INFLUENCE OF MORALITY, IDENTITY AND RISK PERCEPTION ON CONSERVATION OF A RECOVERED CARNIVORE

By

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ABSTRACT

INFLUENCE OF MORALITY, IDENTITY AND
RISK PERCEPTION ON CONSERVATION
OF A RECOVERED CARNIVORE

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This dissertation sought to advance knowledge about the social psychology of human-nature relationships using Michigan wolf management as a case study. Specifically, I explored how conservation ethics, risk perception, and social identity (i.e., independent variables) influenced acceptability of management actions and stewardship behaviors (i.e., dependent variables). Objectives were to (1) apply social identity theory to the case study, (2) explore stewardship toward wolves, (3) examine perceptions related to power among decision-makers and stakeholders, (4) explore the role of scientific and local knowledge in decision-making, (5) quantify factors related to conservation ethics and (6) model relationships between conservation ethics, risk perceptions, and stewardship behaviors. To achieve objectives 1-4 and explore stakeholder (dis)agreement over wolf management, I conducted semi-structured key informant interviews (n=21) in August-September 2012. Four overarching themes emerged to categorize two main identity groups by their opinions of management (1) objectives, (2) focal levels, (3) methods and (4) justifications. Interviewees from both groups identified six common stewardship themes: (1) bequest values, (2) education, (3) existence values, (4) healthy ecosystems, (5) sustainability and (6) pride in Michigan's natural resources. Issues of competing forms of knowledge (i.e., local versus scientific knowledge), power inequalities among group and tyranny of the minority also emerged among both groups in relation to potentially hunting wolves in Michigan.

To achieve objectives 5-6, I designed and implemented a web-based survey in October-November 2013 to empirically assess individual conservation ethics and model the relationships between conservation ethics, social identity, risk perceptions, acceptability of management strategies and stewardship behaviors. Intrinsic value for wolves and all life were positively related to stewardship. Results revealed conservation ethics are likely linked to behavior by way of both emotional and cognitive judgments: affective risk perception, emotional dispositions and acceptability of hunting/trapping were important considerations in the process of translating ethics to behaviors. Results also indicate that at least certain moral foundations are relevant in the ethics-behavior relationship; particularly salient in this sample were moral considerations of loyalty to a social group and respect for authority. Most respondents, regardless of identification with any particular group, attributed intrinsic value to not only wolves but all life and engaged in stewardship in part because of values for ecosystems. Finally, social groups as well as gender and political affiliations may provide useful ways to predict which groups will engage in positive stewardship behaviors, which groups will be inactive and which may be opposed to stewardship.

Taken together, greater knowledge of these novel elements may advance understanding of the psychology underlying human-nature relationships and improve efficacy of wildlife management. This dissertation contributes novel theoretical exploration of how individuals make moral judgments about conservation, which is useful for understanding motivations to participate in conservation or support certain management strategies. This work makes a unique contribution to practice by providing a baseline assessment of wolf-related perceptions after delisting that may be useful for understanding how perceptions change in recovered species contexts.

This dissertation is dedicated to all the wild things that inspire and challenge us to remember from where we came.

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rewarding vocation. Dr. Laurie Eberhardt's knowledge and guidance provided me with an ecological knowledge base that started me on an interesting and circuitous career path.

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KEY TO ABBREVIATIONS

ESA	U.S. Endangered Species Act
HD	Human dimensions
HWC	Human-wildlife conflict
IRB	Institutional review board
MDNR	Michigan Department of Natural Resources
MSU	Michigan State University
n	Sample size
RCR	Responsible conduct in research
SD	Standard deviation
SE	Standard error
USFWS	U.S. Fish and Wildlife Service
WMAC	Wolf Management Advisory Council
$\overline{X}$	Mean

CHAPTER 1
INTRODUCTION

A Brief History of Human-Wolf Interactions in North America

Gray wolves (*Canis lupus)* are found throughout the northern hemisphere, as is controversy over their management. The evolution of human-wolf interactions in many ways parallels more general relationships between humans and nature in western society. When humans were hunter-gatherers, wolves may have been perceived as fellow hunters (as they are by some even today; Hampton, 1997). As humans shifted to agriculture and expanded geographically, some viewed wolves as competitors for resources (e.g., game, livestock) and eradicated throughout their ranges (Hampton, 1997; Musiani & Paquet, 2004). With the advent of the modern U.S. environmental movement in the twentieth century and increased conservation awareness, wolves were considered symbolic of wild nature by many and restored in some regions (Musiani & Paquet, 2004; Nie, 2003). Even as society has generally shifted toward greater concern for animals (Inglehart, 1977, 1990), opposition to the presence of wolves has persisted among certain stakeholders who view wolves as a threat to their values, livelihoods or interests (e.g., risks to property, limits to resource extraction; Nie, 2002). Other stakeholders view wolves as symbols of wilderness and apex predators that fill an important ecological niche (Ripple & Beschta, 2012; Ripple et al., 2014). This evolution of human-wolf interactions is rooted in changes in opinions about how to interact with nature (e.g., conserve, control, manage, preserve; Callicott, Crowder, & Mumford, 1999; Vucetich & Nelson, 2013).

Background and Importance

Historically, gray wolves were distributed throughout Canada, U.S., and Mexico (Fritts, Hayes, Boitani, & Stephenson, 2003). Predator and pest eradication campaigns aided by government-issued bounties resulted in the extirpation of wolves and many other carnivores in the U.S. and Mexico by the twentieth century (Ruid et al., 2009). Wolf eradication was predicated upon multiple justifications, including increasing abundance of game species such as white-tailed deer (*Odocoileus virginianus*) and elk (*Cervus canadensis*), protecting livestock and controlling disease (Musiani & Paquet, 2004). Wolves were also removed from human-dominated landscapes due to fear (Kellert, Black, Rush, & Bath, 1996) and perceptions that wolves were "evil" (Lopez, 1978:146). Wolves were one of the first species to be listed on the U.S. Endangered Species Act (ESA) in 1974, and while listed, the Fish and Wildlife Service (USFWS) oversaw their management. In 1995, the USFWS reintroduced wolves to central Idaho and Yellowstone National Park as "experimental populations" (i.e., populations outside the species current range but within historical range; USFWS, 2014). Having reintroduced wolf populations to the Greater Yellowstone ecosystem, wolf recovery in the Northern Rockies region was deemed successful beginning with the first attempt to delist wolves in 2002 (Musiani & Paquet, 2004; Ripple & Beschta, 2012). During this time, wolves began naturally recolonizing states in the Western Great Lakes from Canada and northern Minnesota, where wolves were never eradicated.

Gray wolves are a highly studied species. Myriad biological and social science studies have attempted to characterize wolves' interactions with other species, including humans, wild ungulates and ecosystems (e.g., Carbyn & Trottier, 1988; Kellert, 1980; Ripple et al., 2014). This knowledge base has informed wolf management in attempts to maximize policy

effectiveness, efficiency and feasibility. In 2012, the U.S. Congress and USFWS deemed wolves to be recovered and delisted from the ESA in the Northern Rockies (i.e., Idaho, Montana, Wyoming) and Western Great Lakes (i.e., Michigan, Minnesota, Wisconsin) although current wolf distribution in the contiguous U.S. is a fraction (<5-20% by US region) of its original range (Mech & Boitani, 2004). Delisting returned management responsibility to states where wolves are present. Legislation to hunt wolves, and lawsuits or ballot initiatives to overturn such legislation, followed in many states. All 6 of those states have had at least one season of wolf hunting and/or trapping.

As of January 2013 (when the last winter count survey was conducted), an estimated 650 wolves exist in Michigan's Upper Peninsula (Michigan Department of Natural Resources, 2014). The first statewide wolf recovery plan was signed by the Director of the Michigan Department of Natural Resources (MDNR) in 1997. Since that time a number of wolf recovery activities have occurred, including the 2005 Wolf Roundtable, which was convened to replace the existing wolf management plan. In 2008, the Michigan Wolf Management Plan was approved and focused on management that fostered coexistence between humans and a viable and recovered wolf population (MDNR, 2008). In December 2012, almost one year after wolves were delisted from the ESA, a bill designating wolves a game species passed state congressional review and was signed into law by the governor (Public Act 52). In March 2013, MDNR sought stakeholder input from regional public meetings as well as ongoing meetings with the Wolf Management Advisory Council consisting of 22 individuals representing various stakes and organizations from throughout Michigan. MDNR then made recommendations to the governor-appointed Natural Resource Commission, which determined acceptable method and manner of take for legally hunting wolves.

Regulatory changes provided an opportunity to reexamine the knowledge base and pose new questions about the future of wolf management, including: What new information is needed to inform effective and ethical decision-making in this new regulatory climate? How can knowledge of stakeholder attitudes and behaviors inform and improve the efficacy of wolf management decision processes?

Human Dimensions of Wolf Management

Human dimensions (HD) research regarding wolf management began in the mid-1970s, coinciding with wolves being listed on the ESA (Browne-Nunez, 2002). Early HD work focused on surveying residents of western states on their support for or opposition to wolf reintroduction (Kellert, 1980). Reintroduction was controversial at the time mainly because of concerns over wolves' impacts on livestock and game species such as mule deer (Musiani & Paquet, 2004). HD studies focused on segmenting stakeholders by socio-demographics and value or attitudinal factors influencing support for and opposition to wolves and wolf management in an effort to predict and explain the acceptability of wolf management activities. Findings revealed that most support for wolf reintroduction could be predicated on values based on wolves' benefits to ecosystems, right to exist and human cultural relationships to wolves (Browne-Nunez, 2002; Kellert, Black, Rush, & Bath, 1996). Opposition to reintroduction was predicted by attitudes about livestock or game species losses, fear for human and pet safety, and the geographic distance between respondents and wolf populations (e.g., those living closer to wolves tended to oppose reintroduction or report higher concerns regarding wolf-related risks; Browne-Nunez, 2002; Kellert, Black, Rush, & Bath, 1996). Many studies reported only moderate strength in the relationship between socio-

demographics and environmentally relevant attitudes (Enck & Brown, 2002; J. J. Vaske, Donnelly, Williams, & Jonker, 2001).

Human Dimensions of Wolves and Their Management: Local Insight from Michigan

Several prior HD studies have explored public perceptions of wolves in Michigan over the past three decades when wolves were federally managed and Michigan was crafting its statewide management plan. Hook and Robertson first assessed wolf-related attitudes in the state. They uncovered support for wolf recovery but also fear of wolves and negativistic (i.e., skeptical, derisive) attitudes towards animals generally were the most robust predictors of anti-wolf attitudes (Hook & Robinson, 1982), suggesting perhaps that wolves were not seen as an exceptional animal (i.e., somehow different from other predators, such as cougar or bear) as other research suggests (Kellert et al., 1996). Lower education and income as well as age, anti-MDNR sentiment, residence in the Upper Peninsula (where wolves are located) and rural upbringing also correlated with anti-wolf attitudes.

The next major inquiry into HD of wolf management in Michigan was a statewide study of public attitudes, knowledge, and behavioral intentions conducted by Kellert in 1990, which revealed relatively strong support for wolf recovery among diverse stakeholders with the exception of farmers. Interestingly, deer hunters demonstrated the most interest, affection and concern related to wolves; trappers were highly appreciative and most knowledgeable about wolves (Kellert, 1990). Lower Peninsula (LP) residents, in comparison to Upper Peninsula residents, expressed greater affection for the wolf but also more fear, incomprehension and less outdoor recreational interest related to wolves.

Over a decade later, wolves had recolonized the Upper Peninsula. At this time, Mertig

(2004) surveyed public attitudes and found high overall support for wolf recovery; support increased with more distance from established wolf range and decreased with greater fear of wolves (Mertig, 2004). Awareness of and indirect experience with wolves (e.g., watching television programs, reading) increased but knowledge remained low compared to Kellert's (1990) findings. The majority of respondents supported a hands-off approach to wolf management as long as humans were not injured. Support for killing wolves to reduce population size was low. Similar to Kellert's (1990) findings, Mertig found most Michigan citizens did not support consumptive uses of wolves (e.g., hunting for recreation, trapping for pelts).

Beyer and colleagues (2006) reported that tolerance for wolves in the Upper Peninsula (i.e., acceptance of living near wolves) was strongly related to basic beliefs about the benefits of wolves and moderately related to concerns about negative impacts of wolves (Beyer et al., 2006). Similar to the studies discussed above, tolerance was also predicted by participant's region of residence and hunting participation. Support for measures to prevent depredation (e.g., fladry/flagging, guard dogs, donkeys) was weak (Beyer et al., 2006). Despite considerable support for Upper Peninsula wolves, polarity between tolerant and intolerant groups suggested controversy existed over wolf management (Peyton, Bull, & Holsman, 2007).

Study Justifications

Although aforementioned HD of wolf management studies in Michigan have provided important knowledge about factors influencing public opinion, critical gaps in knowledge still exist. These studies (1) have not assessed public opinion after regulatory recovery; (2) were

based on attitudes of stakeholders sampled using socio-demographic parameters, which have shown generally low ability in predicting attitudes associated with wildlife (J. J. Vaske et al., 2001); and (3) have focused primarily on documenting public opinion without grounding empirical findings in theory. Contemporary research to understand current public opinion and better stakeholder segmentation would help provide up-to-date insight as well as identify potential changes over time from previous studies. Additional opportunities exist to apply innovative and interdisciplinary concepts to help crystallize factors underlying human attitudes about and behaviors toward wolves (see Bruskotter & Fulton, 2011; Treves & Martin, 2011; Treves, 2012). In much of the wildlife-related literature, the role of cognition in influencing human judgment has been emphasized and the role of emotional influences minimized, limiting holistic HD insight (Jacobs, Vaske, & Roemer, 2012; J. J. Vaske, Roemer, & Taylor, 2013). (This emphasis on cognition stems from the influence of certain philosophers including Plato and Descartes who argued for the superiority of rationality and the relation of emotion to animal nature and sin; Haidt, 2001.) Finally, wolf-related decision-making in Michigan has not directly incorporated the ethics of human-wolf interactions; understanding conservation ethics (i.e., value-laden sets of moral principles) may help improve the efficacy of wildlife management through clarification of factors underlying behavior (Gore, Nelson, Vucetich, Smith, & Clark, 2011; John A Vucetich & Nelson, 2013).

Using Michigan wolf management as a case study, this dissertation seeks to advance knowledge about the psychological foundations of human-nature relationships (Figure 1.1). I explored relationships between five main concepts that my review of literature suggested may be relevant to wolf management:

(1) acceptability of management actions,

(2) conservation ethics,

(3) risk perceptions,

(4) social identity, and

(5) stewardship behaviors related to wolves.

I conceptualize these ideas as being related in the following way (Figure 1.1). First, an individual's conservation ethic can have a significant effect on acceptability of management strategies and wildlife-relevant behaviors (Nelson & Vucetich, 2012; Vaske et al., 2012). Affective and cognitive aspects of risk perception are important for understanding myriad human behaviors, (Renn, 1998; Slovic, 1987) some of which impact predator populations (Treves, Martin, Wydeven, & Wiedenhoeft, 2011). Social identity details how humans relate within and between groups (Brown, 2000; Tajfel & Turner, 1979), which is of dynamic importance in wolf management and may segment stakeholders better than socio-demographic variables. Stewardship behaviors are one way to define human-wolf interactions and expand upon abbreviated tolerance and acceptance capacity measures (Bruskotter & Fulton, 2011; Treves & Martin, 2011; Treves, 2009, 2012).

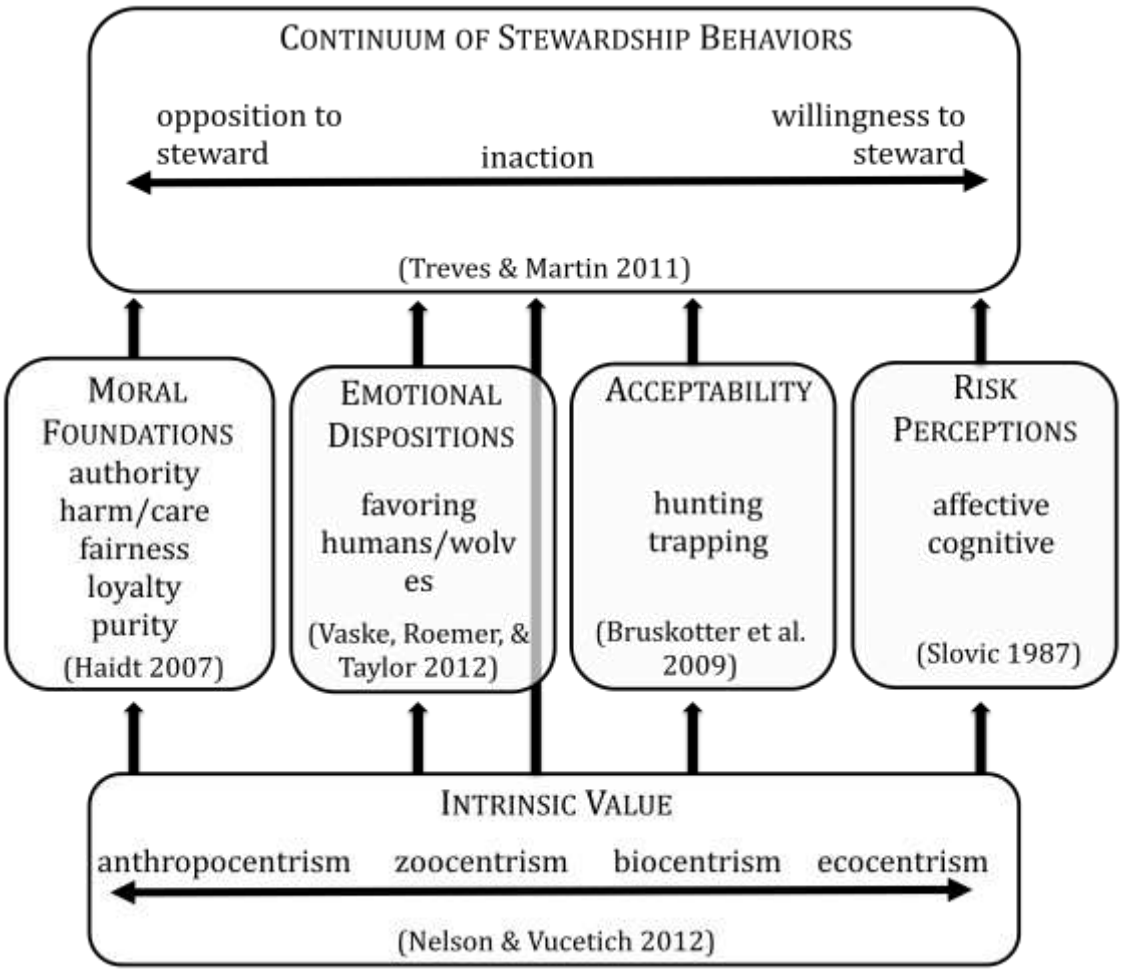

Figure 1.1. Proposed conceptual framework. Attribution of intrinsic value influences stewardship behavior directly and indirectly via moral foundations, emotional dispositions, acceptability of hunting/trapping and risk perceptions.

Theoretical Concepts

Herein I briefly outline the four main concepts that guided this dissertation.

Conservation Ethics

Although philosophers have explored conservation and environmental ethics for decades (Callicott, 1990, 1992; Rolston III, 1975), empirical ethics research related to human-nature relationships is a new and growing subdiscipline (Gore et al., 2011; Haider & Jax,

2007). The first and most basic concept I used to measure ethics as it relates to wildlife was *intrinsic value*, or the value of an entity beyond its utility to another (Callicott, 1979; Nelson, 2004). Stakeholders who attribute intrinsic value to an animal believe that it has the right to exist in its own right, not simply to serve some human purpose. As such, animals belong in what might be called a moral community of all those with intrinsic value (Callicott, 1979). These stakeholders would be considered at least *zoocentric* if they attribute intrinsic value to some but not all animals and *biocentric* if they attribute intrinsic value to all life (Figure 2; Nelson, 2002; Nelson, 2004). *Anthropocentric* stakeholders attribute intrinsic value only to humans (Goralnik & Nelson, 2012). Finally, *ecocentrists* attribute value to not only individual animals but also ecological collectives (e.g., populations, species, communities, ecosystems; Nelson, 2002).

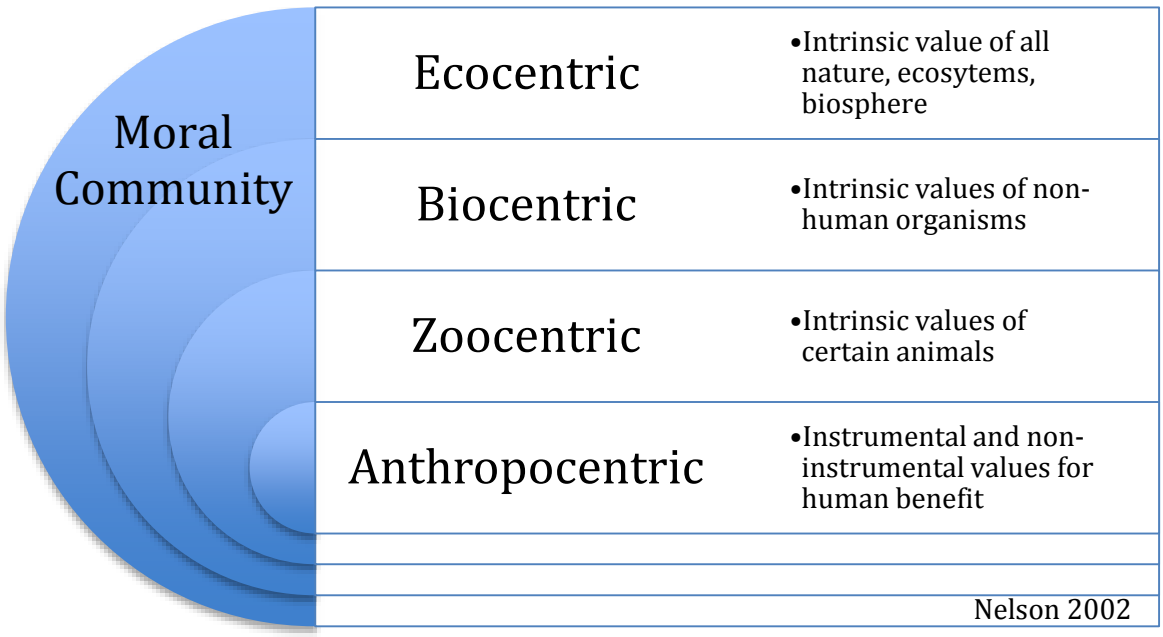

Figure 1.2. Conservation ethics typologies. Circles reflect greater inclusivity in a moral community, or who has intrinsic value. At the center, anthropocentric concerns related to a range of human interests do not consider non-human animals. Zoocentric concerns consider individual welfare of certain animals. Biocentric concerns are more inclusive of all life. Finally, ecocentric concerns are the most inclusive, addressing intrinsic values at all levels from individual organisms to whole systems of biotic and abiotic components.

I also incorporated a social psychological theory to addresses how humans make ethical judgments. Moral foundations theory (MFT) was developed to explain intuitive ethics and has broad application across cultures (Haidt, 2007). MFT argues for five foundations that comprise most ethical considerations:

(1) *authority/subversion* addresses respect for established tradition and hierarchy;

(2) *care/harm* relates to avoiding harm and encouraging care of those within a moral community;

(3) *fairness/cheating* focuses on rights, autonomy and justice among members of society;

(4) *ingroup loyalty/betrayal* involves obligations to an identity group; and

(5) *purity/disgust* emphasizes what is natural or decent and avoids contamination of body or mind.

Stakeholders vary in the extent to which each foundation influences a personal ethic; some foundations are more important than others in an individual's judgments of right and wrong (Haidt & Graham, 2007). MFT has presented strong predictive ability for a wide range of moral concerns beyond justice and equality of other humans (e.g., treatment of non-human entities, appropriate behavior within groups; (Haidt & Joseph, 2004, 2007), suggesting its usefulness for predicting conservation and wildlife related ethics. However, to date, MFT has not been applied to wildlife management in the US.

Acceptability is another consideration for understanding ethics and has been used synonymously with words such as adequate, appropriate, desirable, preferred, supported, and tolerated (Bruskotter et al., 2009); its definitions are usually in terms of tolerance or wildlife

acceptance capacity (i.e., acceptable wildlife population levels; (Riley & Decker, 2000) or normative beliefs about management strategies (J. J. Vaske et al., 2001; Zinn, Manfredo, Vaske, & Wittmann, 1998). I followed Bruskotter and colleagues' (2009) combined approach to measure acceptability as a judgment related to action or policy appropriateness. Measuring acceptability of lethal control and underlying justifications (e.g., to locally control depredation, for recreation) may provide practical relevance for managers seeking to predict support for policy changes of wolf populations.

Finally, I measured moral emotional dispositions or traits that influence specific emotional responses to an ethical question. One example of an ethical wildlife management question is whether or not to hunt wolves (Jacobs et al., 2012). Emotional dispositions related to wildlife (e.g., anger, sympathy in reaction to various scenarios) may influence acceptability of management actions (Slagle, Bruskotter, & Wilson, 2012; Vaske, Roemer, & Taylor, 2012; Wieczorek Hudenko, 2012). Emotional dispositions may drive much debate over wolf management and are likely useful for identifying areas of disagreement that conflict mitigation and stakeholder engagement processes should address (Jacobs, 2012; Vaske et al., 2012).

Risk Perception

Risk perception is an important consideration in human interactions with wildlife (Gore, Knuth, Curtis, & Shanahan, 2007; Riley & Decker, 2000). Wildlife-related risks can include attacks to humans or pets, livestock depredation or competition over game species. Risk perceptions are subjective, value-laden and intuitive judgments related to an individual's risk and influence behaviors and behavioral intentions (O'Connor, Bord, & Fisher, 1999;

Renn, 1998). Because of the subjective nature and uncertainty surrounding risk, stakeholders often conflict with each other over how to mitigate those risks (Keller, Siegrist, & Gutscher, 2006; Paul Slovic, Peters, Finucane, & Macgregor, 2005). I utilized the psychometric paradigm of risk perception (Slovic, 1987) to measure eight elements that humans may consider when judging risks from wildlife: certainty, control, frequency, naturalness, responsiveness, seriousness, trust and volition (adapted from Gore et al., 2007; Table 1). These elements are useful and relevant to wolf management on a national level (Houston, Bruskotter, & Fan, 2010) but have yet to be systematically quantified to a post-recovery context such as current Michigan wolf management. Affective dimensions of risk, referred to as dread in the psychometric paradigm, may be as important as cognitive aspects in understanding risk perception (Lazo, Kinnell, & Fisher, 2000; Slovic, 1987).

Table 1.1. Psychometric paradigm of risk perception concepts and definitions.

Concept	Definition	Principle Investigator(s)
Certainty	Extent to which individual is sure of causes and preventions of risks	Flynn et al. 1992, Siegrist 1999
Control	Individual's perceived ability to avoid negative effects of risk	Grobe et al. 1999; Slovic 1987; Weber et al. 2001, Rogers 1975
Frequency	Degree to which individual assesses risk effect as rare or common	Flynn et al. 1992; Siegrist 1999
Naturalness	Whether perceived cause of risk is anthropogenic or environmental	Burton 1972
Responsiveness	Individual's assessment of response time and degree by wildlife management agencies	Crawford-Brown 1999
Seriousness	Degree to which individual assesses risk effect as severe	Grobe et al. 1999; Rogers 1975; Weber et al. 2001
Trust	Individual's assessment of wildlife management agencies' ability to manage risks	Frewer et al. 2003; Slovic 1993
Volition	Whether individual assesses risk exposure as intentional or accidental	Fischhoff et al. 1978, Zimmerman et al. 2001

Social Identity Theory

Social identity theory (SIT) explores the component of one's self concept that is derived from group membership and the value and emotion attached to that membership (Tajfel, 1982; Tajfel, H., & Turner, 1979). According to SIT, humans find *ingroups* consisting of like-minded individuals through *self-categorization*, which occurs when an individual enters a situation they believe relevant to a certain social group for which s/he is a member (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990). The individual views him/herself as a representative of that group and acts according to group social norms (Jetten, Postmes, & McAuliffe, 2002). Ingroups are cohesive because of a shared desire for positive social identity (i.e., high self-esteem), which is attained by comparisons of their ingroup to germane outgroups (R. Brown, 2000; Labianca, Brass, & Gray, 1998). Comparisons that reveal perceived inequalities in status (e.g., based on socioeconomic levels, power) result in competition and *ingroup bias*, whereby humans seek to increase positive ingroup characteristics and negative aspects of outgroups (Sherif, 1966; Tyerman & Spencer, 1983).

Given socio-demographics' limited explanatory power for wildlife-related perceptions and behaviors (Enck & Brown, 2002; J. J. Vaske et al., 2001), social identities may strengthen predictability of models considering such concepts and have been found relevant to myriad conflict situations (Hornsey, 2008; Naughton-Treves, Grossberg, & Treves, 2003). Through socialization within a cultural group, sometimes by profession, social identity reflects deeply held, value-laden perceptions that ultimately influence behaviors towards wildlife (Kaltenborn, Bjerke, & Vitterso, 1999; Naughton-Treves et al., 2003). Strength of group identification increases normative influence on perception-behavior relationships and positive emotions for

members who act in accordance with group norms (Hogg & Terry, 2000; Karasawa, 1991). Therefore, utilizing SIT may be one useful tool for segmenting stakeholders, and informing strategies for public involvement and communication in wildlife decision-making.

Stewardship

The concept of stewardship might be considered the behavioral corollary of a conservation ethic (Bruskotter & Fulton, 2011; Holsman, 2000; Treves, 2009) and offers a perspective with which to measure human-wildlife interactions (Dixon, Siemer, & Knuth, 1995; Holsman, 2000; Treves, 2012). Defined as behaviors taken to support conservation of a species (Bruskotter & Fulton, 2011; Treves, 2012), stewardship may vary depending on an individual's ethical perspective. Stewardship may be directed at myriad spatial and temporal scales, from individual animals to ecosystems as well as future generations of humans, and might be conceptualized as a continuum of willingness to steward wildlife to opposition (with inaction in the center; Treves, 2012). Stewardship might include pro-environmental and pro-social behaviors such as private-sphere environmentalism (i.e., pro-environmental behaviors that do not occur in the public realm; e.g., consumer choices to purchase environmentally friendly products; Bruskotter & Fulton, 2011; Holsman, 2000; Stern, 2000; Treves & Martin, 2011; Treves, 2012).

Dissertation Organization

This dissertation consists of this introductory chapter, a methods chapter, four data chapters that were each independent manuscripts submitted for publication (and therefore include minor redundancy) and a concluding chapter.

Chapter 2 outlines the mixed methods used for the dissertation. Details of data collection and analysis for qualitative and quantitative research are included. The chapter concludes with a discussion of the reliability and validity of results as well as a statement of my orientation as a researcher and the implications of my orientation for research.

Chapters 3 and 4 comprise the qualitative phase of my dissertation. In Chapter 3, I explore the relationship between social identity and stewardship, characterizing differences among identity groups over wolf management and similarities in stewardship conceptualizations. Chapter 4 addresses stakeholder perceptions of decision-makers and processes and identifies perceived problems of competing knowledge forms, disenfranchisement and inequality among identity groups.

Chapters 5 and 6 form the quantitative dissertation research phase. In Chapter 5, I explore the relationship between my measure of conservation ethics (i.e., emotional dispositions of anger and sympathy, intrinsic value for wolves and moral foundations) and stewardship behavioral intentions. In Chapter 6, I test the relationships between conservation ethics, risk perceptions, social identity and stewardship.

Finally, Chapter 7 concludes this dissertation with a synthesis of findings from all chapters and outline of significant theoretical, methodological and practical contributions. Future areas of research and research limitations are also addressed. Appendices consist of interview guide and survey instrument used in data collection.

CHAPTER 2
DISSERTATION METHODS

In this chapter, I present methodological details about this dissertation, including: (1) a justification for using mixed methods research; (2) evidence for responsible conduct in research; (3) an explanation of my orientation as a researcher; (4) considerations for the validity and reliability of this dissertation; and (5) extensive background on data collection, measurement, and analysis procedures.

Justification for Mixed Methods

This dissertation research used a mixed methodology with qualitative interviews and a quantitative online survey (Creswell, 2009). Mixed methods were appropriate for this research for five key reasons. First, qualitative inquiry allowed me to deeply explore novel concepts I identified as relevant to the case study of wolf management in Michigan after reviewing the literature on historical human-wolf interactions in North America (Creswell, 2009). Second, qualitative work facilitated the capture of myriad stakeholders perspectives with thick descriptions, which is not simply highly detailed ethnography but also addresses context and meaning and interprets stakeholder behavior (Ponterotto, 2006). Third, I used quantitative inquiry to confirm relationships between the variables I found to be important during the qualitative and exploratory research phase (Creswell, 2009). Fourth, mixed methods allowed me to capture both breadth and depth of understanding about wolf management in Michigan, which served as way to attain convergent validation (Campbell & Fiske, 1959). Researcher triangulation was attained by colleagues' and coauthors' review of all work to validate concepts, ensure clarity of interview/survey and cross-check the interpretation of results

(Denzin, 1978). Finally, I leveraged mixed methods to help me explore relationships in a natural context through interviews and establish credibility with a thorough consideration of cause and effect among variables to the extent possible through quantitative data analysis (LeCompte & Goetz, 1983). Throughout the qualitative research process, I used disciplined subjectivity, an iterative process of self-monitoring throughout data collection and analysis where decisions are continuously reevaluated to maintain reliability and validity (Erickson, 1984).

Responsible Conduct in Research (RCR)

I maintained responsible conduct in research by following all institutional review board (IRB) requirements and university-required RCR training (e.g., 3 hours per year engaged in learning about RCR-related issues; 1 hour of which was face-to-face discussion with advisor). IRB requires respondent anonymity; therefore no identifying information was connected to interview or survey responses. IRB also requires informed consent, which I obtain via signed consent forms for interviews and electronic agreement for web-based surveys. Informed consent outlined the purpose of the study, what the respondent was expected to do, potential risks and benefits of participation, privacy and confidentiality, respondents' rights to refuse or withdraw and contact information in case of later questions or concerns. The University Committee on Research Involving Human Subjects (IRB# x11-1144e) reviewed and approved methods used in this research for the duration of my dissertation (Appendix A). Below, I include detailed protocols for sample frames, research instruments (Appendices B, C and D) and data analysis.

Researcher Orientation

As a researcher, I position myself at the nexus of positivist and postpositivist orientations. As I will outline in the next section, I strive for some degree of objectivity through traditional measures of reliability and validity. Through quantitative work, I seek to reach tentative conclusions from empirical findings. These approaches root this dissertation, particularly quantitative Chapters 5 and 6, in positivist orientations. Yet I allow for disciplined subjectivity through qualitative work in Chapters 3 and 4 to explore social, ethical and political dimensions of wolf management that a purely positivist research paradigm may not have uncovered (Erickson, 1984; Farrell, 2010). Postpositivist (and postnormal) science that seeks to observe some facets of a phenomenon in depth rather than aim for pure objectivity (Vasilachis De Gialdino, 2011) may aid in understanding the inherent nature of wolf management. Empiricism drives the focus of my work, in part because of its emphasis in dominant positivist science, but I recognize diverse ways of knowing (e.g., local knowledge; see Chapter 4) and thus emphasize the constructivist recognition that how knowledge is constructed varies (Jonassen, 1991). I believe that my ontological and epistemological orientations strengthen my work by balancing theory, observation and pragmatism and helping capture both depth and breadth of understanding.

Validity and Reliability

Reliability in research means that results are replicable, consistent and stable over time (Kirk & Miller, 1986); I addressed threats to external reliability (i.e., whether independent researchers would reach the same conclusions given the same context) and internal reliability (i.e., whether independent observers would reach the same conclusions given the same data)

through several methodological approaches. Following standardized methodology and seeking both internal and external review of all data collection methods and analysis increased reliability (Goetz & LeCompte, 1982). Thorough literature review and pre-testing also maximized reliability. I addressed reliability issues of biases related to sampling bias and social context by carefully choosing and describing diverse stakeholders as study participants, delineating contexts in which data was gathered, and recording decision criteria throughout data collection and analysis (Creswell, 2009; LeCompte & Goetz, 1982). For quantitative work, I used statistics to measure reliability estimates (e.g., Cronbach's alpha).

Validity in research means that results are accurate (i.e., reflect empirical reality, measure the human experience; LeCompte & Goetz, 1982). Externally valid findings can be compared across groups; internally valid results reflect an empirical reality (LeCompte & Goetz, 1982). I maximized validity in quantitative work by optimizing sample size (for low margins of error and sufficient statistical power) and using statistical tests to analyze data (Salant & Dillman, 1994) and in qualitative work by not generalizing conclusions beyond the specific case study and clearly identified phenomenon in question (Wolcott, 1973, 1990). To maintain construct validity (i.e., equivalence in meaning and interpretation), I used more than one question or measurement to measure each concept (Creswell, 2009). To maintain face validity, I had external parties (e.g., contact team of MDNR employees, Michigan State University colleagues and peers) review interview guides and survey instruments. Whenever possible, data, investigator, methodological and theoretical triangulation was used (Denzin, 1978) and data was iteratively checked to ensure context and meaning were accurately maintained and presented (Trochim, 2001). Through all phases, decision rules were delineated *a priori* to maintain validity and consistency (Denzin & Lincoln, 2000). Above all, I took

Wolcott's advice on validity very seriously by aiming to "not get it all wrong" (Wolcott, 1990:128) through accurate recording and writing, letting readers see for themselves, reporting fully and being candid.

Threats to validity also come in the form of (1) social desirability to over-report desirable behaviors that follow social norms (either those of the interviewer or the participant's ingroup), (2) acquiescence bias, which is a tendency to agree to questions regardless of the truth, (3) the opposite tendency (i.e., to disagree) or (4) desire to skew survey for some personal or political purpose. Response bias and lying in surveys may lead to spurious correlations (Farber, 1963). I minimized these biases by alternating positive and negative valence of answer choices in non-regular patterns such that respondents could not simply work through a survey and agree or disagree to every question (Tellis & Chandrasekaran, 2010). I also included a number of control measures in my survey. Two items in the moral foundations measures, assessing right and wrong based on "Whether or not someone was good at math" and "It is better to do good than to do bad," served as specific control measures (See Appendix B); if any respondents had agreed to the former item or disagreed with the latter item the respondent would have been removed from analyses (See Appendix C for survey instrument from moralfoundations.org).

Rational choice theory addresses issues of social desirability bias. Expected risks or losses from being truthful will influence respondents' propensity to falsify responses (Becker, 2006; Krumpal, 2013). Risks are typically identified as negative feelings, including embarrassment during interview, guilt or shame associated with cognitively dissonant behaviors (i.e., behaviors are not consistent with values) or fear of sanctions (e.g., arrests stemming from illegal killing of wolves; Krumpal, 2013). Respondents may not be truthful

when answering questions that measure highly sensitive information (e.g., illegally killing wolves). At least three conditions determine respondents' perceptions of risk associated with truthful answers: desire for approval, lack of privacy resulting in negative consequences (e.g., from spouse discovering a previously unknown truth) and others' reactions to a certain response choice (Stocké, 2007). If no more than one of these conditions is met, then respondents are expected to answer truthfully (Stocké, 2007). Based on rational choice theory, my survey design adequately addressed these issues. The only condition I could not control was a respondent's desire for approval; given that anonymity is ensured at the beginning of the survey (following Institutional Review Board protocol) even this condition should not have significantly altered responses. As for risks, embarrassment is less relevant because my survey was completed in the privacy of respondents' personal computers. Fear of sanctions, whether formal or informal, was most likely also minimal given that the survey did not ask about illegal behavior or sensitive topics and anonymity and confidentiality is ensured at the beginning of the survey (Rasinski, Willis, Baldwin, Yeh, & Lee, 1999).

The last potential source of bias, the desire to skew a survey for some personal or political purpose, can be addressed in two possible ways. The first option is: conclusions from this work should not be over-generalized and potential falsification should be considered when interpreting results (Trochim, 2001). To some extent, reliance on self-reporting will always leave open the chance for falsification. Wolcott's advice on validity or "not getting it all wrong" (Wolcott, 1990:128) seems germane here: record and write accurately, let readers see for themselves, report fully, be candid. The second option involves additional research: experimentally testing concepts measured by self-reporting in my dissertation survey may serve as validation of results. For example, fear can be directly assessed by measuring implicit

association and physiological response times to images of predators such as wolves (Johansson, Karlsson, & Flykt, unpublished data). As with all science, replication of findings results in robust and confident conclusions.

Data Collection

This dissertation had 2 phases: Qualitative Phase 1 in which I conducted semi-structured key informant interviews (August-September 2012) and Quantitative Phase 2 in which I conducted a web-based survey (October-November 2013). Below I detail the protocols for data collection in each research phase. In the next section, I describe data analysis for each phase.

Qualitative Phase 1: Sample Population

For Chapters 3 and 4, I used qualitative inquiry to maximize opportunities to explore emergent categories and relationships between concepts first identified in literature review and deemed relevant by study participants (Creswell, 2009). Data were collected via voluntary, semi-structured, key-informant interviews (Kvale & Brinckmann, 2009; Willis, 2005) in August-September 2012 throughout the Upper Peninsula and northern, central and southeastern regions of Michigan's lower peninsula (i.e., within and outside of current wolf range; Figure 2.1). Semi-structured interviews are interviews that follow a set of pre-determined protocol consisting of specifically worded questions (Kvale & Brinckmann, 2009; Willis, 2005). Key-informant interviews are those that gather information about the personal experiences and perspectives of highly involved stakeholders (Denzin & Lincoln, 2000; Kvale & Brinckmann, 2009). I targeted this sample population of active stakeholders (i.e., those taking action because wolf management is highly salient and important to them; Grunig,

1979) because these groups are most affected by policy changes and likely to insert themselves into the process if unsatisfied (Loker, Decker, & Chase, 1998). Measuring social identity and stewardship behaviors among the latent public (i.e., those that do not perceive wolf management to be a salient issue; Grunig, 1979) would have been less meaningful because these individuals presumably would hold no identity relevant to the issue and been unlikely to have engaged in stewardship behaviors. I was interested in exploring the extent to which these perspectives of involved stakeholders that drive conflict in wolf management because such understanding might contribute to efficacy of future management and communication between decision-makers and stakeholders. Participants outside of wolf range were included because North American wildlife is managed as a public trust resource owned by all citizens (Bruskotter, Enzler, & Treves, 2011) and to allow testing of whether proximity to wolves affects cognitions and behaviors. Thus, excluding participants outside of the Upper Peninsula would ignore an important component of active and aware stakeholders who can engage in stewardship behaviors that indirectly affect wolves (e.g., activism, public participation processes).

Figure 2.1. Map of Michigan and current wolf range. As of 2014, wolf populations (range denoted in gray) are limited to the Upper Peninsula.

An initial list of potential groups within which to sample was generated from groups represented on the Michigan Department of Natural Resources (MDNR) Wolf Management Advisory Council (WMAC) in 2012. These groups are highly involved in wolf management and represent diverse stakes, including: animal welfare or rights advocates, deer hunters, environmentalists, hunters who use dogs, legislators, livestock owners, MDNR wildlife managers, trappers and tribal members. A complete list of the MDNR WMAC groups is found on the MDNR website (http://www.michigan.gov/dnr/). Additional groups were not identified in snowball sampling for Phase 1 research, suggesting that external (i.e., MDNR) and internal parties (i.e., public stakeholders) agree on the representativeness of the WMAC. It should be noted that these groups are not mutually exclusive. For example important differences may occur within hunting groups (e.g., deer versus bear hunters) or between animal rights and animal welfare advocates. I considered groups separate for classification

purposes and allowed participants to self-identify; participants confirmed personal identities aligned with formal organizational affiliation. Participants were active members of organizations that participated in public input processes and other wolf management activities in the state; some participants were former members of the Wolf Management Roundtable (i.e., the group responsible for reaching consensus on prior wolf management plans) and current members of the Wolf Forum, which became the Wolf Management Advisory Council in December 2012.

Some qualitative researchers give rules of thumb for sufficient sample sizes of approximately 12-15 participants for qualitative inquiry using key-informant interviews (Miles & Huberman, 1994). My priority was to interview at least one or more key informants from nine specific stakeholder groups involved in the WMAC. According to this rule of thumb (i.e., 12-15 participants) and my minimum goal of one interview per group, I obtained an adequate sample size, especially if managers and legislators are considered under the same broad decision-making role. I caution against interpreting results beyond the specific context (LeCompte & Goetz, 1982; Wolcott, 1973).

Qualitative Phase 1: Interview Protocol

Using the same script to recruit interview participants, I first contacted potential participants by email, with follow-up emails and subsequent phone calls when I did not receive a response within 4 days (Salant & Dillman, 1994). If the potential participant agreed to an interview, I set up and met the participant at a location and time convenient for him or her. I began interviews by explaining the purpose of my work, reading the consent script, having participants sign a consent form, and asking a few ice-breaker questions (See

Appendix A; Dillman, Smyth, & Christian, 2009). With permission, interviews were digitally recorded on an iPhone 4S using the voice memo application. One participant did not agree to be recorded; the same protocol was applied to detailed written notes taken during the interview.

I conducted all interviews following the same protocol to maximize consistency and minimize interviewer bias that might occur through inconsistent order or wording of questions (Denzin & Lincoln, 2000)(Emerson, 2001). Interviews followed a set of predetermined questions about research concepts, with further probing questions to garner additional information when the participant did not completely answer the question; this systematic approach also helped minimize potential for interviewer bias. I used several open-ended questions about each research concept to ensure construct validity (Miles & Huberman, 1994; see Appendix A for interview guide). Concepts addressed were (1) social identity in relation to wolf management and strength of identity, (2) perceptions about outgroup identities, (3) perceptions of actual and ideal decision makers and processes (e.g., fairness, involved stakeholders, roles of science and politics), (4) perceptions of lethal and non-lethal control, including recreational hunting/trapping and depredation prevention by livestock owners, and (5) stewardship (e.g., beneficiaries of stewardship, personal stewardship norms, welfare of individual wolves versus populations). These theoretical concepts are discussed further in Chapters 3 and 4. I concluded interviews by asking if there was any important topic that was not discussed during the interview, offering further informational materials about the project (e.g., business cards) and asking for recommendations on other potential participants. Participants did not identify additional individuals that were not on my initial list, suggesting that this non-probability, snowball sampling adequately covered the appropriate key-

informants (Goodman, 1961). Thank you emails were sent to participants within one week of the interview.

Quantitative Phase 2: Sample Population

I conducted a voluntary, self-administered web-based survey of self-selected Michigan citizens age 18 years or older who were involved in wolf management through organizations represented on the WMAC in 2013. Using the same criteria from Qualitative Phase 1, I targeted a sample of aware (i.e., those perceiving wolf management to be a salient issue) stakeholders in addition to active stakeholders in Michigan wolf management (Grunig, 1979). I targeted this sample population for the same reasons I targeted active stakeholders in Qualitative Phase 1. Snowball sampling commenced with the same participants from Qualitative Phase 1; starting with these participants and sampling within their networks helped capture active and aware publics in this phase. By focusing on the most relevant subgroup of the Michigan public, I was able to maximize sampling effort with directly applicable results. Additionally, expanding to include aware and possibly latent aware stakeholders serves to confirm findings from the first phase and thus increases confidence in results and implications of results (Salant & Dillman, 1994). This increased confidence may augment decision-makers' ability to predict public responses to wolf-related policy.

Quantitative Phase 2: Survey Design and Distribution

The survey was designed in Qualtrics, a popular and powerful online survey platform (qualtrics.com), and distributed via a hyperlink (Paolacci, Chandler, & Stern, 2010). The survey hyperlink was first distributed to WMAC members in October 23, 2013. WMAC

members that completed the survey were then asked to forward the hyperlink to members of their respective organizations through email listserves or posting the link their organization webpage. WMAC members were contacted weekly for 3 consecutive weeks or until they responded that they had forwarded the survey (Dillman et al., 2009). I anticipated that this snowball sampling approach would maximize response rates among active publics because respondents would receive the survey from within their trusted networks (Cohen & Arieli, 2011). I also emailed the survey hyperlink to survey participants who had participated in prior MDNR surveys (in March-April 2013; see Lute, Bump and Gore, in review), agreed to be contacted for future research and provided email addresses; the Qualtrics Mailer service sent each email address a unique hyperlink that could only be accessed once. This unique hyperlink and the option to allow only one response per IP address prevented participants from submitting duplicate responses, which could skew results toward inaccurate conclusions (Duda & Nobile, 2010). Participants were invited to forward the survey hyperlink to other Michigan citizens interested and involved in wolf management. After being open for 38 days, the survey closed on November 30, 2013 because (1) all targeted groups (WMAC member organizations and prior survey participants) had access to the survey for >2 weeks, (2) regular firearm season for deer and Thanksgiving holiday had commenced and (3) new responses had not been submitted in >5 days (Salant & Dillman, 1994). Because my sampling frame was aimed at active, aware and latent aware public stakeholders and data was not meant to be representative of all Michigan citizens, I chose not to weight data and caution against interpreting results beyond the specific sample population of this study (Vaske et al., 2012; Vaske, 2011). Weighting data deemphasizes participants that respond at higher rates, which are the stakeholder groups I specifically targeted (Babbie, 1998). The influence of

sociodemographic characteristics (a potential source of sampling bias) on the relationships explored herein is assessed in tests that measure mediation of sociodemographic variables (David P. MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

Quantitative Phase 2: Survey Instrument

The survey assessed acceptability, conservation ethic, emotional dispositions, moral foundations, risk perception, social identity, socio-demographics and stewardship through 5-point Likert-type close-ended questions (see Appendix B for survey). I also measured acceptability of hunting and trapping (Bruskotter, Vaske, & Schmidt, 2009; Vaske, Roemer, & Taylor, 2012; Zinn, Manfredo, Vaske, & Wittmann, 1998), emotional dispositions about sympathy and anger related to hunters, ranchers and wolves (Vaske, Roemer, & Taylor, 2012) and Haidt's (2007) questions about five moral foundations (authority, care, fairness, loyalty, purity; see moralfoundations.org for details on measures and below for definitions). Previously validated measures for acceptability, conservation ethic, emotional dispositions, moral foundations, risk perception, social identity and stewardship were used or adapted from references outlined in Table 2.1. Several control questions were included to identify satisficing (i.e., answering neutral or randomly to shorten length of survey) (See "math" and "good" questions in Appendix B; Bell, Huber, & Viscusi, 2011; Lindhjem & Navrud, 2011). Indices were used for five concepts in Quantitative Phase 2 because they increase three qualities I sought to maximize with this work: measurement reliability, validity and precision (Vaske, 2008). Measurement reliability comes from measuring several items for each construct and is assessed with Cronbach's alpha. Measurement validity (i.e., the intended measure was actually assessed) increases with multiple item scales in which each item has

multiple response options (i.e., the 5-point Likert-type scale). Multiple response options also increase precision (i.e., detailed exactitude) and allow extreme or strong perceptions to be differentiated from moderate or neutral perceptions (Vaske, 2008). Means were used to create indices of items with continuous (at least 5-point) response options: affective risk perceptions, cognitive risk perceptions, emotional dispositions and the five moral foundations. One summated index was created for stewardship because it was measured with binary (yes, no) response options to a range of behavioral categories and thus means could not be calculated. For all indices (described in more detail below) and analyses, cases with missing data in the independent or dependent variables were excluded, therefore n values vary by analysis (Preacher & Hayes, 2004; Schafer & Graham, 2002). For summary statistics of each item and index see Chapters 5 and 6.

Table 2.1. Validated dissertation concepts and associated references.

Concept	Definition	Principle Investigator(s)
Acceptance	A judgment related to action or policy appropriateness	Bruskotter et al., 2009
Conservation Ethic	An ideology or worldview related to appropriate human-nature relationships	Bruskotter in prep.; Nelson, 2004
Emotional Dispositions	Traits that influence specific emotional responses and acceptability of management actions	Vaske et al., 2012
Moral Foundations	Intuitive ethical considerations to determine right and wrong	Haidt, 2007; moralfoundations.org
Risk Perception	Subjective judgment accessing uncertainty and severity of a hazard	Gore, Knuth, Curtis, & Shanahan, 2002; Muter, Gore, & Riley, 2012
Social Identity	Component of one's self concept that is derived from group membership and the value and emotion attached to that membership	Bruskotter in prep.; Karasawa, 1991
Stewardship	Actions taken to benefit an animal, species, habitat or ecosystem	Holsman, 2000; Stern, 2000; Treves, 2012

The survey was pre-tested with a sample of Mechanical Turk respondents in August 2013 (n=200; incentivized with $2.00/respondent) and reviewed by academic colleagues (committee members: M. Axelrod, M.L. Gore, C.D. Navarrete, M.P. Nelson; peers and lab mates) and MDNR wildlife managers (that form a contact team to advise on this dissertation; C. Albright, D. Beyer, A. Bump, P. Lederle, T. Minzey, B. Roell) to optimize clarity and construct validity and minimize any potential researcher bias (Salant & Dillman, 1994). The pre-test sampled U.S. citizens and was comprised of representative sociodemographic groups (i.e., no bias in age, education, income, race or sex). Although incentivizing is useful for increasing response rates generally, I chose not to incentivize for the final survey because it often increases response from participants with less genuine interest in the topic (Wells, Cavanaugh, Bouffard, & Nobles, 2012), which were not the targeted stakeholders for this work. Instead, I relied on the salience of the issue to determine which participants completed the final survey (Wells et al., 2012). Herein, I detail survey concepts and how they were measured.

Acceptability of hunting and trapping might be thought of as a cognition comparable to an attitude or belief (Bruskotter et al., 2009; Zajac, Bruskotter, Wilson, Prange, & Dimensions, 2012). Three measures of acceptability were assessed by asking respondents to indicate on a 5-point Likert-type scale (1 = Never Acceptable; 5 = Always Acceptable) whether or not they accepted (a) hunting wolves ($\overline{X}$ = 3.79; *SD* = 1.31), (b) hunting wolves with dogs ($\overline{X}$ = 2.92; *SD* = 1.46), and (c) trapping wolves ($\overline{X}$ = 3.47; *SD* = 1.48). I also created a unique list of 13 reasons for accepting hunting and trapping wolves. I asked

respondents to indicate with which of the 13 reasons they agreed separately for hunting and for trapping. The 13 reasons were (0 = No, 1 = Yes):

- "Because hunting/trapping is a tool to reduce conflict" (hunting: $\overline{X}$ = 0.61; *SD* = 0.49; trapping: $\overline{X}$ = 0.54; *SD* = 0.50)
- "Because it ensures human safety" (hunting: $\overline{X}$ = 0.38; *SD* = 0.49; trapping: $\overline{X}$ = 0.32; *SD* = 0.47)
- "Because it will increase people's acceptance of wolves" (hunting: $\overline{X}$ = 0.17; *SD* = 0.37; trapping: $\overline{X}$ = 0.14; *SD* = 0.35)
- "Because it will increase wolves' fear of humans" (hunting: $\overline{X}$ = 0.40; *SD* = 0.49; trapping: $\overline{X}$ = 0.21; *SD* = 0.41)
- "Because people want to hunt/trap wolves" (hunting: $\overline{X}$ = 0.20; *SD* = 0.40; trapping: $\overline{X}$ = 0.21; *SD* = 0.41)
- "Because wolf populations can sustain hunting/trapping" (hunting: $\overline{X}$ = 0.65; *SD* = 0.48; trapping: $\overline{X}$ = 0.56; *SD* = 0.50)
- "To maximize economic benefits (e.g., livestock production, revenue from pelts)" (hunting: $\overline{X}$ = 0.32; *SD* = 0.47; trapping: $\overline{X}$ = 0.30; *SD* = 0.46)
- "To obtain a wolf as a trophy" (hunting: $\overline{X}$ = 0.17; *SD* = 37; trapping: $\overline{X}$ = 0.14; *SD* = 0.34)
- "To obtain pelts as a livelihood (hunting: $\overline{X}$ = 0.17; *SD* = 0.38; trapping: $\overline{X}$ = 0.25; *SD* = 0.43)

- "To participate in natural processes (e.g., as a predator in an ecosystem)" (hunting: $\overline{X}$ = 0.47; *SD* = 0.50; trapping: $\overline{X}$ = 0.37; *SD* = 0.48)
- "To protect pets or livestock from immediate threats" (hunting: $\overline{X}$ = 0.73; *SD* = 0.42; trapping: $\overline{X}$ = 0.60; *SD* = 0.49)
- "To protect wolves' prey base" (hunting: $\overline{X}$ = 0.34; *SD* = 0.48; trapping: $\overline{X}$ = 0.29; *SD* = 0.45)
- "When nonlethal methods have not worked" (hunting: $\overline{X}$ = 0.35; *SD* = 0.48; trapping: $\overline{X}$ = 0.29; *SD* = 0.45)
- "Never" (hunting: $\overline{X}$ = 0.09; *SD* = 0.287; trapping: $\overline{X}$ = 0.20; *SD* = 0.40)

MDNR wildlife management professionals (i.e., contact team members) validated and contributed to this list.

Conservation ethic was considered a basic cognition and consisted of novel measures of intrinsic value for ecological collectives, individual wolves and wolf populations. I measured intrinsic value by respondents' level of agreement (1 = Strongly Disagree; 5= Strongly Agree) that:

- "Wolves have intrinsic value" (which represents at least a zoocentric perspective, a respondent could still be bio- or ecocentric; $\overline{X}$ = 3.98, *SD* = 1.06)
- "All life has intrinsic value" (at least biocentrism; $\overline{X}$ = 4.12, *SD* = 0.921)
- "Only humans have intrinsic value" (anthropocentrim; $\overline{X}$ = 1.98, *SD* = 1.11).

I chose to use the zoocentric measure of intrinsic value for analyses for simplicity and clarity of understanding and to match specificity of conservation ethic to stewardship (i.e., target of ethic and target of behavior were both wolves; Manfredo, Zinn, Sikorowski, & Jones, 1998).

Four items assessed reasons for respondents' attributions of intrinsic value to wolves (0 = No, 1 = Yes):

- "All life has intrinsic value." ($\overline{X}$ = 0.50, *SD* = 0.49).
- "They are part of an interconnected ecosystem." ($\overline{X}$ = 0.78, *SD* = 0.414).
- "They are sentient and conscious." ($\overline{X}$ = 0.21, *SD* = 0.41).
- "They have human-like qualities." ($\overline{X}$ = 0.05, *SD* = 0.23).
- "I do not value wolves." ($\overline{X}$ = 0.13, *SD* = 0.33).

The first reason is an additional indication of biocentrism. The second reason suggests ecocentrism. Third and fourth reasons might indicate zoocentrism as these are common reasons why some species are considered to have intrinsic value while others do not (Michael P. Nelson, 2002; Nelson, 2004).

Emotional dispositions, which may have a cognitive component, are mostly affective and were adapted from similar items from Vaske et al. (2012). This concept was measured respondents' level of agreement (1 = Strongly Disagree; 5 = Strongly Agree) to 8 items:

- I do not understand why people object to hunting or trapping wolves. (anger about anti-hunting attitudes; $\overline{X}$ = 2.82; *SD* = 1.39)
- I feel sorry for people who have to live in fear of wolves. (sympathy for residents in wolf territories; $\overline{X}$ = 3.46; *SD* = 1.24)
- I feel sorry for wolves when they are killed for any reason. (sympathy for wolves; $\overline{X}$ = 2.33; *SD* = 1.37)
- I get angry when I learn that a wolf has killed someone's livestock. (anger about wolf pretense; $\overline{X}$ = 3.16; *SD* = 1.20)

- I get angry when I think about hunters shooting wolves. (anger about hunting; $\overline{X}$ = 2.17; *SD* = 1.46)
- I get angry when I think about wolves caught in traps. (anger about trapping; $\overline{X}$ = 2.49; *SD* = 1.59)
- The thought of wolves killing prey saddens me. (sympathy for prey; $\overline{X}$ = 2.19; *SD* = 1.21)
- Ranchers losing livestock to wolves saddens me. (sympathy for ranchers; $\overline{X}$ = 3.45; *SD* = 1.17)
- I feel sad when wolves are treated like other wildlife species. $\overline{X}$ = 2.13; *SD* = 1.18)
- I feel sad when wolves lose their fear of people. $\overline{X}$ = 3.49; *SD* = 1.28).

These questions and questions with similar framing have been extensively validated and commonly used in other psychological studies and diverse contexts (e.g., Navarrete, McDonald, Molina, & Sidanius, 2010; Vaske et al., 2012). The novel measures I created were emotional dispositions related to residents in wolf territories and wolves' prey as well as the last two additional items. For participants who answered each question (Preacher & Hayes, 2004; Schafer & Graham, 2002), items were averaged to create a single variable for analysis. The five items endorsing human considerations (i.e., anger about anti-hunting attitudes, wolf presence; sympathy for ranchers, residents in wolf territories, wolves' prey) were reverse-coded. Thus for this index, high values indicated emotional dispositions toward wolves (i.e., anger about hunting wolves, trapping wolves; sympathy for wolves) and low values favored human considerations ($\overline{X}$ = 2.67; *SD* = 0.90; Cronbach's α = 0.84).

Moral foundations are basic judgments of right and wrong (social psychologists debate the extent to which morality is intuitive or cognitive; Haidt & Joseph, 2004; Paxton & Greene, 2010). Five foundations were measured:

- *authority* addresses respect for established tradition and hierarchy ($\overline{X}$ = 3.03; *SD* = 0.94)
- *fairness* focuses on rights, autonomy and justice among members of society ($\overline{X}$ = 3.55; *SD* = 0.86)
- *harm* relates to avoiding harm and encouraging care of those within a moral community ($\overline{X}$ = 2.98; *SD* = 1.05)
- *ingroup* involves obligations to an identity group ($\overline{X}$ = 2.90; *SD* = 0.97)
- *purity* emphasizes what is natural or decent and avoids contamination of body or mind purity ($\overline{X}$ = 2.97; *SD* = 1.14).

Subscales were computed for each foundation, with averages of four items per foundation subscale (participants that did not answer each item were not included). For more details on the instrument see moralfoundations.org and Appendix C (Graham et al., 2011; Haidt, 2007).

Risk perceptions were measured in terms of both affect and cognition. Cognitive risk perception was measured by 5-point Likert-type scales of dis/agreement with 7 psychometric items (Rogers, 1975; Sjöberg, 1998; Slovic, 1987):

- certainty ($\overline{X}$ = 4.13; *SD* = 0.89)
- control ($\overline{X}$ = 3.53; *SD* = 1.18)
- frequency ($\overline{X}$ = 4.11; *SD* = 1.22)
- naturalness ($\overline{X}$ = 3.78; *SD* = 0.93)

- responsiveness ($\bar{X}$ = 3.49; *SD* = 1.10)
- seriousness ($\bar{X}$ = 3.24; *SD* = 1.27)
- trust ($\bar{X}$ = 3.68; *SD* = 1.30).

I expanded on typical risk perception questions by also measuring affective risk perception, which was measured by asking respondents, "I worry about risks posed by wolves to…":

- children ($\bar{X}$ = 3.34; *SD* = 1.31)
- game species ($\bar{X}$ = 3.22; *SD* = 1.37)
- hunting dogs ($\bar{X}$ = 3.49; *SD* = 1.32)
- livestock ($\bar{X}$ = 3.80; *SD* = 1.13)
- my health ($\bar{X}$ = 2.09; *SD* = 1.10)
- my hunting traditions ($\bar{X}$ = 2.70; *SD* = 1.42)
- my livelihood ($\bar{X}$ = 1.89; *SD* = 1.06)
- my personal safety ($\bar{X}$ = 2.30; *SD* = 1.23)
- pets ($\bar{X}$ = 3.61; *SD* = 1.22).

Final measures for the two types of risk perception were computed by averaging all items (8 items for cognitive risk perception $\bar{X}$ = 3.71; *SD* = 0.57; Cronbach's α = 0.92; 9 items for affective risk perception, $\bar{X}$ = 2.98; *SD* = 0.99; Cronbach's α = 0.95) and scores ranged from 1-5. As noted above, indices, such as these risk perception scales, have high measurement reliability, validity and precision (Vaske, 2008).

Social identity was measured in terms of 8 relevant stakeholder groups, which were adapted from Bruskotter (unpublished data) because this was the only known work that considered social identity in relation to wildlife or natural resource management and thus were

deemed the most salient to inform my dissertation. Respondents were asked their agreement on a 5-point Likert-type scale about whether they identified with each identity as well as which exclusive group they identified with most (i.e., primary identity; participants could not indicate more than one group). Respondents were categorized into identity groups by their agreement to the question, "To what extent do you identify yourself with each of the following groups":

- animal welfare or rights advocates ($\overline{X}$ = 2.44; *SD* = 1.39)
- conservationists ($\overline{X}$ = 4.25; *SD* = 0.85)
- environmentalists ($\overline{X}$ = 3.87; *SD* = 1.03)
- farmers ($\overline{X}$ = 3.22; *SD* = 1.25)
- gun rights advocates ($\overline{X}$ = 3.99; *SD* = 1.29)
- hunters ($\overline{X}$ = 4.20; *SD* = 1.25)
- property rights advocates ($\overline{X}$ = 3.89; *SD* = 1.07)
- wildlife advocates ($\overline{X}$ = 4.15; *SD* = 0.96).

Strength of group identification was measured with four items about affective and cognitive dimensions of group salience (Karasawa, 1991):

- I often acknowledge the fact that I am a member of my group. ($\overline{X}$ = 4.28; *SD* = 0.94)
- I often refer to my group when I introduce myself. ($\overline{X}$ = 3.08; *SD* = 1.13)
- It would be accurate if someone described me as a typical member of my group. ($\overline{X}$ = 3.62; *SD* = 1.06)
- I would feel good if I were described as a typical member of my group. ($\overline{X}$ = 3.88; *SD* = 0.98)

Socio-demographic measures are typical in social science methodology and can help assess if results are generalizable or skewed toward various groups (Kals, Schumacher, & Montada, 1999). Socio-demographic variables are also important to measure as they may be useful proxies for access to social and economic resources, which may explain patterns in many variables but most notably in environmentally-relevant behaviors such as stewardship (Stern, 2000). Socio-demographic measures included closed and open questions about:

- age ($\overline{X}$ = 53.80 years, *SD* = 13.64)
- county of residence
- education (1= Elementary/Middle school; 9= Ph.D./M.D.; $\overline{X}$ = 5.18, *SD* = 1.94)
- ethnicity (Asian or Asian American; Black or African American; Hispanic or Latino including Mexican American; White Caucasian, Anglo, European American; American Indian/Native American)
- gender (0 = female, 1 = other, 2 = male; $\overline{X}$ = 1.52, *SD* = 0.88)
- income (1= Less than $10,000 a year; 8 = $100,000 a year and over; $\overline{X}$ = 6.37, *SD* = 1.93)
- political ideology (1 = Very Liberal; 7 = Very Conservative; $\overline{X}$ = 4.41, *SD* = 1.57)
- political party affiliation (1 = Strong Democrat; 5 = Strong Republican; *M*= $\overline{X}$ = 3.57, *SD* = 1.54).

Stewardship was developed by adapting stewardship definitions and pro-environmental and pro-social behaviors that include activism and private-sphere environmentalism (i.e., pro-environmental behaviors that do not occur in the public realm such as consumer choices to purchase environmentally friendly products; Bruskotter & Fulton,

2011; Holsman, 2000; Stern, 2000; Treves & Martin, 2011; Treves, 2012). I asked respondents which of the following 11 activities they engaged in that could be intended to support (1) wolves or (2) wolf management (0 = No, 1 = Yes):

- Attended a legislative hearing or organizational meeting ($\overline{X}$ = 0.16; *SD* = 0.37)
- Boycotted or avoided buying the products of a company because of their stance on wolf management ($\overline{X}$ = 0.09; *SD* = 0.29)
- Donated money to a group ($\overline{X}$ = 0.17; *SD* = 0.38)
- Called or wrote a letter to a legislator ($\overline{X}$ = 0.24; *SD* = 0.43)
- Educated others ($\overline{X}$ = 0.37; *SD* = 0.48)
- Managed land to create or conserve wolf habitat ($\overline{X}$ = 0.05; *SD* = 0.21)
- Read newsletters, magazines or other publications ($\overline{X}$ = 0.57; *SD* = 0.50)
- Signed a petition ($\overline{X}$ = 0.29; *SD* = 0.46)
- Volunteered with a group ($\overline{X}$ = 0.11; *SD* = 0.32)
- Voted for a candidate in an election based at least in part because of his/her stance on wolf management ($\overline{X}$ = 0.13; *SD* = 0.33)
- Wrote a letter to a newspaper or called in to a news program ($\overline{X}$ = 0.07; *SD* = 0.25)

The final stewardship measures were summated index scores of total behavior categories engaged to support wolves for participants that indicated yes or no to each behavior; because there were 11 behavior categories, scores ranged from 0-11 ($\overline{X}$ = 1.86; *SD* = 2.42; Cronbach's $\alpha = 0.82$). I also asked whether motivation for wolf stewardship was intended to benefit individual wolves, wolf populations/species, and ecosystems.

Data Analysis

Qualitative Phase 1

For Chapters 2 and 3, I conducted 21 interviews, 20 of which were recorded and saved as digital audio files. For the one participant that did not agree to be recorded, the same protocol was applied to detailed written notes, which were taken during the interview and iteratively coded for emergent themes with reading replacing listening for the six steps outlined below. The overarching goal of this qualitative phase of my dissertation research was to gain depth of understanding about social identity, acceptability of lethal and non-lethal control methods and perceptions of decision-makers and processes from at least one or more key informants from nine specific stakeholder groups involved in my specific case study, Michigan wolf management (Table 2.2). I rooted conclusions in Chapters 3 and 4 within the relevant sample population by (1) reminding readers that results are not generalizable to a broader population and (2) explaining throughout the chapters that the focus and tentative conclusions are based in a very specific sample (i.e., highly involved and active stakeholders) of a particular case study (i.e., Michigan wolf management; LeCompte & Goetz, 1982; Wolcott, 1973).

Table 2.2. Participants by stakeholder group for Phase 1 qualitative research (August-September 2012).

Participants	N
Animal/wolf advocates	2
Deer hunters	3
Environmentalists	3
Hunters who use dogs	3
Legislator	1
Livestock owners	4
State agency manager	1
Trapper	1
Tribal members	3

My study objectives (i.e., explore social identity, acceptability of lethal and non-lethal control methods and perceptions of decision-makers and processes) guided but did not confine analysis. I analyzed interviews via the scan, order, review, and compare method (LeCompte & Goetz, 1983), an iterative process that does not constrain data and leads to rich descriptions and depth of understanding (Miles & Huberman, 1994). Each interview was considered an individual case, coded and analyzed in Audacity 2.0.2 (©2012, ®Dominic Mazzoni). An identical protocol was used to analyze all interviews. First, I listened to each interview in its entirety for repeated keywords (e.g., stewardship, hunting) and phrases (e.g., "members of my group…") and from this first iteration, developed overarching themes that emerged among interviews (e.g., social identities, perceptions of outgroups). I then listened through interviews a second time to digitally mark audio files at each keyword or phrase. Emergent themes were ordered in meaning and compared for similarities and differences among interviews. I used common emergent themes to explore where stakeholders agreed or disagreed on the concepts measured (e.g., acceptability of lethal control, justifications for various management strategies, perceptions of decision processes). Numbers or percentages of participants that agreed or disagreed on an emergent theme were not reported as data was not intended to be representative, rendering numbers or percentages somewhat irrelevant (Miles & Huberman, 1994; Wolcott, 1990). In a final iteration, I cross-checked all data to ensure accuracy in context and meaning (Trochim, 2001). Through all phases, decision rules were delineated to maintain validity and consistency and direct quotes included to maintain participants' original meaning (Denzin & Lincoln, 2000).

Quantitative Phase 2

I performed general descriptive statistics (e.g., means, standard deviation, skew, kurtosis) and calculated Cronbach's alpha (acceptable alpha ≥ 0.6) for multiple item response sets (Trochim, 2001). I performed path analysis (David P. MacKinnon et al., 2002; Preacher & Hayes, 2004, 2008) to explore whether measures of variables mediated relationships: (1) between conservation ethics (independent variable [IV]) and wolf stewardship (dependent variable [DV]) and (2) between social identity and (IV) and wolf stewardship (DV). Path analysis is a form of structural equation modeling that tests for the indirect effect of a mediating variable on the relationship between IV and DV. Using regression tests to conduct path analysis is common and widely accepted (David P. MacKinnon et al., 2002). Evidence for mediation is supported when three conditions are met: the relationship between (1) mediator and IV is significant, (2) mediator and DV is significant, and (3) IV and DV is significantly smaller when the effect of the mediator is controlled (RM Baron & Kenny, 1986). Therefore to conduct path analysis, I followed the following protocol: (1) if significant correlations (at the $p<0.05$ level) occurred between the mediator and (1a) IV and (1b) DV then (2) regressions were run for the relationship between (2a) mediator and IV and (2b) mediator and DV accounting for IV. Eleven potential mediators were analyzed for the ethics-stewardship relationship: (1) acceptability of hunting, (2) acceptability of trapping, (3) affective risk perceptions, (4) cognitive risk perceptions, (5) a combined risk perception index of both affective and cognitive measures, (6) emotional dispositions, and (7-11) 5 moral foundations. Only respondents who completed the dependent variable of interest were included in analyses. All analyses were conducted using standardized z-scores for each variable and the 'sgmediation' module in STATA 13.1 (StataCorp LP, College Station, TX,

USA) followed by the bootstrapping procedure for calculating standard errors (Preacher & Hayes 2008).

CHAPTER 3
STEWARDSHIP AS A PATH TO COOPERATION? EXPLORING THE ROLE OF IDENTITY IN INTERGROUP CONFLICT AMONG MICHIGAN WOLF STAKEHOLDERS[1]

Abstract

Post-recovery wolf management remains controversial. In Michigan, dialogue centers on hunting wolves but controversy may be more nuanced than simple pro- or anti-hunting positions. Social identity may cause stakeholders to organize in groups and identity differences may be driving controversy. To explore stakeholder disagreement over wolf management, I conducted semi-structured key informant interviews (*n*=21) about identity and stewardship in August-September 2012. Four overarching identity themes emerged regarding: (a) management objectives, (b) focal levels, (c) control methods and (d) justifications for methods. Themes indicated two main researcher-defined identity groups. Interviewees from both groups identified six common stewardship themes: (a) bequest values, (b) ecosystem health, (c) education, (d) existence values, (e) pride in natural resources and (f) sustainability. Findings suggest stakeholders may be conflicting over opposing identities vis-à-vis organization affiliation, which may be related to what management strategies individuals oppose. Establishing common stewardship objectives through established participation methods may help alleviate controversy.

[1] Citation: Lute, M.L., & M.L. Gore. (2014) Stewardship as a path to cooperation? Exploring the role of identity in intergroup conflict among Michigan wolf stakeholders. *Human Dimensions of Wildlife*, 19(3): 267-279.

Introduction

Disagreement over how to manage human-wildlife conflict (HWC) is a challenge for contemporary wildlife management. Integrating human dimensions into wildlife management has provided key insights into understanding what and how people think about HWC management, not least of which includes measuring concepts such as social acceptance capacity, support for compensation schemes or media coverage effects (Bruskotter, Schmidt, & Teel, 2007; Mertig, 2004; Treves, Naughton-Treves, Wilcove, & Jurewicz, 2009). Yet some wildlife management actions (e.g., hunting large carnivores to mitigate conflict) remain highly controversial among stakeholder groups. Social identity may cause stakeholders to organize into groups of individuals with similar positions and identity differences between groups may be driving debate. Such conflict among groups for control of natural resources can inhibit effective management (M. A. Wilson, 1997a). Understanding group conflict through social identity theory may help inform HWC management and other politically contentious wildlife management issues, such as the case study of Michigan wolf management I examine here. Stewardship, defined as behavioral intentions motivated to benefit wolves or support their management, might help transcend different identities and reorient dialogue toward cooperation.

Social Identity Theory

Social identity theory (SIT) offers one mechanism to understand why groups or organizations might conflict over wolf management. Social identity is defined as the component of one's self concept derived from group membership (Tajfel, 1982; Tajfel & Turner, 1979). According to SIT, individuals find *ingroups* consisting of like-minded

individuals through *self-categorization*, which occurs when an individual enters a situation she/he believes relevant to a certain social group for which she/he is a member (Abrams et al., 1990). The individual views himself/herself as a representative of that group and acts according to group social norms (Jetten, McAuliffe, Hornsey, & Hogg, 2006; Jetten et al., 2002). Individuals with different values, attitudes, norms, and behaviors belong to outgroups; ingroup members often assume that outgroup members are "carbon-copy" representatives of a homogenous group rather than unique individuals (Labianca et al., 1998). Ingroups are cohesive due to the value and emotion attached to membership and a shared desire for positive self-esteem via social identity, which is attained by comparisons of their ingroup to germane outgroups (R. Brown, 2000). Comparisons reveal perceived inequalities in status (e.g., based on sociodemographics, power) and result in conflict and *ingroup bias*, whereby individuals overemphasize positive ingroup characteristics and negative outgroup characteristics (Hornsey, 2008).

Social identity theory can strengthen knowledge of wildlife-related perceptions and behaviors (M. Manfredo, 2008; Naughton-Treves et al., 2003; Stern, 2000) especially in the face of sociodemographics' limited explanatory power (J. J. Vaske et al., 2001). SIT has been found relevant to conflict situations outside the wildlife management field (R. Brown, 2000; Hornsey, 2008; Jetten et al., 2002). Through socialization within a cultural group, social identity reflects deeply held, value-laden perceptions that ultimately influence behaviors towards wildlife (Kaltenborn et al., 1999; Naughton-Treves et al., 2003). The strength of group identification increases normative influences on perception-behavior relationships and positive emotions for members who act in accordance with group norms (Hogg & Reid, 2006; Hogg & Terry, 2000). SIT may inform understanding of normative

influences on behavioral intentions (e.g., stewardship) and best strategies for public involvement and communication in wildlife decision-making.

Wolf management includes a clear political dimension; disagreements are often divided along political party lines (Nie, 2003; Skogen & Thrane, 2008) and wolf-related decisions can be made within a political arena involving legislators, governor-appointed commissioners and voters. Exploring SIT in relation to intergroup relations may be a first step in mitigating wolf-related conflict because identity-driven politics may fuel disagreement. SIT suggests the politics behind wolf management may be more about inequalities between groups than about the animals per se (Brown, 2000; Hornsey, 2008; Labianca et al., 1998). Well documented inequalities (or perceptions of inequality) between rural and urban residents or hunters and animal rights advocates have played out in political arenas and courtrooms in many regions and countries (Minnis, 1998; Naughton-Treves et al., 2003; Skogen & Krange, 2003). Importantly, group size does not have to be large to result in intergroup conflict; relatively small but vocal minority groups have been instrumental in stymieing wolf reintroduction for years (M. Nie, 2003; M. A. Wilson, 1997a). Mass media, which tends to frame stories around highly involved dichotomized stakeholders engaged in "wolf wars" (Lamoreux, 2009), may also influence perceptions of dichotomy and inequality. Perceptions of inequality can result in entrenched stakeholder groups feeling disenfranchised and defending their identities in ways that undermine sustainable management decisions (R. Brown, 2000; Hornsey, 2008; Yeates, Röcklinsberg, & Gjerris, 2011).

Stewardship

The concept of stewardship may help contribute solutions to conflicts over wolf management by encouraging group cooperation. Although academic disciplines conceptualize stewardship differently with some emphasizing action (e.g., Bruskotter & Fulton, 2011; Treves, 2012) and others ethics (e.g., Holsman, 2000), care for nature may serve as a unifying common denominator. Stewardship may manifest at myriad spatial and temporal scales, from individual animals to ecosystems and from present needs to those of future generations. Stewardship might operate at multiple cognitive levels from values to behaviors. Emphasizing the moral underpinnings of behavior may help expand management to reflect a broader suite of social, psychological and ecological values (Bruskotter & Fulton, 2011; Dixon et al., 1995; Holsman, 2000). Stewardship of a single species (e.g., deer, wolves) may unite individuals within similar groups. But a holistic view of stewardship as care for thriving ecosystems may illuminate responsibilities to a shared natural world and opportunities for collaboration among diverse groups (Holsman, 2000).

SIT may help explain why an individual who identifies as a hunter, for example, may be reluctant to support non-lethal control of wolves involved in HWC. Groups often oppose each other not necessarily over fundamentally different values but over political contests over access to resources (e.g., photographing vs. eating deer) and specific focal levels of management (e.g., protecting individuals vs. populations). A photographer and a deer hunter may both share a common value in "nature preservation" but disagree over specific deer management strategies. By focusing on a level beyond the individual or population, stewardship offers a way for hunters and non-hunters to agree on systems management of ecosystems that provides values for both groups (e.g., opportunities for sustainable harvest,

wildlife watching). Stewardship is not a panacea—those fundamentally opposed to taking the lives of individual animals will most likely consistently oppose hunting—but it may offer a way to refocus efforts toward shared values and concomitant behaviors. Exploring how stakeholders conceptualize stewardship in the context of wolf management may contribute to more effective public participation and efforts to balance stakeholder preferences.

The aforementioned perspectives on why groups compete or collaborate in HWC management prompted us to question: (a) Do groups compete over wolf management because of their social identity? and (b) Might groups collaborate based on shared stewardship positions? To this end, I used the case of wolf management in Michigan to: (a) explore relevant social identities to delineate ingroups, (b) characterize how ingroup members perceive outgroups and their constituent members, and (c) examine stewardship associated with wolves and their management.

Case study: Michigan Wolf Management

Human interactions with gray wolves (*Canis lupus)* have been wrought with conflict for centuries (Hampton, 1997). Gray wolves were eradicated from the Great Lakes region except in Northern Minnesota and Canada by the 1930s, listed as endangered under the Endangered Species Act in 1973 and naturally emigrated back to Michigan's Upper Peninsula over the past two decades (Beyer et al., 2006). Upper Peninsula wolves now number approximately 650 individuals (A. Bump, pers. comm., 2013), which prompted the U.S. Fish & Wildlife Service to delist Western Great Lakes wolves in 2012. Wolf management now falls under Michigan Department of Natural Resources (MDNR) jurisdiction. Prior human dimensions research conducted in Michigan has found that

residents, with the exception of some hunters and ranchers, value wolves (Beyer et al., 2006; Hook & Robinson, 1982; Stephen R Kellert, 1990; M. L. Lute, Gore, Nelson, & Vucetich, 2012; Mertig, 2004). Several studies reveal strong public support for depredation control but less support for consumptive uses of wolves such as hunting and trapping (Kellert, 1990; Lute et al., 2012; Mertig, 2004). Current debate centers on whether the wolf population in the Upper Peninsula should be hunted. Although conflict can be beneficial in wildlife management (e.g., prevents stagnation, stimulates creativity, creates forum for testing ideas), conflict can also result in entrenched disagreement and undermine decision processes. Reducing the downside of conflict is a laudable goal for wolf management.

Methods

Data Collection

I collected qualitative data to maximize capacity to explore emergent themes and relationships between concepts deemed relevant by interviewees. Data were collected via voluntary, semi-structured, key-informant interviews (Kvale & Brinckmann, 2009; Willis, 2005) in August-September 2012 throughout the Upper Peninsula and northern, central and southeastern regions of Michigan's lower peninsula. Interviews were digitally recorded with permission. All but one interviewee agreed to be recorded; for this interview, the same protocol was applied to detailed written notes, instead of an audio file, taken during the interview. An initial list of potential interviewees was generated from a MDNR list of individuals highly involved in wolf management and represented diverse stakeholder groups, including: animal rights advocates, animal welfare advocates, deer hunters, environmentalists, hunters who use dogs, legislators, livestock owners, MDNR wildlife managers, trappers and

tribal members. I used these groups for organizational purposes and recognized that diversity existed within categories.

Interviews followed a set of predetermined questions about social identity, perceptions of outgroups and stewardship, with further probing questions to garner additional information deemed salient by interviewees; this systematic approach helped minimize the potential for interviewer bias (Denzin & Lincoln, 2000). I asked multiple open-ended questions about each research concept to ensure construct validity and capture breadth and depth of responses (Miles & Huberman, 1994). Identity was measured by asking interviewees about the role or group related to wolf management in Michigan with which they identified. Follow up questions explored whether there were multiple relevant identities and the importance and strength of identities (i.e., concepts of group salience and quality of identity in relation to interviewee-defined ingroup membership; following Jetten et al., 2006; Karasama, 1991; Perreault & Bourhis, 1998).

I conducted 21 interviews that lasted on average 77 minutes. Interviewees represented n=9 diverse stakeholder groups (Table 1). Five interviewees were female and 16 were male. Eight interviewees lived within wolf range and 13 did not. The lead author conducted, coded and analyzed all interviews following the same protocol to maximize consistency (Emerson, 2001). Both authors reviewed and interpreted compiled results to reach consistent conclusions and reduce researcher bias (Denzin, 1978).

Table 3.1. Emergent themes related to management used to define two major ingroups based on semi-structured interviews (n = 21) August –September 2012.

Management Concept	Operational Definition	Wise Use Ingroup	Protectionist Ingroup
Objectives	Goals of management	"There is no balance, we've got to get our hands in there." [R015] "I value wise use and sustainability…We should manage all wildlife for a balance." [R003]	"We need to allow the natural carrying capacity to work." [R014] "We need to be hands off because we don't know what we're doing well enough." [R017]
Focal Levels	Level at which management aims	Wolf populations are "out of control" [R002], "running rampant" [R004], "insurgent" [R009]. "We should manage at the population level because numbers cause the conflict." [R020]	"Removing even a single individual can have a large impact." [R014] "I think about individuals and the importance of family group dynamics." [R019]
Control Methods	Strategies in which management attains objectives	"Even people who don't want to hunt wolves want to see them managed… so have some management, have some goals." [R011] "Hunting is the solution." [R004]	"Wildlife management is an oxymoron…as soon they stopped shooting wolves, [wolves] came back." [R013] "Hunting is not a management tool." [R001]
Justifications	Reasons used to determine whether management is appropriate	"You have to kill some to help all of them." [R005] "Why aren't wolves paying for themselves?" [R011]	"We shouldn't have to kill wolves to get along with wolves." [R013]

Note. The total sample included individuals from the following non-mutually exclusive categories: animal/wolf advocates (*n*=2), deer hunters (*n*=3), environmentalists (*n*=3), hunters who use dogs (*n*=3), legislator (*n*=1), livestock owners (*n*=4), state agency managers (*n*=1), trappers (*n*=1) and tribal members (*n*=3).

Data Analysis

I analyzed digital audio files via the scan, order, review, and compare method (M. D. LeCompte & Goetz, 1983); this is an iterative process that does not constrain data and leads to rich descriptions and depth of understanding (Miles & Huberman, 1994). Each interview was coded and analyzed in Audacity 2.0.2 (©2012, ®Dominic Mazzoni). First, the lead author listened to each interview for repeated keywords (e.g., stewardship, hunting) and phrases (e.g., "members of my group…") and from this first iteration, developed overarching themes that emerged among interviews (e.g., social identities, perceptions of outgroups). She then listened to interviews a second time to digitally mark audio files at each keyword or phrase. Emergent themes were ordered by content and meaning and compared for similarities and differences among interviews. In a final iteration, the lead author cross-checked all data to ensure accuracy in context and meaning (Trochim, 2001). Emergent themes (i.e., management objectives, focal levels, control methods, justifications) identified in the above process were then used to define two ingroups (see Table 1). Through all phases, decision rules were recorded to maintain accuracy and consistency (Denzin & Lincoln, 2000).

Results

Ingroup Identities

My first objective explored themes associated with ingroup identity among key wolf stakeholders. When asked about the groups with which they identified, interviewees often defined identity in terms of their formal organizational affiliation. Interviewees diverged on four overarching themes associated with ingroups: the appropriateness of (a) management objectives, (b) focal levels (i.e., level at which management aims, namely individuals or

populations), (c) control methods (i.e., lethal or non-lethal strategies in which management attains objectives), and (d) justifications for methods. From these themes, two ingroups emerged conceptually (Table 1). The two groups differed somewhat in how often interviewees addressed each theme; I call these groups the 'wise use ingroup' and the 'protectionist ingroup' for reasons explained below. The wise use ingroup emphasized control methods and focal levels and the protectionist ingroup addressed these themes in relatively equal proportions (Figure 1). Perceptions for each of these four themes by the two ingroups are described in more detail below:

Theme 1: Objectives. The wise use ingroup supported a doctrine of responsible use of wildlife in which humans have a responsibility to control nature and a right to emphasize certain desired species over others (M. A. Wilson, 1997a). The protectionist ingroup focused on non-interventionist conservation of ecosystems where both game and non-game species were valued. Both ingroups supported use of wildlife in specific contexts such as subsistence hunting by tribal groups.

Theme 2: Focal levels. The wise use ingroup supported managing wolves at population or species levels and discussed aims for specified population sizes. The protectionist ingroup supported wolf management that considered individual, population and species levels. The protectionist ingroup discussed individual wolves, family groups and pack dynamics as important considerations in management decisions. Interviewees from both ingroups referenced initial recovery goals for wolf population sizes; the wise use ingroup supported

managing for this population size while the protectionist ingroup viewed this goal as rigidly defined by outdated and perhaps arbitrarily chosen minimum viable population sizes.

Theme 3: Control Methods. Interviewees in the wise use ingroup believed hunting was a requisite of wolf management and supported hunting of wolves among other lethal and non-lethal control measures. The protectionist ingroup emphasized the sustainability of wolf populations, did not support hunting of wolves, and accepted lethal control of problem wolves with the caveat that non-lethal measures were tried first.

Theme 4: Justifications. The wise use ingroup was concerned the Michigan wolf population exceeded social carrying capacity, threatened deer populations and supported the idea that hunting wolves would result in increased tolerance for wolves. The protectionist ingroup felt lethal control was justified only when wolves posed threats to humans or domestic animals (e.g., pets, hunting dogs, livestock) and hunting or trapping was not justified and would not effectively address human-wolf conflict (Table 1).

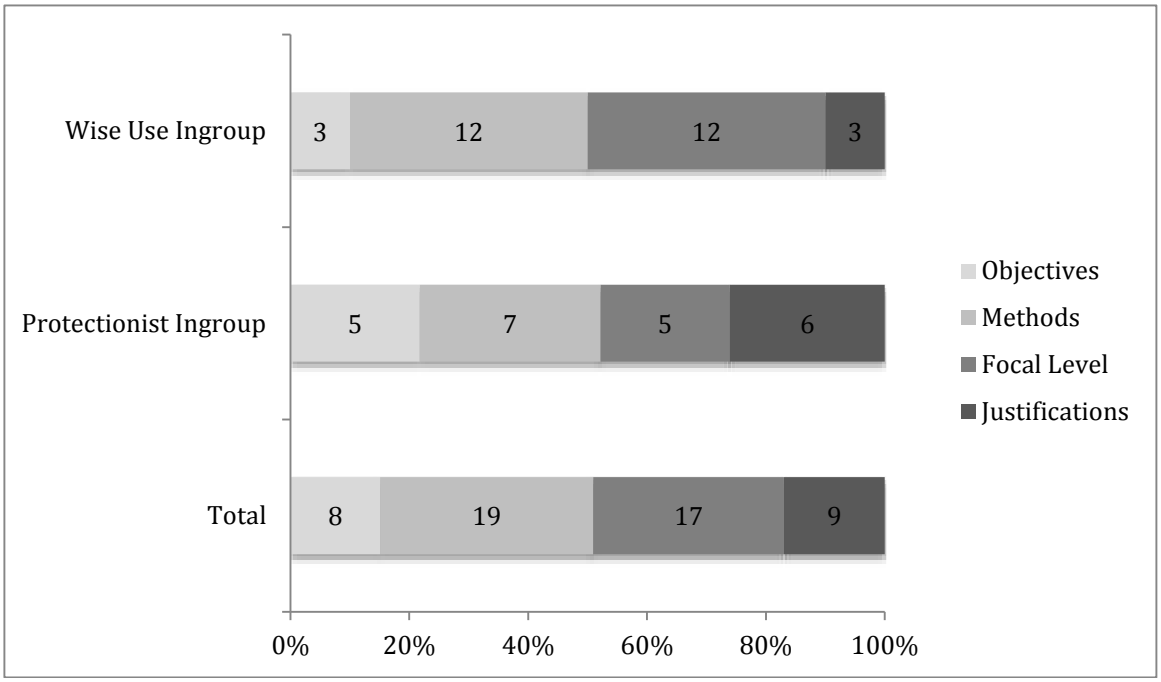

Figure 3.1. Percentage of ingroup interviewees (n=21) in Michigan that addressed emergent themes. Four management themes emerged from interviews in August–September 2012: management objectives, control methods, focal levels, and justifications.

Perceptions of Outgroup Identities

Two themes emerged as central to the identity of outgroups: attitudes and emotions. The wise use ingroup described outgroup members as anti-hunting advocates who prioritized animals over people, were prone to anthropomorphizing animals and naive about the harsh reality of nature. The wise use ingroup believed outgroup individuals responded emotionally to an inaccurate perception that wolves experienced suffering and fear when hunted. The protectionist ingroup described outgroup members as hunters and ranchers who only held consumptive values for wildlife and were prone to anger when asked to share resources with other groups. A few interviewees from each ingroup also recognized people had legitimate reasons to be angry (e.g., perceived inability to protect themselves from wolf-related risks) or to experience other emotional reactions in response to wolf management.

Stewardship

Six stewardship themes were common across both ingroups (in alphabetical order; Figure 2): (a) bequest values: for the interests of future generations, stewardship should ensure wolves exist for future generations and problems should not be left unsolved; (b) ecosystem health: stewardship should promote healthy, thriving ecosystems and all comprising species, including apex predators such as wolves; (c) education: stewardship entails building awareness and understanding about wolves and their management; (d) existence values: wolves, both individuals and populations, have a right to exist and should not be extirpated; (e) long-term sustainability: stewardship goals should aim to maintain populations in perpetuity; and (f) pride in Michigan's natural resources: wolf recovery in Michigan is evidence of successful stewardship at work and thus a source of pride. Interviewees defined wolf stewardship in terms of (a) values for wolves (e.g., bequest, ecosystem health, existence) and (b) behaviors that influence wolf management (e.g., contacting legislators, contributing in various ways to wildlife-related organizations or management agencies). Some interviewees spoke of stewardship as a moral obligation or personal norm. Beneficiaries of stewardship actions included humans (current and future generations), wolves (individuals and populations/species) and ecosystems.

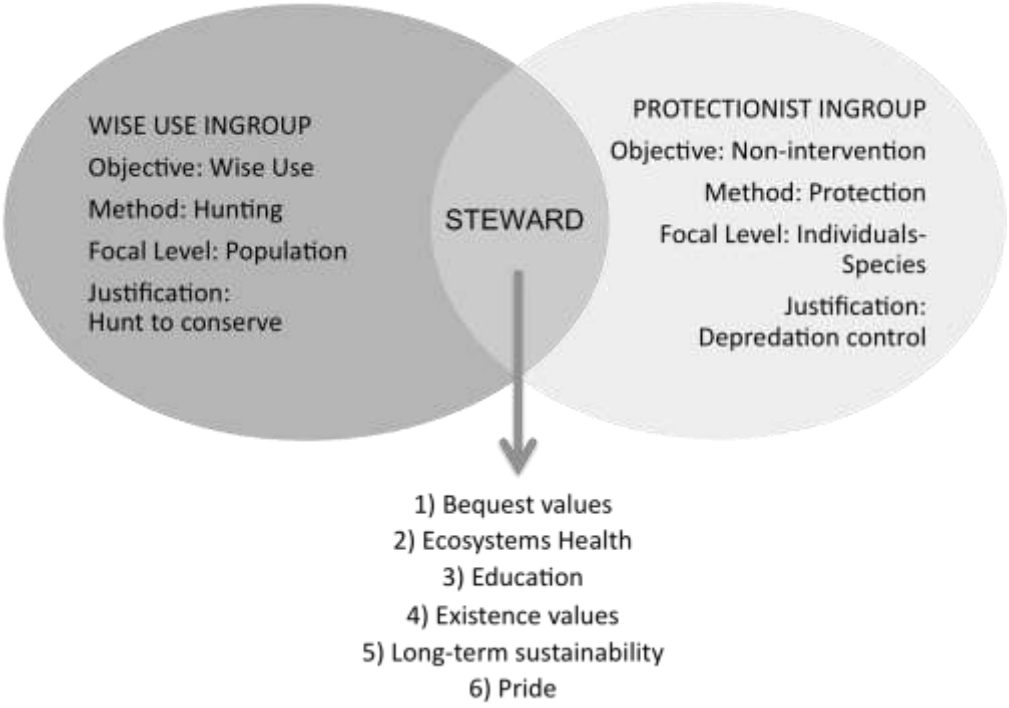

Figure 3.2. Venn diagram of ingroups and stewardship. Emergent themes defined ingroups while overlapping stewardship themes may define a common identity.

Discussion

Social identity, more specifically, ingroup bias can reveal potential underlying factors for conflict over recovered wolf management. Interviewees offered mostly negative and one-dimensional stereotypes of outgroups, which dichotomized stakeholders into pro-hunting or anti-hunting across contexts. Although identities are constantly redefined, negotiated and context-specific (Yount, Madison, Tucker, Carolina, & Hill, 2001) and interviewees did not claim strict pro- or anti-hunting positions, ingroup biases can drive the perception that groups are polarized (Labianca et al., 1998; Muter et al., 2012). Traditional responses to conflict aiming to bring different stakeholders together and cooperate on delineating, advising, or coming to consensus on management decisions may fail; contact alone is insufficient to ameliorate negative perceptions of outgroups and conflict (Labianca et al., 1998; Tyerman & Spencer, 1983). Managers and group leaders may be able to decrease ingroup bias by overtly

exploring perceptions of outgroups, fostering a safe environment where implicit biases can be openly discussed (Kahan, 2010) and explicitly addressing conflict between identity groups (Labianca et al., 1998; Sponarski, Semeniuk, Glikman, Bath, & Musiani, 2013). Encouraging interpersonal relations where people relate one-on-one as individuals may also help overcome negative ingroup biases (Hornsey, 2008; Tajfel & Turner, 1979); involved stakeholders may be more likely to support public participation processes that include meaningful interactions between parties (Webler & Tuler, 2006). To advance group cooperation and reach acceptable decisions about wolf management, activities may aim to address outgroup stereotypes; success might be measured by recognition that not all members of a group are homogeneous in their positions about wolf management.

Public participation processes can also advance group cooperation by encouraging broader interests and shifting identity groups from rigid positions to flexible interests (Gregory, Failing, Ohlson, & McDaniels, 2006; Kahan, 2010; Sponarski et al., 2013). Although managers might perceive multiple interests as a challenge to decision-making, participation processes that seek to include, engage and satisfy diverse stakeholders may lead to higher acceptance of decision outcomes in the end (Webler & Tuler, 2006). Participation processes that aim to increase overlap in concerns among groups may advance such efforts. Given the prevalence of stereotypes in this study, most outgroup members were not trusted and thus would be unlikely to change the minds of ingroup members. But effective communication from respected ingroup peers about why management objectives and justifications (i.e., protectionist ingroup concerns) are important may encourage such concerns among the wise use ingroup members (Kahan, 2010). Another useful approach may be to increase transparency of the decision process and equality among groups so that all

groups understand how their input was incorporated in the final outcome (Webler & Tuler, 2001, 2006). To do so, managers and decision-makers may gather information on identity group preferences for tradeoffs among a suite of clearly articulated decision alternatives (Gregory et al., 2006). Findings from this work regarding group preferences for particular management objectives, focal levels, control methods and justifications may aid in this endeavor. Subsequent communication of how interests and preferences were explicitly incorporated in policy decisions could help increase perceptions of equality among groups and thereby decrease disagreement that seeks to overturn decisions (e.g., ballot initiatives, litigation, noncompliance; Kahan, 2010).

Public participation processes may benefit from encouraging diverse stakeholders to identify as stewards and enfranchising groups to collaborate on shared responsibilities to nature (Benson, 1998). A 'steward' identity might blend both ingroups' ideas regarding human relationships with the natural world, respecting the need to control in some situations and protect in others. Interviewees identified a diverse array of actions undertaken to influence wolf management (e.g., educating others about depredation prevention, targeted control of problem wolves). These actions were motivated by a sense of obligation to benefit decision-making processes, wolves, and the ecosystems they inhabit. Although values and norms were discussed in relation to the concept, stewardship was most clearly articulated as a behavior (Treves & Martin, 2011; Treves, 2012). Stewards were described as individuals who engaged in actions that benefited holistic ecosystem sustainability and welfare of both individuals and collectives (for a discussion on whether these objectives are compatible see Eggleston, Rixecker, & Hickling, 2003; Nelson & Vucetich, 2012; Vucetich & Nelson, 2009). Managers aiming to increase cooperation may encourage these shared behaviors that

transcend group identity. If defined appropriately, stewardship may function as a common denominator or superordinate goal that increases solidarity among people (Sherif, 1966; Tyerman & Spencer, 1983). Shared stewardship behaviors may also specifically prohibit actions in certain contexts that do not align with shared objectives.

Fundamental wildlife management objectives (i.e., why we manage wildlife at all) serve as the ideological foundation upon which management actions are taken, but they can often marginalize segments of a population (Decker, Riley, Organ, Siemer, & Carpenter, 2011). Emphasizing specific stewardship behaviors identified as relevant to stakeholders here may help refocus dialogue to reflect fundamental objectives. Overall, interviewees emphasized control methods and focal levels over fundamental objectives or related justifications. Interviewees generally disagreed about the appropriateness of hunting as a management tool, but they agreed on fundamental objectives of management: holistic ecosystem stewardship, livestock depredation prevention and protection of pet and human safety. Stakeholders might attend to fundamental objectives by considering stewardship and appropriate actions may follow accordingly (Decker et al., 2011). Based on the six identified stewardship themes, best practices for wolf stewardship could prioritize specific strategies to facilitate ecosystem health, raise awareness regarding wolf management and prevent depredations. Although interviewees supported the idea that hunting wolves would encourage stewardship, empirical evidence for this idea is equivocal (Bruskotter & Fulton, 2011; Holsman, 2000; Treves & Martin, 2011; Treves, Naughton-Treves, & Shelley, 2013; Treves, 2009, 2012). Determining which strategies enhance stewardship and decrease depredations may help set a clear direction for management and anchor informed decisions in both biological and social science. Further refining conceptions of stewardship may help

guide desired interactions between humans and wolves by identifying adequate justifications for various lethal and non-lethal interventions.

In this article, I characterized two social identities that may influence why some wolf stakeholders compete and identified possible underlying motivations for stakeholder cooperation vis-à-vis stewardship. The overlap among ingroups over stewardship themes needs further validation but may provide a common starting point for collaboration among supposedly disparate groups. The human dimensions of HWC are important because negative interactions between identity groups can inhibit management decisions. Although social conflicts may be driven by relatively small groups, the political fallout resulting from such conflicts can be pronounced (Triezenberg, Knuth, & Yuan, 2011). Together with knowledge on collective action (e.g., Triezenberg et al., 2011) and communication (e.g., Morris, Jacobson, & Flamm, 2007), my results may contribute to more effective public participation and outcomes. The challenge of addressing fundamental differences of opinion regarding how humans should interact with nature remains.

CHAPTER 4
EXPLORING KNOWLEDGE AND POWER IN MICHIGAN WOLF MANAGEMENT[2]

Abstract

Who has knowledge and how it is communicated between groups can help determine who has power in wildlife management. Despite a trend toward more transactional processes that purposefully incorporate stakeholder knowledge, technical and science-based information remain dominant inputs for wildlife governance in the United States and elsewhere. Thus, most decision-making rests with wildlife managers and politicians, depends on scientific knowledge, and includes varying involvement of local stakeholders. Resultant tension from top-down wildlife governance can result in conflict over stagnated decision-making in wildlife management. Understanding public perceptions of knowledge and power can help improve management effectiveness that balances top-down and bottom-up approaches. I used Michigan wolf management as a case study to explore these ideas, the first study to my knowledge to explore this relationship in regard to a delisted endangered species. Through semi-structured interviews of highly involved stakeholders throughout Michigan (n = 21) 6 months after wolves were delisted in August and September 2012, I qualitatively explored public perceptions related to 1) power inequalities among groups and 2) the role of scientific knowledge in decision-making associated with hunting wolves in Michigan. Emergent themes related to relationships between power and knowledge in wolf management were 1) sources of knowledge for decision-making, 2) political power overrides science in decision-making, 3) special interests disenfranchise other publics, and 4) mistrust of decision-makers

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exists among stakeholders. With further testing and validation, these themes might inform predictive models and inferential studies useful for public participant planning and stakeholder engagement.

Introduction

Gray wolves (*Canis lupus)* are one of the most widely distributed large carnivores on Earth and, like many large carnivores, disagreement over their management is similarly widespread (Treves & Karanth, 2003). In 2012, after decades of legal protection and years of litigation, Western Great Lakes (Michigan, Minnesota, Wisconsin) wolves were legally deemed recovered and removed from the list of endangered species under the United States Endangered Species Act (ESA; Figure 1). Delisting has shifted management responsibility from federal to state and tribal agencies and introduced the possibility for new management activities, such as recreational hunting seasons aimed at addressing human-wolf conflict (Bruskotter, 2013) and alternative processes for engaging stakeholders in decision-making.

While wolves were listed as endangered, decision-making was legally required to be expert-driven and rooted in biological science. Although these expert-based processes provided invaluable knowledge for wolf recovery specifically and wildlife management generally, at times they resulted in controversial decisions that appeared to ignore the importance of non-technical variables like values, fairness, and trust (Sarewitz 2004, Raik et al. 2008). Today, these variables can be more directly accounted for during transactional decision-making processes, in which decision-makers incorporate greater public input than would occur in more authoritarian processes (Decker and Chase 1997). Such processes are increasingly common in wildlife management generally and in delisted wolf management

specifically and enhance managers' ability to concomitantly incorporate technical and non-technical knowledge (Decker & Chase, 1997). Importantly, simply including the public in decision-making and accounting for non-technical variables may not necessarily translate to the desired outcomes of stakeholder empowerment and satisfaction (Webler, Tuler, & Krueger, 2001). In the case of delisted wolf management, controversy among stakeholders persists despite substantial efforts by decision-makers to account for and incorporate technical and non-technical knowledge into wildlife management. Such controversy plays out among diverse publics and is evidenced in part by ballot initiatives against wolf hunting. This study investigates how 2 key variables, knowledge and power, operate in a transactional decision-making process in wildlife management. My aim is to improve understanding about why controversy arises and persists in wildlife management despite significant public participation efforts.

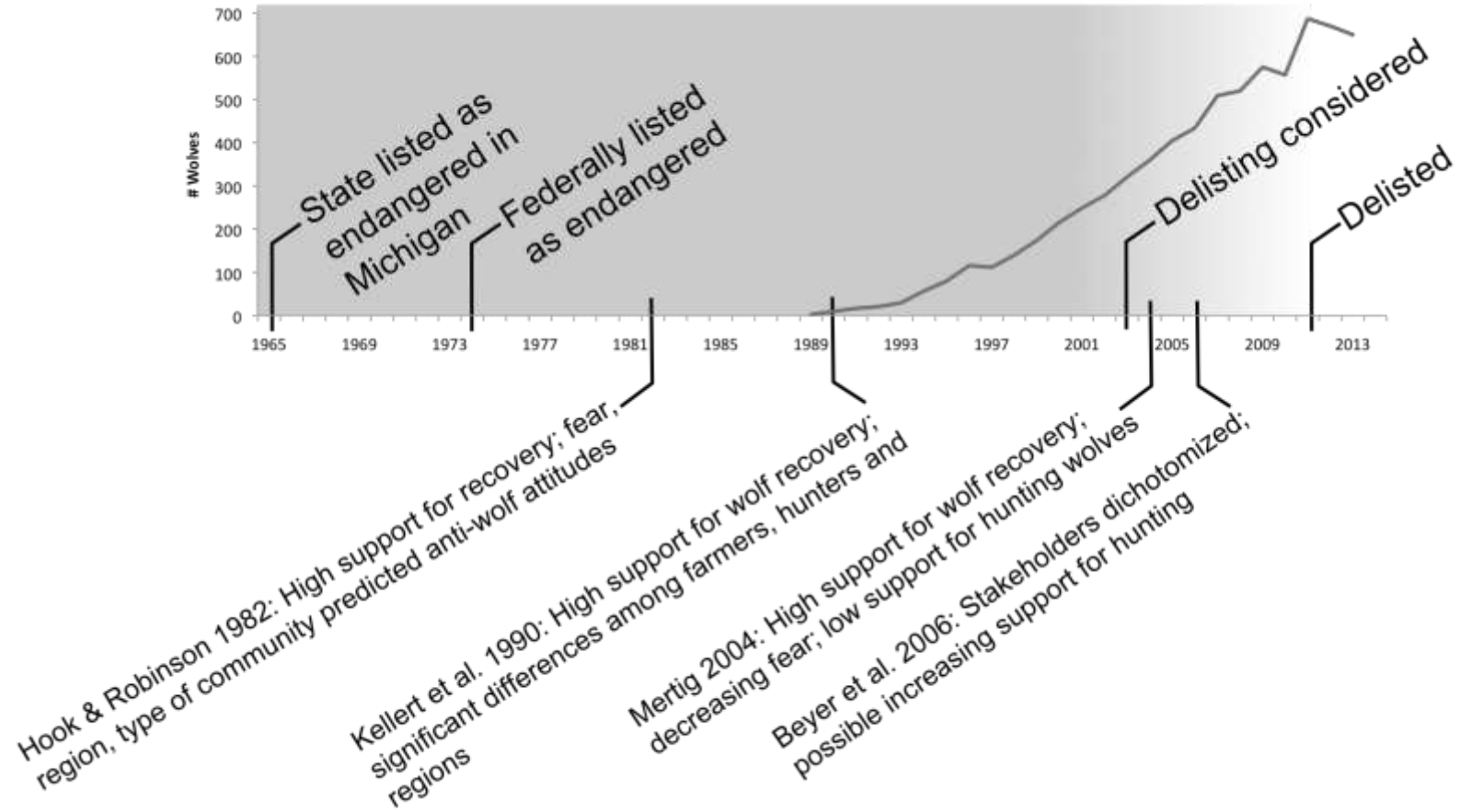

Figure 4.1. Michigan wolf management timeline. The wolf population in Michigan began increasing in the late 1980s while wolves were listed as endangered on both state and federal lists. Four key studies of social dimensions in Michigan occurred during this period. Two of these studies occurred when wolf numbers were rebounding enough that delisting was considered. Wolves were federally delisted in 2012 and Michigan legislation to make wolves a game species soon followed.

Technical knowledge generated from science has a long history of informing decision-making. But non-technical considerations, such as personal values and social context, have been less considered in wildlife decision-making. When people disagree about what to do with knowledge because they have different values, science alone may not be able to address the root of such value-based conflict. Often, the value-based nature of the issue is not recognized and instead debate focuses on interpreting relevant science or what science should be considered (Brewer & Ley, 2013). Consider, for example, questions such as: How should we mitigate climate change? Scientific knowledge clearly explains how various levels of carbon in the atmosphere will influence temperature, but is less adept at making tradeoffs in value-based conflict over which solutions are best. Thus, when individuals with different values (e.g., values of nature, for management solutions, information sources) are given the same information, they may still differ in what information to consider and how to interpret that information (Teel, Bright, Manfredo, & Jeffrey, 2006). Arguments over global climate change policy often get mired in contradictory claims, levels of uncertainty, and various interpretations by diverse stakeholders, media, and expert scientific testimony (Brewer & Ley, 2013).

The identity and affiliations of the actors involved in knowledge transfer also influence how information is filtered and interpreted. In the case of wolf management, animal rights advocates may not accept hunting wolves even if they learn that removing up to 30% of the individual wolves in a population will not jeopardize the sustainability of that population. Similarly, a rancher who is concerned about the effects of a harsh winter on his cattle herd will not necessarily experience decreased risk perception knowing that the additional risk posed by wolves is minimal by some standard. Who holds and dispenses

knowledge may also be an important dimension of the stakeholder conflict calculus. If information comes from someone within the ranchers' trusted network, another rancher for example, it is more likely considered as legitimate. An expert or decision-maker far removed from the context is less likely to be a trusted source of information (Kahan, 2010).

During transactional wildlife management processes dynamic interactions between legislators, managers, public stakeholders, and scientists may involve competition for control and authority (i.e., power) over the role of final decision-maker (Berkes, 2004). These power struggles may manifest in competition over whose knowledge is recognized as the most legitimate (Skogen 2001, 2003; Berkes 2004). Such competition can disenfranchise less powerful stakeholders (Sjölander-Lindqvist 2008). Trends over time in power dynamics that may seem resolved can still leave stakeholders feeling disempowered (Hazzah & Dolrenry, 2007). For example, despite initial efforts to address past injustices against Native American, they may still feel some disenfranchisement in current decision-processes. Stakeholders with long histories of involvement may proactively and vehemently defend their knowledge or seek to discredit others' knowledge based on previous experiences (K Skogen & Krange, 2003; K Skogen, Mauz, & Krange, 2006). If stakeholders perceive that a singular interest or group was favored, they may discredit decision-makers and processes (even if they were involved; Beck 2008, Simon 2013) and insert themselves into the decision process by way of litigation (Ludwig et al. 2001), ballot initiatives (Loker et al., 1998), or non-compliance with rules (Keane et al. 2008). The political implications of wildlife management decisions add another layer of complexity and stakeholders may become divided along party lines because they identify with and trust those within their party.

The case of delisted wolf management in Michigan provides an opportunity to consider the effect of scientific knowledge and power dynamics in transactional decision-making processes. Stakeholders have participated in decision-making to various extents since wolves began returning to Michigan in the 1990s. Gray wolf delisting in 2012 produced a sea change in decision-making. Two immediate products of the delisting were 1) the opportunity for changes in decision-making processes and 2) the possibility of hunting wolves, which is the focus of this study. Within a year of being delisted, both of these products were the subject of ballot initiatives and dialogue about the science supporting wolf-related policy.. With evidence-based insight about the roles of knowledge and power, managers may be better equipped to overcome stakeholder conflict and implement effective wildlife management. This study represents a first attempt at defining and describing the association between knowledge and power in contentious management of a species recently delisted from endangered status. I gauged Michigan wolf stakeholder perceptions related to 1) power inequalities (i.e., disenfranchisement) among groups and 2) the role of scientific knowledge in decision-making associated with hunting wolves in Michigan.

Study Area

Eradicated from the lower 48 states except for Northern Minnesota by the 1930s gray wolves in the United States were federally listed as endangered in 1974 through the ESA. Wolf populations recovered in 3 distinct regions (Northern Rockies, Western Great Lakes, and the subspecies of Mexican gray wolves [*Canis lupus baileyi*] in the Southwest). Western Great Lakes wolves expanded from Canada and northern Minnesota to other parts of Minnesota, Wisconsin and finally emigrated back to Michigan's Upper Peninsula (UP) over the past 2

decades (Beyer et al., 2006). Based on the 2012−2013 winter count, the wolf population in the Upper Peninsula (UP) at the time of publication is estimated to be approximately 658 wolves, which contribute to a total of approximately 3,686 wolves in the Western Great Lakes (U.S. Fish and Wildlife Service 2013). Wolf dispersal into the Lower Peninsula (LP) of Michigan is biologically feasible, depending on adequate ice formation in the Straits of Mackinac, and socially questionable, depending on human tolerance for their presence in that region (Beyer et al., 2006; Potvin et al., 2005; Wydeven et al., 2009). Prior human dimensions work found that over time most Michiganders, with the exception of some hunters and ranchers, have supported wolf recovery in Michigan (Hook and Robinson 1982, Kellert 1990, Mertig 2004, Beyer et al. 2006, Lute et al. 2012). Studies also revealed strong support for depredation control (both lethal and non-lethal) but less support for recreational hunting or trapping of wolves (Stephen R Kellert, 1990; M. L. Lute et al., 2012; Mertig, 2004).

Following federal delisting of Western Great Lakes wolves in January 2012, Michigan state legislators introduced and passed 2012 Public Act 520 designating wolves as a game species in Michigan and the authority for wolf management was transferred to the Michigan Department of Natural Resources (MDNR). Employees at MDNR make management recommendations to the final decision-making body, the Natural Resources Commission, which consists of 7 governor-appointed individuals who delineate method and manner of take for game species. The recommendations from MDNR take into consideration information from stakeholder engagement processes, which consist of public meetings throughout the state as well as structured meetings with a formal group of diverse public stakeholder representatives. In 2013, Michigan's first hunting season occurred with the goal

of addressing human-wolf conflicts in specific zones and a quota of 43 wolves (MDNR 2013). Human-wolf conflicts include attacks on domestic animals, particularly hunting dogs and livestock, and competition over shared prey species (e.g., white-tailed deer). Conflicts between humans occur over how to manage human-wolf conflicts and center on hunting wolves. The 2007 Consent Decree outlines Native American sovereign rights to natural resources throughout the region and hunting on tribal lands are managed separately, but many Native American individuals and tribes have publically stated they will not hunt wolves (Williams 2012, Johnson 2013, Pluta 2013). Wolf hunting zones in Michigan did not include tribal lands.

Methods

Six months after delisting the first author conducted voluntary, semi-structured key-informant interviews (Kvale & Brinckmann, 2009; Willis, 2005) August−September 2012 in the Upper Peninsula, northern, central, and southeastern Michigan. I digitally recorded interviews with permission and followed a set of open-ended questions about research concepts (i.e., science, knowledge, power interactions between stakeholders and decision-makers). I used follow-up questions to garner additional information deemed salient by interviewees. I used qualitative inquiry to achieve study objectives because it does not constrain data to researcher-defined ideas (LeCompte & Goetz, 1983) and used multiple questions about each concept to ensure construct validity and capture breadth and depth of responses (Miles & Huberman, 1994). The lead author conducted, coded, and analyzed all interviews (Emerson, 2001). Following a pre-determined, systematic interview and analysis protocol helped minimize effects of interviewer bias (N. Denzin & Lincoln, 2000).

I identified interviewees by their frequent and sustained participation in the above-mentioned public input processes with MDNR wolf management. Interviewees represented a diverse set of stakes defined by self-identification including animal rights, welfare and wolf advocates, deer hunters, environmentalists, hunters who use dogs (to hunt bear or coyote typically), legislators, livestock owners, MDNR wolf biologists, trappers, and tribal members. Although these groups are not mutually exclusive, I followed interviewee self-identification, which generally aligned with formal organization affiliation. Some groups have a stake in wolf management because they are interested directly in wolves, but others (e.g., deer hunters) are involved in wolf management because they are concerned about the effects of wolf predation (e.g., on deer). Interviewees were active members of organizations that participated in public input processes and other wolf management activities in the state, which have gone by several names (e.g., Wolf Management Roundtable, Wolf Forum, Wolf Management Advisory Council). I asked interviewees to recommend other potential interviewees but did not identify individuals beyond my initial list, suggesting that this non-probability, snowball sampling adequately covered the appropriate key-informants (Goodman, 1961). I did not aim for a specific sample size because I did not seek to generalize findings to a greater population, and thus I caution against interpreting results beyond the specific context (LeCompte & Goetz, 1982; Wolcott, 1973).

I recorded 20 interviews. One additional interviewee did not agree to be recorded, and applied the same protocol to detailed written notes, which were taken during the interview and iteratively coded for emergent themes with reading replacing listening for the 6 steps outlined below. I considered each interview an individual case and I coded and analyzed each interview in Audacity 2.0.2 (http://audacity.sourceforge.net/, accessed date 05 09 2012). I

used the scan, order, review, and compare method to analyzed audio files (LeCompte & Goetz, 1983). This iterative process guides analysis based on objectives but does not constrain data and instead leads to rich descriptions and depth of understanding (Miles and Huberman 1994). An identical protocol for all interviews followed this process: the lead author 1) listened to all interviews to identify frequently repeated keywords (e.g., MDNR, politics, science) and phrases (e.g., "people with boots on the ground know more…"); 2) developed a list of overarching themes that emerged across interviews (e.g., local knowledge, trust in MDNR science); 3) listened to interviews for a second iteration and digitally marked audio files at each keyword or phrase; 4) ordered themes in context and meaning; 5) reviewed and compared themes for similarities and differences across interviews; and finally 6) listened through interviews again to confirm themes and order, ensure no themes were overlooked, and context and meaning were accurately preserved (Trochim, 2001). I delineated criteria for identifying and ordering themes were delineated through all 6 steps to maintain validity and consistency (Denzin and Lincoln 2000). I included direct quotes in analysis to maintain interviewees' original meaning. The University Committee on Research Involving Human Subjects (IRB# x11-1144e) reviewed and approved methods used in this research.

Results

I conducted 21 interviews lasting an average of 77 minutes and ranging from 40 to 146 minutes. Participants represented at least 9 stakeholder groups: animal rights, welfare and wolf advocates (n = 2), deer hunters (n = 3), environmentalists (n = 3), hunters who use dogs (n = 3), legislator (n = 1), livestock owners (n = 4), an MDNR wolf biologist (n = 1), a

trapper (n = 1), and tribal members (n = 3). Five interviewees were female and 16 were male. Eight interviewees lived within current wolf range and 13 did not. Given prior work suggesting a lack of significant regional differences in attitudes about wolves, I did not seek to draw inferences about attitudes within and out of wolf range (Naughton-Treves et al., 2003; Skogen and Krange, 2003; Sponarski et al., 2013). Emergent themes related to relationships between knowledge and power in wolf management were 1) sources of knowledge for decision-making, 2) political power and science in decision-making, 3) special interests and disenfranchisement and 4) mistrust among stakeholders (Table 4.1).

Table 4.1. Themes emerging from interviews with Michigan wolf management stakeholders (n = 21), August-September 2012. Representative statements and potential management responses are also included.

Theme	Representative Statements	Potential Management Responses
Decision-makers ignoring local knowledge	"Old guys know their backyard best." [R020] "Listen to the guys with boots on the ground." [R009]	Processes that seek win-win outcomes may balance local and scientific knowledge.
Power and decision-making	"The DNR has to make politically-generated decisions… A little bending goes on to make a group happy that may not be best for the species." [R001] "The decision-making process is severely broken… The agency [MDNR] is simply a political organism. Politics had to be a part of DNR culture but it never drove the agency's very being like it does now. What drove the agency was sound science." [R019]	Downward accountability, equitable sharing of responsibility, risk and benefits and institutional capital building may ease tension between perceptions that politics and science are at odds.
Special interests and disenfranchisement	"They're bending to pressure from…the squeaky wheels, which are not a big number…[Wolves] are everybody's. Let everybody have a say." [R017] "We all elect our legislators but we don't elect what is happening with wildlife management and it can be very swayed by certain opinion-makers." [014]	Avoid single-focused framing to ensure representation of diverse interest. Strive for equitable distribution of risks and benefits among all stakeholders.
Mistrust among stakeholders	"This doesn't seem like a transparent process. Let's play by the rules-isn't that what democracy is about?" [R017] "[The public input process] has been a dog and pony show." [R013]	Successfully addressing the above solutions in ways that increase transparency and stakeholder input may increase trust between local, state and federal actors.

Sources of Knowledge for Decision-Making

Interviewees generally supported the use of scientific knowledge to inform wolf management. But they also discussed a lack of adequate information (e.g., how hunting would affect wolf behavior), prevalence of misinformation, and need for increased use of sound science in wolf management. Interviewees supported biological and social science as well as local knowledge to inform management and did not indicate local and scientific knowledge as mutually exclusive. Relevant literature defines local knowledge, sometimes also referred to as traditional or practical knowledge, as a culturally generated and transmitted body of information that is context-dependent, experiential and garnered over generations (Reed 2008, Berkes 2009). The term local knowledge was not used in interviews, but the concept was addressed in discussions about knowledge of natural processes and animal activity patterns that were garnered after spending considerable time outdoors observing nature.

Some interviewees elaborated on the notion of mythology or folklore as a form of local knowledge. The interviewees that used myth as a pejorative did not believe it should be considered in decision-making. Other interviewees discussed folklore as a legitimate form of understanding the world and argued for its inclusion in decision processes. Interviewees referred to myths and misinformation generated from informal social interactions (e.g., describing an encounter with a wolf at a family gathering where details change over time). Tribal and non-tribal interviewees alike referenced Native American cultural and spiritual beliefs from the Great Lakes Basin as an important consideration in wolf management. They relayed the Ojibwa creation story in which Anishinaabe, the original man, and his brother Ma'iingan, the wolf, learn of their shared fates and suggested it accurately symbolizes

ecological connections between humans and nature (see Callicott and Nelson 2004 for more information about Anishinaabe).

Interviewees discussed specific scientific evidence of control measures and effects of hunting wolves. Some interviewees believed that there was no evidence for the efficacy of non-lethal control (e.g., fencing, guard dogs, donkeys); others thought scientific studies did support effective non-lethal controls. Some interviewees addressed the claim that hunting wolves will increase tolerance for wolves with some contending that this was scientifically supported. (This point has been made by some wolf stakeholders to justify a hunt although evidence for this concept is equivocal and the mechanism by which it would operate is unclear; Bruskotter and Fulton 2011, Treves and Martin 2011, Treves 2012).

Political Power and Science in Decision-Making

When discussing power, interviewees described the roles of political power and science in decision-making as competing, not complimentary. Interviewees believed that decision-makers' personal agendas or political considerations had skewed data collection or interpretation. The MDNR was often the target of these ideas and accused of "playing politics" to a degree that jeopardized wolf recovery or the welfare of individual wolves. Interviewees rejected the use of ballot initiatives or any form of public voting to decide management strategies, stating either that 1) the majority of voters would not be informed well enough or 2) such a purely democratic process was unjust to minority stakeholders because the interests of underrepresented groups may not be as well represented with voting as they should be. For example, Upper Peninsula interviewees were concerned that if wolf management policies were put to a vote, their voice would not be heard over the majority of

voters in more populated areas of the state. Interviewees considered this unjust because Upper Peninsula residents incur the direct effects of wolves (e.g., depredation on livestock) and thus their interests should be fully represented in any decision on wolf management.

When asked who should be decision-makers in wolf management, interviewees deemed various stakeholders as appropriately involved in decision-making roles. Involvement was often based on perceptions of a decision-maker's ability to be fair and balanced. Managers at MDNR were most often cited as the appropriate decision-maker in wolf management because of their expert biological knowledge and ability to balance science and politics. The public was also considered appropriate decision-makers. I found little support for legislators' role in decision-making because interviewees believed them vulnerable to lobbying from special interest groups. Interviewees reported feeling that current decision-makers were not listening to their opinions about possible wolf management policy changes and input processes (e.g., MDNR-led public meetings) were designed to placate stakeholders, not to generate meaningful insights for decision-making.

Special Interests and Disenfranchisement

Although interviewees were concerned about representation of minority interests as outlined above, they were also concerned about prioritizing special interests over broader public sentiment. Interviewees described different special interest groups as wielding power; these groups were defined in terms of political ideology (e.g., liberals), geography (e.g., Upper Peninsula, southern Michigan), socio-demographics (e.g., urban, rural residents), or stakeholder group (e.g., hunters, ranchers). Interviewees did not indicate that they were members of these special interest groups or that they believed majority groups were in power.

Further, special interest groups were considered to have had undue influence on legislators because of their financial resources. Even among Upper Peninsula interviewees, interviewees disagreed on whether decision-makers considered Upper Peninsula residents' and hunters' interests too much or too little. Some interviewees stated beliefs that other groups' interests were considered more than their groups' stakes. Another prevalent theme was Native American disenfranchisement. Interviewees discussed concerns that some stakeholder groups disrespected Native American spiritual values for wolves and sovereign rights in wildlife management. Some interviewees did not believe tribal values should be given special consideration, a possible contradiction to other concerns about minority representation.

Mistrust Among Stakeholders

A lack of trust between public stakeholders and decision-makers was a common theme. Interviewees focused on their mistrust for the agency generally, MDNR-generated data and legislators. Interviewees stated that decision-makers were more concerned with self-preservation (e.g., avoiding confrontation rather than addressing stakeholder complaints) over effective management and believed transparency was important but often lacking in wolf management (e.g., that public input was ignored, decisions made before input was sought). Interviewees from both the Upper Peninsula and other parts of Michigan stated that they mistrusted the MDNR because they believed MDNR had introduced wolves to the UP (as opposed to wolves returning on their own via dispersal) and prioritized other interests over those in the Upper Peninsula. The seeming contradiction between MDNR being the preferred decision-maker but also mistrusted may be the result of trying to realistically choose among a limited set of options. Additional research would clarify this point. Implicit

in this belief that MDNR did not prioritize Upper Peninsula interests was the idea that all Upper Peninsula interests were homogenous (i.e., united against wolf recovery efforts), which was and is not the case based on the diversity of opinions among UP interviewees in this study and others (Beyer et al., 2006; Stephen R Kellert, 1990; M. L. Lute et al., 2012; Mertig, 2004). Although interviewees focused on trust between public stakeholders and decision-makers, mistrust was also apparent between stakeholder groups; interviewees believed that other individuals had stated willingness to compromise in the past but reneged to serve self-interests.

Discussion

In this study, I qualitatively characterized stakeholder perceptions of knowledge and power associated with hunting wolves in Michigan 6 months after delisting. Results suggest some individuals view tensions between local knowledge, politics and science as contributing to power struggles and mistrust among wolf management stakeholders in Michigan. These tensions may contribute to conflict over wolf management in Michigan; increased incorporation of local knowledge into decision-making processes may complement science and provide a reliable way of mitigating conflict while engaging disempowered stakeholders (Berkes 2009, Berghoefer et al. 2010). Local knowledge may be best leveraged in adaptive co-management processes such as those described by Berkes (2009). Of course, the translation of theoretical insights into practical wildlife management is an art requiring both experience and expertise (Riley 2003). Although not generalizable to a broader population, data herein characterize a number of assumptions different wildlife stakeholder groups may

be making about the role of knowledge, politics and science in management. Below, I discuss some of these assumptions and review potential ways for overcoming them.

First, tensions between local knowledge and scientific knowledge may be undermining trust in wolf-related decision-making processes. Interviewees did not believe that decision-makers overtly recognized or sufficiently respected local knowledge; they mistrusted decision-making *processes* in part because of perceptions that public input was sought disingenuously. In other words, although chances for stakeholders to voice their opinions and relay their experiences were available, they felt their knowledge fell on deaf ears. The perception that some managers focus on technical science, ignore the local context and prioritize outsider knowledge is not unique to, but clearly evident in, this wolf management example. Competition between knowledge forms can create mistrust between managers and publics (Sjölander-Lindqvist, 2008). However, research suggests that the 2 forms of knowledge are not only compatible but also unable to be truly separated (Berkes 2009). Therefore, processes that are perceived as just and fair may increase trust among public stakeholders and decision-makers (Sjölander-Lindqvist, 2008). This trust may then encourage those involved to cooperate (Tyler, 1994; Winter & May, 2001) and seek win-win, rather than personally preferred, outcomes (Mattson, Byrd, Rutherford, Brown, & Clark, 2006; Adrian Treves, Wallace, Naughton-Treves, & Morales, 2006) and to cooperate and accept outcomes, even if the selected outcomes were not preferred. Transactional processes in wolf management that engender trust may help avoid continued litigation and changes in protected status, although they can be difficult to implement effectively.

I discovered the role of power to be an important consideration for interviewee perceptions of decision-making processes. Interviewees divergently characterized the role of

minorities in decisions processes, stating concerns that minority groups can unfairly dominate certain situations (e.g., strong lobby in the legislature) or that minority interests get ignored in other situations (e.g., when decisions are made via public vote). The difference most likely depends on who has power, which may be related to dominant forms of knowledge (e.g., science). Disenfranchised and underrepresented groups were seen as needing empowerment. Powerful groups representing a small contingent were seen as threatening decision-making processes. That interviewees with diverse stakes shared opinions about special interests having greater power over decision-making than broader constituencies is consistent with literature on contentious wildlife management issues (e.g., Wilson 1997, Minnis 1998, Gregory et al. 2006). Framing arguments based on a single interest (e.g., economic value) may increase perceptions that decision-makers prioritize certain groups' interests, which may undermine effective management (Ludwig et al. 2001, Skogen and Krange 2003). For example, some interviewees did not find compelling evidence in economic arguments connecting reduced wolf populations to livestock benefits. These increased perceptions of bias are known to jeopardize the acceptance and longevity of management decisions and encourage stakeholders to find alternative means of representation (e.g., ballot initiatives, litigation, protests; Loker and Decker 1995). The literature on stakeholder empowerment might be a useful resource for decision-makers and managers to tap into for new approaches to transactional processes (e.g., Shackelton and Campbell 2000, Brown 2002, Morris et al. 2007). One such recommendation from the literature is that sharing responsibility, risks, and benefits equally among groups may increase stakeholder enfranchisement and trust in transactional processes (Berkes, 2004, 2009).

Finally, the role that politics play in wildlife management was a concern of many interviewees. Interviewees characterized politics as being an inappropriate component of decision-making process because politicians are too prone to undue influence by powerful lobbies and do not appropriately consider all interests. In reality, contemporary wildlife management unavoidably includes a political dimension because agencies are established by and contingent upon legislatures, and wildlife-related decisions are often made within a larger political context (Ludwig et al. 2001). Even so, stakeholders who stand to lose or gain power from policy decisions may influence legislators to support certain policies (Ludwig et al., 2001). This dichotomy of science and politics that emerged among interviewees may oversimplify a complex relationship because science consistently informs policies and diverse politicians, lobbyists and advocates enlist science to advance agendas (Miller, 2001). Further probing of the roots of this oversimplification of the wildlife politics−science relationship may help inform efforts to balance tension (Sarewitz, 2004; Sjölander-Lindqvist, 2008).

This work's unique contribution to understanding post-delisting perceptions can be built upon with further inquiry into these themes as wolves recover and, potentially expand and management evolves in response. Results herein must be considered in relation to the historical context of endangered species listing; these findings about knowledge and power may be influenced by the complexities involved in United States endangered species policies. Canadian wolf management, for instance, may not be as complex or controversial because wolves were never listed as endangered there and some stakeholders never felt disempowered by management restrictions (Nie 2003). Yet findings may be applied to other controversial wildlife contexts, particular where carnivores conflict with human interests. To

generate predictive models and help build theory, future research might include quantitative assessment of this study's four emergent themes 1) sources of knowledge for decision-making, 2) political power and science in decision-making, 3) special interests and disenfranchisement, and 4) mistrust among stakeholders.

Management Implications

Stakeholder input is an important aspect of effective management (Decker, Shanks, Nielsen, & Parsons, 1991); input processes perceived as fair encourage trust and cooperation among stakeholders, particularly wildlife managers and the public (Berkes, 2009). Importantly, interviewees in this study perceived the roles of science and politics as competing. Given the increasing use of transactional decision-making in wildlife management, finding solutions that approach science and politics as complementary may aid public participation processes. Exploring local knowledge may contribute to more effective and sustainable wildlife management by empowering stakeholders and connecting individual-level values with institutional-level policies (Haider and Jax 2007, Gore et al. 2011, Manfredo et al. 2009). Perceived inequalities may need to be addressed to move wolf management past power struggles that stymie management decisions and implementation (Hogg & Reid, 2006).

CHAPTER 5
INTEGRATING CONSERVATION ETHICS INTO HUMAN-WILDLIFE CONFLICT

Abstract

Conservation ethics can help increase understanding about why different people support or oppose policy. Intrinsic value, or the inherent value of wildlife beyond its use to people, is an important measure of empirical conservation ethics. Cognitive and emotional judgments can also underlay ethical perspectives. Stewardship may be influenced by conservation ethics and can be defined as a set of actions undertaken to positively impact a wildlife population, species, or the habitat on which they depend. To help navigate debate surrounding my case study of hunting wolves in Michigan, I conducted a web-based survey (n=1239) in October-November 2013 of Michigan wolf stakeholders familiar with human-wolf conflict. I analyzed the ethics-behavior relationship and potential influences on it using a form of structural equation modeling called mediation. Intrinsic value for wolves and all life were positively related to stewardship. Results revealed conservation ethics are likely linked to behavior by way of both emotional and cognitive judgments, but there is varying influence. Most respondents, regardless of identification with any particular group, attributed intrinsic value to not only wolves but all life and engaged in stewardship in part because of values for ecosystems. Finally, social groups as well as gender and political affiliations may provide useful ways to predict which groups will engage in positive stewardship behaviors, which groups will be inactive and which may engage in negative behaviors. These findings are encouraging if a common ethic can be leveraged to foster agreement among stakeholders and garner support for management in controversial policy contexts.

Introduction

Resolving human-wildlife conflict (HWC) is one of conservation's most complex endeavors (Madden, 2004). At times, conflicts among humans can prove more multifarious than conflicts between humans and wildlife (Dickman, 2010), playing out in arenas from court rooms to public lands (Minnis 1998; Triezenberg et al. 2011). Conservation ethics, the subdiscipline of environmental ethics dedicated to exploring how and why people ought to practice conservation, is not typically incorporated into HWC management but may be at the root of stakeholder disagreement over HWC management policies (Ripple et al., 2014). For instance, some stakeholders oppose black rhino trophy hunting in Namibia as a means to generate funds for community-based natural resource management because the individual rhino's inherent right to exist is not outweighed by the value gained from killing it. Opponents have lobbied government officials and publicly sparred on global television news debates (Conniff, 2014). Conservation ethics can systematically analyze arguments supporting various sides of debate. It can also help increase understanding about why different people support or object to hunting for economic or other purposes. In this paper, I mainly employ the latter method, using a conservation ethics framework as a way to understand why people support or oppose conservation policy related to wolves in Michigan.

Ethical considerations are often not explicitly recognized in conservation. HWC management may exclude explicitly recognizing ethics because ethical language is not part of the HWC vernacular or because ethical considerations are considered intractably subjective rather than objective human dimensions (Haidt & Joseph 2004, 2007). However, systematically incorporating conservation ethics into HWC management can provide stakeholders with additional tools for navigating decisions and deliberately considering

wildlife's inherent value (Nelson & Vucetich 2012; Vucetich & Nelson 2013). Quantifying conservation ethics and analyzing their relationship to public support for HWC management can also help predict public reactions to different policies. For HWC management to fully realize the benefits from conservation ethics, a better understanding of how ethics affect behavior and methodologically robust measurement procedures are needed. In this paper, I discuss research implemented in pursuit of these goals using the case of wolf management in Michigan. First, I define key interdisciplinary principles relevant to the theoretical framing of the relationship between ethics and behavior. Then, I detail a measurement protocol for successfully capturing stakeholder ethics and associated behaviors in relation to HWC.

Conservation Ethics and Implications for HWC

A concept highly relevant to HWC management (Haider & Jax, 2007), is the notion of *intrinsic value*—defined as an entity's worth in its own right, beyond its utility to another entity (Callicott 1979; Nelson 2004). Theoretically, at least, the extent to which people intrinsically value wildlife influences how much they support HWC management or take actions consistent with their belief in a species' intrinsic value (Nelson & Vucetich 2012). How people attribute intrinsic value to other entities is one way to categorize ethical perspectives related to nature: (1) *anthropocentrism* attributes intrinsic value only to humans; (2) *zoocentrism* also attributes intrinsic value to at least some non-human animals in addition to humans; (3) *biocentrism* furthers the accretions to attribute intrinsic value to all living things; and (4) finally *ecocentrism* includes both individual animals and ecological collectives in the community of those with intrinsic value (Nelson & Vucetich 2012; Nelson 2002).

Empirically analyzing individuals' conservation ethics increases the potential to predict human behavior. A small body of literature applies empirical measures to understanding values and perceptions related to conservation ethics (e.g., Eggleston, Rixecker, & Hickling, 2003; Gore, Nelson, Vucetich, Smith, & Clark, 2011; Haider & Jax, 2007; Manning, Valliere, & Minteer, 1999). Two concepts I hypothesize may be related to conservation ethics are *moral judgment* and *emotional dispositions.* I make a unique contribution to the field of conservation ethics by exploring the extent to which intrinsic value, moral judgment and emotional dispositions influence ethically-relevant behaviors of *stewardship.* I discuss these three additional concepts (i.e., moral judgment, emotional dispositions and stewardship) in relation to HWC management below.

Moral Judgment. Moral foundations theory (MFT) was developed to explain moral judgments as human intuitions rooted in five broad and fundamental considerations of what is right or wrong. These domains are: (1) *authority/subversion*, which addresses respect for established tradition and hierarchy; (2) *care/harm*, which relates to avoiding harm and encouraging care of those within a community; (3) *fairness/cheating*, which focuses on rights, autonomy and justice among members of society; (4) *ingroup loyalty/betrayal*, which involves obligations to a social group; and (5) *purity/disgust*, which emphasizes what is perceived as clean or decent and avoids contamination of body or mind. Research on MFT has been prolific, and the general theory has received broad empirical support (Graham et al. 2013; Haidt 2007). Because people vary in the extent to which each foundation influences their moral sense, some ethical concerns are more important than others (Haidt & Graham 2007). I expect the foundation of harm/care to directly relate to stewardship because both concepts encompass care for those deserving moral consideration. The other foundations may

have less direct connections with stewardship. Given their potential importance in judgments of right and wrong more generally, exploration of their influence on stewardships is warranted. My review of literature failed to uncover a published application of MFT to a natural resource management context.

Emotional Disposition. Psychological reactions expressed as emotions are said to influence individuals' responses to ethical questions (Jacobs et al., 2012). Emotional dispositions related to wildlife (e.g., anger, sympathy, worry) may influence how individuals think wildlife should be managed (Jacobs 2012; Vaske et al. 2012). Understanding which HWC management policies elicit particular emotional reactions and the relationship between emotions and acceptability of HWC policies may simplify efforts to predict responses to HWC management (Bruskotter, Vaske, & Schmidt 2009; Jacobs et al. 2012; Vaske et al. 2012). The extent to which emotion or reason plays the primary role in ethical judgments is debated (Haidt 2001; Paxton & Greene 2010) as is the exact mechanism by which emotions relate to cognitions (e.g., which comes first, which is more influential?)(Paxton & Greene, 2010), though it is clear that emotions often precede reason in terms of reaction chains in everyday decision-making contexts (Frank, 1988).

Stewardship. Lastly, stewardship can be thought of as the behavioral corollary of a conservation ethic (Bruskotter & Fulton 2011; Holsman 2000; Treves 2009) and defined as a set of actions undertaken to positively impact a wildlife population, species, or the habitat on which they depend (Bruskotter & Fulton 2011; Treves 2012). Stewardship may vary depending on an individual's ethical perspective and can be directed at myriad spatial and temporal scales (i.e., individual animals to ecosystems as well as future generations of people). It can be conceptualized as a continuum from willingness to steward on one end to

opposition to steward on the other (Treves 2012). Although most research on stewardship focuses on actions that directly impact wildlife (e.g., hanging a birdfeeder to supplement local bird species' food supply), indirect actions (e.g., adopting a sea turtle) may also be highly salient to HWC because most people, at least in developed nations, have limited direct interactions with wildlife (Carter et al. 2012; McNay 2002). Indirect stewardship behaviors might include activism and involvement in conservation non-profit organizations or legislative processes (Stern 2000).

Integrating principles from the literature about intrinsic value, emotional dispositions, moral judgment, and stewardship into a conceptual framework (Figure 5.1) may boost understanding about the ethical underpinnings of conservation behavior that can be reinforced, attenuated, or enhanced with, for instance, communication or policy interventions. My framework posits and I hypothesize that (a) conservation ethics are foundational intuitions or cognitions that positively influence stewardship behavior, and (b) less foundational, specific emotions and cognitions will function as psychological filters in the relationship between ethics and behavior (Azjen & Fishbein 1977).

The ability of this above integrated framework to reliably and validly measure conservation ethics is an untested empirical question. Thus, I next test the framework's ability to measure conservation ethics associated with a HWC case study of wolf management in Michigan, USA. My objectives were to (1) quantify the conservation ethics of Michigan wolf stakeholders familiar with human-wolf conflict, (2) operationalize these stakeholders' stewardship behaviors and (3) analyze influences on the relationship between conservation ethics and stewardship in the path of causation described in a and b above (see Figure 5.1 for graphical depiction).

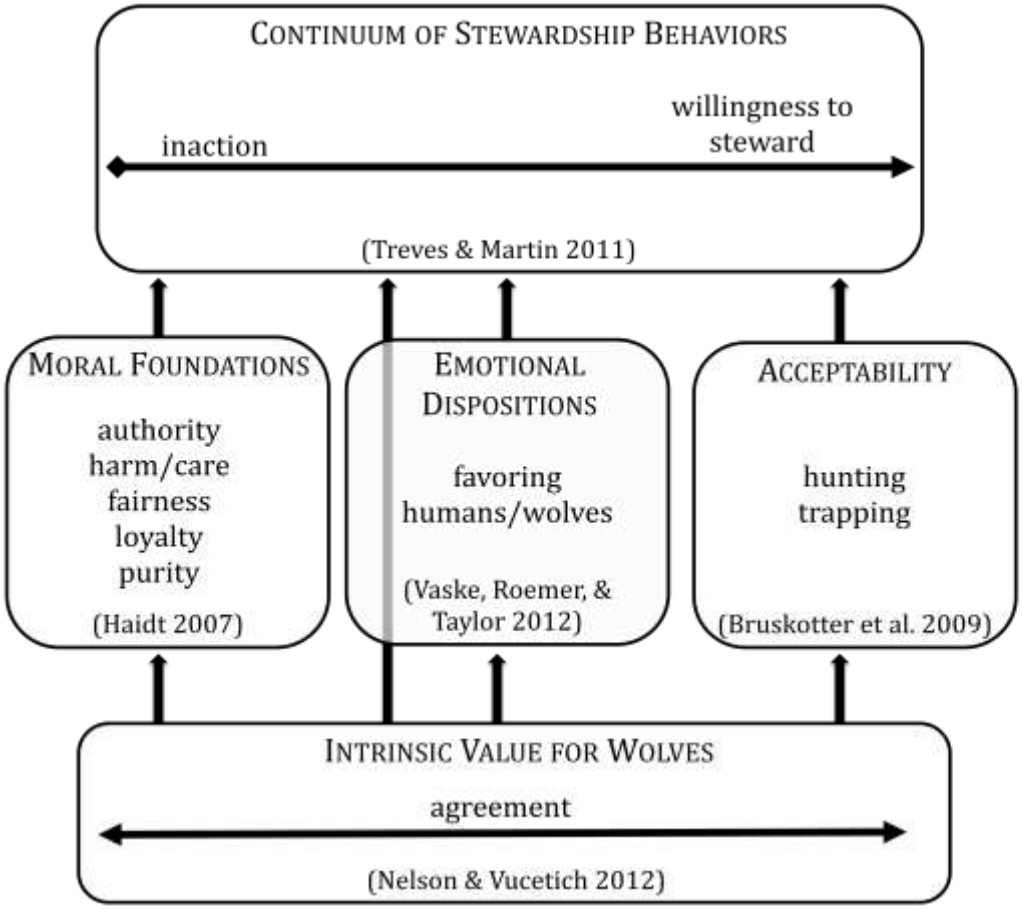

Figure 5.1. Conceptual framework. Foundational judgments about whether wolves have intrinsic value may influence willingness to steward wolves. Moral foundations, emotional dispositions and acceptability of hunting/trapping may filter or carry the relationship between intrinsic value and behavior.

Methods

Study Site

The context of this study occurs throughout Michigan although wolves are currently found only in the Upper Peninsula of northern Michigan (See Figure 2.1). HWC related to wolves in Michigan, and often elsewhere, centers overwhelmingly on wolf depredation of livestock (e.g., cattle, sheep) and hunting dogs as well as wolves' impact on abundance of game

species such as white-tailed deer (Thompson, 1993). Stakeholder conflict over wolves and their management in Michigan is currently dominated by whether wolves should be hunted.

Sample Population

I contacted Michigan citizens age 18 years or older who were involved in wolf management through organizations represented on the Michigan Wolf Management Advisory Council, a group of stakeholders regularly involved in engagement processes conducted by the Michigan Department of Natural Resources (MDNR). These groups are highly involved in wolf management and represent diverse and relevant identities, including: animal welfare or rights advocates, conservationists, environmentalists, hunters/trappers, livestock owners, and tribal members.

Survey Design and Distribution

The survey was designed in Qualtrics, an online survey service, and distributed via snowball sampling from my initial contact list. The initial list of stakeholder group representatives completed the online survey and forwarded its hyperlink to members of their respective organizations through email listservs and their organization webpages (Paolacci et al., 2010). I used this sampling technique to maximize response rates under the assumption that potential respondents would be more likely to participate if they received the survey from within their trusted networks of like-minded individuals (Cohen & Arieli, 2011).

Survey Instrument

The survey was designed to (1) quantify conservation ethics (i.e., intrinsic value) and related concepts, (2) operationalize stewardship behaviors and (3) analyze influences on the relationship between conservation ethics and stewardship by measuring intrinsic value for wolves, emotional dispositions, stewardship behaviors and socio-demographics through multiple choice-type questions on a range-response Likert-type metric or "Yes/No" options. I assessed reliability of the survey items using Cronbach's $\alpha \geq 0.7$ as a cutoff point (Cronbach, 1951).

I measured *intrinsic value*, my independent variable, in relation to only humans (anthropocentric), wolves (at least zoocentric) and all life (at least biocentric). An additional question measured reasons why respondents might attribute intrinsic value to wolves.

Additional measures thought to be related to conservation ethics and thus potential mediator variables (i.e. variables hypothesized to filter or carry the effect of conservation ethics on stewardship) included cognitions (i.e., acceptability of hunting/trapping) and intuitions (i.e., emotional dispositions, MFT). *Acceptability of hunting and trapping* assessed support for (a) hunting wolves, (b) hunting wolves with dogs, and (c) trapping wolves (adapted from Bruskotter et al. 2009). I also measured acceptability on the basis of thirteen specific reasons each for hunting and trapping wolves identified through thorough literature review and input from wildlife management professionals. *Emotional dispositions* (adapted from Vaske, Roemer, & Taylor 2012) were measured using five items endorsing human considerations (i.e., anger about anti-hunting attitudes, wolf presence; sympathy for ranchers, residents in wolf territories, wolves' prey) against three emotional dispositions toward wolves (i.e., anger about hunting wolves, trapping wolves; sympathy for wolves). To create a

single index variable for analysis, I reverse-coded the five items endorsing human considerations and then averaged all eight items. Thus, high values indicated emotional dispositions toward wolves and low values favored human considerations. *Moral foundations* were measured with Haidt's (2007) validated 20-item questionnaire on five moral foundations using a six point Likert-type scale (see moralfoundations.org for more details on measures): authority, harm, fairness, ingroup, and purity.

To group and understand broader patterns in stakeholder conservation ethics (i.e., objectives 1 and 3), I present findings in terms of socio-demographics (i.e., age, education, gender, income, political ideology, political party affiliation) and eight identity groups (adapted from Bruskotter, unpublished data; and Lute & Gore 2014): animal welfare or rights advocates, conservationists, farmers, gun rights advocates, hunters, environmentalists, and property rights advocates.

Stewardship measured eleven activities intended to support wolves (Stern et al. 1999; Treves & Martin 2011). A final index summated stewardship behaviors, identifying respondents along a spectrum from inactive stakeholders (0) to strong stewards (11). I also asked whether motivation for wolf stewardship was intended to benefit individual wolves, wolf populations/species, and ecosystems.

Data Analysis

I performed path analyses (R. Baron & Kenny, 1986) to explore whether my measures of moral judgment and emotional dispositions mediated the relationship between conservation ethics, the independent variable (IV) and wolf stewardship, the dependent variable (DV). I tested whether eight variables (unacceptability of hunting/trapping,

emotional dispositions, and five moral foundations) mediated the effect of intrinsic value of wolves (zoocentrism) on stewardship using the 'sgmediation' module in STATA (v. 13.1, StataCorp, College Station, TX, USA) followed by the bootstrapping procedure for calculating standard errors (Preacher & Hayes 2008). Acceptability of hunting and trapping were reversed for this analysis such that the variables measured *unacceptability* of hunting and trapping. I also conducted bivariate regression analyses to understand relationships between individual variables: (1a) conservation ethics and (1b) 22 separate variables (the above eight plus six socio-demographic and eight stakeholder identity variables) and (2a) stewardship and (2b) the same 22 variables. For both initial regressions and mediation analyses, I used standardized z-scores for each variable. Only respondents who completed the dependent variable of interest were included in analyses. The MSU Committee on Research Involving Human Subjects (IRB# x11-1144e) reviewed and approved methods used in this research.

Results

Of the initial 1303 respondents, 64 were filtered out as non-Michigan residents, resulting in a final sample of 1239 participants. The survey was skewed toward white participants (67.6%, n=837), male (76%, n=699), conservationists (19.4%, n=240) and hunters (32.1%, n=398). Age, education and income were normally distributed. Data was not meant to be representative of all Michiganders and thus was not demographically weighted.

My first objective was to quantify the conservation ethics of stakeholders familiar with human-wolf conflict. A small proportion (8.2%, n=101) of respondents were anthropocentric (agreed that only humans have intrinsic value; Figure 5.2). Majorities agreed

that wolves (59.3%, n=734) and all life have intrinsic value (62.4%, n=773). When grouped by identity, conservationists, farmers, gun rights advocates, hunters and property rights advocates showed emotional dispositions in favor of humans while animal rights and welfare advocates, environmentalists and wildlife advocates showed emotional dispositions in favor of wolves (Figure 5.3).

More respondents accepted hunting (57%, n=706) and trapping wolves (46.4%, n=575) than those that opposed hunting (17.1%, n=212) and trapping wolves (21.4%, n=266). Respondents were divided on support for hunting wolves with dogs (28.0%, n=347 agreed and 28.5%, n=353 disagreed). The most common reason for accepting hunting and trapping for wolf management was to protect pets/livestock.

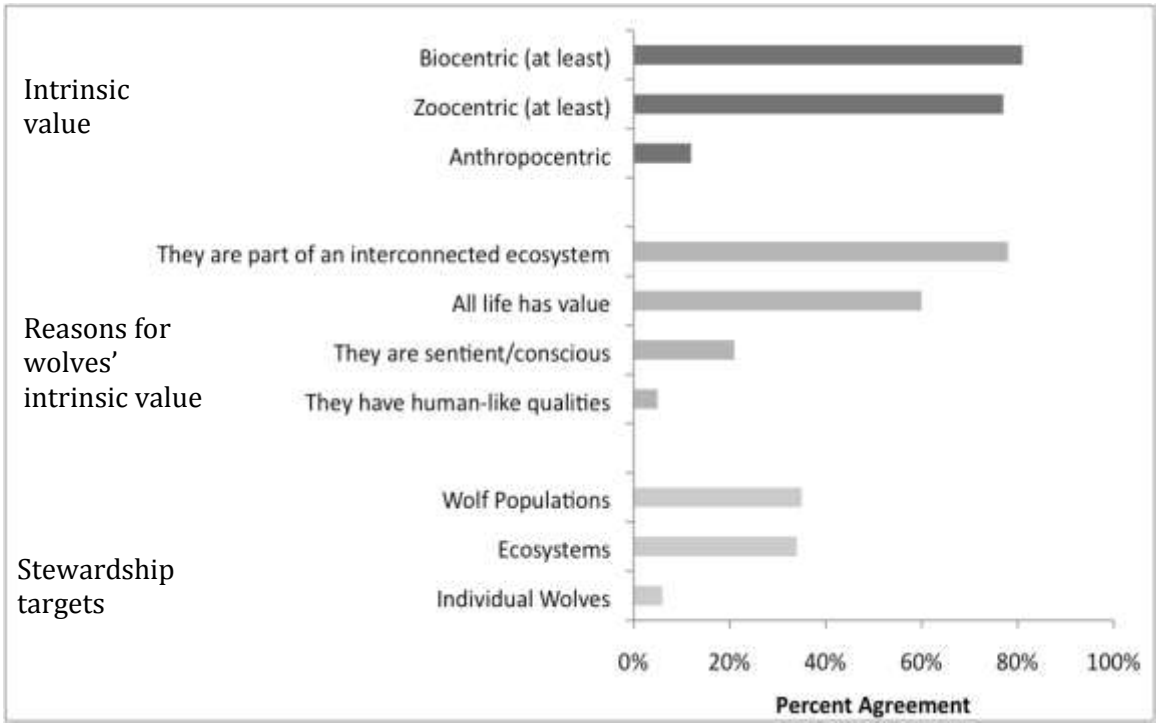

Figure 5.2. Percentage of respondents that agreed with conservation ethical concepts. Reasons for wolf value and desired stewardship target. Most respondents reported holding a zoocentric or biocentric ethic. The most common reasons wolves were valued were because

they are part of an interconnected ecosystem and because all life has value. Ecosystems and populations were the most common intended beneficiaries of stewardship behaviors.

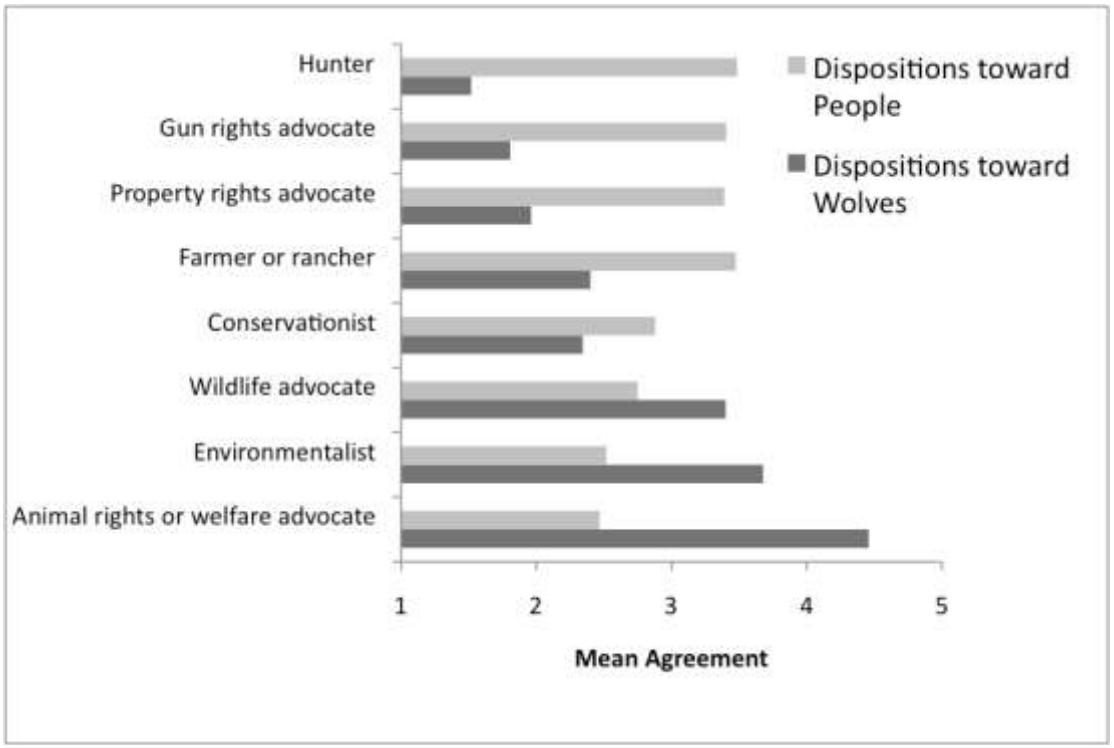

Figure 5.3. Mean agreement with emotional dispositions by identity group. Conservationists, hunters, gun and property rights advocates and farmers show higher mean agreement with dispositions in favor of people while animal rights and welfare advocates, environmentalists and wildlife advocates show higher mean agreement with dispositions in favor of wolves.

My second objective was to operationalize stewardship behaviors. Fifty-eight percent of respondents (n = 589) indicated that they engaged in some form of stewardship activity. The top five most common wolf stewardship behaviors were: read materials, educated others, signed a petition, contacted legislators and donated money.

My third objective was to analyze influences on the ethics-stewardship relationship. Initial correlations revealed nine variables that were positively linked and eleven variables were negatively linked to intrinsic value of wolves at the $p \leq 0.001$ level (Table 5.1). Stewardship regressions showed very similar patterns in the nine variables that were

positively linked and nine variables negatively linked with stewardship of wolves at the p≤0.001 level.

Table 5.1: Socio-demographic and identity factors related to intrinsic value and stewardship of wolves.

	Intrinsic value of wolves: β (SE)	Stewardship of wolves β (SE)
Education	0.22 (0.03)[a]	0.12 (0.03)[a]
Gender (higher numbers = female)	0.26 (0.03)[a]	0.32 (0.03)[a]
Animal rights and welfare advocates	0.42 (0.03)[a]	0.44 (0.03)[a]
Conservationists	0.26 (0.03)[a]	0.19 (0.03)[a]
Environmentalists	0.36 (0.03)[a]	0.27 (0.03)[a]
Wildlife advocates	0.23 (0.03)[a]	0.26 (0.03)[a]
Harm	0.22 (0.03)[a]	0.27 (0.03)[a]
Fairness	0.11 (0.03)[b]	0.17 (0.03)[a]
Acceptability of hunting	-0.42 (0.03)[a]	-0.48 (0.03)[a]
Acceptability of trapping	-0.39 (0.03)[a]	-0.42 (0.03)[a]
Political party (higher numbers =Republicans)	-0.18 (0.03)[a]	-0.20 (0.03)[a]
Political orientation (higher numbers = conservatives)	-0.31 (0.03)[a]	-0.31 (0.03)[a]
Income	-0.08 (0.03)[c]	-0.03 (0.03)
Farmers	-0.13 (0.03)[a]	-0.11 (0.03)
Gun rights advocates	-0.31 (0.03)[a]	-0.35 (0.03)[a]
Hunters	-0.28 (0.03)[a]	-0.36 (0.03)[a]
Property rights advocates	-0.25 (0.03)[a]	-0.23 (0.03)[a]
Authority	-0.18 (0.03)[a]	-0.20 (0.03)[a]
Ingroup	-0.20 (0.03)[a]	-0.15 (0.03)[a]
Purity	-0.15 (0.03)[a]	-0.07 (0.03)[c]

a = p<0.001
b = p<0.01
c = p<0.05

The statistical term *mediation* (Baron & Kenny 1986) suggests a causal psychological process occurring in steps: (1) independent variable→ (2) mediator→ (3) dependent variable, where the mediator filters or "carries" the effect between one variable and another. A mediating variable explains a significant proportion of the relationship between independent (in this case, intrinsic value) and dependent variables (stewardship). Three variables were found to carry the relationship between intrinsic value of wolves and stewardship of wolves (each through separate path analyses): *Unacceptability of hunting* explained 58% of the total

effect between intrinsic value and stewardship (β = 0.18, SE = 0.02, $p \leq 0.001$); bias-corrected and accelerated confidence intervals around the indirect effect did not overlap with zero (95% CI = [0.14, 0.22]). *Unacceptability of trapping* mediated 45% of the total effect (β = 0.13, SE = 0.02, $p \leq 0.001$; 95% CI = [0.10, 0.17]). *Emotional dispositions* toward wolves mediated 62% of the total effect (β = 0.20, SE = 0.02, $p \leq 0.001$; 95% CI = [0.16, 0.24]).

One of the five *moral foundations* showed slight mediation at the $p \leq 0.001$ level. *Harm* mediated 15% of the total effect (β = 0.05, SE = 0.001, $p \leq 0.001$; 95% CI = [0.03, 0.07]). The other four foundations showed slight mediation (i.e., carried <10% of the total effect at the $p \leq 0.05$ level). *Authority* mediated 8% of the total effect (β = 0.03, SE = 0.008, $p \leq 0.05$; 95% CI = [0.01, 0.04]). *Fairness* mediated 5% of the total effect (β = 0.02, SE = 0.006, $p \leq 0.05$; 95% CI = [0.005, 0.03]). *Ingroup* mediated 5% of the total effect (β = 0.02, SE = 0.007, $p \leq 0.05$; 95% CI = [0.004, 0.03]).

Discussion

Directly incorporating conservation ethics into HWC management can help inform explicit recognition of tradeoffs among management policy alternatives (Gore et al. 2011; Vucetich & Nelson 2013). One barrier to formally incorporating conservation ethics is a lack of reliable measurements of ethical concepts. This research provides an initial attempt at quantifying conservation ethics using the case study of Michigan human-wolf conflict that can be adapted or applied to conservation decision-making in this and other HWC contexts. Below I discuss the key implications from this work. I then discuss the practical implications of results for HWC management.

My conservation ethics framework identifies a number of important concepts for understanding judgments that influence stewardship. Results suggest that a conservation ethics framework that reliably predicts self-reported behavior should include not only wildlife- or nature-specific cognitions (e.g., recognition of ecological relationships) and emotions but also all five moral foundations. Because the domains of so-called moral foundations (Haidt, 2007) mediated only small proportions of the ethics-behavior relationship, their effects were mostly independent. Therefore, each domain is important to consider separately in understanding ethical judgments that influence HWC-related behavior. Harm/care and fairness foundations were positively related to ethics and stewardship. Individuals that prioritize these concerns, particularly "caring," may more likely value wildlife and engage in strong stewardship behavior. It makes intuitive sense that those concerned about caring for and avoiding harm to others might apply such concerns beyond the human community and thus attribute intrinsic value to wildlife and engage in stewardship (Haidt, Koller, & Dias 1993; Swart 2005). How the foundation of fairness operationalizes in relation to wildlife is less intuitive: Are people concerned about fairness for (human) stakeholders or fairness in terms of what is just for all members of an ecological and moral community?

Unacceptability of hunting/trapping and emotional dispositions were significant mediators of the ethics-stewardship relationship as hypothesized. In other words, ethics are likely linked to behavior by way of both emotional and cognitive judgments (i.e., unacceptability). Intrinsic value for wolves lead to increased unacceptability for hunting and trapping wolves, which then resulted in increased stewardship. Similarly, emotional dispositions toward HWC management options may be an indication of a person's ethical

perspective and serve to reinforce ethical judgments about how people ought to interact with wildlife (i.e., their willingness, or opposition, to steward wildlife). Data herein cannot untangle whether intuition drives moral reasoning (Haidt 2001) or vice versa (Paxton & Greene, 2010) but suggests it may not matter in predicting human behavior toward wildlife. Knowing a few key pieces of information, namely intrinsic value for wildlife, acceptability of and emotional reactions to management of HWC, may contribute understanding of why and in what ways stakeholders directly and indirectly steward wildlife.

Conservation ethics clearly influence how people positively relate to wildlife in tangible, actionable ways. For example, in this study, attribution of intrinsic value to wolves and all life were positively related to stewardship; anthropocentric respondents were less likely to engage in stewardship behaviors. Results also suggest that social groups as well as gender and political affiliations may provide useful ways to predict which groups will engage in positive stewardship behaviors, which groups will be inactive and which may engage in negative behaviors (e.g., opposition to stewardship). Furthermore, my results affirm that if a particular HWC mitigation strategy is not acceptable to stakeholders they are less likely to engage in stewardship at large. In fact, perverse outcomes may result if stakeholders actively oppose stewardship or engage in negative behaviors toward wildlife. For example, carnivore conservation efforts have been delayed when conservation strategies have been unsupported by key stakeholder groups (e.g., reintroduction, compensation schemes); some stakeholders have even retaliated with poaching (e.g., shooting or poisoning wolves; Goodrich 2010; Liberg et al. 2012; Treves et al. 2013). Understanding the ethical foundations of behavior can help isolate the motivations for stakeholder behaviors that directly (e.g., poisoning) as well as indirectly (e.g., activism) impact wildlife. Encouraging and facilitating the motivations that

lead to stewardship and attenuating those that inhibit stewardship can guide efficacy of mitigation strategies.

On a policy level, systematic inclusion of conservation ethics in HWC management decisions may help determine which HWC management policies are most appropriate and feasible for a particular context. Working toward stakeholder agreement that a common intrinsic value is salient to a particular HWC situation can help provide a starting point for evaluating tradeoffs among management alternatives (Callicott 1990, 1992; Maguire & Servheen 1992; Rolston III 1975). For example, if stakeholders agree that the intrinsic value of a wildlife species is not outweighed by a certain category or level of property damage then HWC mitigation might focus on preventing wildlife-induced damage rather than engaging in strategies aimed at reducing population sizes (which may be contentious and require significant resources to implement). Management that is sufficiently justified by not only biological and social science, economics and politics but also ethics may be better able to navigate tradeoffs between management alternatives and eventually be more supported by diverse stakeholders (Nelson & Vucetich 2012; Sauer & Nelson 2011). Thus, HWC mitigation strategies that match publically-supported justifications, such as those measured by my acceptability measures (e.g., protecting pets or livestock), may be the least contested (Minnis 1998; Manfredo et al. 1999).

Assuming specific stakeholder groups have monolithic ethical perspectives about wildlife (e.g., that anthropocentric, or specifically economic, values predominate) may be myopic and detrimental to effective HWC management. Study results suggest that HWC stakeholders can be highly non-anthropocentric and intrinsically value wildlife at the same time, even one of the most contentious carnivore species. Anthropocentrism was a minority

position among this sample. This finding is encouraging for uncovering common ground among HWC stakeholders but is perhaps not surprising because my sample of involved stakeholders may more likely intrinsically value wildlife than a random sample of the public. Wolves' role in healthy ecosystems was an important factor in their intrinsic value; this emphasis may be a result of the popularity of the trophic cascade work that indicates wolves can be influential habitat engineers (Estes et al. 2011; Ripple & Beschta 2012). Further exploration of the importance of ecosystem functioning and health in relation to ethical judgments about HWC management may illuminate whether this is unique to wolves, carnivores or more broadly applicable to wildlife.

Building off this work, future studies might seek to quantify conservation ethics in other HWC contexts and expand the model to include additional measures. My conservation ethics model may be transferable to other countries and cultures, although the specific patterns in moral foundations, for instance, may differ (Haidt & Joseph 2004, 2007). Here, I focused on exploring ethics, but there are of course non-ethical considerations that might help explain stewardship behavior. For example, a model that includes economic values might be more applicable to a context where providing subsistence income and alleviating extreme poverty are strong. Further exploration of the role of emotion in wildlife-related judgments and behaviors is also warranted given the strong mediating role it played in my model.

Shared ethical perspectives rooted in agreement over intrinsic value for wildlife may be a key aspect of overcoming HWC. Most respondents, regardless of identification with any particular group, attributed intrinsic value to not only wolves but all life and engaged in stewardship in part because of values for ecosystems. This finding is encouraging if a

common ethic of biocentrism and perhaps even ecocentrism can be leveraged as a foundation from which to launch conservation initiatives and may be especially helpful for garnering support for management in controversial HWC contexts. Recognizing and addressing the legitimate role of emotion in stakeholder judgment may strengthen HWC decision-making.

CHAPTER 6
MORAL INTUITIONS AND RISK PERCEPTIONS IN HUMAN-WILDLIFE INTERACTIONS

Introduction

Risk perceptions are important for understanding human interactions with nature, particularly wildlife that may pose threats to the health and safety of livestock and pets (Johansson & Karlsson, 2011a; Riley & Decker, 2000). Although the relationship between risk perception and behavior is well-studied in different contexts (Dohmen, Falk, & Huffman, 2011; Liao, Lin, & Liu, 2009), empirical knowledge of how risk perception and behavior are influenced by moral judgments is virtually non-existent perhaps because of an emphasis on outcomes, as opposed to actions and their motivations, in risk research (Sjoberg & Winroth, 1986; Lennart Sjöberg, 2000). The moral aspects of risk may be important in judgments of whether a risk is acceptable and moral values related to risk are the subject of public debate and political action (Sjoberg & Winroth, 1986).

Addressing such gaps in knowledge may improve our understanding of behaviors that can affect natural resource management ranging from carnivore conservation to climate change adaption (Gregory, Failing, Ohlson, & McDaniels, 2006; Pielke, 2001). Increased knowledge of moral judgments and risk perceptions may also inform risk communication and other interventions aimed at improving policy implementation and compliance (Cervantes & Espejel, 2008; Huang, Sun, Ban, & Bi, 2010). In this study, I seek to quantify risk perceptions related to a case study of wolves in Michigan and begin to fill a gap in understanding about the relationships between moral judgments, risk perceptions and behavior. Below, I briefly introduce each concept and their possible relationships to each

other and to behavior. I then introduce the case study of Michigan wolf management and how each concept relates to the study context.

Theoretical Background

Risk perceptions are value-laden judgments about one's likelihood of harm and include both affective (i.e., related to intuitive feeling states) and cognitive (i.e., related to thinking through information) dimensions (Lazo, Kinnell, & Fisher, 2000; Lindquist, Barrett, Bliss-Moreau, & Russell, 2006; Sjöberg, 1998). Researchers employing the psychometric paradigm to investigate cognitive elements that affect individuals' risk perception (Slovic, 1987) have often utilized seven factors that influence people's risk judgments about nature: certainty, control, frequency, naturalness, responsiveness, seriousness and trust (Table 6.1; Rogers, 1975; Sjöberg, 1998; Slovic, 1987). Including affective risk perception (e.g., dread, fear, worry) may enhance understanding of the risk perception-behavior relationship because cognitive components only provide partial explanations (Rivers & Arvai, 2007; Wilson & Arvai, 2010), and it is along this *affective* dimension that I seek to complement current psychometric approaches.

Table 6.1. Psychometric paradigm of risk perception: Concepts and definitions.

Concept	Definition	Author(s)
Certainty	Extent to which individual is sure of causes and preventions of risks	Flynn, Slovic, & Mertz, 1994
Control	Individual's perceived ability to avoid negative effects of risk	Rogers, 1975; Slovic, 1987
Frequency	Degree to which individual assesses risk effect as rare or common	Flynn, Slovic, & Mertz, 1994
Naturalness	Whether perceived cause of risk is anthropogenic or environmental	Burton 1972
Responsiveness	Individual's assessment of response time and degree by wildlife management agencies	Crawford-Brown 1999
Seriousness	Degree to which individual assesses risk effect as severe	Grobe et al. 1999; Rogers 1975; Weber et al. 2001
Trust	Individual's assessment of wildlife management agencies' ability to manage risks	Frewer et al. 2003; Slovic 1993

Moral judgments assess right or wrong and, similar to risk perceptions, include intuition, involve uncertainty and vary by individual (Amit & Greene, 2012; Schwartz, 2011). Moral Foundations Theory (MFT) was developed to explain how people come to hold their intuitions about right and wrong, and seeks to explain both the diversity and unity of moral judgments between individuals and cultures. The theory posits the existence of at least five innate, universal moral categories: authority, harm, fairness, loyalty and purity (Table 6.2; Haidt & Joseph, 2004, 2007). These categories are then elaborated or attenuated based on one's experiences and culture, thereby creating the unique moralities we see within and between groups and societies (e.g., generally that conservatives emphasize respect for authority; liberals emphasize fairness).

Importantly for the issues at hand, MFT researchers emphasize the primacy of gut-level moral intuitions over conscious declarative moral reasoning in how people come to

their decisions about policy, politics and morality. Here, moral judgments are made as a result of pre-existing intuitions (reviewed in Haidt, 2012). MFT researchers have demonstrated a compelling empirical case for the usefulness of conceptualizing moral judgment as composed of basic, intuitive foundations that predict a wide range of political concerns relevant to wildlife management (e.g., treatment of animals and appropriate behavior within social groups; Graham et al., 2013; Graham et al., 2011; Haidt, 2007). Consider for example, a scenario in which risks are incurred unevenly across society. The environmental justice literature addresses myriad such cases and suggests that moral indignation over the asymmetrical nature of some risks is in part due to issues of fairness, or a lack thereof (Earle & Siegrist, 2008). The risk literature has contributed important knowledge about risk-related decision-making, politics, communication and pro-environmental or risk-reducing behaviors to cases such as Superfund sites (i.e., highly contaminated areas abandoned by the polluter) that are more likely located near low-income neighborhoods and polluting the Great Lakes with chemicals from automobile manufacturing (Hatcher et al., 2000; Jurin, Roush, & Danter, 2010).

Table 6.2. Moral foundations theory: Concepts and definitions (adapted from Haidt & Joseph, 2007).

Concept Continuum	Definition
Authority/Subversion	Involves respect for established tradition and hierarchy
Harm/Care	Relates to avoiding harm and encouraging care of those within a moral community
Fairness/Cheating	Focuses on rights, autonomy and justice among members of society
Ingroup Loyalty/Betrayal	Involves obligations to an identity group
Purity/Disgust	Emphasizes what is natural or decent and avoids contamination of body or mind

Toward a comprehensive model of moral judgments, risk perception and behavior

Although studies have shown that both moral judgments and risk perception influence behavior, little work has explored whether or not and how the two factors influence each other, or applied the concept to natural resource management. Some researchers have expanded the psychometric paradigm of risk perception to include moral aspects of risk, which highly correlate with acceptance of risk among diverse individuals and cultures (Sjoberg & Winroth, 1986). Specific moral intuitions may also relate to risk perceptions that influences behavior. Moral concerns about harm/care in relation to humans may lead to heighted perceptions of risk posed by an element in nature (e.g., large carnivore) to those humans. On the other hand, if nature is seen as something requiring protection, concerns about decreasing harm of nature may be more salient. Other studies have used disgust (i.e., the opposite of purity) to explain fear of various animals (Johansson & Karlsson, 2011b). Intuitions about authority and ingroup loyalty may influence risk perceptions via social norms (Lute & Gore, 2014). For example, a person may judge their own level of risk based in part on risk perceptions of respected authorities or other ingroup members. Lastly, if what is fair is more acceptable to a person, s/he may view natural risks as more acceptable and less threatening than unnatural risks that are man-made. Consider, for instance, the situation in which farmers seem to accept the natural albeit unpredictable and potentially significant risks posed by weather but strongly object to exposure to less likely risks posed by federally-protected carnivores (Nie, 2002; 2003). Fairness may explain such differences in risk perception because the presence of carnivores is seen as an unfair situation created by centralized governments more concerned with other interests rather than that of the local farmer (Naughton-Treves et al., 2003; Skogen & Krange, 2003).

Because moral intuitions and risk perception may relate to each other and are important for understanding myriad human behaviors (O'Connor, Bord, & Fisher, 1999; Slovic, 1987), exploring the relationships between moral intuitions , risk perception and behavior in a single, causal model may provide a more comprehensive account of human judgments according to context and natural resource-related behavior. My conceptual model posits that moralities are foundational intuitions about right and wrong that can directly influence pro-environmental behaviors that reduce risk (Figure 6.1; Holsman, 2000; Schwartz, 2011), which I term stewardship and define as direct or indirect actions taken to benefit nature or some component of nature. However, we posit that the influence of moral intuitions on behavior may be filtered by both affective and cognitive risk perceptions (Sjöberg, 1998) as intermediate steps between a person's foundational moral intuitions and their behavior or policy positions. Thus, consistent with the general MFT approach, my model suggests a step-wise psychological process in which basic moral intuitions occur first, then lead to more specific judgments about risk and finally specific actions (Baron & Kenny 1986).

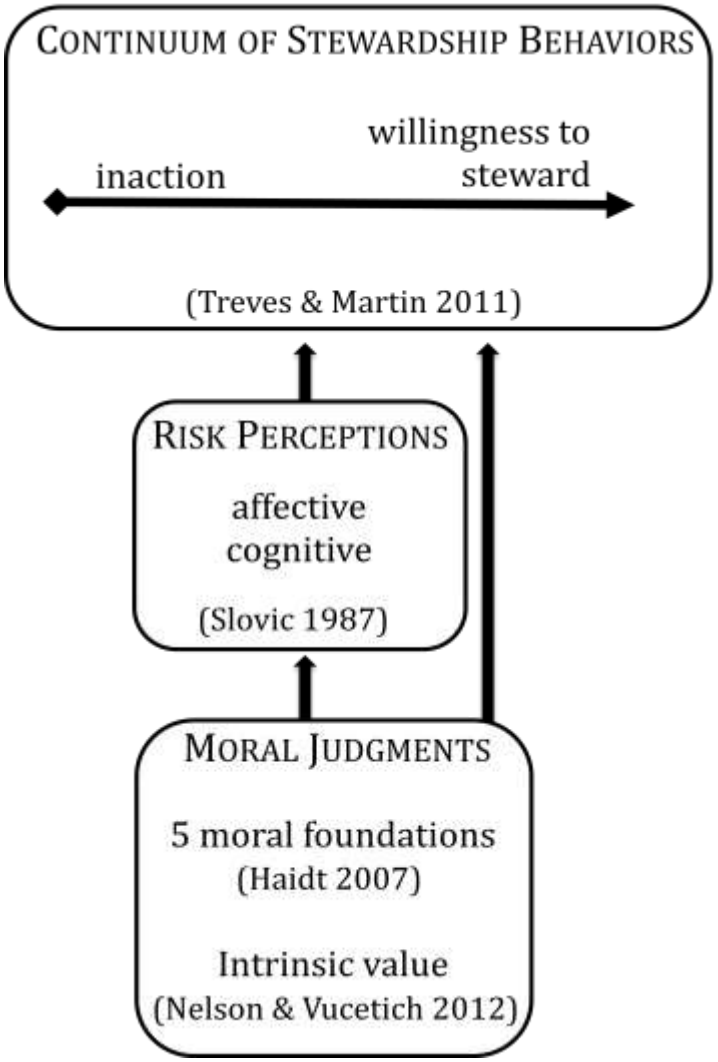

Figure 6.1. Conceptual model. Risk perceptions may act as mediators of the moral-behavior relationship. Moral judgments may have direct effects as well as indirect effects (via risk perception) on behaviors.

Case study context

In the present study, I use Michigan wolf management as a case study to advance knowledge about moral and risk-related judgments associated with human-nature interactions. Having been removed from the U.S. list of endangered species in 2012, wolves are now managed by and hunted in the states in which they are present. In Michigan, wolves number about 650 individuals ranging across the Upper Peninsula and hunting is focused on

addressing human-wolf conflict (*2013 Michigan Wolf Digest*, 2013). Human-wolf conflict centers on risks posed by wolves, particularly attacks on domestic dogs and livestock. Hunters are concerned about the effects wolves have on game species or hunting dogs, and thus this may also be considered a wolf-related risk. Attacks on humans in North America are extremely rare (McNay, 2002) but may still be a concern among stakeholders (Beyer et al., 2006; Kellert, 1990; Mertig, 2004). Stakeholders often conflict with each other over how to manage risks, in part because of the uncertainty surrounding risk (Earle & Siegrist, 2008). When risks involve carnivores, uncertainty surrounds both their behavioral ecology and potential to impact many aspects of human well-being and life (Carter et al., 2012). Thus people often disagree over the likelihood of attacks to people or other animals (Riley & Decker, 2000).

Wolf-related conflict may thus occur because people disagree about the (perceived) level of risk and whether hunting wolves to reduce risks is justified or will be effective. In other words, addressing conflict over wolves requires answering the question: What level of risk (both perceived and assessed) justifies lethally removing wolves? Adequately answering this question at the policy level involves technical risk assessments (e.g., likelihood of livestock attacks), biological knowledge (e.g., how hunting wolves may affect their behavior) and understanding from social sciences (e.g., risk perceptions related to wolves, moral considerations of killing wolves). This study sought to contribute to the question by exploring the last dimension and (1) quantifying risk perceptions within the case study context and (2) testing my model to explore how moral intuitions and risk perceptions influence behavior.

Methods

Sample Population

I targeted *aware* (i.e., those perceiving wolf management to be a salient issue) and *active* (i.e., those taking action based on the salience of wolf management) individuals in Michigan wolf management to increase relevance of measured concepts (i.e., moral intuitions, risks perceptions and behaviors related to Michigan wolf management; Grunig, 1979). I contacted Michigan citizens age 18 years or older who were involved in wolf management through organizations represented on the Wolf Management Advisory Council (WMAC), a group of stakeholders regularly involved in engagement processes conducted by the Michigan Department of Natural Resources and representing diverse stakes, including: animal welfare and rights advocates, deer hunters, environmentalists, hunters who use dogs, legislators, livestock owners, MDNR wildlife managers, trappers and tribal members.

Survey Design and Distribution

The survey was designed in Qualtrics (qualtrics.com) and distributed via snowball sampling from my initial contact list of WMAC representatives who completed the survey and forwarded the hyperlink to members of their respective organizations by email or posting on organization webpages (Paolacci et al., 2010). I used snowball sampling to maximize response rates among aware and active citizens (Cohen & Arieli, 2011). I also distributed the survey hyperlink to prior survey respondents who had agreed to be contacted in the future. Qualtrics allows the option to restrict responses to one per IP address, which prevented ballot-stuffing (Duda & Nobile, 2010). The survey closed on November 30, 2013 once (a) all targeted groups had access to the survey for ≥2 weeks, (b) regular firearm hunting season for

deer in Michigan and Thanksgiving holiday seasons had commenced and (c) new responses had not commenced in ≥5 days.

Survey Instrument

The survey included items measuring moral foundations, affective and cognitive risk perceptions, stewardship behaviors and socio-demographic characteristics through multiple choice-type questions using binary response options and 5-point Likert-type scales (reported results collapse responses into agree and disagree). Scale items were evaluated for internal consistency using Cronbach's alpha (all scales were ≥0.8; Table 6.3). Means were used to create indices of items with continuous response options: affective and cognitive risk perceptions and the five moral foundations. One summated index was created for stewardship because it was measured with binary response options.

Moral foundations were measured by Haidt and Joseph's (2007) cross-culturally validated 20-item questionnaire on five *moral foundations* (see moralfoundations.org for additional information on measures): authority, fairness, harm, ingroup and purity.

Table 6.3. Descriptive statistics: Mean, standard deviation (SD), Cronbach's alpha and n.

Concept	Item	Mean	SD	Alpha	n
Socio-demographics	Age	53.80	13.64	N/A	855
	Education	5.18	1.94		
	Gender	1.52	0.88		
	Income	6.37	1.93		
	Political Party	3.57	1.54		
	Political Orientation	4.41	1.57		
Intrinsic Value	All living things have intrinsic value.	3.98	1.06	N/A	921
Moral Foundations	Authority	3.03	0.94	N/A	972
	Fairness	3.55	0.86		
	Harm/Care	2.98	1.05		
	Ingroup	2.90	0.97		
	Purity	2.97	1.14		
Cognitive Risk Perception	Frequency: Evidence of human-wolf conflict is rare in my community.	4.11	1.22	0.92	960
	Control: I believe that I have control over risks posed by wolves.	3.53	1.18		
	Certainty: If the wolf population increases, human-wolf interactions will increase.	4.13	0.89		
	Trust: I trust wildlife managers to manage wolves appropriately.	3.68	1.30		
	Naturalness: Problems involving wolves are increased by environmental factors.	3.78	0.93		
	Seriousness: The risks posed by wolves are acceptably low.	3.24	1.27		
	Responsiveness: Wildlife managers are responsive to wolf problems.	3.49	1.10		
Affective Risk Perception	I worry about risks posed by wolves to… Children	3.34	1.31	0.95	895
	Game species	3.22	1.37		
	Hunting dogs	3.49	1.32		
	Livestock	3.80	1.13		
	My health	2.09	1.10		
	My hunting traditions	2.70	1.42		
	My livelihood	1.89	1.06		
	My personal safety	2.30	1.23		
	Pets	3.61	1.22		

Table 6.3 (Cont'd)

Stewardship	Attended a legislative hearing or organizational meeting	0.16	0.37	0.82	855
	Boycotted or avoided buying the products of a company because of their stance on wolf management	0.09	0.29		
	Donated money to a group	0.17	0.38		
	Called or wrote a letter to a legislator	0.24	0.43		
	Educated others	0.37	0.48		
	Managed land to create or conserve wolf habitat	0.05	0.21		
	Read newsletters, magazines or other publications	0.57	0.50		
	Signed a petition	0.29	0.46		
	Volunteered with a group	0.11	0.32		
	Voted for a candidate in an election based at least in part because of his/her stance on wolf management	0.13	0.33		
	Wrote a letter to a newspaper or called in to a news program	0.07	0.25		

Cognitive risk perception was measured by 5-point scales of dis/agreement with 7 psychometric items: *certainty, control, frequency, naturalness, responsiveness, seriousness* and *trust*; adapted from (Gore et al., 2007; Muter et al., 2012). I also measured **affective risk perception** by asking respondents to rate on 5-point scales their level of worry related to 9 wolf-related risks to: *children, game species, health, hunting dogs, hunting traditions, livelihood, livestock, personal safety* and *pets*. Final measures for the two types of risk perception (cognitive risk perception $\alpha = 0.92$; affective risk perception $\alpha = 0.95$) were computed by averaging all items for each risk perception into a single index for each (Vaske, 2008).

Stewardship was measured by asking respondents to indicate which of 11 activities they engaged in that were intended to support wolves. A final index summated the number of stewardship behaviors in which each respondent engaged, categorizing them along a

spectrum from inactive (engaged in 0 stewardship behaviors) to strong stewards (engaged in up to 11 behaviors).

To answer my second objective of quantifying risk perceptions in the case study, I grouped respondents by **socio-demographics** (closed and open questions about age, education, gender, income, political ideology and political party affiliation) and **social identity** groups (measured by asking respondents' agreement on a 5-point scale about whether they identified with each of 8 identity groups, adapted from Bruskotter, unpublished data; Lute & Gore, in press; Lute & Gore, 2014).

Data Analysis

To quantify risk perceptions related to the case study, I explored descriptive statistics of affective and cognitive risk perceptions by identity group and zero order correlations between affective and cognitive risk perception indices as well as the respective items used to measured each index (independent variables) and stewardship (dependent variable). To explore whether risk perceptions mediated the relationship between moral intuitions and wolf stewardship, I also performed path analyses (Baron & Kenny, 1986) followed by the bootstrapping procedure (5,000 samples) for calculating standard errors recommended by Preacher & Hayes (2008). Evidence for mediation is supported when three conditions are met: the relationship between (1) mediator and independent variable is significant, (2) mediator and dependent variable is significant, and (3) independent and dependent variables is significantly smaller when the effect of the mediator is controlled (RM Baron & Kenny, 1986). I entered 5 moral foundation variables as the primary, foundational independent variables (each in separate analyses), stewardship of wolves as the dependent variable and

affective and cognitive risk perception as potential mediators. To deal with missing data, only respondents who completed the dependent variable of interest were included in analyses. Path analyses were conducted using the 'sgmediation' module in STATA 13.1 (StataCorp LP, College Station, TX, USA).

Results

Sample Characteristics

Of the initial 1303 responses, 64 were non-Michigan residents and excluded from analyses, resulting in a final sample of 1239 respondents. Respondents' age, education and income were normally distributed (Table 6.3). The survey was skewed toward white (67.6%, n=837) and male (76%, n=699) respondents. Native American respondents comprised only 1.4% (n=18) of the sample population. Hunters (32.1%, n=398) were overrepresented in the sample compared to published recreational participation records in Michigan (n=795,535/ 8% for hunters and n=10,241/ 0.1% for trappers)(Frawley, 2013; Michigan Department of Natural Resources, 2013). Conservationists (19.4%, n=240) and environmentalists (10%, n=124) were the second and third largest identity groups. Animal rights or welfare advocates (5.5%, n=68), farmers (2.7%, n=33), gun rights advocates (8.2%, n=101), property rights advocates (3.5%, n=43) and wildlife advocates (3.9%, n=48) made up smaller proportions of respondents.

Descriptive Statistics

Affective Risk Perception*:* Respondents were more likely to report worry related to risks posed by wolves to livestock and pets than personal safety and health (Figure 6.2). The

lowest agreement was in relation to worry about personal subjects (e.g., *my* livelihood). When grouped by identity, environmentalists reported the lowest affective risk perceptions and gun rights advocates and hunters showed the highest (Figure 6.3).

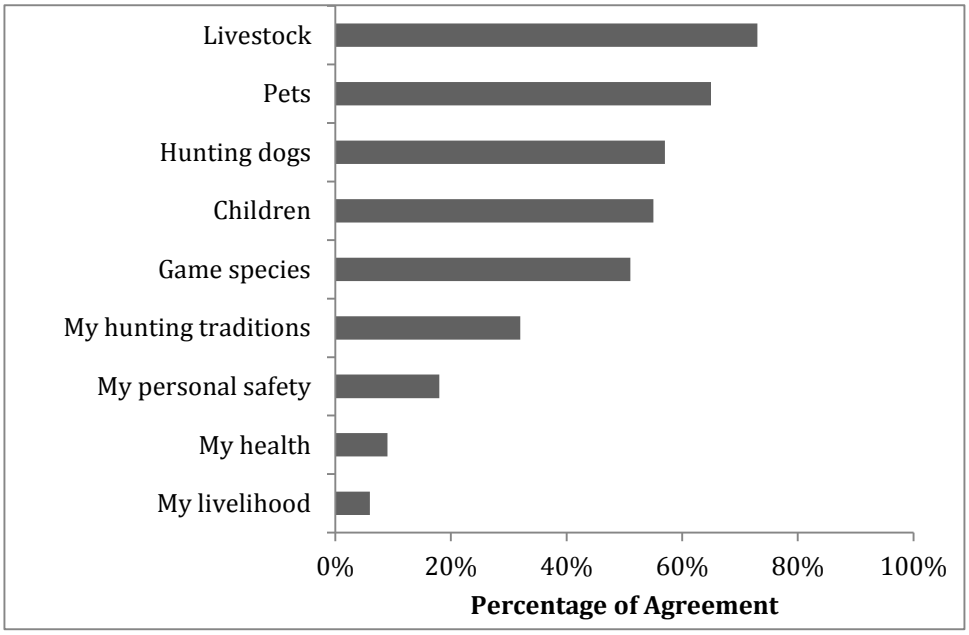

Figure 6.2. Affective risk perceptions index. Respondents most often agreed that they worried about the risks wolves pose to domestic animals (i.e., livestock, pets and hunting dogs).

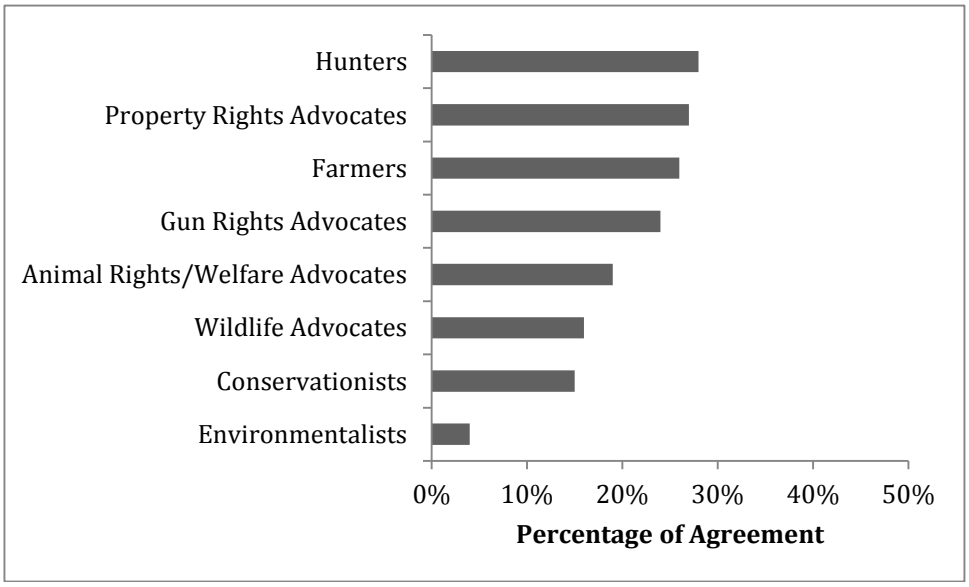

Figure 6.3. Affective risk perceptions by identity. When grouped by self-described identity, percentage of respondents vary in whether they report greater worry (i.e., agreement) that wolves pose risks to 9 targets (e.g., livelihood, livestock). *Note*: Scale on x-axis is different in this figure compared to Figures 6.2 and 6.4.

Cognitive Risk Perception*:* Majorities agreed that risks were controllable (risk perception factor *control*; 59%, n=564), acceptably low (*seriousness*; 48%, n=540) and rare (*frequency*; 79%, n=763); that wildlife managers were responsive (*responsiveness*; 52%, n=495) and trusted (*trust*; 64%, n=610); and "problems involving wolves are increased by environmental factors" (*naturalness*; 70%, n=668). High agreement with these measures may indicate low cognitive risk perception. Majorities also agreed "if the wolf population increases, human-wolf interactions will increase" (*certainty*; 84%, n=815). When grouped by identity, property rights advocates show the highest disagreement followed by hunters, wildlife and gun rights advocates (Figure 6.4).

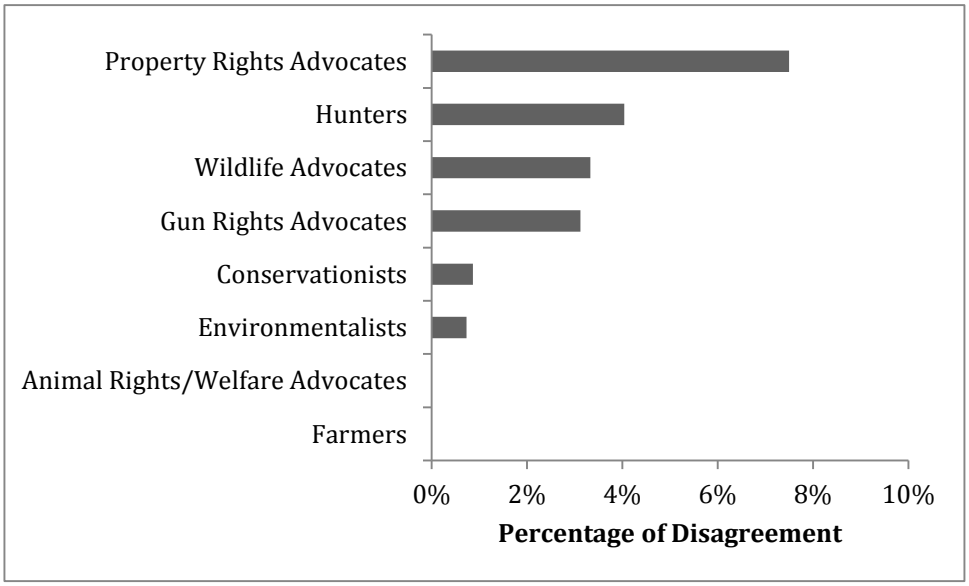

Figure 6.4. Cognitive risk perceptions by identity. Disagreement with seven factors (e.g., certainty, control) may indicate cognitive risk perception. Disagreement was generally low. Property rights advocates show the highest disagreement. *Note*: Scale on x-axis is different in this figure compared to Figures 6.2 and 6.3.

Zero-Order Correlations

Zero-order correlations revealed a significantly negative relationship between affective risk perception and stewardship behavior; the relationship between cognitive risk perception and stewardship behavior was not significant (Table 6.4). Thus, only affective risk perception met the first two criteria for conducting path analyses.

Subjects of worry that were ranked the highest (i.e., livestock, children and game species; Figure 6.2) were also significantly related to stewardship. Five cognitive risk perception items (i.e., certainty, control, responsiveness, seriousness and trust) were significantly related to stewardship.

Table 6.4. Zero-order correlations between risk perceptions and stewardship.

Independent Variable	β	SE
Authority	-0.20**	0.03
Fairness	0.17**	0.03
Harm	0.27**	0.03
Ingroup	-0.15**	0.03
Purity	-0.07**	0.03
Affective risk perception	-0.47**	0.07
Children	-0.14*	0.09
Game species	-0.25**	0.10
Hunting dogs	-0.06	0.08
Livestock	-0.17**	0.11
My health	-0.05	0.11
My hunting traditions	-0.02	0.09
My livelihood	-0.04	0.10
My personal safety	-0.04	0.10
Pets	-0.04	0.10
Cognitive risk perception	-0.12	0.13
Certainty	-0.21**	0.09
Control	0.12**	0.07
Frequency	-0.05	0.07
Naturalness	-1.81	0.08
Responsiveness	0.10*	0.08
Seriousness	0.19**	0.07
Trust	-0.29**	0.07

* $p \leq 0.01$ ** $p \leq 0.001$

Path Analysis

Three moral foundations and one risk perception index met the initial criteria for mediation. Therefore, in order to test whether affective risk perception mediated the link between each moral intuition (i.e., authority, ingroup loyalty, harm/care) and stewardship behavior, I conducted a series of regression analyses to infer a causal psychological process occurring in steps: (1) moral foundation→ (2) affective risk perception→ (3) stewardship, where affective risk perception mediates or "carries" the effect between the moral foundation in question and stewardship (Baron & Kenny, 1986). A mediating variable explains a significant proportion of the relationship between independent and dependent variables.

Affective risk perception mediated the relationship between three moral foundations and stewardship. A negative link between *authority* and stewardship was found in the first step (β = -0.20). However, when affective risk perception was added, the effect of authority was reduced 59% (β = -0.12, *S.E.* = 0.02, $p \leq 0.001$; 95% CI = [-0.09, -0.15]). A negative link between *ingroup loyalty* and stewardship was also found in the first step (β = -0.15). When affective risk perception was added, the effect of ingroup loyalty was reduced by 85% (β = -0.12, *S.E.* = 0.02, $p \leq 0.001$; 95% CI = [-0.09, -0.16]). We found a significant positive relationship between *harm/care* and stewardship (β = 0.27), which was reduced by 26% (β = 0.06, *S.E.* = 0.01, $p \leq 0.001$; 95% CI = [0.04, 0.09]) when affective risk perception was added to the model. Each analysis verified that affective risk perception carries a significant portion of the relationship between moral intuitions about (1a) authority, (1b) ingroup loyalty and (1c) harm/care and (2) stewardship behaviors.

Discussion

The relationship between moral intuitions and risk perception has until now been nebulous. Thus natural resource policy has lacked potentially useful tools in addressing disagreement over contentious management issues. Clearer knowledge about the relationship is needed to understand the ways in which moral and risk considerations compete and complement judgments that eventually influence behavior. Such knowledge may help clarify psychological theory of human judgment and inform efforts that seek to understand, predict or influence human behavior. This work aimed to help fill this gap in knowledge regarding moral intuitions, risk perceptions and stewardship behaviors related to the case study of Michigan wolf management. In this study of active wolf stakeholders, I found support for my proposed model that moral intuitions predicted behavior, and that affective risk perceptions filtered these relationships. Affective risk perception was a particularly salient intermediate in the process of translating moral consideration of loyalty to a social group to behavior. These findings portend a number of implications for theory and practice. Below I discuss them.

Results indicate that intuitions about both risk and morality are important drivers of behavior. Which moral intuitions are important to people can be used to create a picture of their moral landscape, which can inform understanding of behavioral motivations. In this study context, deeply ingrained moral intuitions shape feelings about risks posed by wolves, which then motivate conservation-related behavior. Moral foundations of ingroup loyalty and authority worked in concert with affective risk perception to result in decreased stewardship in this study. Stakeholders in this study emphasized authority and ingroup loyalty, which increased worry about risks and then decreased stewardship. The exact mechanism by which

authority and ingroup loyalty influences affective risk perception is still unclear. For example, the observed relationship between respect for authority and affective risk perception might indicate that people in this sample believe humans should have authority over nature, which correlates with worry about risks posed by wolves (even unlikely ones) and not engaging in activities to benefit wolves. Other potential mechanisms exist to explain the relationships herein and path analyses do not preclude the influence of other variables, such as ingroup members' affective risk perceptions. Among those who prioritize moral concerns of authority and ingroup loyalty, personal worry about wolves may be influenced by the worry of respected authorities and ingroup members. Including this variable in a path analysis or social network analysis may shed additional light and improve the model proposed in this study.

In contrast to authority and ingroup loyalty, moral concerns about harm and care showed a *positive* direct relationship to stewardship but the indirect relationship via affective risk perceptions was negative. This finding suggests that concerns of harm/care increase stewardship behaviors unless affective risk perceptions are considered, in which case the effect may be reduced and stewardship decreased. The direct positive relationship between intuitions about harm/care and stewardship suggest that when reducing harm to and increasing care of natural resources is salient, conservation-related behaviors are increased. However, reducing harm to (and increasing care of) people results in decreased wolf stewardship when worry about wolves is considered.

This study provides a baseline assessment of risk perceptions related to wolf management in Michigan. Importantly, disagreement over wolf management may not be about uncertainty surrounding the likelihood of risks but about worry related to risks

however infrequent. Based strictly on percentages within this sample, cognitive risk factors suggested low levels of cognitive risk perception. Specifically, risks were considered rare and acceptably low. Yet affective risk perception levels in relation to certain targets (i.e., children, domestic animals, game species) may be high among active and aware wolf stakeholders in Michigan. Affective risk perceptions related to personal targets (e.g., *my* livelihood, *my* hunting traditions) or the self (e.g., *my* health, *my* personal safety) were not the most salient among study participants, who instead emphasized vulnerable others. These findings help clarify debate over current wolf management strategies that aim to mitigate human-wolf conflict and partially answer the question posed earlier: What level of risk (both perceived and assessed) justifies lethally removing wolves? Results herein suggest that the level of risk may be irrelevant or that stakeholders may be aiming for very low perceived risk in relation to wolves (perhaps because of ideas about human authority over nature as hypothesized above). Risk messaging that successfully reduces stakeholder worry about wolf-related threats to vulnerable others may be most effective at mitigating risk-related disagreement (rather than aiming to reduce the likelihood of already low level risks).

According to this study, increased affective risk perceptions may have the potential to decrease stewardship but concerns about reducing harm to and caring for nature may increase participation in positive human-nature interactions. Additionally, some of the highest ranked subjects of worry related to wolves, namely livestock, children and game species, were also found to significantly reduce the likelihood of engaging in stewardship. These findings have implications for predicting future participation in wolf conservation as well as practical risk communication (path analysis is particularly useful at identifying the important elements for communication interventions; MacKinnon & Dwyer, 1993). To encourage positive behaviors

or conversely to decrease negative ones, communication that only addresses cognitive aspects of risk (e.g., probabilities that a wolf will attack livestock) may fall short of objectives without also addressing emotional aspects and moral dimensions, such as harm to and care for nature. In order to address emotional aspects of risk, effective stakeholder engagement may provide support for worries as valid (regardless of likelihood) and offer ways to reinforce residents' sense of control to protect vulnerable others from wolf-related risks (Keller, Siegrist, & Gutscher, 2006). Without effective risk communication, managers might expect stewardship of wolves to remain at current levels, especially among the identity groups with the highest affective risk perceptions (in this study, hunters, gun and property rights advocates, hunters).

This work makes a novel contribution toward theoretical and applied behavioral research. Risk literature often focuses on risk mitigating behaviors, with good reason. Applied science of human impacts on the environment focus on negative interactions between humans and nature (e.g., anthropogenic climate change, human-wildlife conflict). Alternatively this work seeks to understand moral and risk-related influences on positive human-nature interactions. Although this research, which relies on self-reporting and statistical models to infer psychological processes, is limited in the conclusions it can make, further confirmation of findings may help advance understanding the psychology of morally relevant behavior as well as how to encourage positive relationships between humans and their environment, from stewardship of habitat and wildlife to reducing greenhouse gas emissions. Future research (1) among broader stakeholders, (2) to further explore the relationships between moral intuitions about authority/ingroup loyalty and affective risk

perception, (3) that directly measure psychological processes and (4) experiment with how to encourage positive human-nature interactions are needed.

CHAPTER 7
CONCLUSIONS

Using recovered wolf management in Michigan as a case study, this dissertation sought to advance knowledge about the psychology of human-nature relationships. In my first research phase, I explored how conservation ethics, risk perception, and social identity influenced stewardship behaviors. Chapters 3 and 4 present results of key informant, semi-structured interviews I conducted in August and September 2012. For this first phase of exploratory research, I:

- investigated why stakeholders do or do not compete over Michigan wolf management, and
- gauged perceptions related to power inequalities among groups, forms of knowledge and science related to hunting wolves in Michigan.

New information emerged from this inquiry. I discovered stakeholders organize into two identity groups, one supporting a "protectionist" model for wildlife and another espousing "wise use" conservation. Four themes emerged in common among both groups, namely about 1) appropriateness of different sources of knowledge for decision-making, 2) political power overriding science in decision-making, 3) special interests disenfranchising other publics, and 4) stakeholders distrusting decision-makers. I also identified for the first time six common stewardship themes among stakeholders: 1) bequest values, 2) ecosystem health, 3) education, 4) existence values, 5) pride in natural resources and 6) sustainability. This work suggested key stakeholders, when they do conflict, may do so over oppositional identities related to wolf management and those identities may be a strong predictor of what management strategies individuals will support. Findings from this exploratory phase

informed the next stage of qualitative inquiry. Stewardship themes revealed in Phase 1 were used to guide the stewardship definition included in Phase 2. Findings related to social identity informed subsequent definitions of identities (e.g., conservationist, environmentalist). Conservation themes discussed in the first phase were further explored in the second phase.

For Phase 2, I designed and implemented a web-based survey in October-November 2013 to collect data for Chapters 5 and 6, which empirically assessed individual's conservation ethics and modeled the relationships between conservation ethics, social identity, risk perceptions, acceptability of management strategies and stewardship behaviors. Intrinsic value for wolves and all life were positively related to stewardship. Results revealed conservation ethics are likely linked to behavior by way of both emotional and cognitive judgments: affective risk perception, emotional dispositions and acceptability of hunting/trapping were important considerations in the psychological process of translating conservation ethics to behaviors. Results indicated three moral foundations were relevant to the ethics-behavior equation. The harm/care foundation linked intrinsic value to stewardship behavior in the first model (Chapter 5). Moral considerations of loyalty to a social group and respect for authority were particularly salient when the model included affective risk perceptions (Chapter 6). Most respondents, regardless of their identifying with any particular group, attributed intrinsic value to not only wolves but all life and engaged in stewardship in part because of values for ecosystems.

Taken together, greater knowledge of these novel elements may advance understanding of the psychology underlying human-nature relationships, namely in terms of the ethical and emotional aspects that translate human judgment to behavior. Knowledge

from this dissertation also improves the efficacy of wildlife management by providing a baseline for post-recovery human dimensions issues and enhancing decision-makers ability to anticipate public responses to policy changes.

Contributions to Theory, Methods and Practice

This dissertation contributes novel insight into theory, methods, and practice related to the human dimensions of wolf management in Michigan. A major goal of my dissertation was to synthesize concepts from diverse research areas to create truly interdisciplinary knowledge. I created a conservation ethic typology to combine philosophical and psychological theories to measure morality related to human-wildlife interactions. It is essential to evaluate the degree of success in research. The tripartite assessment of theory, methods, and practice is an important step in filling knowledge gaps and validating the contributions of one's work within the greater context of germane literature (Jonker & Pennink, 2010). Herein, I synthesize significant results of this dissertation, address potential limitations and suggest future areas of inquiry.

Theoretical Contributions

Exploring the psychology of human-nature interactions can help advise how individuals make moral judgments about conservation, which is useful for understanding motivations to participate in conservation or support certain management strategies. I sought to improve current conservation ethic typologies by expanding them to include emotional dispositions, moral foundations and affective and cognitive risk perceptions. This effort led to an improved model for understanding how attribution of intrinsic value and other

perceptions underlie stewardship behavior based on the case study of Michigan wolf management (Figure 7.1). Results revealed a positive relationship between attributing intrinsic value to wolves and all life (at least zoo- and biocentrism, respectively) and stewardship. In addition to the direct influence of intrinsic valuation on positive behaviors, emotional dispositions and affective risk perceptions were significant mediators of the ethics-behavior relationship.

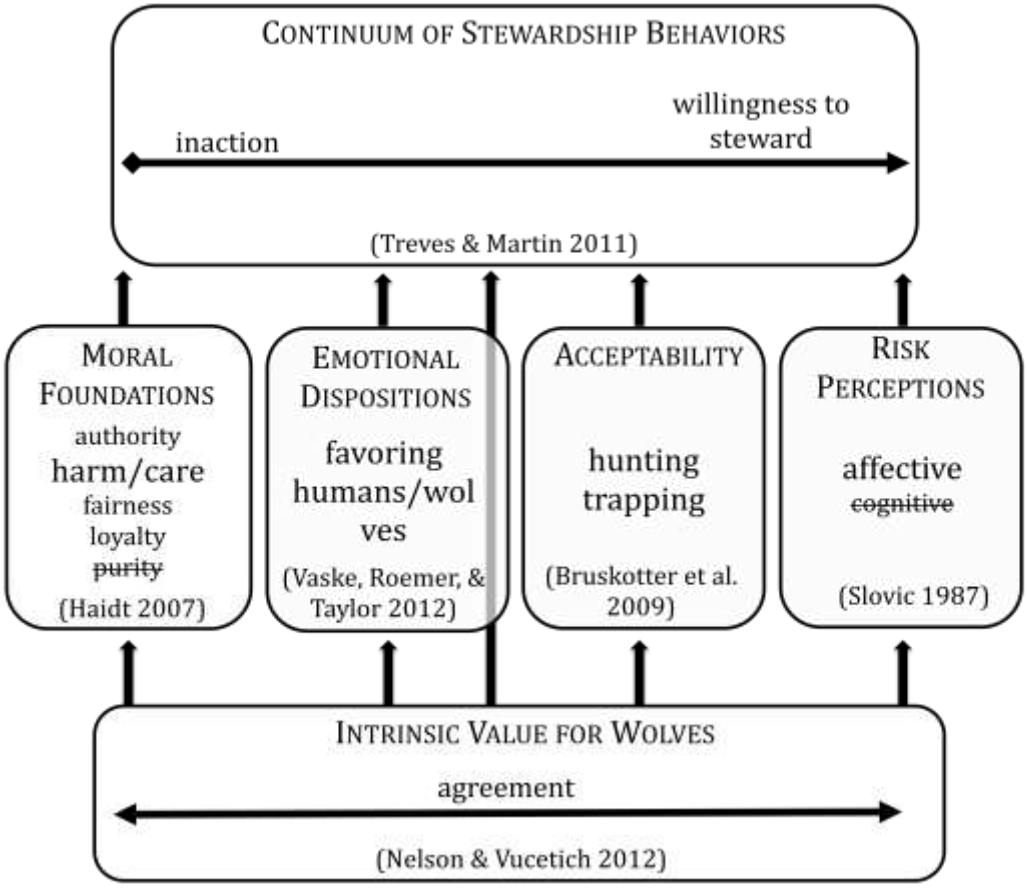

Figure 7.1. Final conceptual framework. Attribution of intrinsic value to wolves directly and indirectly influences stewardship behavior (in which the final measure ranged from inaction to willingness to steward). The strongest mediators (indicated in larger font) included the moral foundation of harm/care, emotional dispositions, acceptability of hunting/trapping and affective risk perceptions. The moral foundation of purity and cognitive risk perception were not found to be significant mediators (indicated with strikes).

As predicted, measuring affect in addition to cognitive measures increased predictability of behaviors. Affective and not cognitive risk perceptions influenced stewardship. Emotional dispositions *and* acceptability of hunting/trapping (i.e., a cognitive judgment) also significantly influenced stewardship. The role of affect in conservation has been understudied compared to cognitive processes despite affect's strong influence on perceptions and behaviors (Jacobs, 2012). This dissertation helps fill this void by describing the relationship between affective risk perception and emotional dispositions, what factors influence them and how they in turn influence conservation-related behavior.

To the extent that results from this study might inform broader psychology, ethical judgments may include a complex pathway of foundational cognitions and emotions. Scholars disagree on the importance and order of intuition/affect versus reasoning/cognition in morality (Amit & Greene, 2012; Haidt, 2001). Some psychologists argue that reasoning is a post-hoc process used to justify intuitions once the moral judgment is made (Haidt & Joseph, 2004; Haidt, 2001), other researchers argue for a dual process where intuition/affect and reasoning/cognition influence moral judgments in parallel (Paxton & Greene, 2010; Zajonc, 1980). Although this study is limited in its ability to explain the exact pathway, path analysis suggests a clear psychological order exists. Results herein support the importance of affective risk perceptions and emotional dispositions in addition to cognitive judgments such as acceptability of hunting/trapping, in influencing behavior. Findings from this dissertation thus support using dual processing models that include both intuition/affect and reasoning/cognition to understand human judgments related to wildlife.

Little work has been dedicated to characterizing the moral aspects of risk perception (Sjoberg & Winroth, 1986); this dissertation sought to contribute clearer knowledge about

the relationship to improve understanding about the ways in which moral and risk considerations compete and complement judgments that eventually influence behavior. Results revealed significant relationships between three moral foundations (i.e., authority, harm/care and loyalty) and affective risk perceptions, which in turn influence behavior. Delineating this association helps clarify the psychology of risk within the complexity of human-nature interactions and efforts that seek to understand or predict human behavior (Gregory et al., 2006; Pielke, 2001).

Additionally, I sought to improve capacity for predicting wildlife-related perceptions by utilizing social identity theory and found that social identity is a relevant and useful measure for segmenting stakeholders. Demographic variables such as age, sex, income, and education level have been predominantly used to explain patterns in value and attitudes, often creating models with low explanatory power (M. J. Manfredo et al., 2009). I found that, among diverse socio-demographic groups, two main identity groups existed and were divided on their opinions about wolf management. These results echo findings from Peyton et al. (2007) and suggest that stakeholders consider their social identity when defining and engaging in stewardship; individuals within identity groups that do not support stewardship may be more likely to oppose positive interactions with wolves in this case study.

Methodological Contributions

This work makes methodological contributions to human dimensions of wildlife research. The resulting conceptual framework (Figure 5.1) stemming from this dissertation provides a novel measurement of wildlife ethics and related judgments. Intrinsic value and concerns of harm/care might be a singular measure of conservation ethics. Emotional

dispositions toward and acceptability of management options may serve as an index of judgments about how humans ought to interact with wildlife. Combining interdisciplinary concepts (e.g., from philosophy, social psychology) may be a useful tool in testing hypotheses related to normative influences on judgments and behaviors not only in wildlife conservation but diverse inquiries.

Another methodological contribution of this work is the extent to which research protocols and procedures effectively utilized technology to simplify research efforts and resources for human dimensions research. I used web-based surveys to streamline data collection and entry compared to other survey modes (e.g., paper, telephone). Survey distribution and reminders required only the time to draft and send an email. Responses were received as they were completed, significantly reducing the typical 8 week return time for postal surveys (Dillman et al., 2009). Data entry was essentially automatic. Because time was saved in survey distribution, return time and data entry phases, I could focus on optimizing survey design and conducting data analysis. Furthermore, the web-based survey resulted in a more than adequate sample size that was not skewed in terms of age, education or income (Mayr et al., 2012; Wells et al., 2012).

Practical Contributions

My dissertation findings also contribute to the efficacy of carnivore conservation by describing the human dimensions of recovered wolf management. Below, I describe three key practical contributions this works makes for Michigan wolf management as well as other management contexts, which can complement biological information to inform more effective management through reduced uncertainty.

First, this work provides a baseline assessment of wolf-related perceptions after delisting that may be useful for understanding how perceptions change in recovered species contexts. Since its creation, few species have been removed from the U.S. Endangered Species List and only wolves have gone from endangered to game species in a matter of months. Phase 1 research functions as a baseline of wolf-related perceptions before wolf hunting was allowed in Michigan in 2013. Phase 2 research occurred while the first wolf hunt in approximately 50 years was occurring in Michigan. Overall this work contributes to a small but important body of literature exploring human dimensions of wolf management in Michigan (Hook & Robinson, 1982; Stephen R Kellert, 1990; Mertig, 2004; Peyton et al., 2007). Together these studies provide snapshots of wolf-related perceptions that might be understood within the context of historical and contemporaneous regulatory changes (e.g., endangered status, recovery, delisting and hunting). This work is the first to describe the human dimensions of wildlife in a recovered management context and can inform future studies of other delisted species (e.g., grizzly bears). Studying perceptions of wildlife in a delisted context may also contribute knowledge to still-listed species where decisions are more urgent and do not allow time for detailed human dimensions inquiry.

Second, this work makes a unique contribution by being the first to assess conservation ethics related to wolves and their management. Majorities attributed intrinsic value to not only wolves but all life, undermining assumptions that anthropocentric interests dominate management (Goralnik & Nelson, 2012; John A. Vucetich & Nelson, 2007). The most prevalent reason for attributing intrinsic value to wolves was related to concerns for healthy, functioning ecosystems, suggesting that active Michigan wolf stakeholders are highly inclusive in what entities deserve moral consideration (i.e., ecosystems) and may

espouse ecocentric ethics in this context. Moral foundations were also found to be relevant in conservation ethics of wolf management. Foundations of harm/care and fairness are considered universal concerns (i.e., they are important to most people, at least in Western cultures) and may be useful in engaging diverse stakeholders (Graham et al., 2011; Haidt, 2007; Haidt & Joseph, 2007). Authority and loyalty foundations were also important among Phase 2 study participants, strongly related to affective risk perceptions and may be useful when communicating with Michigan wolf stakeholders.

The third practical contribution of this dissertation is the quantification of stewardship behavior among active stakeholders in Michigan. Because stewardship behavior has never been described for wolves in Michigan, this work provides baseline data upon which to evaluate future programs and helps delineate what behavioral influence managers might expect stakeholders to have on wolves and their management. Phase 2 research revealed that stakeholders engage in diverse stewardship actions that indirectly influence wolf management, some of which require significant contribution of time and other resources (i.e., volunteering time, educating others). On average, 15% of respondents, which were active and highly involved wolf stakeholders, engaged in any single stewardship activity. Results from mediation analyses suggested four variables (i.e., acceptability of hunting/trapping, affective risk perceptions, emotional dispositions and the harm/care foundation) are important considerations in the ethics-stewardship relationship. Finally, findings indicated that social groups as well as gender and political affiliations may provide useful ways to predict which groups will engage in positive stewardship behaviors, which groups will be inactive and which may be opposed to stewardship.

Limitations of Research

Understanding the limitations of research is helpful for future replication, adaptation, and application (Creswell, 2009). Below, I identify key limitations of this work.

First, generalizability is the main limitation of this work. The nature of study objectives focused findings on the case of Michigan wolf management and specific stakeholders. Because the sampling frame was not randomized, conclusions should not be over-generalized to other wildlife management contexts nor to the entire population of Michigan at large; results should be interpreted within the context of active and aware Michigan wolf stakeholders (Wolcott, 1990).

Second, web-based surveys, although advantageous for a number of reasons outlined above, can introduce potential coverage error (Bell et al., 2011; Mayr et al., 2012). Although age, income and education were normally distributed, respondents in Phase 2 research tended to be white, male respondents that identified as conservationists (i.e., proponents of wise use management) and hunters. This demographic profile may be representative of the targeted population of active and aware wolf stakeholders. Nonetheless, these dominant characteristics should be carefully considered when considering the broader implications and wider contexts in wildlife management. Priming may also have influences responses in web-based surveys; asking about the intrinsic value of wolves may have readied respondents to answer subsequent questions about stewardship or moral foundations differently. Of course, it could be argued that priming would have influenced responses in the opposite question order (i.e., asking about moral foundations first primes respondents to answer intrinsic value questions differently).

Third, to some extent, reliance on self-reporting and interpreting qualitative data will always leave a chance of error vis-à-vis threats to validity (e.g., response bias). Self-reporting of behavior and indirect measures of psychological processes (via path analysis) may be inaccurate or misleading. In Chapter 2, I addressed how I controlled for potential biases in data. Additionally, intentional falsification by research participants for political motivations (e.g., aiming to skew data that might influence a particular policy) should be considered when interpreting results (Trochim, 2001). Wolcott's advice on validity or "not getting it all wrong" (Wolcott, 1990:128) is germane here: record and write accurately, let readers see for themselves, report fully, be candid. Through both research phases I aimed to record and write as accurately as possible. Similar to a laboratory notebook that tracks experiments, I kept detailed records of how I conducted research, when I performed various research activities and why I decided on various techniques and measures—I aimed to be able to justify the appropriateness of all decisions. I wrote methods sections for each chapter and Chapter 2 on dissertation methods during research design and collection phases to be as thorough as possible. To let readers see for themselves, I have provided detailed information throughout this dissertation, including appendixes, and made data available in a public repository (http://datadryad.org/). As I have not yet analyzed all the data from this dissertation's data collection, full reporting is an on-going objective (see below for details about future research). Finally, through this section and discussion in each chapter, I have tried to be completely candid about the limitations of my research.

Lastly, there are two changes I would suggest for future research exploring concepts of identity related to wolf management. First, Native American tribes should have been included as an identity group in the social identity measure and their religion should have

been listed as a separate category in the religion measure. Given the importance of Native American perspective on wolf management and their historical disenfranchisement, overt effort should be made to capture the depth and breadth of their perspectives in wolf-related and other research. Second, the unique hyperlink sent through the Qualtrics mailer to some participants who then passed it on to others resulted in those subsequent respondents being told they had already taken the survey when they first accessed the hyperlink (because the hyperlink was used by the first participant). The Qualtrics option to block duplicate IP addresses should be sufficient to protect from recording duplicate responses, which can also be identified by the researcher; thus the unique hyperlink is unnecessary when snowball sampling.

Future Research

Given the myriad ways humans can impact wildlife populations, understanding and predicting human behavior is an important knowledge gap to continue to fill. Enhanced understanding along these lines is useful not only for conserving wildlife but also for increasing human capacity to adapt to environmental change (Gore et al., 2011). Understanding the causes and consequences of human behavior related to the environment has historically been a question permeating diffuse human dimensions of wildlife research; it is likely to continue to be an important question. This research defines and describes factors underlying conservation behavior. A logical next step is to understand how such behaviors might be attenuated, amplified, or reinforced depending on conservation objectives. Exploring catalysts for behavioral change through experiments may provide a strong tool for conservation practitioners as well as researchers in the behavioral sciences. Results herein

suggest that fruitful avenues for research might seek to uncover how to leverage intrinsic value in engendering behavior change. For example, psychological research has found that priming individuals to think about science or engaging with relevant literature can increase pro-social behaviors (Kidd & Castano, 2013; Ma-Kellams & Blascovich, 2013). Adapting this work to experiments that prime individuals to think about intrinsic values for wildlife may be able to reproduce results in terms of pro-environmental behaviors or extend them to other non-wildlife related environmental contexts (e.g., energy).

Future research may consider correcting for methodological limitations stemming from this work, including adding direct measures of psychology and first-hand observations of behavior to validate and increase accuracy of prior results from self-reporting. Continued improvements on web-based surveys are expected as wider audiences gain Internet access (Rhue & Sundararajan, 2014). Use of Amazon's Mechanical Turk service to reach broader populations or target samples to specific demographics provides promising future research opportunities to gather deeper and wider understanding of human-nature relationships (Amit & Greene, 2012; Paolacci et al., 2010).

Further inquiry into the role of emotion in judgment is also needed. Experimentation with affective and emotional concepts may increase accuracy of theoretical models in psychology. Self-reporting can only measure conscious perceptions and associations between concepts; experiments can gauge less conscious but still important influence on human judgment and behavior. For example, affective risk perceptions can be directly assessed by measuring implicit associations and physiological responses to images of predators such as wolves (Johansson, Karlsson, & Flykt, unpublished data). Greater understanding of how to leverage affective influences on the relationship between conservation ethics and stewardship

behaviors may help conservationists predict public support for initiatives and encourage participation in conservation (Russell, 2009; Robyn S Wilson, 2008). This work suggests that emotional reactions such as anger, fear and sympathy play an important role in human-nature relationships; attenuating negative emotions and reinforcing positive ones may increase agreement among diverse stakeholders.

Dissertation results also indicate an opportunity for explicitly incorporating ethical dialogue into wildlife decision-making processes. Phase 1 interviews with involved stakeholders revealed that conscious recognition or overt discussion of ethical concepts was quite rare among respondents. Phase 2 inquiry revealed that conservation ethics are relevant when respondents were primed to think about such considerations. To leverage the potential of ethics to overcome disagreement, stakeholders must be able to discuss ethical perspectives when participating in dialogue and engagement. A common language and understanding of concepts such as intrinsic value and biocentrism may significantly contribute to structured debate and decision-making (such as that discussed in the Practical Contributions section above).

There are a number of objectives, questions and analyses stemming from this dissertation:

1. Take the path analysis from Phase 2 one step further with an integrated structural equation model that simultaneously tests all concepts (i.e., acceptability, affective and cognitive risk perception, emotional dispositions, intrinsic value, five moral foundations, stewardship) and their relationships with each other. This model may provide a more comprehensive view of the strengths of each behavioral influence.

2. Further understanding the ethic-behavior relationship may also help conservationists target communication and other interventions more effectively. Thus another research question is how ethics may be leveraged to change behavior through communication interventions. To do so, one can build off self-reporting data from this dissertation to design experiments that measures affective risk perception and how cognitive and affective priming might result in pro-environmental behavior change.
3. Adapt the concept of stewardship to other contexts and broader human-nature relationships. The stewardship measure used in my dissertation details specific activities related to wolf management in Michigan. Synthesizing certain behaviors into common categories and adding other activities may help make the stewardship concept more applicable to other case studies as well as environmental change research.

APPENDICES

APPENDIX A

IRB Approval and consent forms

MICHIGAN STATE UNIVERSITY

Initial IRB Application Determination *Exempt*

February 20, 2012

To: Meredith Gore
13 Natural Resources Bldg
Department of Fisheries and Wildlife
Michigan State University

Re: **IRB# x11-1144e** Category: Exempt 1.2
Approval Date: February 20, 2012

Title: Improving the effectiveness of wolf management approaches in Michigan

The Institutional Review Board has completed their review of your project. I am pleased to advise you that **your project has been deemed as exempt** in accordance with federal regulations.

The IRB has found that your research project meets the criteria for exempt status and the criteria for the protection of human subjects in exempt research. **Under our exempt policy the Principal Investigator assumes the responsibilities for the protection of human subjects** in this project as outlined in the assurance letter and exempt educational material. The IRB office has received your signed assurance for exempt research. A copy of this signed agreement is appended for your information and records.

Renewals: Exempt protocols do not need to be renewed. If the project is completed, please submit an ***Application for Permanent Closure***.

Revisions: Exempt protocols do not require revisions. However, if changes are made to a protocol that may no longer meet the exempt criteria, a new initial application will be required.

Problems: If issues should arise during the conduct of the research, such as unanticipated problems, adverse events, or any problem that may increase the risk to the human subjects and change the category of review, notify the IRB office promptly. Any complaints from participants regarding the risk and benefits of the project must be reported to the IRB.

Follow-up: If your exempt project is not completed and closed after three years, the IRB office will contact you regarding the status of the project and to verify that no changes have occurred that may affect exempt status.

Please use the IRB number listed above on any forms submitted which relate to this project, or on any correspondence with the IRB office.

Good luck in your research. If we can be of further assistance, please contact us at 517-355-2180 or via email at IRB@msu.edu. Thank you for your cooperation.

Sincerely,

Harry McGee, MPH
SIRB Chair

c: Michelle Lute

Office of Regulatory Affairs
Human Research Protection Programs

Biomedical & Health Institutional Review Board (BIRB)

Community Research Institutional Review Board (CRIRB)

Social Science Behavioral/Education Institutional Review Board (SIRB)

207 Olds Hall
East Lansing, MI 48824
(517) 355-2180
Fax: (517) 432-4503
Email: irb@msu.edu
www.humanresearch.msu.edu

Consent form for Phase 1

Research Participant Information and Consent Form

EXPLANATION OF THE RESEARCH:
You are being asked to participate in a research study about perceptions related to wolves and wolf management. Researchers are required to provide a consent form to inform you about the study, explain that participation is voluntary, describe the risks and benefits of participation, and empower you to make an informed decision regarding your involvement. You should feel free to ask the researchers any questions you may have.
The purpose of this research is to explore people's views on wolf management and to determine key variables that influence human understanding of and concerns about various management strategies.
You must be at least 18 years old to participate in this research.

WHAT YOU WILL DO:
The study coordinator (Lute) will ask you a series of open-ended questions. Your responses should be based upon your own thoughts and experiences, but you may ask the interviewer for further clarification or may choose to not answer specific questions. This interview should take no longer than one hour. For those that consent, these discussions will be recorded. If you wish, you will be provided with an executive summary of the research findings upon completion of the study.

POTENTIAL RISKS AND BENEFITS:
There are no foreseeable risks associated with this study. You will not directly benefit from your participation in this study. However, your participation may contribute to a better understanding of how natural resource professionals can more effectively involve the public in wildlife management decisions.

PRIVACY AND CONFIDENTIALITY:
Information about you will be kept confidential to the maximum extent allowable by law. Your name will not be linked to your responses in any way that a third party could reveal or connect your responses to your name. Identifying information will be kept in a single document that is only accessible to the study coordinator (Lute). Unless required by law, only the study coordinator, members of the investigator's staff, and the Michigan State University Institutional Review Board will have authority to review study records. They are required to maintain confidentiality regarding your identity. Data for this study will be stored for 3 years after the date of collection.
Results of this study may be used for teaching, research, publications, and/or presentations at scientific meetings.
I agree to allow audio-taping of the interview. Initials _____

YOUR RIGHTS TO PARTICIPATE, SAY NO, OR WITHDRAW:
Participation in this research project is completely voluntary. You have the right to say no. You may change your mind at any time and withdraw. You may choose not to answer specific questions or to stop participating at any time.

CONTACT INFORMATION FOR QUESTIONS AND CONCERNS:

If you have concerns or questions about this study, such as scientific issues or to report an injury, please contact the researcher (Michelle Lute: 13 Natural Resources, East Lansing, MI 48824, lutemich@msu.edu, 517-432-4943).

If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail irb@msu.edu or regular mail at 207 Olds Hall, MSU, East Lansing, MI 48824.

DOCUMENTATION OF INFORMED CONSENT:

Your signature below means that you voluntarily agree to participate in this research study.

_____ _____

Signature Date

_____

Subject's Name (printed)

APPENDIX B

Interview Guide

Hello, my name is Michelle Lute; I am a graduate student at Michigan State University studying wolf management in Michigan. My research is supported by Michigan State University's College of Agriculture and Natural Sciences and the Department of Natural Resources. I was wondering if you would be willing to take about 45 minutes of your time and chat with me about wolf management. READ consent form and get signature.

1. In what town do you currently live? How long have you lived there?
    a. Did you grow up there? If not, what town/state did you grow up in?

2. What role or group related to wolf management in Michigan do you identify with? For example, I strongly identify as a graduate student and I feel it is something that defines who I am and how others perceive me.
    a. If so, what is the role or group? Why is this role or group important to you?
    b. How strongly do you identify with this group: Strongly, moderate or weakly identify?
    c. Are there other roles or groups that you are aware of but do not identify with? If so, what are they and why are they important?
3. Who are the groups that do not see eye to eye with your group?
    a. Who is in greatest disagreement? Why do you believe they disagree with your role or group?

4. Who currently makes decisions about wolf management?
    a. What and who do you think they consider when making decisions? Do they consider UP residents? Michigan residents? Biological science? Politics? Why do you think these factors are considered?
    b. Can you describe your thoughts about each decision-makers' ability to make decisions? Why?
    c. Who do you think should make decisions about wolf management? Why?
    d. Should state legislators be involved? Congress? The public? DNR? Biological scientists? Social scientists? Why or why not?

5. Can you describe how decisions about wolf management should be made?
    a. How important is it for the process to be fair? Efficient? Fast? In line with your group? In line with decision-makers' recommendations? In line with scientists' recommendations? Take care of people? Take care of wolves?
        i. Why or why not?

6. Have you ever engaged in activities related to wolves and wolf management? For example, volunteer with a non-profit organization or government agency, write legislators, restore habitat, anything you think is related to wolf management.
    a. If so, who were these actions intended to benefit? Individual wolves? Wolf populations? Wolf habitat? Why or why not?
    b. If you own livestock, do you take measures to prevent depredation? If yes, what are these actions and why do you engage in them? Are there measures you know of that you do not engage in? Why not?
    c. Do you feel obligated to take these actions? Why or why not?

7. Do you feel others have an obligation to take actions related to wolves or wolf management?
    a. If so, what actions? Why?
    b. Should livestock owners take measures to prevent depredation? Why or why not?
    c. Do you know of any other actions, positive or negative, taken by other people that affect wolves or wolf management?

8. Do you feel comfortable using your expertise to advocate for a particular management strategy (e.g., lethal vs non-lethal)?
    a. If so, what strategy and why?

9. I'd like to ask you about nonlethal control of wolves in Michigan. In Michigan, nonlethal control includes a diversity of management strategies, such as compensation schemes, aversive conditioning, donkey or guard dog use. To what extent do you approve of nonlethal control?
    a. Why or why not?

10. Currently, to what extent do do members of your group approve of nonlethal control? Why or why not?
    a. (If applicable) To what extent do members of the group that disagrees with yours approve of nonlethal control? Why or why not?

11. Now I'd like to ask you about lethal control of wolves in Michigan. Lethal control includes a diversity of management strategies, including problem animal removal. To what extent do you approve of lethal control?
    a. Why or why not?
    b. Currently, Michigan is the only state that has not introduced a recreational hunting or trapping season for wolves. To what extent do you approve of recreational hunting or trapping?

12. Currently, to what extent do members of your group approve of lethal control? Why or why not?
    a. (If applicable) To what extent do members of the group that disagrees with yours approve of lethal control? Why or why not?

13. What does the term stewardship mean to you?
    a. Do you consider any of the above actions stewardship? Why or why not?
    b. Do you think humans should manage nature or take a more hands-off approach?
    c. Sometimes when managing a species, people sacrifice individual animals for an overall goal. Is this acceptable? Does your acceptance depend on the management goal?

14. Is there anything particularly relevant to the topics we've discussed that you believe I have missed?
15. Can you recommend anyone else who might be willing to talk to me about wolf management?
16. Thank you so much for your time. Here is my business card if you would like to contact me in the future. You're welcome to any of these information materials.

APPENDIX C

Web-Based Survey

Figure 8.1. Survey implemented October-November 2013.

DEPARTMENT OF
Psychology

MICHIGAN STATE
UNIVERSITY

Dear Michigan Wolf Stakeholder:

We invite you to participate in a study conducted by Michigan State University (MSU) to learn about Michigan residents' attitudes and activities related to wolves and wolf management. You were chosen to participate in the study because you are a member of a stakeholder group currently participating in wolf management in Michigan. Information from this study will help the Michigan Department of Natural Resources and its partners improve management related to wolves as well as communication with stakeholders.

If you would like to participate in this study, please complete the following questionnaire as soon as possible. This survey should take about 20 minutes or less.
Your participation in this survey is completely voluntary and you may skip a question or withdraw at any time without penalty. Your responses are important to us and we would like to hear from everyone who receives this survey. Your answers will be kept confidential. Your name and address will never be associated with your responses in any way and your privacy will be protected to the maximum extent allowable by law. Your completion of the questionnaire means that you voluntarily agree with consent to participate in this research. You must be at least 18 years of age to participate.

MSU's Human Research Protection Program (HRPP) approved this study as exempt (IRB# x11-1144e) on February 20, 2012. You may contact HRPP at 517.355.2180, irb@msu.edu, or 207 Olds Hall, MSU, East Lansing, MI 48824 with any questions about your role as a research participant. If you have any questions about this study, please contact Dr. Meredith L. Gore at gorem@msu.edu and 517.432.8203.

Thank you for your assistance with this study.

Sincerely,

Meredith L. Gore
Assistant Professor

Michelle L. Lute
PhD Candidate

DEPARTMENT OF
FISHERIES AND
WILDLIFE

Michigan State University
13 Natural Resources
Building
East Lansing, MI
48824-1222
517/355-4478
FAX: 517/432-1699

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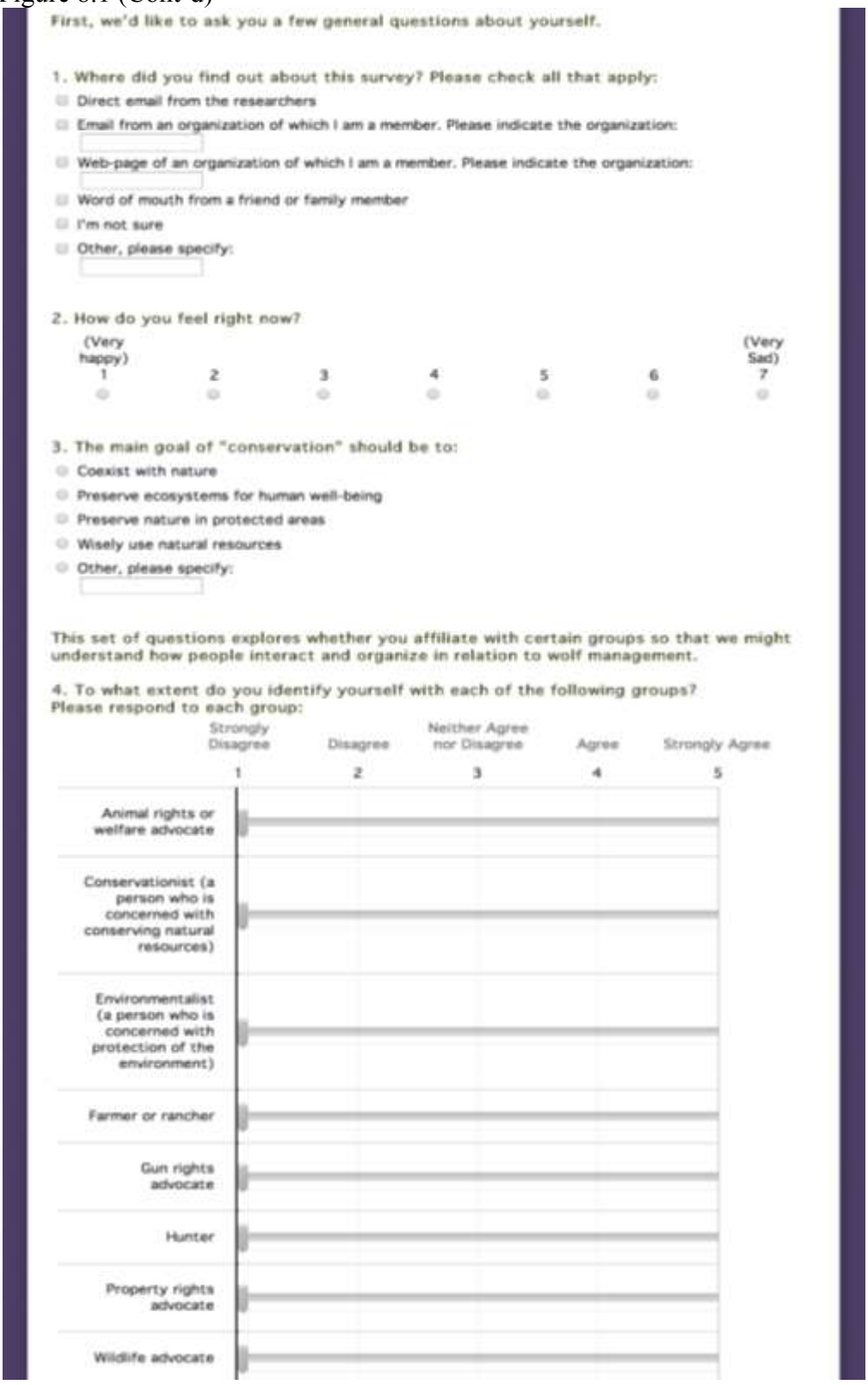
Figure 8.1 (Cont'd)



First, we'd like to ask you a few general questions about yourself.

1. Where did you find out about this survey? Please check all that apply:

- Direct email from the researchers
- Email from an organization of which I am a member. Please indicate the organization:
- Web-page of an organization of which I am a member. Please indicate the organization:
- Word of mouth from a friend or family member
- I'm not sure
- Other, please specify:

2. How do you feel right now?

(Very happy) 1	2	3	4	5	6	(Very Sad) 7
○	○	○	○	○	○	○

3. The main goal of "conservation" should be to:

- Coexist with nature
- Preserve ecosystems for human well-being
- Preserve nature in protected areas
- Wisely use natural resources
- Other, please specify:

This set of questions explores whether you affiliate with certain groups so that we might understand how people interact and organize in relation to wolf management.

4. To what extent do you identify yourself with each of the following groups? Please respond to each group:

	Strongly Disagree 1	Disagree 2	Neither Agree nor Disagree 3	Agree 4	Strongly Agree 5
Animal rights or welfare advocate					
Conservationist (a person who is concerned with conserving natural resources)					
Environmentalist (a person who is concerned with protection of the environment)					
Farmer or rancher					
Gun rights advocate					
Hunter					
Property rights advocate					
Wildlife advocate					

Figure 8.1 (Cont'd)

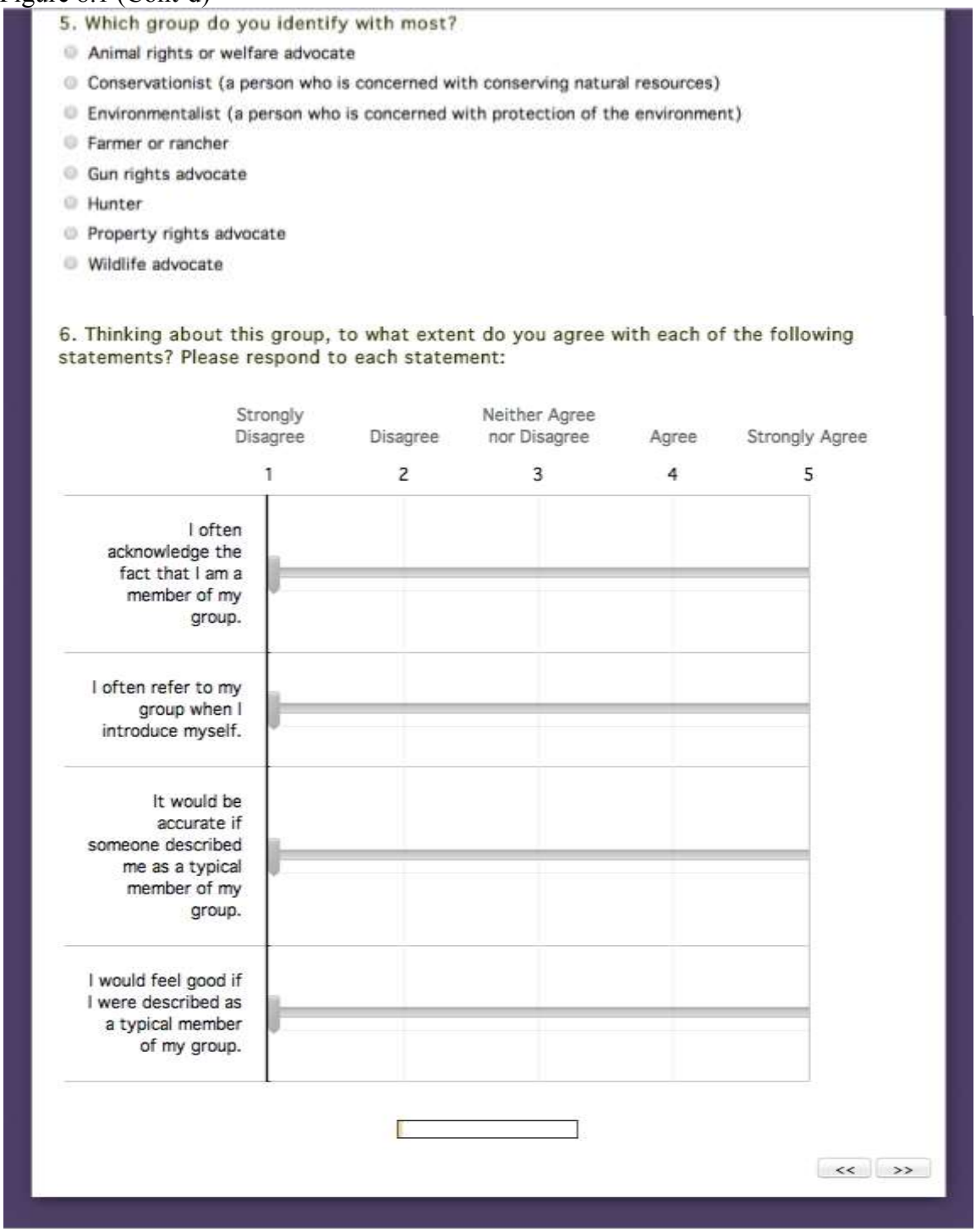
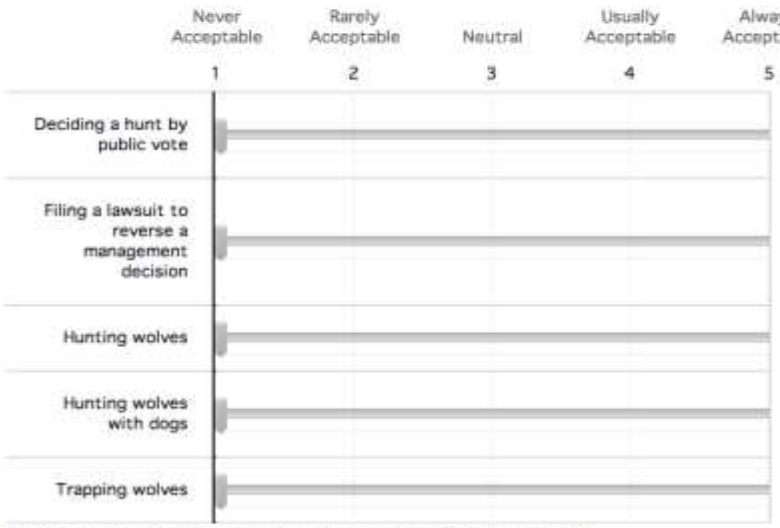


Figure 8.1 (Cont'd)

Now we'd like to ask you about which wolf management actions you support or oppose and the reasons behind your actions.

7. To what extent are each of the following activities acceptable to you? Please indicate acceptance with each activity:



8. Hunting wolves is acceptable (Please check all that apply):

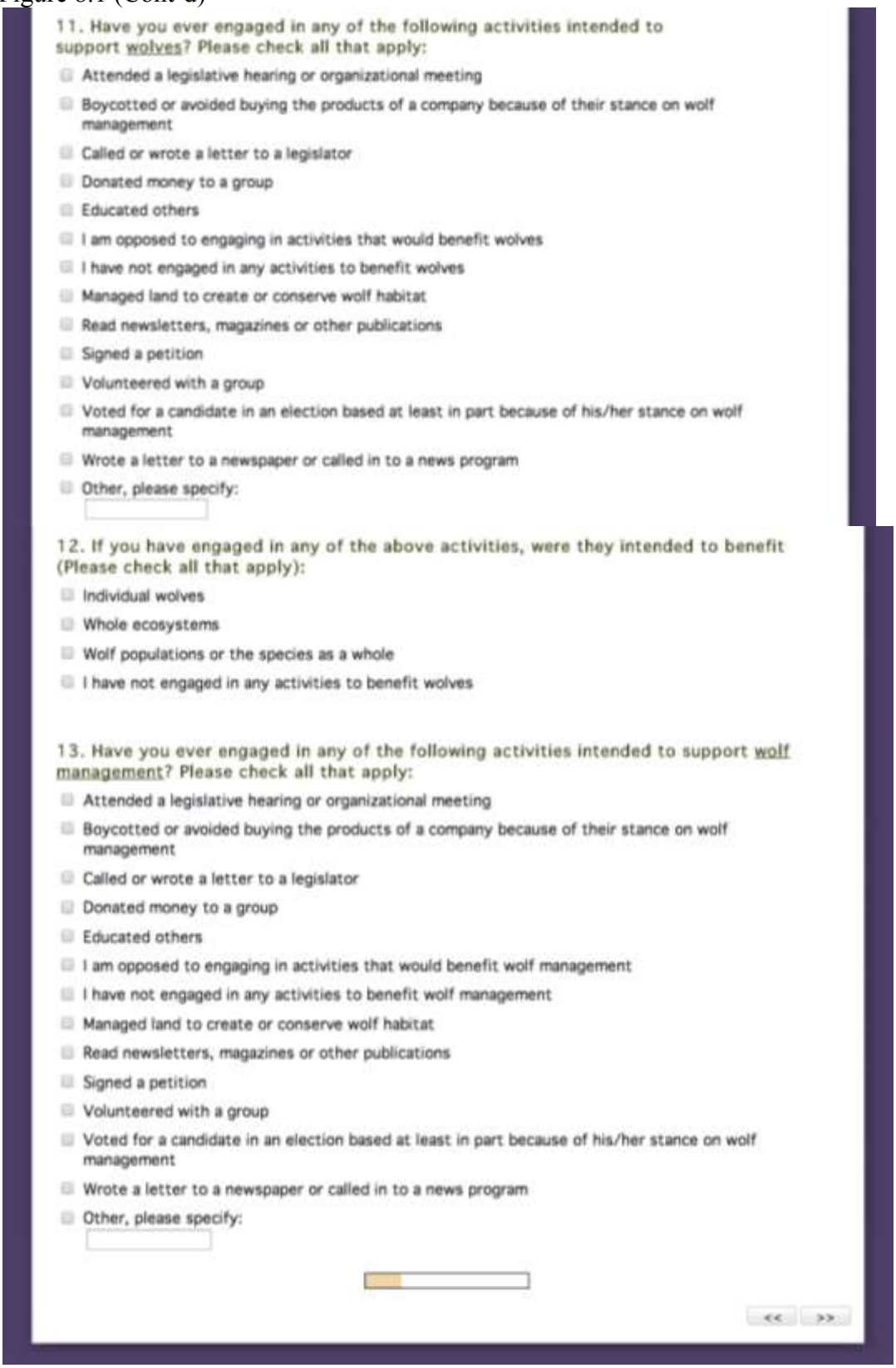
- Because hunting is a tool to reduce conflict
- Because it ensures human safety
- Because it will increase people's acceptance of wolves
- Because it will increase wolves' fear of humans
- Because people want to hunt wolves
- Because wolf populations can sustain a hunt
- Never
- To maximize economic benefits (e.g., livestock production, revenue from pelts)
- To obtain a wolf as a trophy
- To obtain pelts as a livelihood
- To participate in natural processes (e.g., as a predator in an ecosystem)
- To protect pets or livestock from immediate threats
- To protect wolves' prey base
- When nonlethal methods have not worked
- Other, please specify:

9. Trapping wolves is acceptable (Please check all that apply):

- Because it ensures human safety
- Because it will increase people's acceptance of wolves
- Because it will increase wolves' fear of humans
- Because people want to trap wolves
- Because wolf populations can sustain trapping
- Because trapping is a tool to reduce conflict
- Never
- To maximize economic benefits (e.g., livestock production, revenue from pelts)
- To obtain a wolf as a trophy
- To obtain pelts as a livelihood
- To participate in natural processes (e.g., as a predator in an ecosystem)
- To protect pets or livestock from immediate threats
- To protect wolves' prey base
- When nonlethal methods have not worked
- Other, please specify:

Figure 8.1 (Cont'd)

Figure 8.1 (Cont'd)



11. Have you ever engaged in any of the following activities intended to support wolves? Please check all that apply:

- Attended a legislative hearing or organizational meeting
- Boycotted or avoided buying the products of a company because of their stance on wolf management
- Called or wrote a letter to a legislator
- Donated money to a group
- Educated others
- I am opposed to engaging in activities that would benefit wolves
- I have not engaged in any activities to benefit wolves
- Managed land to create or conserve wolf habitat
- Read newsletters, magazines or other publications
- Signed a petition
- Volunteered with a group
- Voted for a candidate in an election based at least in part because of his/her stance on wolf management
- Wrote a letter to a newspaper or called in to a news program
- Other, please specify:

12. If you have engaged in any of the above activities, were they intended to benefit (Please check all that apply):

- Individual wolves
- Whole ecosystems
- Wolf populations or the species as a whole
- I have not engaged in any activities to benefit wolves

13. Have you ever engaged in any of the following activities intended to support wolf management? Please check all that apply:

- Attended a legislative hearing or organizational meeting
- Boycotted or avoided buying the products of a company because of their stance on wolf management
- Called or wrote a letter to a legislator
- Donated money to a group
- Educated others
- I am opposed to engaging in activities that would benefit wolf management
- I have not engaged in any activities to benefit wolf management
- Managed land to create or conserve wolf habitat
- Read newsletters, magazines or other publications
- Signed a petition
- Volunteered with a group
- Voted for a candidate in an election based at least in part because of his/her stance on wolf management
- Wrote a letter to a newspaper or called in to a news program
- Other, please specify:

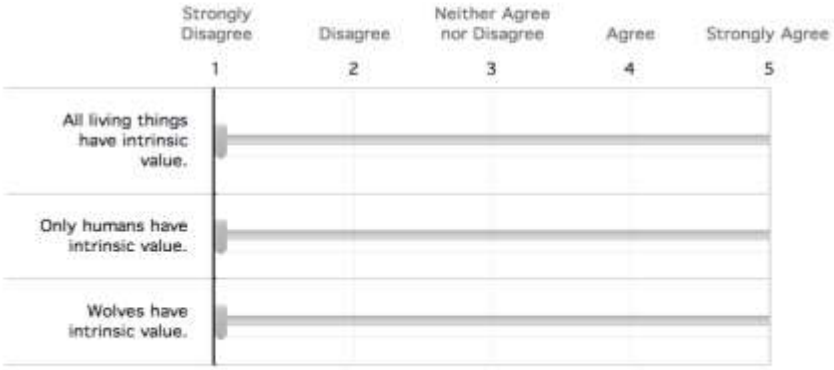
<< >>

Figure 8.1 (Cont'd)

14. To your knowledge, about how many wolves currently exist in the state of Michigan? Please answer in whole numbers only:

The following two questions are about intrinsic value, or the value of someone or something above and beyond its use to people.

15. To what extent do you agree with each of the following statements? Please respond to each statement:



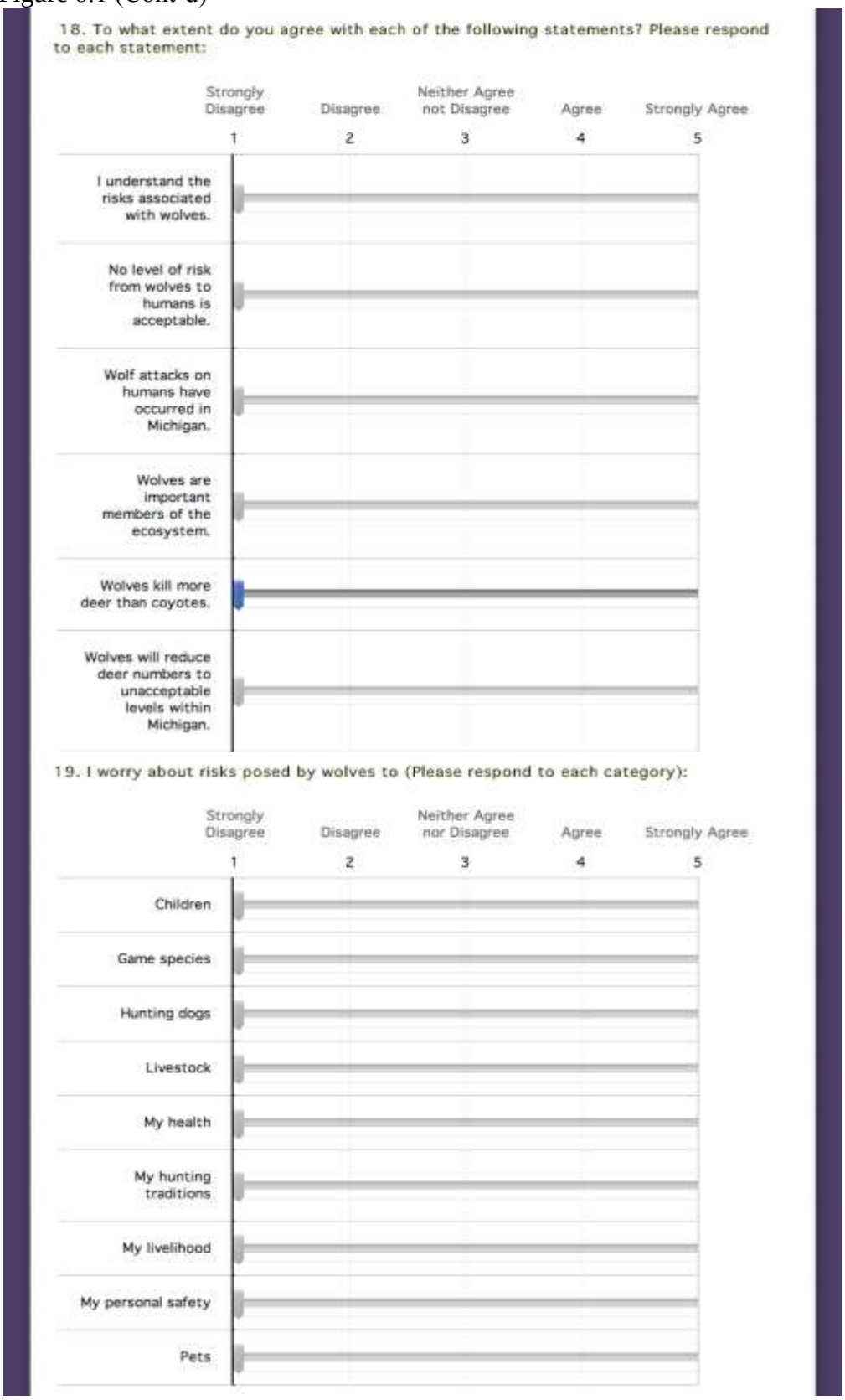
16. I value wolves because (Please check all that apply):

- All life has intrinsic value.
- I do not value wolves.
- They are part of an interconnected ecosystem.
- They are sentient and conscious.
- They have human-like qualities.
- Other, please specify:

In the next four questions, we'd like to ask about your thoughts and feelings regarding interactions with wolves.

17. If someone told me that a wolf was near, I would feel (Please respond to each emotion):

Figure 8.1 (Cont'd)



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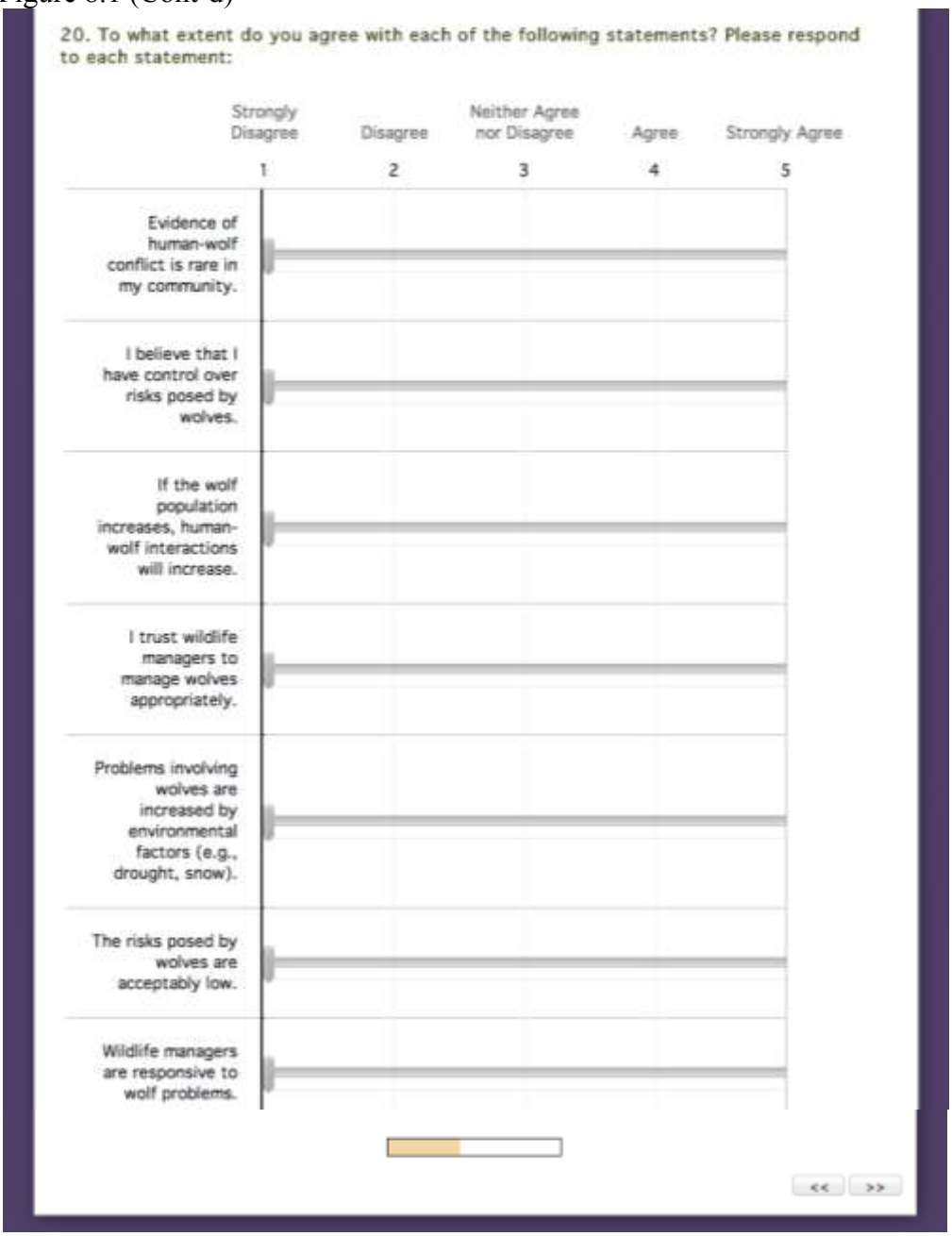

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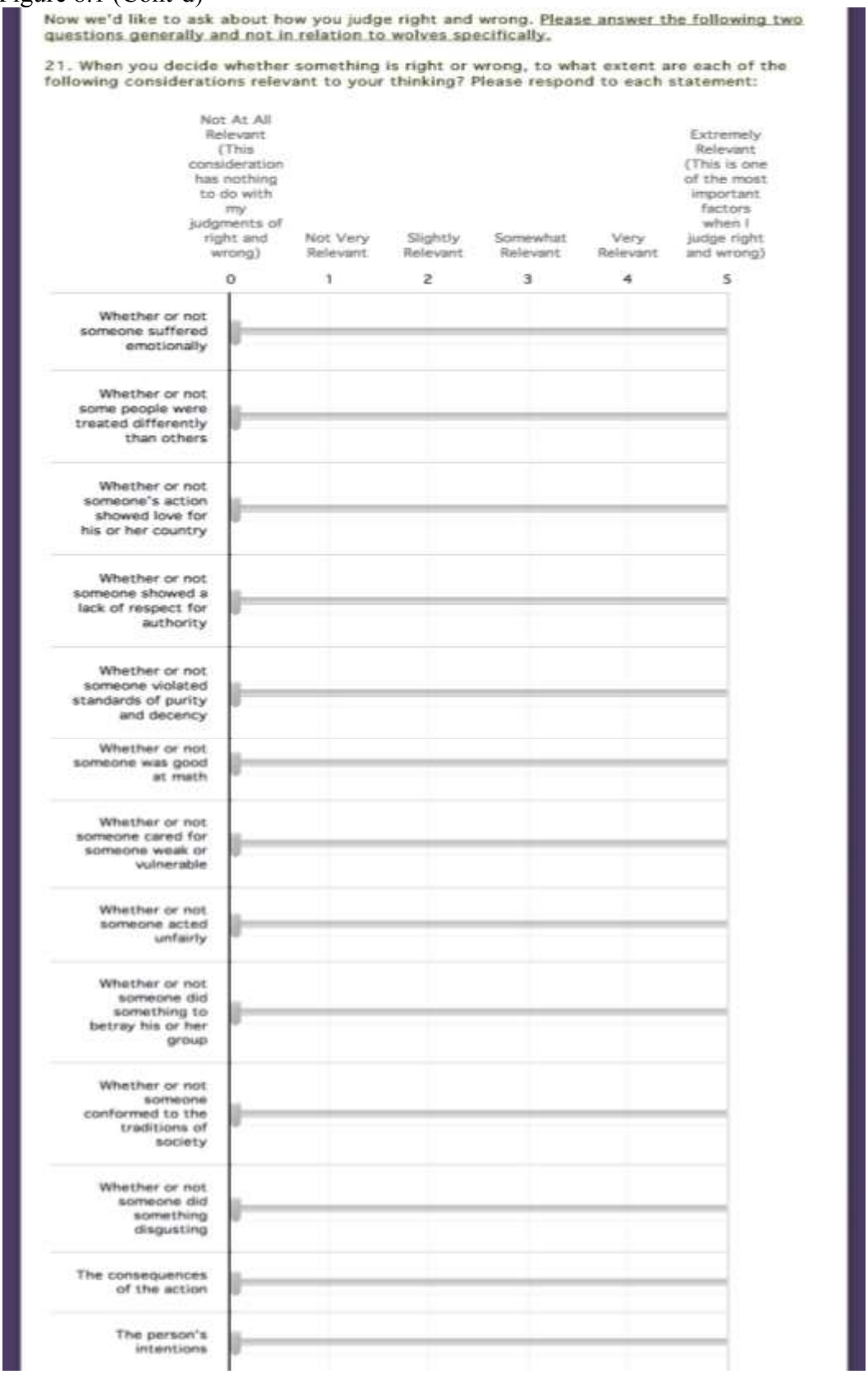

Figure 8.1 (Cont'd)

Figure 8.1 (Cont'd)

Please tell us a little bit more about yourself. All responses will be kept confidential.

23. Please indicate the year you were born:

24. What is your gender?

Male | Other | Female

25. My ethnicity is predominantly:

- American Indian/Native American
- Asian or Asian American, including Chinese and Japanese
- Black or African American
- Decline to state
- Hispanic or Latino, including Mexican American and Central American
- Middle Eastern / Arabic
- Pacific Islander
- White, Caucasian, Anglo, European American; not Hispanic
- Other, please specify:

26. Please indicate your religion:

- Atheist / Agnostic/ Not religious
- Buddhist
- Christian / Catholic
- Christian / Nondenominational
- Christian / Protestant
- Decline to state
- Hindu
- Jewish
- Muslim
- Other, please specify:

27. What is your annual household income?

- Less than $10,000 a year
- $10,001 - $20,000 a year
- $20,001 - $30,000 a year
- $30,001 - $40,000 a year
- $40,001 - $55,000 a year
- $55,001 - $70,000 a year
- $70,001 - $100,000 a year
- $100,001 a year and over
- Decline to state

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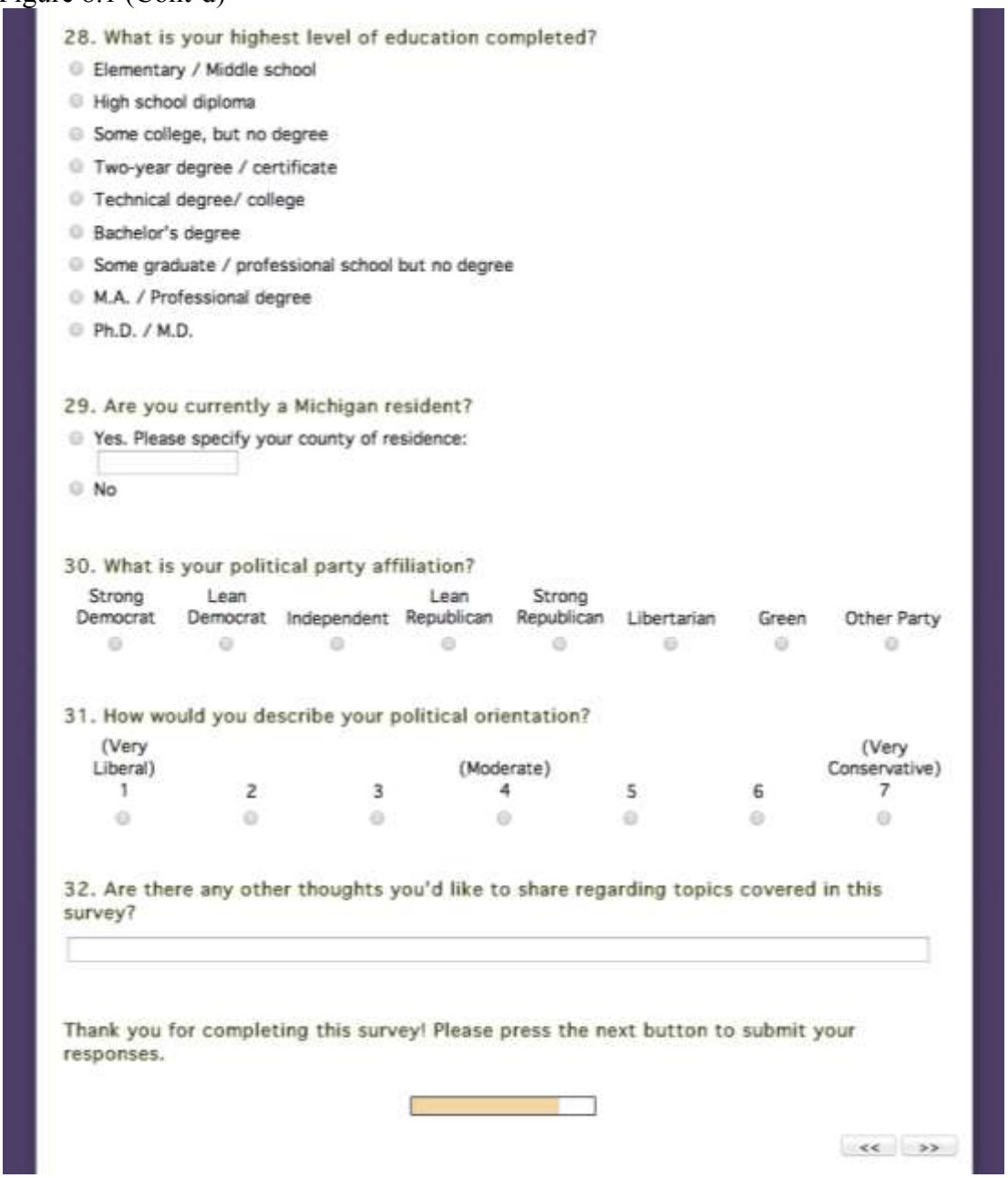
Figure 8.1 (Cont'd)



28. What is your highest level of education completed?

- Elementary / Middle school
- High school diploma
- Some college, but no degree
- Two-year degree / certificate
- Technical degree/ college
- Bachelor's degree
- Some graduate / professional school but no degree
- M.A. / Professional degree
- Ph.D. / M.D.

29. Are you currently a Michigan resident?

- Yes. Please specify your county of residence:
- No

30. What is your political party affiliation?

Strong Democrat	Lean Democrat	Independent	Lean Republican	Strong Republican	Libertarian	Green	Other Party

31. How would you describe your political orientation?

(Very Liberal)						(Very Conservative)
1	2	3	(Moderate) 4	5	6	7

32. Are there any other thoughts you'd like to share regarding topics covered in this survey?

Thank you for completing this survey! Please press the next button to submit your responses.

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APPENDIX D

Moral Foundations Questionnaire: 20-Item Short Version
Item Key, July 2008

--Below are the items that compose the MFQ20. Variable names are IN CAPS
--Besides the 20 test items there are 2 "catch" items, MATH and GOOD
--For more information about the theory, or to print out a version of this scale formatted for participants, or to learn about scoring this scale, please see: www.moralfoundations.org
---

PART 1 ITEMS (responded to using the following response options: not at all relevant to judgments of right and wrong, not very relevant, slightly relevant, somewhat relevant, very relevant, extremely relevant)

MATH - Whether or not someone was good at math [This item is not scored; it is included both to force people to use the bottom end of the scale, and to catch and cut participants who respond with 3 or above]

Harm:
EMOTIONALLY - Whether or not someone suffered emotionally
WEAK - Whether or not someone cared for someone weak or vulnerable
Fairness:
TREATED - Whether or not some people were treated differently than others
UNFAIRLY - Whether or not someone acted unfairly
Ingroup:
LOVECOUNTRY - Whether or not someone's action showed love for his or her country
BETRAY - Whether or not someone did something to betray his or her group
Authority:
RESPECT - Whether or not someone showed a lack of respect for authority
TRADITIONS - Whether or not someone conformed to the traditions of society
Purity:
DECENCY - Whether or not someone violated standards of purity and decency
DISGUSTING - Whether or not someone did something disgusting

PART 2 ITEMS (responded to using the following response options: strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, strongly agree)

GOOD – It is better to do good than to do bad. [Not scored, included to force use of top of the scale, and to catch and cut people who respond with first 3 response options]

Harm:
COMPASSION - Compassion for those who are suffering is the most crucial virtue.
ANIMAL - One of the worst things a person could do is hurt a defenseless animal.
Fairness:

FAIRLY - When the government makes laws, the number one principle should be ensuring that everyone is treated fairly.

JUSTICE – Justice is the most important requirement for a society.

Ingroup:

HISTORY - I am proud of my country's history.

FAMILY - People should be loyal to their family members, even when they have done something wrong.

Authority:

KIDRESPECT - Respect for authority is something all children need to learn.

SEXROLES - Men and women each have different roles to play in society.

Purity:

HARMLESSDG - People should not do things that are disgusting, even if no one is harmed.

UNNATURAL - I would call some acts wrong on the grounds that they are unnatural.

LITERATURE CITED

LITERATURE CITED

2013 Michigan Wolf Digest. (2013) (pp. 1–20). Lansing, Michigan.

Abrams, D., Wetherell, M., Cochrane, S., Hogg, M. A., & Turner, J. C. (1990). Knowing what to think by knowing who you are: self-categorization and the nature of norm formation, conformity and group polarization. *The British Journal of Social Psychology*, *29*(2), 97–119. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/2372667

Amit, E., & Greene, J. D. (2012). You see, the ends don't justify the means: visual imagery and moral judgment. *Psychological Science*, *23*(8), 861–8. doi:10.1177/0956797611434965

Babbie, E. (1998). *The Practice of Social Research* (8th ed.). Belmont, CA: Wadsworth Publishing Company.

Baron, R., & Kenny, D. (1986). The moderator-mediator distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality & Social Psychology*, *51*(6), 1173–1182. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/3806354

Baron, R., & Kenny, D. (1986). The moderator-mediator distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality & Social Psychology*, *51*(6), 1173–1182.

Beck, T. D. I. (2008). Citizen ballot initiatives : A failure of the wildlife management profession. *Human Dimensions of Wildlife Management*, *3*(2), 21–28.

Becker, R. (2006). Selective Response to Questions on Delinquency*. *Quality & Quantity*, *40*(4), 483–498. doi:10.1007/s11135-005-8832-6

Bell, J., Huber, J., & Viscusi, W. K. (2011). Survey mode effects on valuation of environmental goods. *International Journal of Environmental Research and Public Health*, *8*(4), 1222–43. doi:10.3390/ijerph8041222

Benson, D. W. (1998). Enfranchise landowners for land and wildlife stewardship: examples from the Western United States. *Human Dimensions of Wildlife*, *3*(1), 59–68.

Berghoefer, U., Rozzi, R., & Jax, K. (2010). Many Eyes on Nature : Diverse Perspectives in the Cape Horn Biosphere Reserve and Their Relevance for Conservation. *Ecology and Society*, *15*(1), 18.

Berkes, F. (2004). Rethinking Community-Based Conservation. *Conservation Biology*, *18*(3), 621–630. doi:10.1111/j.1523-1739.2004.00077.x

Berkes, F. (2009). Evolution of co-management: role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management*, *90*(5), 1692–702. doi:10.1016/j.jenvman.2008.12.001

Beyer, D., Hogrefe, T., Peyton, R. B., Bull, P., Burroughs, J. P., & Lederle, P. (2006). *Review of social and biological science relevant to wolf management in Michigan.* (No. Report No. 3457). *Michigan Department of Natural Resources*. Lansing, Michigan.

Brewer, P. R., & Ley, B. L. (2013). Whose Science Do You Believe? Explaining Trust in Sources of Scientific Information About the Environment. *Science Communication*, *35*(1), 115–137. doi:10.1177/1075547012441691

Brown, K. (2002). Innovations for conservation and development. *The Geographical Journal*, *168*(1), 6–17. doi:10.1111/1475-4959.00034

Brown, R. (2000). Agenda 2000 Social Identity Theory: past achievements, current problems and future challenges. *European Journal of Social Psychology*, *30*, 634–667.

Browne-Nunez, C. (2002). Americans' attitudes toward wolves and wolf reintroduction: An annotated bibliography. *USGS*.

Bruskotter, J. T. (2013). The predator pendulum revisited: Social conflict over wolves and their management in the western United States. *Wildlife Society Bulletin*, doi: 10.1002/wsb.293. doi:10.1002/wsb.293

Bruskotter, J. T., Enzler, S. A., & Treves, A. (2011). Rescuing Wolves from Politics: Wildlife as a Public Trust Resource. *Science*, *333*(17), 1828–29.

Bruskotter, J. T., & Fulton, D. C. (2011). Will hunters steward wolves? A Reply to Treves and Martin. *Society & Natural Resources*, *25*(1), 97–102.

Bruskotter, J. T., Schmidt, R. H., & Teel, T. L. (2007). Are attitudes toward wolves changing? A case study in Utah. *Biological Conservation*, *139*(1-2), 211–218. Retrieved from http://www.sciencedirect.com/science/article/B6V5X-4PCH4D5-1/2/f4f7a603649a0f7cbeedd70fd7203762

Bruskotter, J. T., Vaske, J. J., & Schmidt, R. H. (2009). Social and Cognitive Correlates of Utah Residents' Acceptance of the Lethal Control of Wolves. *Human Dimensions of Wildlife*, *14*(2), 119–132. doi:10.1080/10871200802712571

Butler, J. R. A. (2011). The challenge of knowledge integration in the adaptive co-management of conflicting ecosystem services provided by seals and salmon. *Animal Conservation*, *14*(6), 599–601. doi:10.1111/j.1469-1795.2011.00509.x

Callicott, B. (1979). Elements of an Environmental Ethic : Moral Considerability and the Biotic Community. *Environmental Ethics*, *1*(1), 71–81.

Callicott, J. B. (1990). Whither Conservation Ethics? *Conservation Biology*, *4*(1), 15–20. Retrieved from http://www.jstor.org/stable/2385958

Callicott, J. B. (1992). The Searth for an Environmental Ethic. In T. Regan (Ed.), *Matters of Life and Death* (3rd ed., pp. 322–382). New York: McGraw-Hill.

Callicott, J. B., Crowder, L. B., & Mumford, K. (1999). Current Normative Concepts in Conservation. *Conservation Biology*, *13*(1), 22–35. Retrieved from http://www.jstor.org/stable/2641561

Callicott, J. B., & Nelson, M. P. (2004). *American Indian Environmental Ethics: An Ojibwa case study* (p. 163). New Jersey: Pearson Prentice Hall.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*(2), 81–105.

Carbyn, L. N., & Trottier, T. (1988). Descriptions of Wolf Attacks on Bison Calves in Wood Buffalo National Park, *41*(4), 297–302.

Carter, N. H., Shrestha, B. K., Karki, J. B., Man, N., Pradhan, B., & Liu, J. (2012). Coexistence between wildlife and humans at fine spatial scales. *Proceedings of the National Academy of Sciences of the United States of America*, *109*(8), 15360–15365. doi:10.1073/pnas.1210490109/-/DCSupplemental.www.pnas.org/cgi/doi/10.1073/pnas.1210490109

Cervantes, O., & Espejel, I. (2008). Design of an integrated evaluation index for recreational beaches. *Ocean & Coastal Management*, *51*(5), 410–419. doi:10.1016/j.ocecoaman.2008.01.007

Cohen, N., & Arieli, T. (2011). Field research in conflict environments: Methodological challenges and snowball sampling. *Journal of Peace Research*, *48*(4), 423–435. doi:10.1177/0022343311405698

Conniff, R. (2014, January 20). A Trophy Hunt That's Good for Rhinos. *New York Times*.

Creswell, J. W. (2009). *Research design: qualitative, quantitative, and mixed method approaches*. Los Angeles, USA: Sage Publications.

Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(3), 297–334.

Decker, D. J., & Chase, L. C. (1997). Human Dimensions of Living with Wildlife: A Management Challenge for the 21st Century. *Wildlife Society Bulletin*, *25*(4), 788–795. Retrieved from http://www.jstor.org/stable/3783724

Decker, D. J., Riley, S. J., Organ, J. F., Siemer, W. F., & Carpenter, L. H. (2011). *Applying Impact Management: A Practitioner's Guide* (p. 119). Ithaca, New York.

Decker, D. J., Shanks, R. E., Nielsen, L. A., & Parsons, G. R. (1991). Ethical and Scientific Judgements in Management: Beware of Blurred Distinctions. *Wildlife Society Bulletin*, *19*(4), 523–527.

Denzin, N. K. (1978). *The Research Act: A Theoretical Introduction to Sociological Methods*. New York: McGraw-Hill.

Denzin, N., & Lincoln, Y. (2000). *Handbook of qualitative research*. Thousand Oaks, CA: Sage Publications.

Dickman, A. J. (2010). Complexities of conflict: The importance of considering social factors for effectively resolving human-wildlife conflict. *Animal Conservation*, *13*(5), 458–466. doi:10.1111/j.1469-1795.2010.00368.x

Dillman, D., Smyth, J., & Christian, L. (2009). *Internet, mail, and mixed-mode surveys: the tailored design method* (3rd ed.). Hoboken: Wiley.

Dixon, D. O., Siemer, W. E., & Knuth, B. A. (1995). *Stewardship of the Great Lakes environment: A review of literature*. Ithaca, New York.

Dohmen, T., Falk, A., & Huffman, D. (2011). Individual Risk Attitudes: Measurement, Determinants and Behavioral Consequences. *Journal of the European Economic Association*, *9*(3), 522–550.

Dryzek, J. S. (2012). *The Politics of the Earth: Environmental Discourses* (p. 288). Oxford, England: Oxford University Press.

Duda, M. D., & Nobile, J. L. (2010). The Fallacy of Online Surveys: No Data Are Better Than Bad Data. *Human Dimensions of Wildlife*, *15*(1), 55–64. doi:10.1080/10871200903244250

Earle, T. C., & Siegrist, M. (2008). On the relation between trust and fairness in environmental risk management. *Risk Analysis*, *28*(5), 1395–414. doi:10.1111/j.1539-6924.2008.01091.x

Eggleston, J. E., Rixecker, S., & Hickling, G. (2003). The role of ethics in the management of New Zealand ' s wild mammals. *New Zealand Journal of Zoology*, *30*, 361–376.

Emerson, R. (2001). *Contemporary field research: Perspectives and formulations*. Prospect Heights, IL: Waveland Press.

Enck, J. W., & Brown, T. L. (2002). New Yorkers' attitudes toward restoring wolves to the Adirondack Park. *Wildlife Society Bulletin*, *30*(1), 16–28.

Endangered Species Act: Experimental Populations. (n.d.). Albuquerque, NM.

Erickson, F. (1984). What Makes School Ethnography "Ethnographic"? *Anthropology & Education Quarterly*, *15*, 51–66.

Estes, J. A., Terborgh, J., Brashares, J. S., Power, M. E., Berger, J., Bond, W. J., … Wardle, D. a. (2011). Trophic downgrading of planet Earth. *Science (New York, N.Y.)*, *333*(6040), 301–6. doi:10.1126/science.1205106

Farber, B. (1963). Response Falsification and Spurious Correlation in Survey Research. *American Sociological Review*, *28*(1), 123–130.

Farrell, K. N. (2010). Snow White and the Wicked Problems of the West: A Look at the Lines between Empirical Description and Normative Prescription. *Science, Technology & Human Values*, *36*(3), 334–361. doi:10.1177/0162243910385796

Flynn, J., Slovic, P., & Mertz, C. K. (1994). Gender, race, and perception of environmental health risks. *Risk Analysis*, *14*(6), 1101–8. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/7846319

Frank, R. (1988). *Passions Within Reason: The Strategic Role of the Emotions*. W. W. Norton.

Frawley, B. J. (2013). *2012 Michigan Furbearer Harvest Survey* (Vol. 400). Lansing, Michigan.

Frequently Asked Questions On the Gray Wolf Recovery and Delisting Proposal. (2013).

Fritts, S., Hayes, R., Boitani, L., & Stephenson, R. (2003). Wolves and Humans. In L. Mech & L. Boitani (Eds.), *Wolves: Behavior, Ecology, and Conservation* (pp. 289–316). Chicago, IL: The University of Chicago Press.

Goetz, J. P., & LeCompte, M. D. (1982). Ethnographic Research and the Problem of Data Reduction. *Anthropology & Education Quarterly*, *7*(1), 51–70.

Goodman, L. A. (1961). Snowball sampling. *Annals of Mathematical Statistics*, *32*(1), 148–170.

Goodrich, J. M. (2010). Human-tiger conflict: a review and call for comprehensive plans. *Integrative Zoology*, *5*(4), 300–12. doi:10.1111/j.1749-4877.2010.00218.x

Goralnik, L., & Nelson, M. P. (2012). Anthropocentrism. In R. Chadwick (Ed.), *Encyclopedia of Applied Ethics* (2nd ed., Vol. 1, pp. 145–155). doi:10.1016/B978-0-12-373932-2.00349-5

Gore, M. L., Knuth, B. A., Curtis, P. D., & Shanahan, J. E. (2002). Stakeholder Perceptions of Risk Associated with Human – Black Bear Conflicts in New York' s Adirondack Park Campgrounds: Implications for Theory and Practice. *Wildlife Society Bulletin*, *34*(1), 36–43.

Gore, M. L., Knuth, B. A., Curtis, P. D., & Shanahan, J. E. (2007). Campground Manager and User Perceptions of Risk Associated with Negative Human–Black Bear Interactions. *Human Dimensions of Wildlife*, *12*(1), 31–43. doi:10.1080/10871200601107882

Gore, M. L., Nelson, M. P., Vucetich, J. A., Smith, A. M., & Clark, M. A. (2011). Exploring the ethical basis for conservation policy: the case of inbred wolves on Isle Royale, USA. *Conservation Letters*, *4*(5), 394–401. doi:10.1111/j.1755-263X.2011.00191.x

Graham, J., Haidt, J., Koleva, S., Motyl, M., Iyer, R., Wojcik, S., & Ditto, P. H. (2013). Moral Foundations Theory: The pragmatic validity of moral pluralism. *Advances in Experimental Social Psychology*, *47*, 55–130.

Graham, J., Nosek, B. a, Haidt, J., Iyer, R., Koleva, S., & Ditto, P. H. (2011). Mapping the moral domain. *Journal of Personality & Social Psychology*, *101*(2), 366–85. doi:10.1037/a0021847

Gregory, R., Failing, L., Ohlson, D., & McDaniels, T. L. (2006). Some Pitfalls of an Overemphasis on Science in Environmental Risk Management Decisions. *Journal of Risk Research*, *9*(7), 717–735. doi:10.1080/13669870600799895

Grunig, J. (1979). A new measure of public opinions on corporate social responsibility. *The Academy of Management Journal*, *22*(4), 738–764.

Haider, S., & Jax, K. (2007). The application of environmental ethics in biological conservation: a case study from the southernmost tip of the Americas. *Biodiversity and Conservation*, *16*(9), 2559–2573. doi:10.1007/s10531-006-9088-8

Haidt, J. (2001). The Emotional Dog and Its Rational Tail: A Social Intuitionist Approach to Moral Judgment. *Psychological Review*, *108*(4), 814–834.

Haidt, J. (2007). The new synthesis in moral psychology. *Science (New York, N.Y.)*, *316*(5827), 998–1002. doi:10.1126/science.1137651

Haidt, J. (2012). *The Righteous Mind: Why Good People Are Divided by Politics and Religion*. Pantheon.

Haidt, J., & Graham, J. (2007). When Morality Opposes Justice: Conservatives Have Moral Intuitions that Liberals may not Recognize. *Social Justice Research*, *20*(1), 98–116. doi:10.1007/s11211-007-0034-z

Haidt, J., & Joseph, C. (2004). Intuitive ethics: how innately prepared intuitions generate culturally variable virtues. *Dædalus*, *133*(4), 55–66.

Haidt, J., & Joseph, C. (2007). The moral mind: How five sets of innate intuitions guide the development of many culture-specific virtues, and perhaps even modules. In P. Carruthers, S. Laurence, & S. Stich (Eds.), *The Innate Mind* (Vol. 3, pp. 367–91). New York, NY: Oxford University Press.

Haidt, J., Koller, S. H., & Dias, M. G. (1993). Affect, culture, and morality, or is it wrong to eat your dog? *Journal of Personality and Social Psychology*, *65*(4), 613–28. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/8229648

Hampton, B. (1997). *The Great American Wolf*. New York, NY: Henry Holt and Company.

Hatcher, A., Jaffry, S., Thébaud, O., & Bennett, E. (2000). Normative and Social Influences Affecting Compliance with Fishery Regulations. *Land Economics*, *76*(3), 448–461.

Hazzah, L., & Dolrenry, S. (2007). Coexisting with predators. *Seminar*, *577*, 1–12.

Hogg, M. A., & Reid, S. A. (2006). Social Identity, Self-Categorization, and the Communication of Group Norms. *Communication Theory*, *16*(1), 7–30. doi:10.1111/j.1468-2885.2006.00003.x

Hogg, M. A., & Terry, D. J. (2000). Social identity and self-categorization processes in organizational contexts. *The Academy of Management Review*, *25*(1), 121–140.

Holsman, R. H. (2000). Goodwill Hunting? Exploring the role of hunters as ecosystem stewards. *Wildlife Society Bulletin*, *28*(4), 808–816.

Hook, R. A., & Robinson, W. L. (1982). Attitudes of Michigan citizens toward predators. In G. H. Harrington & P. C. Paquet (Eds.), *Wolves in the world* (pp. 382–394). Park Ridge, N.J.: Noyes.

Hornsey, M. J. (2008). Social Identity Theory and Self-categorization Theory: A Historical Review. *Social and Personality Psychology Compass*, *2*(1), 204–222. doi:10.1111/j.1751-9004.2007.00066.x

Houston, M., Bruskotter, J., & Fan, D. (2010). Attitudes toward wolves in the United States and Canada: A content analysis of the print news media, 1999-2008. *Human Dimensions of Wildlife*, (July), 389–403.

Huang, L., Sun, K., Ban, J., & Bi, J. (2010). Public perception of blue-algae bloom risk in Hongze Lake of China. *Environmental Management*, *45*(5), 1065–75. doi:10.1007/s00267-010-9480-8

Inglehart, K. (1977). *The silent revolution*. Princeton, New Jersey: Princeton University Press.

Inglehart, K. (1990). *Cultural Change in Advanced Societies*. Princeton, New Jersey: Princeton University Press.

Jacobs, M. H. (2012). Human Emotions Toward Wildlife. *Human Dimensions of Wildlife*, *17*(1), 1–3. doi:10.1080/10871209.2012.653674

Jacobs, M. H., Vaske, J. J., & Roemer, J. M. (2012). Toward a Mental Systems Approach to Human Relationships with Wildlife: The Role of Emotional Dispositions. *Human Dimensions of Wildlife*, *17*(1), 4–15. doi:10.1080/10871209.2012.645123

Jetten, J., McAuliffe, B. J., Hornsey, M. J., & Hogg, M. A. (2006). Differentiation between and within groups: the influence of individualist and collectivist group norms. *European Journal of Social Psychology*, *36*(6), 825–843. doi:10.1002/ejsp.322

Jetten, J., Postmes, T., & McAuliffe, B. J. (2002). We're all individuals?: Group norms of individualism and collectivism, levels of identification and identity threat. *European Journal of Social Psychology*, *32*(2), 189–207. doi:10.1002/ejsp.65

Johansson, M., & Karlsson, J. (2011a). Subjective Experience of Fear and the Cognitive Interpretation of Large Carnivores. *Human Dimensions of Wildlife: An International Journal*, *16*(1), 15–29. Retrieved from http://www.informaworld.com/10.1080/10871209.2011.535240

Johansson, M., & Karlsson, J. (2011b). Subjective Experience of Fear and the Cognitive Interpretation of Large Carnivores. *Human Dimensions of Wildlife*, *16*(1), 15–29. doi:10.1080/10871209.2011.535240

Johansson, M., Karlsson, J., & Flykt, A. (2011). Fear of brown bear and wolf. *Unpublished*, (november), 15–16.

Johnson, B. (2013, November 14). On eve of Michigan's first wolf hunt, Saginaw Chippewa Indian Tribe hosts vigil to honor animal called "brother." *MLive*. Mount Pleasant, MI. Retrieved from http://www.mlive.com/news/saginaw/index.ssf/2013/11/saginaw_chippewa_indain_tribe.html

Jonassen, D. H. (1991). Objectivism versus constructivism, Do we need a new philosophical paradigm? *Educational Technology Research and Development*, *39*(3), 2–14.

Jones, S. (2006). A political ecology of wildlife conservation in Africa. *Review of African Political Economy*, *33*(109), 483–495. doi:10.1080/03056240601000911

Jonker, J., & Pennink, B. (2010). *The Essence of Research Methodology* (pp. 97–109). Berlin, Heidelberg: Springer Berlin Heidelberg. doi:10.1007/978-3-540-71659-4

Jurin, R. R., Roush, D., & Danter, J. (2010). *Environmental Communication* (2nd ed.). Dordrecht: Springer.

Kahan, D. (2010). Fixing the communications failure. *Nature*, *463*(7279), 296–7. doi:10.1038/463296a

Kals, E., Schumacher, D., & Montada, L. (1999). Emotional Affinity toward Nature as a Motivational Basis to Protect Nature. *Environment and Behavior*, *31*(2), 178–202. doi:10.1177/00139169921972056

Kaltenborn, B. P., Bjerke, T., & Vitterso, J. (1999). Attitudes toward Large Carnivores among Sheep Farmers, Wildlife Managers, and Research Biologists in Norway. *Human Dimensions of Wildlife*, *4*(3), 37–41.

Karasawa, M. (1991). Toward an assessment of social identity: The structure of group. *British Journal of Social Psychology*, *30*, 293–307.

Keane, A., Jones, J. P. G., Edwards-Jones, G., & Milner-Gulland, E. J. (2008). The sleeping policeman: understanding issues of enforcement and compliance in conservation. *Animal Conservation*, *11*(2), 75–82. doi:10.1111/j.1469-1795.2008.00170.x

Keller, C., Siegrist, M., & Gutscher, H. (2006). The role of the affect and availability heuristics in risk communication. *Risk Analysis*, *26*(3), 631–9. doi:10.1111/j.1539-6924.2006.00773.x

Kellert, S. R. (1980). American attitudes toward and knowledge of animals. *International Journal for the Study of Animal Problems*, *1*(2), 87–119.

Kellert, S. R. (1990). *Public Attitudes and Beliefs About the Wolf and its Restoration in Michigan*.

Kellert, S. R., Black, M., Rush, C. R., & Bath, A. J. (1996). Human Culture and Large Carnivore Conservation in North America. *Conservation Biology*, *10*(4), 977–990. Retrieved from http://www.jstor.org/stable/2387134

Kidd, D. C., & Castano, E. (2013). Reading Literary Fiction Improves Theory of Mind. *Science (New York, N.Y.)*, (October), 1–6. doi:10.1126/science.1239918

Kirk, J., & Miller, M. (1986). *Reliability and validity in qualitative research*. Beverly Hills: Sage Publications.

Krumpal, I. (2013). Determinants of social desirability bias in sensitive surveys: a literature review. *Quality & Quantity*, *47*(4), 2025–2047. doi:10.1007/s11135-011-9640-9

Kvale, S., & Brinckmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing* (2nd ed., p. 354). Los Angeles, USA: Sage Publications.

Labianca, G., Brass, D. J., & Gray, B. (1998). Social networks and perceptions of intergroup conflict: The role of negative relationships and third parties. *The Academy of Management Journal*, *41*(1), 55–67.

Lamoreux, D. D. (2009). The Wolf Wars. *Fur-Fish-Game, Jan*, 7–9.

Lazo, J. K., Kinnell, J. C., & Fisher, A. (2000). Expert and layperson perceptions of ecosystem risk. *Risk Analysis*, *20*(2), 179–93. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/10859779

LeCompte, M. D., & Goetz, J. P. (1982). Problems of Reliability and Validity in Ethnographic Research. *Review of Educational Research*, *52*(1), 31–60.

LeCompte, M. D., & Goetz, J. P. (1983). Playing with ideas: analysis of qualitative data. In *Paper presented at the Annual Meeting of the American Educational Research Association, Montreal.*

Liao, C., Lin, H.-N., & Liu, Y.-P. (2009). Predicting the Use of Pirated Software: A Contingency Model Integrating Perceived Risk with the Theory of Planned Behavior. *Journal of Business Ethics*, *91*(2), 237–252. doi:10.1007/s10551-009-0081-5

Liberg, O., Chapron, G., Wabakken, P., Pedersen, H. C., Hobbs, N. T., & Sand, H. (2012). Shoot, shovel and shut up: cryptic poaching slows restoration of a large carnivore in Europe. *Proceedings of the Royal Society Society of London Series B*, *279*(1730), 910–5. doi:10.1098/rspb.2011.1275

Lindhjem, H., & Navrud, S. (2011). Are Internet surveys an alternative to face-to-face interviews in contingent valuation? *Ecological Economics*, *70*(9), 1628–1637. doi:10.1016/j.ecolecon.2011.04.002

Lindquist, K. a, Barrett, L. F., Bliss-Moreau, E., & Russell, J. a. (2006). Language and the perception of emotion. *Emotion (Washington, D.C.)*, *6*(1), 125–38. doi:10.1037/1528-3542.6.1.125

Loker, C. A., Decker, D. J., & Chase, L. C. (1998). Ballot initiatives — antithesis of human dimensions approaches or catalyst for change? *Human Dimensions of Wildlife Management*, *3*(2), 8–20.

Lopez, B. (1978). *Of Wolves and Men*. New York, NY: Charles Scribner and Sons.

Ludwig, D. (2001). The Era of Management Is Over. *Ecosystems*, *4*(8), 758–764. doi:10.1007/s

Ludwig, D., Mangel, M., & Haddad, B. (2001). Ecology, Conservation, and Public Policy. *Annual Review of Ecological Systems*, *32*, 481–517.

Lute, M., & Gore, M. L. (n.d.). Exploring knowledge and power in Michigan wolf management. *Journal of Wildlife Management*.

Lute, M. L., & Gore, M. L. (2014). Stewardship as a path to cooperation? Exploring the role of identity in intergroup conflict among Michigan wolf stakeholders. *Human Dimensions of Wildlife*, *19*(3), 267–279.

Lute, M. L., Gore, M. L., Nelson, M. P., & Vucetich, J. A. (2012). *Toward improving the effectiveness of wolf management approaches in Michigan: insights from a 2010 statewide survey. Michigan Department of Natural Resources Report.* East Lansing, Michigan.

Lynam, T., Jong, W. De, Sheil, D., Kusumanto, T., & Evans, K. (2007). A Review of Tools for Incorporating Community Knowledge, Preferences, and Values into Decision Making in Natural Resources Management. *Ecology and Society*, *12*(1), 5.

Ma-Kellams, C., & Blascovich, J. (2013). Does "science" make you moral? The effects of priming science on moral judgments and behavior. *PloS One*, *8*(3), e57989. doi:10.1371/journal.pone.0057989

MacKinnon, D. P., & Dwyer, J. H. (1993). Estimating mediated effects in prevention studies. *Evaluation Review*, *17*, 144–158.

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, *7*(1), 83–104. doi:10.1037//1082-989X.7.1.83

Madden, F. (2004). Creating Coexistence between Humans and Wildlife: Global Perspectives on Local Efforts to Address Human–Wildlife Conflict. *Human Dimensions of Wildlife*, *9*(4), 247–257. doi:10.1080/10871200490505675

Manfredo, M. (2008). *Who Cares About Wildlife?* New York: Springer.

Manfredo, M. J., Pierce, C. L., Fulton, D., Pate, J., & Gill, B. R. (1999). Public Acceptance of Wildlife Trapping in Colorado. *Wildlife Society Bulletin*, *27*(2), 499–508. Retrieved from http://www.jstor.org/stable/3783919

Manfredo, M. J., Teel, T. L., & Henry, K. L. (2009). Linking Society and Environment: A Multilevel Model of Shifting Wildlife Value Orientations in the Western United States. *Social Science Quarterly*, *90*(2), 407–427. doi:10.1111/j.1540-6237.2009.00624.x

Manfredo, M. J., Zinn, H. C., Sikorowski, L., & Jones, J. (1998). Public Acceptance of Mountain Lion Management: A Case Study of Denver, Colorado, and Nearby Foothills Areas. *Wildlife Society Bulletin*, *26*(4), 964–970. Retrieved from http://www.jstor.org/stable/3783577

Manning, R., Valliere, W., & Minteer, B. a. (1999). Values, Ethics, and Attitudes Toward National Forest Management: An Empirical Study. *Society & Natural Resources*, *12*(5), 421–436. doi:10.1080/089419299279515

Mattson, D. J., Byrd, K. L., Rutherford, M. B., Brown, S. R., & Clark, T. W. (2006). Finding common ground in large carnivore conservation: Mapping contending perspectives. *Environmental Science & Policy*, *9*(4), 392–405. doi:10.1016/j.envsci.2006.01.005

Mayr, A., Gefeller, O., Prokosch, H.-U., Pirkl, A., Fröhlich, A., & de Zwaan, M. (2012). Web-based data collection yielded an additional response bias--but had no direct effect on outcome scales. *Journal of Clinical Epidemiology*, *65*(9), 970–7. doi:10.1016/j.jclinepi.2012.03.005

McNay, M. E. (2002). Wolf-human interactions in Alaska and Canada: a review of the case history. *Wildlife Society Bulletin*, *30*(3), 831–843.

Mech, L. D., & Boitani, L. (2004). Grey wolf Canis lupus Linnaeus, 1758. In C. Sillero-Zubiri, M. Hoffman, & D. W. Macdonald (Eds.), *Canids: Foxes, Wolves, Jackals, and Dogs: Status Survey and Conservation Action Plan* (pp. 124–129). IUCN. Retrieved from http://books.google.com/books?id=5gnWHLaUsqUC&pg=PA124&dq=sillero+2004+gr

ay+wolf&hl=en&sa=X&ei=H1IPU4ayO9Ou2gXBlIC4CA&ved=0CCsQ6AEwAA#v=onepage&q=sillero 2004 gray wolf&f=false

Mertig, A. G. (2004). *Attitudes about wolves in Michigan, 2002. Final report to Michigan Department of Natural Resources*. East Lansing, Michigan.

Michigan Department of Natural Resources: Economic Impact. (n.d.). *Michigan Department of Natural Resources*. Retrieved January 31, 2014, from http://www.michigan.gov/dnr/0,4570,7-153-10366-121641--,00.html

Michigan Wolf Management Plan. (2008). Michigan Department of Natural Resources.

Miles, M. B., & Huberman, M. A. (1994). *Qualitative data analysis*. Thousand Oaks, CA: Sage Publications.

Miller, C. (2001). Hybrid Management: Boundary Organizations, Science, Policy, and Environmental Governance in the Climate Regime. *Science, Technology & Human Values*, *26*(4), 478–500.

Minnis, D. L. (1998). Wildlife Policy-Making by the Electorate: An Overview of Citizen-Sponsored Ballot Measures on Hunting and Trapping. *Wildlife Society Bulletin*, *26*(1), 75–83. Retrieved from http://www.jstor.org/stable/3783804

Morris, J. K., Jacobson, S. K., & Flamm, R. O. (2007). Lessons from an evaluation of a boater outreach program for manatee protection. *Environmental Management*, *40*(4), 596–602. doi:10.1007/s00267-006-0389-1

Musiani, M., & Paquet, P. C. (2004). The practices of wolf persecution, protection, and restoration in Canada and the United States. *BioScience*, *54*(1), 50–60. Retrieved from <Go to ISI>://000187958800011

Muter, B. a, Gore, M. L., & Riley, S. J. (2012). Social Contagion of Risk Perceptions in Environmental Management Networks. *Risk Analysis*, *33*(8), 1489–99. doi:10.1111/j.1539-6924.2012.01936.x

Naughton-Treves, L., Grossberg, R., & Treves, A. (2003). Paying for Tolerance: Rural Citizens' Attitudes toward Wolf Depredation and Compensation. *Conservation Biology*, *17*(6), 1500–1511. doi:10.1111/j.1523-1739.2003.00060.x

Navarrete, C. D., McDonald, M. M., Molina, L. E., & Sidanius, J. (2010). Prejudice at the nexus of race and gender: an outgroup male target hypothesis. *Journal of Personality and Social Psychology*, *98*(6), 933–45. doi:10.1037/a0017931

Nelson. (2004). Environmental Ethics. In S. Krech, J. R. McNeill, & C. Merchant (Eds.), *Encyclopedia of World Environmental History* (pp. 445–449). New York: Routledge.

Nelson, M. P. (2002). Introduction to Environmental Ethics. In *Biodiversity Project Ethics for a Small Planet: A Communications Handbook* (pp. 40–53). Madison, WI: University of Wisconsin Press and the Biodiversity Project.

Nelson, M. P., & Vucetich, J. A. (2012). Environmental Ethics and Wildlife Management. In D. J. Decker, S. J. Riley, & W. F. Siemer (Eds.), *Human Dimensions of Wildlife Management* (pp. 223–37). ., Johns Hopkins University Press.

Nie, M. (2003). *Beyond Wolves: The Politics Of Wolf Recovery And Management* (p. 272). Univ Of Minnesota Press.

Nie, M. A. (2002). Wolf Recovery and Management as Value-based Political Conflict. *Ethics, Place & Environment*, *5*(1), 65–71. doi:10.1080/1366879022014646

O'Connor, R. E., Bord, R. J., & Fisher, A. (1999). Risk Perceptions, General Environmental Beliefs, and Willingness to Address Climate Change. *Risk Analysis*, *19*(3), 461–471.

Paolacci, G., Chandler, J., & Stern, L. N. (2010). Running experiments on Amazon Mechanical Turk 2 Amazon Mechanical Turk. *Judgment and Decision Making*, *5*(5), 411–419.

Paxton, J. M., & Greene, J. D. (2010). Moral Reasoning: Hints and Allegations. *Topics in Cognitive Science*, *2*(3), 511–527. doi:10.1111/j.1756-8765.2010.01096.x

Perreault, S., & Bourhis, R. Y. (1998). Social Identificaiton, Interdependence and Discrimination. *Group Processes & Intergroup Relations*, *1*(1), 49–66.

Peyton, R., Bull, P., & Holsman, R. (2007). *Measuring the social carrying capacity for gray wolves in Michigan* (pp. 1–35). Lansing, Michigan.

Pielke, R. a. (2001). Room for doubt. *Nature*, *410*, 151.

Pluta, R. (2013, June 3). American Indian Tribes To Challenge Michigan Wolf Hunt. *WKAR Michigan Public Radio*. Retrieved from http://wkar.org/post/american-indian-tribes-challenge-michigan-wolf-hunt

Ponterotto, J. G. (2006). Brief Note on the Origins , Evolution , and Meaning of the Qualitative Research Concept "Thick Description." *The Qua*, *11*(3), 538–549.

Potvin, M. J., Drummer, T. D., Vucetich, J. A., Beyer, D. E., Peterson, R. O., & Hammill, J. H. (2005). Monitoring and habitat analysis for wolves in upper Michigan. *Journal Of Wildlife Management*, *69*(4), 1660–1669. Retrieved from <Go to ISI>://000236478700032

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*(4), 717–31. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/15641418

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891. doi:10.3758/BRM.40.3.879

Raik, D., Wilson, A., & Decker, D. (2008). Power in Natural Resources Management: An Application of Theory. *Society & Natural Resources*, *21*(8), 729–739. doi:10.1080/08941920801905195

Rasinski, K. A., Willis, G. B., Baldwin, A. K., Yeh, W., & Lee, L. (1999). Methods of Data Collection , Perceptions of Risks and Losses , and Motivation to Give Truthful Answers to Sensitive Survey Questions. *Applied Cognitive Psychology*, *13*, 465–484.

Reed, M. S. (2008). Stakeholder participation for environmental management: A literature review. *Biological Conservation*, *141*(10), 2417–2431. doi:10.1016/j.biocon.2008.07.014

Renn, O. (1998). Three decades of risk research: accomplishments and new challenges. *Journal of Risk Research*, *1*(1), 49. Retrieved from 10.1080/136698798377321

Rhue, L., & Sundararajan, A. (2014). Digital access, political networks and the diffusion of democracy. *Social Networks*, *36*, 40–53. doi:10.1016/j.socnet.2012.06.007

Riley, S. J., & Decker, D. J. (2000). Risk perception as a factor in Wildlife Stakeholder Acceptance Capacity for cougars in Montana. *Human Dimensions of Wildlife Management*, *4*(3), 50–62.

Ripple, W. J., & Beschta, R. L. (2012). Trophic cascades in Yellowstone: The first 15years after wolf reintroduction. *Biological Conservation*, *145*(1), 205–213. doi:10.1016/j.biocon.2011.11.005

Ripple, W. J., Estes, J. a, Beschta, R. L., Wilmers, C. C., Ritchie, E. G., Hebblewhite, M., … Wirsing, A. J. (2014). Status and ecological effects of the world's largest carnivores. *Science*, *343*(6167), 1241484. doi:10.1126/science.1241484

Rivers, L., & Arvai, J. (2007). Win Some, Lose Some: The Effect of Chronic Losses on Decision Making Under Risk. *Journal of Risk Research*, *10*(8), 1085–1099. doi:10.1080/13669870701615172

Rogers, E. M. (1975). *Diffusion of Innovations* (4th ed.). New York: The Free Press.

Rolston III, H. (1975). Is There an Ecological Ethic? *Ethics: An International Journal of Social, Political, and Legal Philosophy*, *18*(2), 93–109.

Ruid, D. B., Paul, W. J., Roell, B. J., Wydeven, A. P., Wiliging, R. C., Jurewicz, R. L., & Lonsway, D. H. (2009). Wolf — Human Conflicts and Management in Minnesota , Wisconsin , and Michigan. In A. P. Wydeven, T. R. van Deelen, & E. J. Heske (Eds.), *Recovery of Gray Wolves in the Great Lakes Region of the United States,* (pp. 279–295).

Russell, J. A. (2009). Emotion, core affect, and psychological construction. *Cognition & Emotion*, *23*(7), 1259–1283. doi:10.1080/02699930902809375

Salant, P., & Dillman, D. (1994). *How to conduct your own survey*. New York: John Wiley and Sons.

Sarewitz, D. (2004). How science makes environmental controversies worse. *Environmental Science & Policy*, *7*(5), 385–403. doi:10.1016/j.envsci.2004.06.001

Sauer, T. J., & Nelson, M. P. (2011). Science, Ethics, and the Historical Roots of Our Ecological Crisis: Was White Right? In T. J. Sauer, J. M. Norman, & V. K. Sivakumar (Eds.), *Sustaining Soil Productivity in Response to Global Climate Change: Science, Policy, and Ethics* (pp. 3–16). John Wiley and Sons.

Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, *7*(2), 147–177. doi:10.1037//1082-989X.7.2.147

Schwartz, S. H. (2011). Awareness of Consequences and the Influence of Moral Norms on Interpersonal Behavior, *31*(4), 355–369.

Shackelton, S., & Campbell, B. (2000). Empowering Communities to Manage Natural Resources : Case Studies from Southern Africa, (690).

Sherif, M. (1966). *Group Conflict and Cooperation: Their Social Psychology*. London: Routledge & Kegan Paul Ltd.

Simon, A. (2013). A Historical and Case Study Analysis of the Reasons Why Many Trophy Hunters are Hostile Toward Wolves and Wolf Advocates. *Capitalism Nature Socialism*, *24*(1), 104–120.

Sjöberg, L. (1998). Worry and risk perception. *Risk Analysis*, *18*(1), 85–93. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/22795397

Sjöberg, L. (2000). Factors in Risk Perception, *20*(1).

Sjoberg, L., & Winroth, E. (1986). Risk, moral value of actions, and mood. *Scandanavian Journal of Psychology*, *27*, 191–208.

Sjölander-Lindqvist, A. (2008). Local Identity, Science and Politics Indivisible: The Swedish Wolf Controversy Deconstructed. *Journal of Environmental Policy & Planning*, *10*(1), 71–94. doi:10.1080/15239080701652672

Skogen, K. (2001). Who's afraid of the big, bad wolf? Young people's responses to the conflicts over large carnivores in eastern Norway. *Rural Sociology*, *66*(2), 203–226. Retrieved from <Go to ISI>://000169215800003

Skogen, K. (2003). Adapting Adaptive Management to a Cultural Understanding of Land Use Conflicts. *Society & Natural Resources*, *16*(5), 435–450. doi:10.1080/08941920309180

Skogen, K., & Krange, O. (2003). A wolf at the gate: The anti-carnivore alliance and the symbolic construction of community. *Sociologia Ruralis*, *43*(3), 309–325. Retrieved from <Go to ISI>://000184840800008

Skogen, K., Mauz, I., & Krange, O. (2006). Wolves and eco-power - A French-Norwegian analysis of the narratives on the return of large carnivores. *Revue De Geographie Alpine-Journal Of Alpine Research*, *94*(4), 78–87. Retrieved from <Go to ISI>://000243307600005

Skogen, K., & Thrane, C. (2008). Wolves in Context: Using Survey Data to Situate Attitudes Within a Wider Cultural Framework. *Society & Natural Resources*, *21*(1), 17–33. doi:10.1080/08941920701460408

Slagle, K. M., Bruskotter, J. T., & Wilson, R. S. (2012). The Role of Affect in Public Support and Opposition to Wolf Management. *Human Dimensions of Wildlife*, *17*(1), 44–57. doi:10.1080/10871209.2012.633237

Slovic, P. (1987). Perception of Risk. *Science*, *236*(4799), 280–285.

Slovic, P., Peters, E., Finucane, M. L., & Macgregor, D. G. (2005). Affect, risk, and decision making. *Health Psychology*, *24*(4 Suppl), S35–40. doi:10.1037/0278-6133.24.4.S35

Sponarski, C. C., Semeniuk, C., Glikman, J. a., Bath, A. J., & Musiani, M. (2013). Heterogeneity among Rural Resident Attitudes Toward Wolves. *Human Dimensions of Wildlife*, *18*(4), 239–248. doi:10.1080/10871209.2013.792022

Stern, P. C. (2000). Toward a Coherent Theory of Environmentally Significant Behavior. *Journal of Social Issues*, *56*(3), 407–424.

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A Value-Belief-Norm Theory of Support for Social Movements : The Case of Environmentalism. *Human Ecology Review*, *6*(2), 81–97.

Stocké, V. (2007). The interdependence of determinants for the strength and direction of social desirability bias in racial attitude surveys. *J. Off. Stat.*, *23*, 493–514.

Swart, J. a. a. (2005). Care for the Wild: An Integrative View on Wild and Domesticated Animals. *Environmental Values*, *14*(2), 251–263. doi:10.3197/0963271054084902

Tajfel, H. (1982). Social Psychology of Intergroup Relations. *Annual Review of Psychology*, *33*, 1–39.

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The Social Psychology of Intergroup Relations* (pp. 33–47). Monterey, CA: Brooks/Cole.

Teel, T. L., Bright, A. D., Manfredo, M. J., & Jeffrey, J. (2006). An Evidence of Biased Processing of Natural Resource-Related Information: A Study of Attitudes Toward Drilling for Oil in the Arctic National Wildlife Refuge. *Society & Natural Resources*, *19*(5), 447–463.

Tellis, G. J., & Chandrasekaran, D. (2010). Extent and impact of response biases in cross-national survey research. *International Journal of Research in Marketing*, *27*(4), 329–341. doi:10.1016/j.ijresmar.2010.08.003

Thompson, J. G. (1993). Addressing The Human Dimensions Of Wolf Reintroduction - An Example Using Estimates Of Livestock Depredation And Costs Of Compensation. *Society & Natural Resources*, *6*(2), 165–179. Retrieved from <Go to ISI>://A1993LF19400005

Treves, A. (2009). Hunting for large carnivore conservation. *Journal of Applied Ecology*, *46*(6), 1350–1356. doi:10.1111/j.1365-2664.2009.01729.x

Treves, A. (2012). Tolerant Attitudes Reflect an Intent to Steward: A Reply to Bruskotter and Fulton. *Society & Natural Resources*, *25*(1), 103–104. doi:10.1080/08941920.2011.621512

Treves, A., & Karanth, K. U. (2003). Human-Carnivore Conflict and Perspectives on Carnivore Management Worldwide. *Conservation Biology*, *17*(6), 1491–1499. doi:10.1111/j.1523-1739.2003.00059.x

Treves, A., & Martin, K. A. (2011). Hunters as Stewards of Wolves in Wisconsin and the Northern Rocky Mountains, USA. *Society & Natural Resources*, *24*(9), 984–994. doi:10.1080/08941920.2011.559654

Treves, A., Martin, K. a., Wydeven, A. P., & Wiedenhoeft, J. E. (2011). Forecasting Environmental Hazards and the Application of Risk Maps to Predator Attacks on Livestock. *BioScience*, *61*(6), 451–458. doi:10.1525/bio.2011.61.6.7

Treves, A., Naughton-Treves, L., & Shelley, V. (2013). Longitudinal Analysis of Attitudes Toward Wolves. *Conservation Biology*, *27*(2), 315–323. doi:10.1111/cobi.12009

Treves, A., Naughton-Treves, L., Wilcove, D. S., & Jurewicz, R. L. (2009). The Price of Tolerance: Wolf Damage Payments After Recovery. *Biodiversity Conservation*, *18*, 4003–4021.

Treves, A., Wallace, R. B., Naughton-Treves, L., & Morales, A. (2006). Co-Managing Human–Wildlife Conflicts: A Review. *Human Dimensions of Wildlife*, *11*(6), 383–396. doi:10.1080/10871200600984265

Triezenberg, H. A., Knuth, B. A., & Yuan, C. (2011). Evolution of public issues in wildlife management: how social networks and issue framing change though time. *Human Dimensions of Wildlife*, *16*, 381–396.

Trochim, W. M. K. (2001). *The research methods knowledge base*. Cincinnati, OH: Atomic Dog Publishing, Originating.

Tyerman, a., & Spencer, C. (1983). A Critical Test of the Sherifs' Robber's Cave Experiments: Intergroup Competition and Cooperation Between Groups of Well-Acquainted Individuals. *Small Group Research*, *14*(4), 515–531. doi:10.1177/104649648301400407

Tyler, T. R. (1994). Psychological Models of the Justice Motive : Antecedents of Distributive and Procedural Justice. *Journal of Personality and Social Psychology*, *67*(5), 850–863.

Vasilachis De Gialdino, I. (2011). Ontological and Epistemological Foundations of Qualitative Research. *Forum: Qualitative Social Research*, *10*(2), Art. 30.

Vaske, J. (2011). Advantages and Disadvantages of Internet Surveys: Introduction to the Special Issue. *Human Dimensions of Wildlife*, *16*(3), 149–153. doi:10.1080/10871209.2011.572143

Vaske, J. J. (2008). *Survey research and analysis: applications in parks, recreation and human dimensions* (p. 635). State College, PA: Venture Publishing.

Vaske, J. J., Donnelly, M. P., Williams, D. R., & Jonker, S. (2001). Demographic Influences on Environmental Value Orientations and Normative Beliefs About National Forest Management. *Society & Natural Resources*, *14*, 761–776.

Vaske, J. J., Roemer, J. M., & Taylor, J. G. (2013). Situational and emotional influences on the acceptability of wolf management actions in the Greater Yellowstone Ecosystem. *Wildlife Society Bulletin*, *37*(1), 122–8. doi:10.1002/wsb.240

Vucetich, J. A., & Nelson, M. P. (2007). What are 60 warblers worth? Killing in the name of conservation. *Oikos*, *116*(8), 1267–1278. doi:10.1111/j.2007.0030-1299.15536.x

Vucetich, J. A., & Nelson, M. P. (2009). Working to resolve the conflict between Animal Welfare and Conservation Ethics. *Unpublished*.

Vucetich, J. A., & Nelson, M. P. (2013). The Infirm Ethical Foundations of Conservation. In M. Beckoff (Ed.), *Ignoring Nature No More: The Case for Compassionate Conservation* (pp. 9–25). Chicago, IL: University of Chicago Press.

Webler, R., Tuler, S., & Krueger, T. (2001). What Is a Good Public Participation Process? Five Perspectives from the Public. *Environmental Management*, *27*(3), 435–450.

Webler, T., & Tuler, S. (2001). Public Participation in Watershed Management Planning: Views on Process from People in the Field. *Research in Human Ecology*, *8*(2), 29–40.

Webler, T., & Tuler, S. (2006). Four Perspectives on Public Participation Process in Environmental Assessment and Decision Making: Combined Results from 10 Case Studies. *Policy Studies Journal*, *34*(4), 699–722. doi:10.1111/j.1541-0072.2006.00198.x

Wells, W., Cavanaugh, M. R., Bouffard, J. a., & Nobles, M. R. (2012). Non-Response Bias with a Web-Based Survey of College Students: Differences from a Classroom Survey About Carrying Concealed Handguns. *Journal of Quantitative Criminology*, *28*(3), 455–476. doi:10.1007/s10940-011-9148-4

Wieczorek Hudenko, H. (2012). Exploring the Influence of Emotion on Human Decision Making in Human–Wildlife Conflict. *Human Dimensions of Wildlife*, *17*(1), 16–28. doi:10.1080/10871209.2012.623262

Williams, R. (2012, January). Tribes opposed to possibility of Michigan wolf hunting season. *Michigan Radio: The Environment Report*. Retrieved from http://michiganradio.org/post/tribes-opposed-possibility-michigan-wolf-hunting-season

Willis, G. B. (2005). *Cognitive interviewing: A tool for improving questionnaire design* (p. 355). Thousand Oaks, USA: Sage Publications.

Wilson, M. A. (1997a). The wolf in Yellowstone: Science, symbol, or politics? Deconstructing the conflict between environmentalism and wise use. *Society & Natural Resources*, *10*(5), 453–468. Retrieved from http://www.informaworld.com/10.1080/08941929709381044

Wilson, M. A. (1997b). The wolf in Yellowstone: Science, symbol, or politics? Deconstructing the conflict between environmentalism and wise use. *Society & Natural Resources*, *10*(5), 453–468. doi:10.1080/08941929709381044

Wilson, R. S. (2008). Balancing emotion and cognition: a case for decision aiding in conservation efforts. *Conservation Biology : The Journal of the Society for Conservation Biology*, *22*(6), 1452–60. doi:10.1111/j.1523-1739.2008.01016.x

Wilson, R. S., & Arvai, J. L. (2010). Why less is more: exploring affect-based value neglect. *Journal of Risk Research*, *13*(4), 399–409. doi:10.1080/13669870902983171

Winter, S., & May, P. (2001). Motivation for compliance with environmental regulations. *Journal of Policy Analysis and Management*, *20*(4), 675–698.

Wolcott, H. (1973). *The man in the principal's office: an ethnography*. New York: Rinehart & Winston.

Wolcott, H. (1990). On seeking--and rejecting--validity in qualitative research. In E. Eisner & A. Peshkin (Eds.), *Qualitative Inquiry in Education* (pp. 121–152). New York: Teachers College Press.

Wolf Biology and Identification. (n.d.). *Michigan Department of Natural Resources*. Retrieved January 31, 2014, from http://www.michigan.gov/dnr/0,4570,7-153-10370_12145_12205_63607_63608-292026--,00.html

Wydeven, A. P., Wiedenhoeft, J. E., Schultz, R. N., Thiel, R. P., Jurewicz, R. L., Kohn, B. E., & Deelen, T. R. Van. (2009). History, Population Growth, and Management of Wolves in Wisconsin. In A. P. Wydeven, T. R. Deelen, & E. J. Heske (Eds.), *Recovery of Gray Wolves in the Great Lakes Region of the United States* (pp. 87–105). New York, NY: Springer New York. doi:10.1007/978-0-387-85952-1

Yeates, J. W., Röcklinsberg, H., & Gjerris, M. (2011). Is welfare all that matters? A discussion of what should be included in policy-making regarding animals. *Animal Welfare*, *20*, 423–432.

Yount, J. W., Madison, W., Tucker, B. T., Carolina, N., & Hill, C. (2001). Constructing Mikea Identity: Past or Present Links to Forest and Foraging. *Ethnohistory*, *48*, 257–291.

Zajac, R. M., Bruskotter, J. T., Wilson, R. S., Prange, S., & Dimensions, H. (2012). Learning to live with black bears: A psychological model of acceptance. *The Journal of Wildlife Management*, *76*(7), 1331–1340. doi:10.1002/jwmg.398

Zajonc, R. (1980). Feeling and Thinking Preferences Need No Inferences. *American Psychologist*, *35*, 151–175.

Zinn, H. C., Manfredo, M. J., Vaske, J. J., & Wittmann, K. (1998). Using normative beliefs to determine the acceptability of wildlife management actions. *Society & Natural Resources*, *11*(7), 649–662. doi:10.1080/08941929809381109