Full proportions of responses to each question are reported in the Appendix.

Demographic Information

We surveyed 315 respondents from across the park. Of those, 54.9% were male and 45.1% were female. Respondents were all adults, but 69.9% of them reported their age as 50 or older. There is evidence of a significant relationship between age and gender (Pearson Chi-Square =9.186, df=3, p=0.027), with men more likely to be younger. More than half of the respondents (58%) were residents of the park, with 62.8% of those being year round residents. The amount of time a resident had lived in the Adirondack Park ranged from 1 to 80 years, with a mean residency of 29.84 years. Non-residents visited at a wide range of rates, from weekly visits to those for whom the survey caught them at their first ever visit to the region. More than three-quarters of visitors reported that they came to the Adirondack Park at least once per year (77.1%).

Less than one-fifth of Adirondack respondents (18.2%) had children under 18 living with them at the time of the survey. More than half of respondents had some kind of domestic animals that spend time outdoors (53.8%). Of those, 14.9% had livestock of some kind, including horses, cattle, chickens, goats, and sheep and 98% had cats or dogs. Respondents could indicate owning both livestock and cats or dogs, and only two respondents owned livestock exclusively.

Adirondack survey respondents almost universally reported enjoying spending leisure time outdoors when in the Adirondack Park (98.4%). A majority (79.3%) of respondents hiked in the Adirondacks at least once a year, while 14.6% never did. Residents were more likely to hike in the Adirondacks more frequently than non-residents (Pearson Chi-square=48.284, df=5, p<0.001). Nearly 42% of the respondents went camping in the Adirondacks at least once a year, while 47.5% never had camped in the Adirondacks. There was evidence of a significant relationship between residency and camping frequency, with residents more likely to report never camping (Pearson Chi-square= 12.427, df=5, p=0.029). Respondents visited all wilderness areas about which they were questioned, but some wilderness areas were more popular than others (varied from 4% of respondents for Pigeon Lake to 63.8% for the High Peaks, n=285). 20.4% had never been to any of the wilderness areas listed.

Most Adirondack respondents were not hunters - only 13.4% of all respondents reported that they had hunted in the Adirondack Park in the previous 12 months. Significantly more male respondents were hunters than female respondents (t=4.309, df=271.472, p<0.001). Residents were more than twice as likely to hunt in the Adirondacks (17.03% of all residents versus 8.33% of all non-residents, Pearson Chi-Square =4.998, df=1, p=0.025). Of all hunters, 85.7% had hunted white-tailed deer, 26.2% had hunted black bear (*Ursus americanus*), 36.6% had hunted a game bird species such as turkey (*Meleagris gallopavo*) or ruffed grouse (*Bonasa umbellus*), and 31.7% had hunted a furbearing mammal of some kind. These were not exclusive categories, and hunters frequently chose more than one. Nearly 62% of hunters reported going out to hunt at least once a week during their game species' season. Only 4.8% made a hunting effort once per season. When asked to describe the quality of hunting in the Adirondacks on a 5 point scale, the average response was 2.81 (standard deviation 1.065), which translates to between "good" (2) and "neither good nor bad" (3).

The ESP had 800 respondents from across New York State out of a total of 6806 calls, of which 81 faced a language barrier, 388 were refused and the remaining 5537 were either inactive or a

wrong number. The respondents were 49.1% male and 50.9% female, and again respondents were all adults. In this case, 50.5% of respondents reported being 50 years old or older. In the ESP, 35.2% of respondents had at least one child under 18 in the house. ESP respondents were not asked about pet or livestock ownership or about outdoor recreation habits and preferences.

Section A: Wildlife Values

Principal components factor analysis of the Wildlife Attitudes and Values Scale (WAVS) items of the survey revealed 4 primary components, and those 4 components explained 64.72% of the variance in response to the 18 Wildlife Values Orientation Questions (Table 1).

Men and women had significantly different WAVS scores only on the Traditional Conservation component, where men scored higher than women ($t=4.65$, $df=312$, $p<0.001$) (Table 2, below). Residents and non-residents differed in their views on Social Benefits ($t=-2.54$, $df=312$, $p=0.012$), Traditional Conservation ($t=-2.239$, $df=311$, $p=0.026$), and Communication Benefits ($t=-2.402$, $df=312$, $p=0.017$). In each case the non-residents had higher scores. Full-time and part-time residents differed significantly only on Social Benefits, where part-time residents had higher scores ($t=-2.227$, $df=181$, $p=0.027$). Hunters and non-Hunters differed significantly on Traditional Conservation, where Hunters had a much higher score ($t=7.496$, $df=311$, $p<0.001$). People with pets and livestock did not have significantly different WAVS scores than people that did not own animals. Regular hikers (defined as those who indicated hiking in the Adirondack Park more than once per year, $n=169$) differed significantly from those that were not regular hikers (defined as those that indicated hiking in the Adirondacks once per year or less often), in that hikers had higher Problem Tolerance scores ($t=2.076$, $df=312$, $p=0.039$). People with children under the age of 18 living at home differed from those without on two WAVS components, Traditional Conservation ($t=2.384$, $df=311$, $p=0.018$) and Problem Tolerance ($t=2.464$, $df=312$, $p=0.014$). In both cases people with children had higher scores. Respondents under 50 years old also had significantly higher Problem Tolerance scores than respondents over 50 ($F=6.934$, $df=3$, $p<0.001$).

Table 1: Results of principal components factor analysis, indicating four main components and the correlation of each question to those components.

		Principal Components			
Question number	WAVS items	Social benefit	Traditional conservation	Communication benefits	Problem tolerance
A1	*Sign of Quality*	0.724*	-0.189	-0.360*	-0.217
A2	*Exist in Nature*	0.859*	-0.093	-0.262	-0.170
A3	*Ecological Role Understand*	0.853*	-0.089	-0.236	-0.203
A4	*Behavior Included in*	0.847*	-0.022	-0.073	-0.151
A5	*Education Discuss with*	0.852*	-0.086	-0.126	-0.142
A6	*Family/Friends Observe/*	0.727*	-0.060	0.288	-0.054
A7	*Photograph*	0.547*	0.183	0.625*	0.011
A8	*Seen in Art*	0.663*	-0.046	0.518*	-0.082
A9	*Express opinions*	0.679*	-0.086	0.182	-0.035
A10	*Furs Recreational*	-0.035	0.723*	-0.027	0.116
A11	*Hunting*	0.047	0.811*	0.025	0.098
A12	*Food Hunting Sustainable*	0.215	0.740*	-0.134	0.039
A13	*Management Local Economic*	0.342*	0.627*	-0.225	-0.043
A14	*Benefit Tolerate*	0.349*	0.458*	0.102	0.117
A15	*Nuisance Property*	0.332*	-0.200	-0.020	0.724*
A16	*Damage Disease*	0.223	-0.253	-0.008	0.734*
A17	*Transmission*	0.238	0.036	-0.065	0.736*
A18	*Personal Safety*	0.418*	0.036	-0.168	0.534*
Eigen Value		5.841	2.545	1.163	2.100

* indicates a significant question for that component

Table 2: Wildlife Attitudes and Values Scores (WAVS) among different subsets of respondents.

WAVS Comparison	Social benefit score	Traditional conservation score	Communication benefits score	Problem tolerance score
Men	1.216 (0.030)	0.635 (0.051)*	1.145 (0.034)	0.632 (0.047)
Women	1.143 (0.034)	0.299 (0.051)*	1.108 (0.044)	0.549 (0.057)
Residents	1.136 (0.028)*	0.412 (0.047)*	1.075 (0.035)*	0.537 (0.051)
Non-residents	1.251 (0.036)*	0.580 (0.069)*	1.207 (0.043)*	0.680 (0.050)
Full-time residents	1.088 (0.035)*	0.461 (0.057)	1.026 (0.045)	0.509 (0.064)
Part-time residents	1.216 (0.045)*	0.327 (0.078)	1.157 (0.055)	0.585 (0.083)
Hunters	1.159 (0.054)	1.138 (0.086)*	1.000 (0.064)	0.667 (0.099)
Non-Hunters	1.188 (0.025)	0.382 (0.374)*	1.151 (0.030)	0.586 (0.039)
Animal owners	1.191 (0.033)	0.501 (0.058)	1.124 (0.039)	0.630 (0.051)
Non-animal owners	1.176 (0.030)	0.462 (0.044)	1.138 (0.038)	0.559 (0.051)
Regular hikers	1.195 (0.026)	0.518 (0.043)	1.121 (0.034)	0.644 (0.041)*
Non-hikers	1.156 (0.043)	0.393 (0.072)	1.155 (0.046)	0.477 (0.073)*
Children	1.249 (0.054)	0.670 (0.094)*	1.158 (0.060)	0.785 (0.055)*
No children	1.170 (0.025)	0.441 (0.040)*	1.125 (0.031)	0.555 (0.042)*

[a] scores reported as mean (standard error) ; *indicates significant differences between groups ($p<0.05$)

Section B: Cougar Existence

When asked how common mountain lions are in the Adirondack Park, only 18.7% of respondents indicated that they are extinct (1 on the 5 point scale). Most (51.9%) chose a 2 on a 5 point scale, putting the animals in the very rare but present category. The mean response of 2.24 (standard error 0.053) is significantly different from a mean of 1, what would be expected if they were believed by survey respondents to be extinct ($t=23.279$ $df=309$, $p<0.05$). When asked whether he or she had ever seen a mountain lion in the Adirondacks, 15.2% said that they had (48 respondents) and 84.8% said no (267 respondents). Not included in the survey questions themselves but included in notes taken during the survey, 64 respondents described either seeing a mountain lion themselves or a close friend or family member seeing a mountain lion in New York State. Seven of those reported their sightings to the NYS DEC.

Section C: Cougar Natural History

Respondents had mixed success with the question about cougar natural history, or knowledge questions (Table 3). The six questions in Section C were used to create a new variable KNOWLEDGESUM which was the number correct answers from each respondent. The average score was 3.54 with a standard error of .08044 (n=315). There was no significant difference in KNOWLEDGESUM between residents and nonresidents ($t=-0.15$, $df=312$, $p=.875$) or between male and female respondents ($t=0.359$, $df=313$, $p=.720$).

Table 3: Percentage of correct responses to each knowledge-based question. Correct responses in parentheses.

Knowledge questions	Correct responses (%)
Did mountain lions live in the Adirondacks in the past? (Yes)	86.7%
Are mountain lion attacks on humans common in areas where mountain lions live close to humans? (No)	72.7%
Are mountain lions found in many countries around the world? (Yes)	37.1%
Do mountain lions prefer to eat livestock, even when wild animals are plentiful? (No)	54.9%
Are mountain lions in danger of becoming extinct worldwide? (Yes)	55.9%
Do mountain lions kill a large number of pets in areas where mountain lions live near homes with pets? (No)	47.3%

Section D: Cougar Attitude and Risk

The majority of respondents did not believe that the risks associated with mountain lions living in the Adirondack Park are well understood, when support was calculated as indicating "strongly agree" or "agree" with the statement (Table 4, below). Less than half of all respondents expected to change their habits regarding their children, pets, and personal time outdoors in response to the presence of mountain lions in the Park.

Table 4: Percentage of respondents indicating agreement with statements of risk. Strongly agree and agree are combined.

Risk statements	Agree (%)
The risks associated with mountain living in the Adirondacks are well-understood	22.9
If mountain lions lived in the Adirondacks I would change my outdoor recreation habits	34.9
If mountain lions lived in the Adirondacks I would keep my pets inside	22.5
If mountain lions lived in the Adirondacks I would worry about children playing outside	41.3
If mountain lions lived in the Adirondacks I would avoid recreating by myself	26.3

Risk Ladder

On a scale from a to z, with a being 0 deaths per million people per year due to mountain lion attacks and z being 1 million deaths per million people per year, the respondents most commonly selected "b" (27.9% of respondents, n=86) as the level of mortality a healthy population of 100-200 mountain lions posed to humans in the Adirondacks. Three-quarters of respondents indicated that the risk of harm to humans from mountain lions was below the risk from operating a farm tractor (n= 285), and 14.6% indicated that mountain lions posed no risk to humans at all (n=45). Women reported a significantly higher average perception of risk than men (t=2.93, df=257, p=0.004). Different age groups did not have significantly different perceptions of risk (F=1.05, df=3, p=0.370). Respondents with children did not have significantly different levels of perceived risk than respondents without them (t=-1.504, df=305, p=0.133). Respondents with higher KNOWLEDGESUM perceived a significantly lower risk from mountain lions (Pearson correlation = -0.188, p=0.001).

Risk to Domestic Animals

Less than 40% of respondents indicated that they would keep their pets inside if mountain lions were to return to the Adirondacks. Women were significantly more likely to agree with the statement than men (t=3.886, df=313, p<0.001). People with pets did not respond significantly differently than people without them (t=1.807, df=312, p=0.72), nor did residents and non-residents (t=-1.728, df=312, p=0.085). Different age groups were also not significantly different (F=2.058, df=3, p=0.106). People with higher KNOWLEDGESUM scores were significantly less likely to indicate that they would keep their pets inside if mountain lions were in the Adirondacks (Pearson correlation =0.182, p=0.001).

Risk to children

More than 41% of respondents indicated that they would worry about children playing outside if there were mountain lions in the Adirondacks. Men and women did not respond differently (t=-1.74, df = 291, p=0.083). Residents and non-residents were also not significantly different (t= 0.89, df=291, p=0.372), nor were the different age groups (F=0.70, df=3, p=0.553). Respondents with children did not have significantly different levels of perceived risk toward mountain lions than respondents with them (t=-0.274, df=312, p=0.784). Respondents with higher KNOWLEDGESUM scores were significantly less likely to agree that they would worry about children if there were mountain lions in the Adirondacks (Pearson correlation=0.312, p<0.001)

Recreating Alone

A majority of respondents disagreed with the statement "If mountain lions lived in the Adirondacks I would avoid recreating by myself" (64.5% n=203). Women were significantly more likely than men to agree that they would avoid recreating alone (t=5.589, df=313, p<0.001). People of different ages did not give significantly different responses (F=1.513, df=3, p=0.211), nor did residents and non-residents (t=-0.895, df=31.5, p=.371). Respondents with higher KNOWLEDGESUM scores were significantly less likely to agree that they would avoid recreating alone (Pearson correlation=0.125, p=0.027).

Section E: Cougar Management

More than three-quarters of all Adirondack respondents supported the idea of mountain lions naturally returning to the Adirondack Park, but only half felt wildlife management agencies should act to encourage a population (Table 5, below). Less than 40% supported the idea of releasing mountain lions into the Park as part of a reintroduction program. Almost a third of respondents were neutral about an intentional release (28.6% n=91), and 21.3% (n=67) were neutral about wildlife management agencies establishing cougars in the park. When divided by residents and non-residents, there were significant differences in support (Table 4). Non-residents were significantly more likely to support a natural return of mountain lions to the park than residents (Pearson Chi-Square= 8.541, df=1, p=0.003), and were more likely to support management actions to bring them in (Pearson Chi-Square= 5.464, df=1, p=0.019). There was no significant difference in support between residents and non-residents for actually releasing mountain lions to the Park (Pearson Chi-Square 0.642, df=1, p=0.423). Significantly more people supported wildlife management agencies taking steps to establish a permanent population than supported intentionally releasing mountain lions (Fisher's exact test p=0.003).

Table 5: Percentage of residents and non-residents who indicated "strongly agree" or "agree" to statements about mountain lion restoration. Asterisks indicate significant differences between communities.

Support for mountain lion return	Resident support (%)	Non-resident support (%)
I would like to have mountain lions naturally return to the Adirondacks	69.8*	84.1*
I would like mountain lions to be intentionally released into the Adirondacks	35.7	40.2
Should wildlife management agencies take steps to establish a permanent mountain lion population in the Adirondack Park?	44.2*	57.6*

When asked about a natural return of mountain lions to the Adirondacks, the ESP respondents were significantly less supportive on average than the Adirondack survey respondents (T= -4.13, df = 797, p<0.001 Figure 3, below).

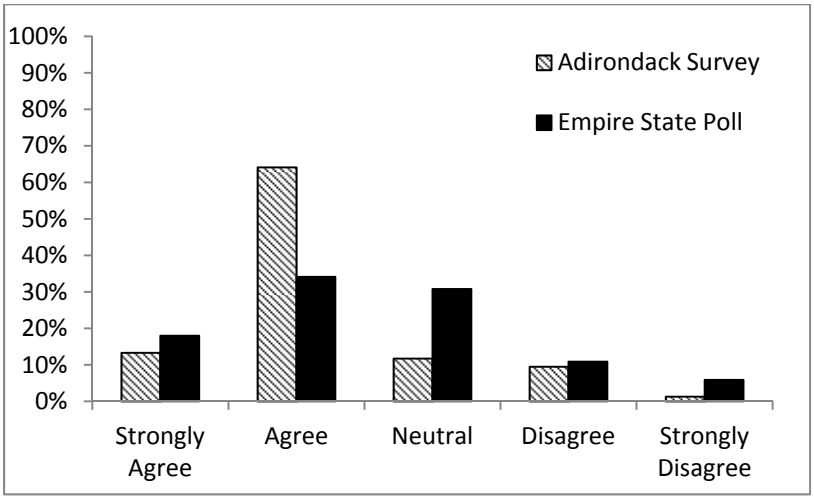


Figure 3: Comparison of response frequencies for the statement "I would like to have mountain lions naturally return to the Adirondacks" in two surveys.

When asked about wildlife management agency action, ESP respondents responded significantly differently from Adirondack Survey respondents (Chi-square = 17.483, df=2, p<0.001, Figure 4, below). The proportion of respondents who supported wildlife management agency action was not significantly different between surveys, however (Z=0.09 p=0.926). A significantly greater proportion of ESP respondents indicated that they were "not sure" than in the Adirondacks (Z=-3.52, p<0.001), and a greater proportion in the Adirondacks indicated that they did not support wildlife management agency action (Z=3.32, p=0.001).

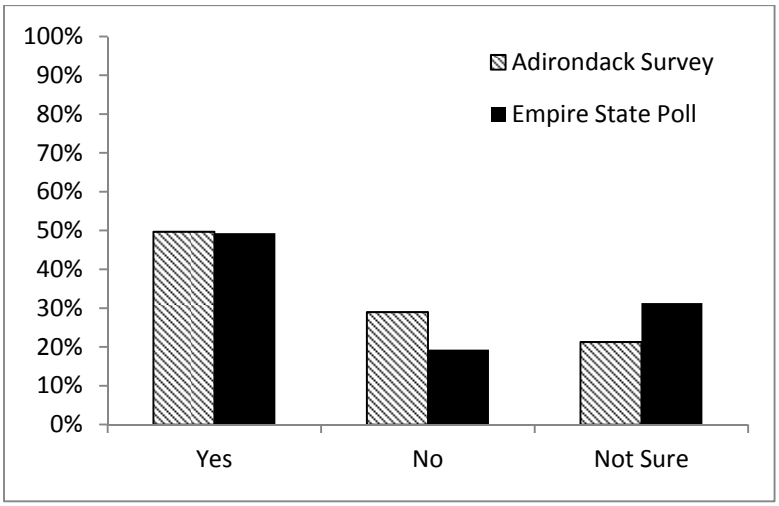


Figure 4: Comparison of response frequencies for the statement "Should wildlife management agencies take steps to establish a permanent mountain lion population in the Adirondack Park?" in two surveys.

The relationship between the factual knowledge score KNOWLEDGESUM and the level of support for wildlife management agency action was significant – those that responded "Yes" to this question had significantly higher KNOWSUM than those that answered either "Not Sure" or "No" ($F=19.84$, $df=2$, $p<0.001$). A significantly greater proportion of ESP respondents indicated that they were "not sure" than in the Adirondacks ($Z=-3.52$, $p<0.001$), and a greater proportion in the Adirondacks indicated that they did not support wildlife management agency action ($Z=3.32$, $p=0.001$).

Risk perception and support for wildlife management agency action were significant for both the risk ladder responses ($N=307$, $df=2$, $F=4.28$, $p=0.015$) and for the concern for children ($N=314$, $df=2$, $F=12.13$, $p<0.001$). In both cases, those that supported wildlife management agency action perceived less risk or indicated less concern about children than people who did not support it.

Preventing conflict

When asked what can be done to prevent conflict between mountain lions and humans, common responses included: education for humans, supporting scientific study of mountain lions and their movements, removing attractants, management of the prey populations, relocating animals away from humans, and hunting seasons for mountain lions. Several respondents made an explicit comparison to what is done to keep black bears away from houses and campsites. When asked who would be responsible for preventing such conflict, 73.6% said that individuals are at least partially responsible, 72.6% said that the NYS DEC is at least partially responsible, 45.2% said Conservation-focused NGOs are at least partially responsible, and 11.8% of respondents chose "other" as at least partially responsible. Among those "other" responsible entities were the Adirondack Mountain Club, local law enforcement, the federal government, schools, and hunters.

DISCUSSION

Wildlife Values Orientation

The four major components found in the principal components analysis were the same as those seen in other applications of the scale, and with similar Eigen values (Butler, Shanahan, and Decker 2003). This confirms that the WAVS scale creates consistent indicators of respondents' wildlife values orientations and that the same questions address the same set of underlying issues. It is worth noting that there is a higher Eigen value for the "problem tolerance" component here than in Butler's analysis of New York State as a whole, which means that more of the variance in respondents' WAVS was explained by Problem Tolerance in the Adirondacks than in other parts of the state.

This study indicates that visitors to the Adirondacks have different wildlife values orientations than residents of the Park. Visitors put a greater value on the social benefits of wildlife (appreciating their existence), on traditional conservation (saw greater benefits from use of wildlife), and on communication benefits (enjoyed talking and learning about wildlife) than residents. This has implications for educational outreach, as materials and programs that tap into these values may resonate more with visitors than residents. In a region where tourism is an important source of income, these differences are important. People who come to the Adirondack Park value seeing, talking about, and making use of wildlife even more than those who live in the park, so changes to the wildlife community could be expected to impact tourism. Future studies about whether the addition of a top predator would have an effect on tourism would be valuable in understanding the potential economic impacts on the region. Part-time residents also differ from full time residents in that they had higher social benefits scores, again indicating that people who come to the park for recreation perceive the existence of wildlife to be more important than those that live in the North Country year-round.

As found in other studies, men perceived greater Traditional Conservation benefits than women (Butler, Shanahan, and Decker 2003). There was no difference between residents and visitors or between full-time and part-time residents in their Problem Tolerance scores. People who hike regularly within the park had higher Problem Tolerance than those that did not, and respondents with children were also more problem-tolerant that those without children. This may be at least partially a function of the respondent's age – people over 50, whose children may have grown up and left the house, were less problem-tolerant than younger people. This age disparity agrees with findings of other studies (Butler, Shanahan, and Decker 2003). Again, the differing wildlife values of these segments of the population means that different approaches may be necessary in communicating effectively about wildlife, and that stakeholders may disagree about wildlife management strategies.

Existence and Knowledge

Fewer than 20% of respondents believed mountain lions to be extinct in the Adirondacks, and more than 15% believed that they had personally seen one or more mountain lions within the park. Without a comparison to non-respondents or New York State as a whole, it is impossible to know whether the high belief in cougar existence and high number of people who had encountered one is unusual or evidence of bias in the method of sampling. Nevertheless, for an extinct species was a surprising result.

Men and women, people of different ages, and residents and non-residents had similar levels of knowledge about mountain lions. Respondents in this survey had similar levels of knowledge

found by Enck and Brown in their 2005 survey about wolves – both averaged 3.6 on the 7 knowledge questions, though unlike in Enck and Brown's survey, there were no differences between Adirondack residents and others. The level of knowledge was fairly low in all cases.

Risk Perceptions

As seen in other studies, women perceived higher levels of risk than men on most questions (Zinn and Pierce 2002; Anthony, Knuth, and Lauber 2004; Riley and Decker 2000a; Thornton and Quinn 2010; Jacobson et al. 2012). Unlike Zinn and Pierce (2002), however, participants with children at home did not perceive greater risk in general or for children specifically than those without children (though the proportion of respondents to this survey with children at home was low), and older people were not significantly different from younger people.

Respondents in the Adirondacks perceived lower risk from mountain lions than in Riley's (1998) study of Montana residents. In the Adirondacks, more than 14% of respondents indicated that mountain lions pose no risk to humans, while in Montana this was only 6%. In both cases the most common response was "b," the first level of threat higher than no threat at all. Riley (1998, 2000b) found that people who interacted more with mountain lions generally perceived greater risk from them and had more negative attitudes towards them – although this study did not measure respondents' level of interaction with mountain lions, it could be assumed that those from the eastern United States would have had little or no interaction with this species. If more mountain lions enter the Adirondacks or if a breeding population is ever established, the number of people with at least some interaction with them would increase and risk perceptions might change.

The major risk questions considered here all had the same relationship between the level of perceived risk (whether for humans in general, for themselves specifically, for children or for pets) and the level of knowledge of the respondents. More knowledgeable respondents perceived lower overall risk from mountain lions to humans and domestic animals. The level of risk perceived for children was not related to the degree to which the respondent believed the risks associated with mountain lions in the Adirondacks are well-understood, but it was related to their own level of knowledge about mountain lions. Personal knowledge and understanding, therefore, rather than the perception that experts know what they are doing, is most important.

Management Preferences

To avoid future human-cougar conflict, most respondents suggested information gathering and dissemination, rather than the relocation or destruction of problem animals as a prevention strategy. Further, more people considered individual humans themselves to be responsible for preventing conflict than the state agency, though it was a close second. This suggests that people do not expect mountain lions to be a disruptive presence, though studies of other species in this region show that people request state assistance for many types of interactions, including those that do not involve conflict (Kretser, Sullivan, and Knuth 2008). This suggests that, although respondents viewed themselves as responsible for preventing human-wildlife conflict, state agencies need to anticipate the need to respond to requests as people begin to encounter mountain lions making their way eastward. Whether these are simple requests for information, expressions of concern or reports of property damage, wildlife managers should be prepared to with residents of and visitors to Adirondack communities on the topic of cougars.

Regardless of whether respondents were residents or not, a strong majority supported the idea of mountain lions naturally returning to the Adirondacks. Wildlife management agency action was

supported by a plurality of residents and a majority of non-residents. The results of this study confirm those of Enck and Brown (2002), in that more knowledgeable people had greater support for predator reintroduction than less knowledgeable people. Those authors did not ask participants to consider natural recolonization as an alternative to human intervention, so no comparisons can be drawn.

Although the randomized Empire State Poll gave statistically significantly different results than the Adirondack Survey on the two management questions, both had the same proportion of support for wildlife management agency action to encourage mountain lion recovery. On both questions, more significantly respondents indicated that they were not sure or neutral, which might reflect a lack of familiarity with the topic (Morzillo et al. 2007), or potentially the opinion that it is a decision for locals to make.

The relationship between knowledge about mountain lions, perceived risk from them and support for mountain lion reintroduction is an area for potential intervention by wildlife managers. Whether these could be causative relationships (and thus environmental education could lower risk perception and opposition to wildlife management agency action) cannot be determined from the results of this study. Other studies have shown that environmental education can actually strengthen extreme negative views in some cases (Kellert et al. 1996). Furthermore, the phrase "take steps to establish a permanent mountain lion population in the park" was intentionally vague as this was the first study of its kind in the region and no interventions have been proposed. These potential interventions could include habitat preservation or protection, which might involve restricting development on large parcels of land to prevent fragmentation and establishing connectivity corridors between the Adirondacks and adjacent large forested areas in the northeastern US and Canada, or the importation and release of animals from the western United States. What precise proposals the wildlife management agency put forth would likely have different levels of public support– indeed, the idea of releasing animals was significantly less popular than simply "taking steps." It may be that no specific action to benefit mountain lions is as popular as the general concept of action.

Since this is not an area with a resident population of mountain lions, the respondents here would most likely not have had much if any interaction with mountain lions (though 15% believed that they had at least seen one). Other authors have shown that greater interaction with mountain lions can decrease tolerance of them and decrease support for their protection (Riley and Decker 2000a, 2000b; Riley 1998), so it is important to consider that the levels of support found in this study may change if mountain lions do return and more people encounter them.

CONCLUSIONS AND RECOMMENDATIONS

Many people in both polls supported the idea of mountain lions returning to the Adirondacks, either on their own or with human assistance, and there is at least some evidence that greater public information about mountain lions could increase or solidify these numbers. However, these positive attitudes may not translate into meaningful behaviors like voting or advocacy (McCleery et al. 2006). Still, this could be a place where interested groups and agencies could make an intervention to improve the knowledge-base of the community about these complicated animals. Additionally, further studies of advocacy groups and others who would be likely to be the key actors in gaining support for or against a government action would be helpful in understanding whether such programs would be likely to get a lot of attention from influential organizations on either side (McCleery et al. 2006).

As there are no current plans for mountain lion restoration, the attitudes found here may respond to new information and change over time. Greater specificity about the different types of possible management intervention and a larger-scale, randomized survey of residents of both the Adirondacks and surrounding states and provinces would be needed before any action based on the preliminary findings of this report should be considered. Such a study across the northeastern United States and surrounding Maritime Provinces in Canada could be used to develop large-scale landscape management strategies for cougars in eastern North America. WCS's work to restore and maintain wildlife connectivity across the northeastern United States provides a framework that could be used to share information between wildlife managers and NGOs about the implications of mountain lion restoration in the region.

This study presents compelling evidence for the need to study the human and ecological aspects of mountain lion restoration in the Adirondack Park. Mountain lions, among many other historically-persecuted carnivores, are naturally recovering their population and range in many parts of the United States. Although we do not yet have a population in the Adirondacks, it is possible that there may be one in the future without human intervention. That such a large percentage of people in this survey were interested in some form of human assistance in mountain lion restoration suggests that wildlife managers seriously consider the ecological and social feasibility of interventions that could make restoration more likely. It may be only a matter of time before this symbol of the wilderness finds its way home to the forever wild forests of the Adirondacks.

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APPENDIX

Survey Instrument with Results

Date and Location:

Prologue:

Hi, my name is Eliza McGovern. I am conducting a brief, voluntary survey on wildlife in the Adirondacks – would you be interested in hearing more about it?

I am a student, and am conducting this survey of Adirondack residents and visitors with the Wildlife Conservation Society. Information from this survey may be used to improve future management of Adirondack wildlife.

It takes less than 10min to complete, and if you would like to participate, your answers will not be associated with your name. You may decline to answer any question.
Would you be willing to speak with me for a few minutes?

Wildlife Values

For the first Section, I will read several statements. Please indicate whether you agree with it. The potential responses are Strongly Agree, Agree, Neutral/Not Sure, Disagree and Strongly Disagree

A. "It is important for me personally that: **(N=315 unless otherwise noted)**

1. People consider the presence of wildlife as a sign of the quality of the natural environment.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
38.7%	**59.7%**	**1.6%**	**0%**	**0%**

2. People know that wildlife exist in nature.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
42.9%	**56.8%**	**0%**	**0%**	**0.3%**

3. People appreciate the role that wildlife play in the natural environment.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
41.3%	**57.8%**	**0.3%**	**0.6%**	**0%**

4. People understand more about the behavior of wildlife.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
37.5%	**58.7%**	**3.2%**	**0.6%**	**0%**

5. Wildlife are included in educational materials as the subject for learning more about nature.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
36.8%	**61.9%**	**1.0%**	**0.3%**	**0%**

6. People talk about wildlife with family and friends.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
23.2%	**67.9%**	**6.0%**	**2.9%**	**0%**

7. People observe or photograph wildlife.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
17.1%	**63.2%**	**12.7%**	**6.7%**	**0.3%**

8. People see wildlife in books, movies, paintings, or photographs.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
22.5%	**68.6%**	**7.0%**	**1.6%**	**0.3%**

9. People express opinions about wildlife and their management to public officials or to officers of private conservation organizations.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
29.2%	**62.2%**	**7.0%**	**1.6%**	**0%**

10. People trap furbearing animals for sale of furs or pelts. **(N=314)**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
12%	**23.2%**	**15.0%**	**42.4%**	**15.6%**

11. People hunt game animals for recreation.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
7.6%	**32.4%**	**15.9%**	**36.2%**	**7.9%**

12. People hunt game animals for food.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
15.9%	**61.3%**	**12.7%**	**8.9%**	**1.3%**

13. Game animals are managed for an annual harvest for human use without harming the future of the wildlife population.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
25.1%	**61.9%**	**5.7%**	**6.7%**	**0.6%**

14. Local economies benefit from the sale of equipment, supplies, or services related to wildlife.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
19.7%	**67.9%**	**8.3%**	**4.1%**	**0%**

15. People tolerate most wildlife nuisance problems.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
8.6%	**64.4%**	**14.3%**	**12.4%**	**0.3%**

16. People tolerate most levels of property damage by wildlife.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
4.4%	**54.3%**	**18.7%**	**20.6%**	**1.9%**

17. People tolerate the ordinary risk of wildlife transmitting disease to humans or domestic animals.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
4.1%	**57.1%**	**12.7%**	**24.1%**	**1.9%**

18. People tolerate the ordinary personal safety hazards associated with some wildlife

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
12.1%	**75.9%**	**5.4%**	**6.3%**	**0.3%**

B. Cougar existence

1. On a scale of 1 to 5, with 1 being they do not exist and 5 being very common, how common are Mountain lions in the Adirondacks?

	1	2	3	4	5
	Do not exist				very common
Valid Percent:	**18.7%**	**51.9%**	**19.4%**	**7.1%**	**2.9%**

N=310

2. Have you seen a mountain lion in the Adirondacks?

	Yes	No	
Valid Percent:	**15.2%**	**84.8%**	**N=315**

C. Cougar natural history **(*indicates correct answer), N=315 for all**

1. Did mountain lions live in the Adirondacks in the past?

	Yes	No	Not sure
Valid Percent:	**86.7%***	**2.5%**	**10.8%**

2. Are mountain lion attacks on humans common in areas where mountain lions live close to humans?

	Yes	No	Not Sure
Valid Percent:	**14.0%**	**72.7%***	**13.3%**

3. Are mountain lions found in many countries around the world?

	Yes	No	Not Sure
Valid Percent:	**37.1%***	**30.8%**	**32.1%**

4. Do mountain lions prefer to eat livestock even when wild animals are plentiful?

	Yes	No	Not Sure
Valid Percent:	**14.3%**	**54.9%***	**30.8%**

5. Are mountain lions in danger of becoming extinct worldwide?

	Yes	No	Not Sure
Valid Percent:	**55.9%***	**17.1%**	**27%**

6. Do mountain lions kill a large number of pets in areas where mountain lions live near homes with pets?

	Yes	No	Not Sure
Valid Percent:	**24.1%**	**47.3%***	**28.6%**

D. Cougar Attitudes and Risks:

For the next section, I will read out a statement. Please indicate your level of agreement for each – the potential responses are strongly agree, agree, neutral, disagree, or strongly disagree (N=315 for all)

1. *The presence of mountain lions is a sign of a healthy environment*
   - Strongly agree **14.3%**
   - Agree **66.0%**
   - Neutral **16.2%**
   - Disagree **3.5%**
   - Strongly Disagree **0%**

2. *Mountain lions help maintain deer populations in balance with their habitats*
   - Strongly agree **16.5%**
   - Agree **63.2%**
   - Neutral **14.9%**
   - Disagree **4.8%**
   - Strongly Disagree **0.6%**

3. *The presence of mountain lions <u>in the Adirondacks</u> would increase my quality of life*
   - Strongly agree **4.4%**
   - Agree **27.0%**
   - Neutral **40.0%**
   - Disagree **25.7%**
   - Strongly Disagree **2.9%**

4. *The presence of mountain lions <u>near my home</u> would increase my overall quality of life*
   - Strongly agree **1.9%**
   - Agree **17.5%**
   - Neutral **26.7%**
   - Disagree **47.0%**
   - Strongly Disagree **7.0%**

5. *Mountain lions <u>do not</u> compete with hunters for deer*
   - Strongly agree **3.8%**
   - Agree **34.9%**
   - Neutral **21.6%**
   - Disagree **38.1%**
   - Strongly Disagree **1.6%**

6. *Mountain lions should have the right to exist wherever they may occur*
   - Strongly agree **19.7%**
   - Agree **58.7%**
   - Neutral **11.7%**
   - Disagree **9.5%**
   - Strongly Disagree **0.3%**

7. *Mountain lions are an unacceptable threat to livestock*
   - Strongly agree **1.0%**
   - Agree **11.7%**
   - Neutral **16.5%**
   - Disagree **63.5%**
   - Strongly Disagree **7.3%**

8. *The risks associated with mountain lions living in the Adirondacks are well understood*
   - Strongly agree **1.3%**
   - Agree **21.6%**
   - Neutral **18.1%**
   - Disagree **50.8%**
   - Strongly Disagree **8.3%**

9. *Wildlife management agencies are a good source of information about mountain lions*
   - Strongly agree **13.3%**
   - Agree **64.1%**
   - Neutral **11.7%**
   - Disagree **9.5%**
   - Strongly Disagree **1.3%**

10. *I would like to have mountain lions naturally return to the Adirondacks*
   - Strongly agree **10.5%**
   - Agree **65.4%**
   - Neutral **14.6%**
   - Disagree **7.9%**
   - Strongly Disagree **1.6%**

11. *I would like mountain lions to be intentionally released into the Adirondacks*
   - Strongly agree **4.1%**
   - Agree **33.7%**
   - Neutral **28.9%**
   - Disagree **28.6%**
   - Strongly Disagree **4.8%**

12. If mountain lions lived in the Adirondacks I would *Look up more information about mountain lions:*
   - Strongly agree **15.2%**
   - Agree **72.1%**
   - Neutral **4.4%**
   - Disagree **8.3%**
   - Strongly Disagree **0%**

13. *Plan trips to try to see mountain lions*:
   - Strongly agree **3.8%**
   - Agree **33.7%**
   - Neutral **8.9%**
   - Disagree **49.8%**
   - Strongly Disagree **3.8%**

14. *Feel more proud of the wildness of the Adirondacks:*
   - Strongly agree **10.8%**
   - Agree **48.9%**
   - Neutral **21.3%**
   - Disagree **17.5%**
   - Strongly Disagree **1.6%**

15. *Change my outdoor recreation habits*:

Strongly agree	**3.2%**
Agree	**31.7%**
Neutral	**10.8%**
Disagree	**49.5%**
Strongly Disagree	**4.8%**

16. *Keep my pets inside*:

Strongly agree	**4.1%**
Agree	**32.4%**
Neutral	**21.0%**
Disagree	**41.0%**
Strongly Disagree	**1.6%**

17. *Worry about the safety of my livestock*:

Strongly agree	**1.3%**
Agree	**21.3%**
Neutral	**47.0%**
Disagree	**27.9%**
Strongly Disagree	**2.5%**

18. *Worry about children playing outside*:

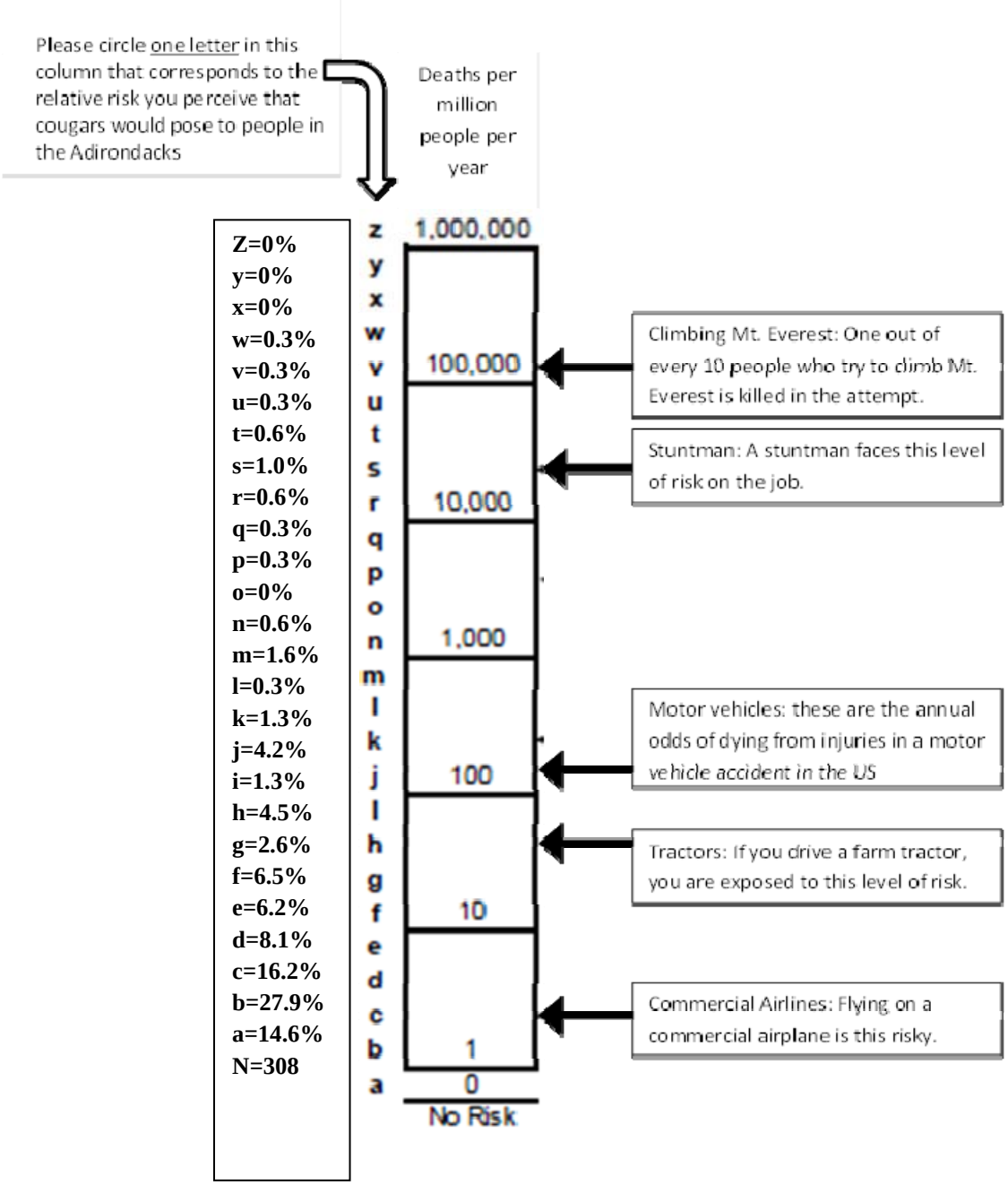
Strongly agree	**3.8%**
Agree	**37.5%**
Neutral	**13.7%**
Disagree	**43.2%**
Strongly Disagree	**1.9%**

19. *Avoid recreating by myself*

Strongly agree	**1.6%**
Agree	**24.8%**
Neutral	**9.2%**
Disagree	**61.0%**
Strongly Disagree	**3.5%**

20. This next question is designed to help us better understand your perceptions about the possibility of Adirondack residents suffering injury, or even death, from a mountain lion if there were a healthy population of 100-200 mountain lions in the area. *Please indicate a single letter along the left side of the diagram below that corresponds to the relative risk you perceive mountain lions would pose to people in the Adirondacks. For comparison, risks from commonplace hazards are listed on the right side of the column.*

For example, respondent A thought whitewater kayaking was less risky than being a stuntman but more risky than driving a car, so she put down "N" as her answer



E. Cougar Management

1. If mountain lions do move into the Adirondacks naturally, what can be done to prevent conflict with humans?

Common responses: education, habitat preservation, remove attractants ("like with bears"), leave them alone, keep them away from humans through monitoring and relocation, have a hunting season on mountain lions, manage the deer population so mountain lions have enough food, research them, "use common sense", carry a gun in the woods, "nothing can be done"

2. Who should be responsible for preventing conflict? (Please select all that apply) **(Valid% for each, more than 100%) N=314**
   - ☐ Individuals **73.2%**
   - ☐ New York State Department of Environmental Conservation (NYSDEC) **72.6%**
   - ☐ Non-governmental Conservation Groups **45%**
   - ☐ Other (please specify below) **11.8%**
     Repeated responses: ADK mountain club, farmers, federal government, hunters, local law enforcement, schools, colleges, 4H, APA

3. Should wildlife management agencies take steps to establish a permanent mountain lion population in the Adirondack Park? **N=314**

Yes	No	Not Sure
49.7%	**29.0%**	**21.3%**

The next questions ask about an event in 2011 where a mountain lion that was born in South Dakota was hit by a car in Connecticut. I have with me a brief news article about it.

4. Had you heard of this event before? **(Valid %) N=315**

Yes	No	Not Sure
33.3%	**66.0%**	**0.6%**

5. Were you aware that the same mountain lion described in the article passed through the Adirondacks? **(Valid %) N=315**

Yes	No
20.6%	**70.4%**

6. How frequently have events like this occurred in the last 20 years, where a mountain lion from outside the park passes through? **N=310**

   - Unique event **17.1%**
   - rare = 1-3 events in last 20 years **43.9%**
   - somewhat rare = every few years **24.8%**
   - common = every-other year to every year **11.3%**
   - very common = more than once a year **2.9%**

7. Do you think events like this will become more common in the next 10 years? **(Valid%) N=315)**

Yes	No	Not Sure
51.4%	**34.9%**	**13.7%**

8. Do you have any other thoughts or comments on mountain lions in the Adirondacks that you'd like to share?

   Responses recorded elsewhere

Demographic information **(Valid %, N=315 unless otherwise noted)**

1. Please indicate your age in the following ranges:

18-33	34-49	50-64	65+
14.0%	**16.2%**	**39.4%**	**30.5%**

2. Please indicate your gender

M	F	Other
54.9%	**45.1%**	

3. Are you a resident of Adirondack Park? **N=314**

Yes	No
58.0%	**42.0%**

   a. If yes, for how long?**N=183**
      [26.70, 32.99] 95% confidence interval of the mean
      i. If yes, is this year-round or part time? **N=183**
      Year-round 62.8% **Part-time 37.2%**

   b. If not, how often do you visit the Adirondacks? **(N=131)**

   Weekly **6.9%** Few times a month **3.8%** Once a month **9.2%** Few times a Year **35.9%**

   Once a Year **21.4%** Fewer than Once per Year **16.8%** First visit ever **6.1%**

4. Do you have children living with you? **(N=314)**

Yes	No
18.2%	**81.8%**

   a. What are their age(s)?

5. Do you have pets or livestock that spend time outside?**(N=314)**

Yes	No
53.8%	**46.2%**

   a. What type(s) of animal(s)? **N=147**
      Pets 98.8% **Livestock 58.0%**
6. What is your occupation?

7. Do you like to spend leisure time outdoors when in the Adirondacks? **(N=314)**

Yes	No
98.4%	**1.6%**

8. How often do you go hiking in the Adirondacks? **(N=314)**

Every week **17.2%** Few times a month **16.2%** Few times a year **38.5%** Once a year **7.3%** Less often than once per year **6.1%** Never **14.6%**

9. How often do you go camping in the Adirondacks? **(N=314)**

Every week **1.0%** Few times a month **6.1%** Few times a year **20.4%** Once a year **14.3%** Less often than once per year **10.8%** Never **47.5%**

10. How often do you participate in other wilderness activities, either here or elsewhere? **(N=314)**

Every week **50.6%** Few times a month **22.0%** Few times a year **17.2%** Once a year **1.9%** Less often than once per year **2.2%** Never **6.1%**

11. Which of the following wilderness areas do you recreate in? **(N=298)**
    - ☐ Siamese ponds Wilderness **11.1%**
    - ☐ Pharaoh Lake Wilderness **16.4%**
    - ☐ West Canada Wilderness **19.8%**
    - ☐ Five Ponds Wilderness **18.8%**
    - ☐ Pigeon Lake Wilderness **4.4%**
    - ☐ William C. Whitney Wilderness Area **13.8%**
    - ☐ St. Regis Canoe **39.6%**
    - ☐ High Peaks Wilderness **63.8%**
    - ☐ Giant Mountain Wilderness **25.5%**
    - ☐ McKenzie Mountain Wilderness **18.8%**

12. Have you hunted or trapped in the Adirondacks in the last 12 months? **(N=314)**

Yes **13.4%** No **86.6%**

a. What type(s) of game do you hunt or trap? **(N=41)**
   White tailed deer = 85.7% Bear=26.2% Birds=36.6% Furbearing species=31.7%
b. How frequently do you hunt or trap? **(N=41)**
   Once per season = 4.8% Few times/season=33.3%
   Weekly in season = 26.2% Multiple times a week in season = 35.7%
c. How would you describe the quality of hunting or trapping in the Adirondacks? **(N=41)**
   - ☐ Very Good **7.1%**
   - ☐ Good **40.5%**
   - ☐ Neither Good nor Bad **21.4%**
   - ☐ Bad **26.2%**
   - ☐ Very Bad **4.8%**