

TOLERANCE OF WILDLIFE OUTSIDE PROTECTED AREAS: PREDICTING INTENTION
TO ALLOW ELEPHANTS IN MAASAI GROUP RANCHES AROUND AMBOSELI
NATIONAL PARK, KENYA

By

CHRISTINE M. BROWNE-NUÑEZ

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

2010

© 2010 Christine M. Browne-Núñez

To the people and wildlife of Amboseli, and all those working for their continued coexistence

ACKNOWLEDGEMENTS

I have many people to thank for the inspiration, support, and encouragement that enabled me to pursue my doctoral studies. First, I would like to express my deepest gratitude to my advisor, Susan Jacobson, who provided guidance while at the same time allowing me the freedom to develop and follow my own path. Her demonstration of confidence in my abilities, and the professional and academic opportunities she provided me, allowed me to further explore and develop my professional strengths and interests. I am indebted to all of the members of my dissertation committee, who provided guidance and encouragement throughout. Thanks to Drs. Martha Monroe, Mark Hostetler and Colin Chapman who have participated in this project since I arrived at UF. Thank you, Colin, for staying on even after your move to McGill. You gave me some great advice early on about choosing nice people with whom to work, which I try to live by and often share with others. To Dr. Jerry Vaske, my master's advisor at Colorado State University and dissertation committee courtesy member, I am grateful to you for sharing so much time and knowledge in teaching and assisting me with research methods, theory, and statistical analysis. I would like to thank Dr. Janaki Alavalapati for serving as a committee member in the "early years" before he moved on to Virginia Tech. Finally, to Dr. Mike Moulton, who I have had the pleasure of knowing since I served as one of his teaching assistants in 2003 (what a fun gig!), thanks for graciously agreeing to review my dissertation and to sit in on my defense at the last minute.

This journey started in Nairobi, Kenya, in 1995, when I had the good fortune to be selected to serve as a volunteer with the International Foundation for Education and Self-Help – Teachers for Africa Program. It was here that I met some amazing women on whose shoulders I stand today. I could write pages on all they have given me, including knowledge, opportunities, friendship, support, and encouragement. Thank you to Dr. Mary Okello, Susan Carvalho, Sandy

Owen, Louise Martin, Dame Daphne Sheldrick, and Cynthia Moss. Special thanks to Daphne for bringing me into the world of elephants and trusting me to help with operations at the elephant orphanage. I learned so much during my tenure at the David Sheldrick Wildlife Trust and will treasure the memories of our many conversations over glasses of wine, our trip to Tsavo, and the amazing time I was privileged to spend with the elephants. I am also grateful to you for providing me Cynthia Moss's phone number. Without this little tidbit, this study may not have happened. I owe my deepest debt of gratitude to Cynthia, who I rang up out of the blue in 1996 and asked if there might be a role for me in her elephant research project in Amboseli. She invited me to her home office to help out with some clerical tasks and sought other opportunities for me, but I needed training in higher education to make any further contributions. Fourteen years later, I am completing my dissertation on human-elephant interactions in Amboseli – a dream of a lifetime! Cynthia, thank you for supporting me from the beginning and suggesting a follow-up to Kadzo's study. Thank you for sharing your home, your camp, and your friendship. Your generosity and dedication are truly remarkable.

There are many organizations and individuals, in addition to those mentioned above, in Kenya, which made this study possible. First, thank you to the Government of Kenya for authorizing this research. I am grateful to Dr. Patrick Omondi of the Kenya Wildlife Service (KWS) for being supportive since our first meeting in 2002. Patrick provided me with important information on human-elephant conflict in Kenya and helpful advice on conducting research in Amboseli. Additional thanks goes to KWS for granting access to the human-elephant conflict occurrence books in Loitokitok and for allowing me to come and go from Amboseli National Park on a daily basis. The scientists and staff at the Amboseli Trust for Elephants provided support of all kinds, including providing me with all the benefits associated with being a research

associate with the Amboseli Elephant Research Project, including office space in Nairobi, a tent in the beautiful AERP research camp, help with obtaining a research permit, and a car during my preliminary research. Thanks so much for all of your support, advice, and assistance. I extend immense thanks to Cynthia Moss, Joyce Poole, Harvey Croze, and Purity Waweru, among others. Special thanks to Cynthia and Harvey for conducting critical negotiations during a challenging moment of this project. Additional thanks go to Harvey for his assistance in creating maps. Thank you to all of the individuals at various conservation organizations who met with me and provided program records and reports.

To my fantastic team, I am so grateful for your hard work, dedication, and determination. Deepest thanks go Grace Majakusi, George Ole Lupempe, Paul Mutero Majakusi, Moses Tetile Ntipapa, Kitesho Soila Peninah, Naisanti Jackline Oloishiro, and Saibulu Ole Kalama. I appreciate the sacrifices each of you made, including being away from your homes and families for extended periods of time.

I am profoundly grateful to the people of Olgulului and Kimana Group Ranches for their tremendous generosity with time and information. I find it truly remarkable that people in this world are still willing to take a large portion of time out of their day to sit down and graciously answer a foreigner's long list of questions, and even offer a cup of chai. Your politeness, patience, and skill in conversation, are a great example to many hurried Westerners. I only hope that the results of this research will benefit you in at least some small way. Ashe oleng!

This project had several generous sources of funding. First, I am grateful to the University of Florida and several programs and departments at the university for funding my doctoral studies and my preliminary research, including my preliminary fieldwork in Kenya in 2002. University funding included a four-year UF Alumni Fellowship, a Jennings Scholarship

from the Department of Wildlife Ecology and Conservation, a Niddrie Award from Center for African Studies, and a field research grant from the Tropical Conservation and Development Program. My fieldwork in 2004-2005 was supported by the U.S. Fulbright Program, the Disney Wildlife Conservation Fund, the Sea World & Busch Gardens Conservation Fund, and the Lincoln Park Zoo Conservation Fund.

I am grateful to all of my friends and fellow graduate students for good times, stimulating conversation, and for keeping me going in my extended version of the pursuit for a Ph.D. Special thanks go to my dear friend, Dr. Sandra Jonker, who reviewed the earliest version of my research proposal during our shared time at Colorado State and continued to be involved in the process throughout, including joining me as a co-author to publish one of the chapters in this document. Sandra has been the most generous of friends and colleagues, and I am fortunate to be able to call her my friend.

My family has been the foundation upon which I could stand and reach for my dreams. I thank my parents, Gaylord and Kathy Browne, for their multiple forms of support, especially the moral support that has endured as I have pursued my goals and lived my dreams throughout the years. Now that I too am a parent, I can truly appreciate the difficulty of supporting a dream that takes a child far away. To my sister, Jenny, thank you for your continuous support and words of encouragement. Your confidence in my abilities always seemed to surpass my own. My grandmother, Barbara Burlingame, provided additional motivation by her excitement and interest in my research, her shared love of elephants, and her without-a-doubt belief that I would succeed in completing this dissertation. I am so grateful that each of you was able to visit Kenya either during my volunteer days or during my fieldwork, so that you could experience the beauty of Africa.

I am deeply grateful to my husband, Richard, who has sacrificed at every step of the way so that I could see this project through. This included giving up tenure to relocate during my write up and taking a year of leave to serve as the official driver for my project. Thank you for sharing the joys and trials all along the way, and always working to keep me focused on the positive. You have been my staunchest supporter, for which I will be forever grateful. Your calm and steady nature kept me from going over the deep end on more than one occasion. Thank you for being patient as the writing stage dragged on and for continuing to encourage me when I became cynical about completing this document. Most of all, thank you for taking precious care of our beautiful children so that I could dedicate the majority of my time to writing during the last several months.

Finally, thanks go to Mara and Kai, who joined our family during the latter part of my doctoral studies. You have added so much joy to life. I look forward to someday sharing with you the beauty of Kenya, its people and its wildlife.

TABLE OF CONTENTS

	<u>page</u>
ACKNOWLEDGEMENTS	4
LIST OF TABLES	13
LIST OF FIGURES	14
LIST OF ABBREVIATIONS.....	15
ABSTRACT.....	16
CHAPTER	
1 INTRODUCTION	18
2 STUDY AREA AND GENERAL METHODS	23
Study Area	23
Biophysical Description	23
Amboseli’s Elephants.....	24
The Human Context	26
A Brief History	26
Human-Elephant Conflict.....	29
Interventions	30
Methods	33
Stages of Data Collection	33
Attitude Survey.....	35
Creating a sampling frame	35
Selecting a sample.....	37
Questionnaire design.....	38
Enumerators	39
Managing bias	40
Follow-up Interviews.....	40
GPS Mapping of HEC Locations	41
3 ATTITUDES TOWARD WILDLIFE AND CONSERVATION ACROSS AFRICA: A REVIEW OF SURVEY RESEARCH.....	49
Introduction.....	49
Methods	51
The Science of Survey Research	52
Reliability and Validity	53
Conceptualization and Theory.....	54
Survey Quality	60
Coverage and Sampling Error	60

	Response Bias.....	65
	Interviewer Bias.....	65
	Other Error.....	66
	Equivalence, Comparability, and Cultural Sensitivity	66
	Discussion.....	68
	Conclusions.....	71
	Recommendations.....	72
4	THE MAASAI-ELEPHANT RELATIONSHIP: THE EVOLUTION AND INFLUENCE OF CULTURE, LAND USE, AND ATTITUDES	82
	Introduction.....	82
	Attitudes, Behavior, and Wildlife Conservation.....	83
	The Elephant in Traditional Maasai Culture	85
	The Maasai, Pastoralism, and Wildlife Conservation	90
	“Being Maasai”	90
	Maasai Pastoralism.....	91
	The Maasai as Conservationists	93
	From Early Attitudes toward Elephants to Modern Attitudes and Interactions	96
	Early Attitudes	96
	Measures of Attitudes	98
	Change, Conflict, and Intervention	99
	Current Attitudes	105
	The Future of the Maasai and Elephants of Amboseli	107
	Economic Opportunities and Other Benefits.....	110
	Land-Use Planning.....	111
	Conclusion.....	112
5	PREDICTING INTENTION TO ALLOW ELEPHANTS ON PRIVATE LAND: AN INTEGRATED MODEL OF COGNITIVE AND CONTEXTUAL VARIABLES.....	113
	Introduction.....	113
	Humans and Elephants	114
	Conceptual and Theoretical Framework.....	119
	The Cognitive Hierarchy	119
	Value Orientations.....	120
	Attitudes	121
	Norms	123
	External Variables	124
	Demographic variables.....	124
	Prior experience.....	127
	Knowledge of elephants	127
	Risk perceptions	130
	HEC mitigation interventions.....	131
	Methods	133
	Study Area	133
	Sampling Procedure.....	136

Questionnaire Design	137
Variables of the Cognitive Hierarchy	138
Variables External to the Hierarchy	140
Future Land Use	143
Validity and Reliability	143
Analysis	144
Results.....	145
Voting Intention and Demographics	146
Wildlife Value Orientations	147
General Attitudes toward Elephants.....	149
Specific Attitude toward Allowing Elephants in Group Ranches	151
Subjective Norm.....	153
Prior Experience	154
Knowledge of Elephants.....	155
Risk Perceptions	156
HEC Mitigation Interventions	158
The Model	162
Future Livelihood Activity.....	165
Discussion.....	166
Wildlife Value Orientations	166
General Attitudes Toward Elephants.....	169
Specific Attitudes toward Allowing Elephants in Group Ranches	170
Subjective Norm.....	171
Demographics.....	172
Prior Experience	174
Knowledge of Elephants.....	175
Risk Perceptions	175
HEC Mitigation Interventions	177
The Model	180
Future Livelihood Activity.....	181
A Note on Gender.....	182
Limitations and Future Research	183
Conclusions.....	186
6 CONCLUSIONS	209
General Results and Implications for Elephant Conservation.....	209
Predicting Tolerance of Elephants.....	209
Mitigating Human-Elephant Conflict.....	213
Theory and Methods in Attitude Research in Africa.....	215
Feedback from Respondents.....	217
APPENDIX	
A PRELIMINARY RESEARCH REPORT OCTOBER 1, 2002	219
B GPS DATA COLLECTION WORKSHEET	223

C ATTITUDE QUESTIONNAIRE – ENGLISH VERSION.....	226
REFERENCES	251
BIOGRAPHICAL SKETCH	283

LIST OF TABLES

<u>Table</u>	<u>page</u>
2-1 Population of Kajiado District 1969-1999	42
2-2 AERP consolation payments.....	42
5-1 Kellert’s typology of attitudes toward animals	187
5-2 Demographic characteristics by voting intention groups.....	191
5-3a Age-set representation in the study sample	192
5-3b Person type.....	192
5-3c Young and older age groups for analysis.....	192
5-4 Factor analysis of basic beliefs about wildlife	193
5-5 Wildlife values orientations, attitudes, and norms by voting intention groups	194
5-7 Comparisons of mean expectancy, evaluation, and belief-evaluation product scores between respondents for and against allowing elephants in Group Ranches	198
5-8 Prior experience with elephants and voting intention groups.....	199
5-9 Locations where respondents see and like to see elephants.....	199
5-10 Correct responses to ten knowledge statements regarding elephants	200
5-11 HEC risk beliefs by voting intention groups.....	201
5-12 Knowledge and beliefs regarding HEC mitigation by voting intention groups.....	202
5-13 Frequencies for awareness organizations with HEC interventions.....	203
5-14 Multiple regression analysis results for attitude and norm variables.....	205
5-16 Current and future primary livelihood activity	208

LIST OF FIGURES

<u>Figure</u>	<u>page</u>
2-1	Map of study area – Amboseli National Park and surrounding group ranches, with Maasai <i>enkangs</i> in red.....43
2-2	Participatory mapping activity in Olgulului Group Ranch.....44
2-3	Focus group with women in Olgulului Group Ranch.....45
2-4	Wildlife identification cards.46
2-5	Livelihood cards depicting a teacher, wildlife conservation workers, pastoralism, cultivation, selling produce, selling handicrafts, and beekeeping.47
2-6	Follow-up interview with an elder conducted by George ole Lupempe.....48
5-1	The cognitive hierarchy model of human behavior.187
5-2	Hypothesizes model of predictors of willingness to allow elephants on private land188
5-3	The Gerontocratic Model: Distribution of Status by Age and Gender.189
5-4	Map of study area – Amboseli National Park and surrounding group ranches, with Maasai <i>enkangs</i> in darkened circles.....190
5-5	Mean belief expectancy and evaluation scores for voting groups regarding potential outcomes of allowing elephants in group ranches.196
5-6	Mean belief-evaluation products for voting groups regarding potential outcomes of allowing elephants in the group ranches.....197
5-7	Relationships between wildlife value orientations, attitudes, norms, and behavioral intentions, with external variables shown in gray.....204

LIST OF ABBREVIATIONS

AERP	Amboseli Elephant Research Project
AWF	African Wildlife Foundation
HEC	Human-elephant conflict
KWS	Kenya Wildlife Service
PA	Protected area
TRA	Theory of Reasoned Action

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

TOLERANCE OF WILDLIFE OUTSIDE PROTECTED AREAS: PREDICTING INTENTION
TO ALLOW ELEPHANTS IN MAASAI GROUP RANCHES AROUND AMBOSELI
NATIONAL PARK, KENYA

By

Christine M. Browne-Nuñez

August 2010

Chair: Susan K. Jacobson

Major: Wildlife Ecology and Conservation

The majority of Kenya's wildlife is found outside protected areas and depends on public tolerance for survival. This study examines residents' willingness to allow elephants (*Loxodonta africana*) in group ranches bordering Amboseli National Park, Kenya. Several interventions aimed at fostering positive attitudes and tolerance of elephants have been implemented to address the increasing level of human-elephant conflict. I (1) test social psychological theory and research methods used in North American human dimensions research, and (2) provide information for planning and evaluating elephant conservation interventions. My review of wildlife attitude survey research in Africa revealed limited use of theory and great variation in research methods. Using the cognitive hierarchy as a theoretical framework, I examined the predictive influence of wildlife values, attitudes, norms, and additional variables on intention to vote to allow elephants in group ranches. Key informant interviews, focus groups, and program record reviews were conducted to develop an interview questionnaire.

Results based on personal interviews with 569 group ranch residents indicate that 53% of respondents would vote to allow elephants in group ranches. General attitudes toward elephants, specific attitudes toward allowing elephants, and norms for allowing elephants explained 62% of

the variance in intention. Three wildlife value dimensions were identified and predicted attitudes, with a dimension representing indifference to wildlife demonstrating the most predictive ability. Gender, group ranch of residence, knowledge of elephants, level of worry about elephants, and awareness of human-elephant conflict mitigation interventions contributed to the prediction and understanding of wildlife value dimensions, attitudes, and norms.

This study demonstrates the transferability of social psychological theory and methods to a rural African setting and provides empirical support for expanding the cognitive hierarchy to include additional predictors of behaviors toward wildlife. Results show the importance and utility of understanding the constructs related to tolerance of wildlife. Recommendations include increasing awareness of human-elephant conflict interventions, increasing actual and perceived elephant-related benefits, providing an education program on elephants based on traditional and scientific information, and implementing land-use policy that would limit land use that is incompatible with wildlife conservation.

CHAPTER I INTRODUCTION

Protected areas (PAs) comprise approximately 12% of the planet's land surface and are a critical strategy for conserving species and ecosystems (UNEP-WCMC 2008). The importance of PAs in sustaining the multiple and diverse values (e.g., ecological, cultural, aesthetic) of the eco-regions of the globe cannot be overemphasized. However, PAs alone are insufficient for conserving species, ecosystems, and their human values. Ecosystems generally extend beyond the boundaries of PAs, where land is often inhabited by humans, often requiring that natural resources be actively conserved on private land. For migratory and dispersing wildlife, tolerance of local people is often essential to their conservation.

This situation is exemplified by the African elephant (*Loxodonta africana*), the largest land animal on earth whose dietary requirements necessitate foraging across vast areas. It is believed that 70% of elephant's range lies outside protected areas (Blanc et al. 2007), highlighting the importance of maintaining private lands as viable elephant habitat. Therefore, conservation efforts aimed at protecting the African elephant and securing habitat for its long-term survival need to be based on both ecological and human dimensions information.

People and elephants have coexisted for millennia with varying levels and types of interaction. People have hunted elephants for meat and ivory, elephants have posed threats to human interests (e.g., destroying crops, livestock, and other property, and posing a threat to human safety), and in some places, such as Maasailand in East Africa, where nomadic and semi-nomadic pastoralism were the primary, if not exclusive, land uses, people and elephants coexisted with low levels of interaction. Today, legal hunting of elephants is highly regulated and limited mainly to southern Africa, although poaching remains a significant threat. Crop depredation, the most common form of human-elephant conflict (HEC), is a critical issue in

elephant conservation as more land is converted to agriculture. In pastoral areas such as Maasailand, coexistence is threatened as a result of the evolving socio-economic landscape. It is evident that people have and will determine the fate of the elephant. Ongoing ecological and social science research is needed in the varied settings that people and elephants coexist in order to provide information for monitoring and adapting methods for protecting both species. This dissertation explores the human factors that have facilitated coexistence between people and elephants over time in an area historically dominated by Maasai pastoralism. I provide an historical and cultural foundation for understanding the Maasai-elephant relationship in what was once open rangeland before examining modern predictors of tolerance of elephants on Maasai group ranches around Amboseli National Park, Kenya.

The area that is now Amboseli National Park received its first PA designation in 1948, when the colonial government created the 3,260 km² Maasai Amboseli Game Reserve. The boundaries and size of the area have changed a number of times until, in 1971, it became the 390 km² park that exists today (see Chapter 2). This process resulted in land alienation for the traditionally pastoral Maasai, who have occupied the Amboseli region for hundreds of years. The creation of the relatively small national park also created artificial boundaries between people and wildlife, with implications for both. The Maasai not only lost land but also access to prime resources, including water in the springfed swamps within the park's borders. The migratory wildlife of the ecosystem now depend on the tolerance of the local people, which now includes immigrants (mostly farmers) from other ethnic groups, to gain wet-season access to grazing land outside the park.

Many conservation interventions are aimed at improving the attitudes of local people toward wildlife and conservation, especially where local people bear a disproportionate amount

of the costs of conservation. One approach has been to create economic benefits for local communities through integrated conservation and development programs (ICDPs). Amboseli National Park is the site of one of the first attempts to integrate conservation and development. In its early stages, it was touted as a model for local participation (Western 1994), but the history of conservation in Amboseli is one of broken promises and many failed projects. ICDPs aspire to develop the conservation of natural areas and the welfare of local communities (Michaelidou et al. 2002), and thus overcome the inequities and ineffectiveness that have typified conservation efforts in the developing world (Stankey 1989). Conservation efforts within ICDPs have ranged from promoting sustainable use of resources within conservation areas to enforcing strict limitations on resources use. Development activities have ranged from broad human development initiatives to specific compensation programs. While some view efforts to link conservation and development as beneficial for both ecosystems and human communities (Alpert 1996; Sibanda and Omwega 1996), others call attention to limitations and shortcomings (Wells et al. 1992).

Amboseli provides a special case for considering the drivers of coexistence between people and elephants. Until very recently, the Amboseli elephants have lived “a comparatively ‘undisturbed’ existence, responding primarily to environmental conditions rather than to the effects of human development” (Moss 2001). They comprise arguably the most well-known, free-ranging elephant population in the world, having been the subjects of the Amboseli Elephant Research Project since 1972 (Moss 2001). Similarly, the Maasai are among the most well-known cultural groups in Africa, and, until recently, noted for their steadfastness in maintaining their traditional lifestyle in a rapidly changing world, a culture that has been credited for the abundant and diverse wildlife found in Maasailand. There is a history, until recent decades, of coexistence

in an environment of little change. This historical relationship and the more recent period of change provide an opportunity to consider the roles of traditional culture and outside intervention on local human-wildlife interactions.

This dissertation had two broad purposes, one academic and the other applied. From an academic perspective, this study extends and tests theory and methods often used in North American human dimensions of wildlife research to a rural African setting. Human dimensions research draws from several fields in the social sciences, including anthropology, economics, psychology, and especially social psychology (Whittaker 2000). A great deal of this research is concerned with attitudes and related social psychological constructs. Using this approach, I surveyed the attitudes of people living around Amboseli National Park toward elephants and allowing elephants in group ranches adjacent to the park. I tested an integrated predictive model of cognitive and contextual variables, including attitudes, to explain variation in local peoples' willingness to accept elephants on the private lands around Amboseli National Park. From an applied perspective, the results of the research will provide local stakeholders with information on the human dimensions of human-elephant interactions around Amboseli. Specifically, conservationists can use this information to augment ecological research on elephants in order to make more informed decisions on how to conserve elephants in this evolving, human-dominated landscape. Findings can be used to evaluate and modify existing conservation interventions and to plan future initiatives.

Data for the dissertation come from a mixed-methods study that was conducted from 2001 through 2005. The details of the study area, including a brief history, and general methods for the study (from preliminary research to the final year of fieldwork) are provided in Chapter 2. Chapters 3 and 4 are based on my preliminary research. They were prepared for specific

publications and, therefore, are designed to stand alone. Chapter 3 was prepared as a journal article for *Human Dimensions of Wildlife* (Browne-Nuñez and Jonker 2008) and examines the use of attitude survey research in African wildlife conservation. It includes a brief overview of scientific principles and methodological issues of survey research and discusses how researchers have addressed these issues in rural African settings. The chapter closes with recommendations for future cross-cultural attitude research. Chapter 4 was written as a chapter for the forthcoming book *The Amboseli Elephants: A Long-Term Perspective on a Long-Lived Mammal* and explores the Maasai-elephant relationship over time by reviewing historical and more recent accounts of Maasai attitudes and behaviors toward elephants in the Amboseli region. It discusses the notion of the Maasai as conservationists and considers the role of culture, livelihood, conservation, and land-use change in influencing the Maasai-elephant relationship. Chapter 5 reports the results of the questionnaire survey, which was based on the theoretical model. It examines the predictors of willingness to allow elephants on private land and discusses the transferability of research theory and methods. Chapter 6 summarizes the overall results, conclusions, and recommendations for future research. A set of appendices includes a summary of the preliminary fieldwork, research aids (e.g., census worksheets, picture cards), and the survey questionnaire. These items are included in order to provide sufficient disclosure to allow the study to be fully evaluated and replicated.

While this research is focused on human-elephant interactions around Amboseli National Park, the overall findings are important in the wider context of conserving elephants on private lands, and, more broadly, to making decisions regarding wildlife conservation in settings of human-wildlife conflict.

CHAPTER 2 STUDY AREA AND GENERAL METHODS

Study Area

Biophysical Description

The Greater Amboseli Ecosystem is located in the Kajiado District of southern Kenya at the north foot of Mt. Kilimanjaro. At the heart of the ecosystem is Amboseli National Park (Figure 2-1), on the Kenya-Tanzania border, encompassing a 390 km² area of the approximately 8,000 km² ecosystem. Water availability is a critical limiting factor in this semi-arid savanna, which only receives an average of 350mm of rainfall annually, with a high level of temporal and spatial variability (Croze et al. 2007). Rainfall generally occurs during two seasons, October-December and March-May (Western and Maitumo 2004). The park lies within the Amboseli Basin, a former Pleistocene lake bed, and serves as the dry season concentration area for wildlife (Western and Sindiyo 1972). The ecosystem's boundaries are defined by the dispersal area of its large mammal community (Western 1973, 1975), with several species of the park's wildlife, including elephants, migrating seasonally, along with Maasai livestock, between the basin and the surrounding rangelands. These rangelands are divided into Maasai group ranches which contain various forms of land tenure and use.

Today, a small area, referred to as Lake Amboseli, floods seasonally, with a maximum level of only a few centimeters during the rains (Croze et al. 2007). This water, however, is saline due to the salts on the surface of the lake bed (Irungu 1992). Oscillations in the lake level, attributable to shifts in the climate, have occurred since 20,000 BP (Foley 1981). The writings and maps of early missionaries and explorers suggest there may have been an extensive, permanent lake (referred to Lake Njiri/Nyiri or Lake Luaya) as recently as the late 19th and early 20th century (Bannerman 1910; Rebmann 1850; Schillings 1906; Von Höhnel 1894). The only

permanent freshwater sources exist in the form of spring-fed swamps, with water originating in the forests of Mt. Kilimanjaro. Two of these swamps serve as critical wildlife habitat inside the park, while two other swamps to the east of the park, Namelok and Kimana, are heavily utilized for intensive agriculture by Maasai and other ethnic groups. There are also numerous seasonal dams, wells, and boreholes throughout the ecosystem, which reduce pressure on the central swamps (Croze et al. 2007).

The study area is dominated by grassland to the north of the park, *Acacia* woodland to the south, and wooded and bush grassland in locations with seasonal water (Croze et al. 2007). In addition to the variation in water throughout the study area, there are different soil types which influence vegetation and human land-use. The volcanic activity that produced Mt. Kilimanjaro left some areas covered with volcanic soils that allow rain-fed agriculture to the east of the park, but the majority of the study region is not suitable for cultivation. The temporal and spatial variation in resource availability makes transhumant pastoralism, which involves seasonal movements of people with their livestock, and wildlife conservation the most viable land-use options for this area (Bulte et al. 2008; Fratkin 1994; Galaty 1992; Homewood and Rodgers 1984).

Amboseli's Elephants

Amboseli is one of the most popular parks in Kenya (Okello et al. 2001) and is a top earner among the country's parks (Bulte et al. 2008; Croze et al. 2007). The combination of wildlife viewing, cultural experience, and an extraordinary view of Mt. Kilimanjaro, makes Amboseli a unique and highly desirable tourist destination. The Amboseli elephants are a key component of this ecosystem. As the subjects of several documentaries and multiple research projects carried out under the the Amboseli Elephant Research Project, they are the most well-

known, free-ranging elephant population in the world (Moss 2001) and they are emblematic of the critical and complex role of elephants at the local, national, and international level – coexisting with pastoral people for thousands of years, increasingly in conflict with transitioning human neighbors, and drawing attention and revenue from abroad.

Based on fossil evidence, elephants have been present in the region for at least tens of thousands of years and probably much longer (K. Behrensmeyer, pers. comm.). Local elephant numbers have likely fluctuated significantly as a result of resource availability and human activity, especially in the last two centuries. In 1850, Rebmann stated that “much ivory is to be found” (p. 309) on the banks of Lake Luaya, but just over thirty years later, when describing the “marvellous abundance” of wildlife on the Njiri Plain (the area north of Amboseli), Thomson (1883, p. 276) made no mention of elephants, possibly indicating a decline in numbers during a period of intense hunting for the ivory (see Wimmelbücker 2002 for statistics on ivory trade during the 19th century). Evidence of this comes from Krapf (1860) and Schillings (1906, p. 153) who stated, “by the end of the last century [the land] was denuded entirely of ivory and elephants.” While the high demand for ivory at this time no doubt took a toll on the region’s elephants, some variation in observed elephant numbers may be attributable to seasonal migration and shifts in ecological and hydrological conditions. Maasai elders have stated that elephants only moved into the Amboseli basin after woodlands spread across the basin around the turn of the century – likely corresponding to a lowering of the lake (Western and Sindiyo 1972). By 1975 there were approximately 480 elephants in the Amboseli population (Moss 1977). During the time of my attitude survey there were approximately 1,500 elephants in the population, with over 1,000 primarily using the private lands outside the park (C. Moss, pers. comm.).

The Human Context

The Maasai moved into the Amboseli area approximately 400 years ago (Jacobs 1975, Kituyi 1990), but they were not the first pastoralists in the region. Other pastoral groups have occupied present day Maasailand,¹ an area extending from north central Kenya south to the central rangelands of northern Tanzania, for thousands of years (Ehret 1971; Foley 1981; Jacobs 1975; Kesby 1977). There is an extensive literature on the history the Maasai and their predecessors (e.g., Bernsten 1980; Galaty 1981; Jacobs 1975; Low 1963) and a corresponding lack of agreement about how and when these groups (e.g, the Iloogalala noted by Fosbrooke 1948; Jacobs 1968; Galaty 1991), who practiced varying degrees of pastoralism, came to occupy present-day Maasailand (Hodgson 2005). While the Maasai have been credited for the abundant wildlife in Maasailand, the explanations for this circumstance are largely anecdotal and have ranged from tolerant attitudes among the Maasai to the compatibility of pastoralism with wildlife conservation (see Chapter 4). Today, as the Maasai way of life undergoes rapid transformation, the implications of change for wildlife must be considered. Before interpreting current conditions, it is useful to gain an understanding of past events that have a bearing on the current state of affairs. While a complete discussion of Maasai history is beyond the scope of this dissertation, a brief review will contribute to understanding the present and planning for the future (see Kangwana and Browne-Nuñez, in press, for a more detailed discussion).

A Brief History

The current range of the Maasai is largely the result of colonial interventions. It was recognized as early as 1904 that the Maasai regions of Kenya had the highest concentrations of wildlife. Meinertzhagen's (1983) diary entry for 18 April 1904 reads:

¹ Maasailand is not “an administratively defined area”, but is a loosely defined region occupied by diverse groups of Maa-speaking peoples (Homewood et al. 2009, p. 1).

In view of the likelihood of a vast invasion by European settlers it seems that the large game must disappear. I have suggesteda structure for a very large area in country unsuitable for white settlement where game can exist forever. I think that the area might be some three or four thousand square miles and possibly in Maasai country. The Maasai are good game preservers but are very wasteful of grazing lands.

This statement was made following huge population crashes among pastoralists and livestock resulting from a series of epidemics that occurred in the latter part of the 19th century (Enghoff 1990). The same year the colonial administration took steps to contain the Maasai in a defined area, mainly in order to free land for European settlers. A treaty was signed between the government and Olenana, a Maasai spiritual leader (*oloiboni*). The treaty confined the Maasai to two reserves (Grandin 1986; Kituyi 1990), with the Maasai losing approximately 90% of their former territory (see Kituyi 1990). The Southern Reserve, a 27,700 km² area, included what is now Amboseli (Croze et al. 2007).

In 1948, a 3,260 km² area of the reserve was designated as the Maasai Amboseli Game Reserve (Croze et al. 2007), where the Maasai and their livestock continued to coexist with wildlife. Almost 25 years later, in 1974, a much smaller area (390 km²) became what is now Amboseli National Park, from which the Maasai were excluded. There were several implications for the Maasai in the creation of the park, including eviction for those residing in the demarcated area and loss of access to critical water sources and grazing pastures. Outside of the park other changes in land tenure were underway which would affect the way the Maasai view land. Traditionally, the Maasai did not see land as something to be owned. It was a resource to be managed for livestock grazing, but, following independence in 1963, the Kenyan government began allocating land to influential members of the community in an effort to bring the area into the national livestock market (Fratkin and Mearns 2003). By 1968, many Maasai were becoming concerned about losing access to grazing land and agreed to a group ranch

system, where groups of individuals were given legal title to land. The group ranches were communally operated until the 1980s when subdivision and privatization started to take place. The group ranches surrounding Amboseli resisted subdivision until recently.

Present Status

As of 2006, of the 52 group ranches in the Kajiado District, 32 had completed subdivision and 15 were in the process of subdivision, leaving only 5 that had not started the process (BurnSilver and Mwangi 2007). Olgulului-Lolarrashi, hereafter referred to as “Olgulului,” and Kimana-Tikondo, hereafter referred to as “Kimana,” were among the last to begin subdivision. Kimana completed the process in 2005, and in 2007, the rain-fed and irrigated agricultural areas of Olgulului were being subdivided. The two group ranches comprise the current study area (Figure 2-1).

Immigration is another factor influencing Maasai culture and land use around Amboseli. In the last several decades the human population in the Kajiado district has grown at a high rate relative to the national rate (Table 2-1). This growth is largely the result of immigration by Kamba and Kikuyu farmers (Campbell et al. 2000; Fratkin and Mearns 2003). While the human population has grown, livestock numbers have remained relatively consistent (Bekure et al. 1991), meaning there are fewer livestock per capita and, therefore, pastoralists have become poorer (BurnSilver et al. 2008). Many Maasai are shifting from livestock-based livelihoods to more diversified livelihood strategies, including agriculture and tourism enterprise. Shifting livelihood strategies has implications for pastoralists and wildlife. For instance, settlement of the better watered areas for agriculture has reduced the area available for dry-season grazing and access to water for livestock and wildlife (Campbell et al. 2000) and affects wildlife migration corridors. The expansion of agriculture, along with the growing human and elephant populations, has significant implications for Amboseli’s elephants.

Human-Elephant Conflict

Human-elephant conflict (HEC) is a growing problem across Africa (Ngure 1992; Waithaka 1993; Hoare 1995; Tchamba 1995; Thouless and Sakwa 1995; Barnes 1996). Deaths and injury to both humans and elephants occur as a result of this negative interaction. Most incidents of conflict with elephants involve crop raiding or competition for water and grazing resources. Human-elephant conflict is a costly problem both economically and psychologically for people living with wildlife. Elephants also suffer through loss of habitat and access to resources and through injuries and mortality caused by local people and wildlife management authorities.

HEC in Amboseli is the result of the increasing human and elephant populations, and changing land use, described above. This conflict has resulted in injury and death of people, elephants, and livestock, and other losses, including crop losses and damaged water pipes. From 1993 to 2005, elephants killed 18 people and injured another 18 (Croze et al. 2007). Thouless et al. (2008) provide a review of figures on elephant mortality in Amboseli, with variation between the records of the Kenya Wildlife Service (KWS) and the Amboseli Elephant Research Project (AERP). Causes of mortality include accident, sickness, natural, HEC, KWS control shooting, poaching, and unknown. For the period of 1993-2001, figures for elephants killed in conflict range from 13 (KWS) to 41(AERP). During the same period, elephants killed by KWS's Problem Animal Control Unit range from 9 (AERP) to 19 (KWS). According to AERP, 133 animals died of unknown causes during this period. Thouless et al. (2008) speculate that the records of AERP are more accurate given that each individual in the Amboseli elephant population is known by AERP researchers. In the mid-1990s, KWS realized it was shooting a large number of animals and has since tried to shift from their shoot-on-control policy to using

alternative methods, such as driving elephants from conflict areas with helicopters, and now KWS considers shooting elephants a last resort (P. Omondi, KWS Elephant Programme Coordinator, pers. comm., 2002).

With continued population growth, land-use change, and no national land-use policy, it is likely that HEC in Amboseli will increase and pose a significant threat to people and elephants. Several organizations are working to mitigate conflict and secure habitat for Amboseli's elephants outside of the park by encouraging land-use activities that are compatible with wildlife conservation, such as pastoralism and wildlife-based tourism (P. Omondi, KWS, pers. comm.), and through interventions designed to reduce human-elephant conflict.

Interventions

Tourism enterprise is often viewed as a viable alternative to pastoralism or as a source of supplemental income, especially given the popularity of Amboseli as a tourist destination. Moreover, the Maasai themselves are often viewed as a tourist attraction, evidenced by the use of their images in international tourism advertisements. To take advantage of this opportunity, the Maasai of Amboseli have created cultural bomas, Maasai homesteads where tourists can visit; observe demonstrations of daily activities, singing, and dancing; and purchase souvenirs such as women's beadwork. The process of creating and improving these bomas has been supported by organizations such as KWS and the African Wildlife Foundation (AWF). There is a growing number of cultural bomas throughout the area, with a concentration of bomas along the southern border of the park in Olgulului Group Ranch. There have been many problems associated with the bomas, including a blocked elephant corridor (see Chapter 4 for further discussion). Other tourism related opportunities include employment at area lodges, and, at the group ranch level,

revenue received from the Olgulului public campsite, lodges purchasing building materials, and rent and fees paid by tour companies and lodges.

KWS is a government parastatal with a mandate to conserve and manage Kenya's wildlife. As mentioned, today KWS is using various strategies to manage conflict with elephants (Omondi et al. 2004) and increase tolerance of elephants. In Amboseli, these include electric fencing, community sensitization (increasing awareness of tourism benefits and discouraging agriculture), elephant drives, a school bursary fund, creation of community wildlife sanctuaries, and problem animal control activities (PAC), which include chasing, scaring, and shooting problem elephants (shooting is only done when human life is at risk) (P. Omondi, KWS, pers. comm.). Perhaps the most obvious intervention, depending on one's location, is the installation of two solar-powered electric fences around Kimana (38 km) and Namelok (24 km) agricultural areas (Figure 2-1). The fencing project, funded by the European Union, was started in 1996 and completed in 2000 at a cost of 9,000 USD/km (Kioko et al. 2008). Individuals with *shambas* (farm plots) inside the fenced areas are responsible for electing fence management committees and financially supporting the monitoring and maintenance of the fences. In 2002, during the preliminary research for the current study, the fences were not fully operational, having been damaged by elephants and people – e.g., theft of power unit components (pers. observ.). There were also insufficient funds for managing the fences.

In 1998, AERP implemented a consolation scheme that pays for livestock (cattle, goats, and sheep) killed by elephants outside of the park in an effort to end the retaliatory spearing of elephants (AERP made retro-active payments for 1997, when negotiations for the consolation program began). The term 'consolation' was selected over 'compensation' due to the concern of KWS for setting a precedent for other sites of HEC in Kenya. Furthermore, 'consolation'

communicates that AERP, as a neighbor in the ecosystem, recognizes and is sorry for the loss of a valued animal (Croze et al. 2007). At the beginning of the research reported here, AERP had paid out 1,684,000 KSh (approximately 22,000 USD) for 137 animals over the course of eight years (Table 2-2) and the director of AERP believed that the program was positively influencing Maasai attitudes and helping to reduce the number of elephants being speared (C. Moss, pers. comm.). Although the spearing of elephants has not completely stopped (Maasai *ilmurran*, or warriors, spear elephants for other reasons²), retaliatory spearing of elephants due to HEC came to an end in the three group ranches participating in the program (both group ranches in the present study participate in the consolation scheme).

Although not intended for elephant conservation, the Government of Kenya (GOK) has a compensation program for human injury or death caused by wildlife (GOK 1989). Prior to 1990, a national wildlife damage compensation program existed where people were compensated for loss of crops, livestock and human life, but this was abolished in 1989 due to inadequate funds and a high level of corruption (Lusiola 1996). The current compensation program pays for human injury (15,000 KSh - approx. 194 USD) and loss of life (30,000 KSh - approx. 388 USD). There is no form of payment for losses of crops to wildlife.

As part of its Heartlands Project, a landscape approach to conserving wildlife, the overall goal of AWF's Kilimanjaro program regarding elephants is to ensure that the Maasai settlement areas bordering the park "are 'friendly' to elephants (and other wildlife) by reducing conflicts between humans and elephants" (AWF 1999). In 1999, AWF proposed an outreach program to be carried out at the "neighborhood" level, where the goal was to promote awareness and

² *Ilmurran* have been known to spear elephants to test their courage and skill (Moss 1988). Elephants and other wildlife are sometimes speared in reaction to other events as a demonstration of discontent.

communication through meetings, workshops and educational tours. Another goal was to promote benefit sharing. For example, one planned AWF activity was to assist the Maasai in improving the cultural bomas.

Methods

The present study, following Kangwana (1993), was conducted in the two Maasai group ranches that immediately border the park, Olgulului and Kimana (Figure 2-1). A multiple-methods approach was used to 1) build on previous research, 2) address concerns with cross-cultural research, 3) reduce the limitations of single-methods research, 4) allow for community participation, 5) obtain supporting information for a deeper understanding of questionnaire data, and 6) to advance a standard framework for attitude research in developing countries. Methods employed in this study, to collect both qualitative and quantitative data, include multiple literature reviews, key informant interviews, a stakeholder analysis, participatory mapping, focus groups, GPS mapping, document reviews, intensive enumerator training, two-stage pretesting (question-response formats and survey instrument), a questionnaire survey, and follow-up interviews. The use of multiple, complementary methods, can enrich overall findings and address limitations of certain methods by providing crosschecks and new information (Chapter 3).

Stages of Data Collection

Data collection occurred in three stages. First, multiple literature reviews were conducted from 2001 and were periodically updated through the course of the study. Reviews covered theory and methods used in North American and African conservation attitude research (Chapter 3); the histories of the Maasai and the general study area (present chapter and Chapter 4); elephant conservation issues, including HEC (present chapter and Chapter 5); and pastoralism in Africa, with a focus on Maasai transhumant pastoralism (Chapters 3 and 4). The historical

reviews were conducted because “it is essential to develop a thorough understanding of the community’s history and current dynamics, particularly in relation to the authority structures which influence peoples’ behavior and the patterns of resource use which form the basis for both conflicts and opportunities in wildlife management” (Kiss 1990, p. 25)³.

The second stage of this project was the preliminary fieldwork in Kenya, which took place in May-June 2002 (a summary is provided in Appendix A). The research included key informant interviews, a stakeholder analysis, participatory mapping (Figure 2-2) with residents of two Maasai group ranches, and an initial review of stakeholder organizations’ program records and reports. Through these activities, I was able to assess the need for and feasibility of the research, gain a better understanding of the socio-political and ecological context of the study site, establish key in-country contacts necessary for advancing the project, and assess the potential for a second, comparison site.⁴

Finally, the main fieldwork for this study was conducted August 2004-June 2005. The principal research during this period was a questionnaire survey focusing on values, attitudes, and behaviors toward elephants. To support and augment the survey, other methods were used including focus groups, GPS mapping, document reviews, intensive enumerator training, two-stage pretesting (question-response formats and survey instrument), and follow-up interviews.

My first task upon returning to Kenya in 2004 was to evaluate the current conditions in the study site, as two years had elapsed since the preliminary fieldwork. I met with representatives of conservation organizations working in the study area and reviewed current

³ Alexander and McGregor (2000) provide an example of where a lack of consideration of local history caused significant conflict in the implementation of a conservation and development program (the Gwampa Valley CAMPFIRE programme).

⁴ Upon securing funding for fieldwork, it was decided there was not adequate time or financial resources to conduct the survey at a second site.

project documents, where available. These included records of consolation payments made by AERP, project reports from AWF, and the HEC occurrence books of KWS (HEC occurrence data was collected by a research assistant in Loitokitok). I met with the newly-elected members of the group ranch committees and the park's new warden to gain permission for the research. I hired a Maasai university student, Grace Masarie, who was from Kimana Group Ranch, to assist me with operating the project – a political requirement and cultural and logistical necessity. She was later replaced with another local Maasai, George Ole Lupempe, who was from Olgulului Group Ranch, when she returned to university.

Attitude Survey

The central part of the overall study was the attitude survey, which was built upon and supported by all other components of the study. The survey was designed and carried out to meet the theoretical, methodological, and applied goals of the project.

Creating a sampling frame

The effort to establish a random, representative sample was a challenging undertaking. Census lists were not available and, given the mobility of a large portion of the population, existing maps of Maasai settlements were out-of-date. Therefore, a map was created by collecting GPS waypoints for each residential site (explained below) in the study area. Two field assistants, with previous GPS data collection experience, were each equipped with Garmin GPS receivers and census worksheets (Appendix B). They covered the entire study area on foot and by bicycle, capturing a total of 519 waypoints, along with data on household construction and composition. Waypoints were integrated into the AERP GIS database and a map of the study area including residences was created (Figure 2-2).

A waypoint could represent a traditional Maasai *enkang*; a *manyata* (*enkang* of *ilmurran* "warriors"); or a non-traditional, "modern" residence (Maasai or non-Maasai). An

enkang is typically a circular compound comprised of multiple houses (*enkaji*) all encircled by a thorny branch enclosure for protection from predators (livestock is kept within the enclosure at night). In the past, the *enkang* was comprised of approximately 6-12 polygamous households (Jacobs 1965 cited in Coast 2002), with each wife having her own house. Each individual house (a structure made of mud and dung) is traditionally built, maintained, and occupied by a married woman, her children, and sometimes the husband. These polygamous households or families, referred to as *olmarei*, are often used as the sampling unit in social research with the Maasai (Serneels et al. 2009).

As with Maasai society in general, the composition of the *enkang* is changing. Coast (2002), citing several others, notes that the trend toward the single-household *enkang* is increasingly evident. Today many men and some women (pers. observ.) are building their own modern, rectangular structures with grass or *mabati* (corrugated iron) roofs (requiring money). Changing values and lifestyles, brought on by numerous factors, including increasing poverty, are influencing household composition (Cochrane et al. 2005). For example, some women are seeking alternative sources of income (e.g., selling beadwork, agricultural products) and are even leaving the home to do so (e.g., moving to cultural bomas – see Chapter 4). The household count revealed a wide range of household compositions across the study area and, because a portion of the population moves seasonally with livestock, some settlement sites were classified as permanent and some as temporary. From the census sheets, we determined that there were 2,444 households in the study area: 1,606 (66%) in Olgulului and 838 (34%) in Kimana.⁵

⁵ A waypoint could represent a traditional *enkang*, comprised of single or multiple households, or a non-traditional, “modern” residence.

Selecting a sample

A multi-stage area sample (Weisburg et al. 1996) was selected to capture the increasing heterogeneity of the widely scattered, sometimes hard to reach, members of the population. Every effort was made to obtain a random, representative sample. Given the limits in resources and time, I selected the largest sample size possible to increase the possibilities of analysis and decrease the sampling error (Peil et al. 1982). A sample of 293 households (12% of total) was selected, with the goal of interviewing two adults (one male, one female) in each household ($n = 586$). This was first stratified by group ranch, following Kangwana (1993). Therefore, 193 households (66%) were selected in Olgulului and 100 (34%) in Kimana. While many studies seek to interview the household head, this limitation can cause serious bias, as the sample will likely be over-represented by elderly men, who differ significantly from other adults living in the household (Piel et al. 1982). Therefore, in addition to targeting both male and female respondents, I decided to select each respondent as randomly as possible. The following sampling procedure was employed:

- **Defining study area** - Olgulului and Kimana Group Ranches were selected to comprise the study site following Kangwana (1993), who selected these areas because of their proximity to park and the resulting level of interaction with elephants. Additionally, they were two separate political areas and they varied in predominant land-use.
- **Defining geographic regions** - Using the census map, the group ranches were divided into regions based on spatial distribution or clustering of settlement areas, commonly referred to as “neighborhoods.” These areas were labeled OLG distant north, OLG near north, OLG west, OLG south, OLG east, KIM kimana fence, and KIM namelok fence.
- **Determining proportions** - The total number of households in each of the regions was summed and divided by the total in the respective group ranch. This gave the percentage of households that each region contributed to the total. The percentage of each region was used to determine the percentage of interviews that should be done in each region. For example, in Kimana, where the desired number of sample households was 100, one region comprised 52% of the sample households, therefore 104 (52% of 200) was the desired number of interviewees from this cluster.

- **Selecting clusters** - Within each region the neighborhoods were numbered and then neighborhoods were selected using a random number table.
- **Selecting households** - Each *enkang* (term used here for convenience to indicate all types of residences) in a neighborhood was numbered. Every household in an *enkang* had an equal chance of being selected, as each *enkang* was assigned as many numbers as the number of households it contained. *Enkangs* were selected by using a random number table. Using this random technique, an *enkang* may not have any households selected or it may have had multiple households selected. Three alternate *enkangs* were selected in each neighborhood.
- **Selecting individuals** - We visited each selected *enkang* the day before the anticipated interviews to seek permission to return the next day. We sought an elder or household head to select a random number or numbers, depending on the number of households to be selected, between 1 and the total number of households in the *enkang*. We then used the number(s) to count around the circle of huts to locate the household(s) where interviewees were to be selected. For example, if there were six households in an *enkang* in which two households were selected, we asked the elder to randomly choose two numbers from 1 to 6. So, if he said “2” and “4”, we counted around the *enkang*, starting at the first house on the right from the gate we entered (an *enkang* has a gate for each *olmarei*) to identify the second and fourth households. We then asked the elder to give the adult composition of the household. We attempted to randomly select individuals (coin toss), if there was more than one adult female and one adult male associated with selected house and more than one was going to be present on the day of the interviews. This process was guided by an interviewee selection worksheet (Appendix B).

Questionnaire design

My assistant and I conducted nine focus groups (September 2004) to 1) elicit salient beliefs about wildlife, elephants in particular, and related issues, and 2) acquire appropriate, culturally-relevant, local vocabulary to develop the survey instrument (Figure 2-3). This, in addition to the preliminary fieldwork, also helped in building rapport in the community. The focus groups took place in three locations – Emeshenani (northern Olgulului), Enkong’u Narok (southern Olgulului) and Namelok (Kimana) – with three focus groups in each location (one with women, one with elders, and one with *ilmurran*) to capture variation by location, livelihood activity, and social standing as defined by age-set and gender.

Questionnaire items were developed using the knowledge gained from the focus groups, the review of the records and documents of various organizations involved in elephant

conservation in Amboseli, and key informant interviews. Attitudinal items were based on hypotheses, which were grounded in social-psychological theory and previous research. The questionnaire started with general questions regarding wildlife, progressed to questions specific to elephants, and concluded with socio-demographic questions. Questions were a combination of open- and fixed-response (yes/no, true/false, agree/disagree, etc.) questions. Open-ended questions were either field coded, where enumerators selected responses from pre-coded lists, or were coded during data analysis (for longhand responses). Picture cards were used to elicit responses to questions regarding identification of wildlife that occurs in the group ranches (Figure 2-4), wildlife that is liked/disliked (card sorting), problematic wildlife (ranking), and current and future livelihood activities (Figure 2-5).

Several methods were utilized to minimize error. The questionnaire underwent expert review by a panel of specialists with expertise in survey research theory and methods, elephant conservation, program evaluation, and local culture. Question-and-answer formats were pretested before the final draft of the questionnaire underwent two stages of pretesting. The questionnaire was translated into Swahili (by my assistant and me) and Maa (by my assistant and another Maasai – a former conservation project manager). The Swahili version was back-translated by a language instructor at the Hekima Language Services, Ltd., in Nairobi to check for accuracy and equivalence of meaning. The Maa version was reviewed by ten Maasai people from Amboseli who had completed secondary school and were fluent in Maa and English.

Enumerators

A pool of potential enumerators received intensive training during a week-long workshop. The final four selected to work on the project spent an additional week conducting closely supervised practice interviews among a subsample that was excluded from the analysis. Enumerators were closely supervised by my assistant and me on a daily basis and required to

review and sign each questionnaire upon completion. They also answered a series of questions at the end of each questionnaire regarding the circumstances of the interview (e.g., did anyone interfere with the interview) and the respondents' demeanor (e.g., was the respondent interested, cooperative, honest, etc.). Questionnaires were then reviewed by the field supervisor, who also signed the questionnaire to confirm it had been checked for errors and completeness. Finally, I checked the questionnaires prior to data entry. My assistant and I promptly followed up with enumerators if there were any questions.

Managing bias

At the close of each interview, respondents were asked for their thoughts on the interview to provide an evaluation of potential bias. Questions included a general evaluation of the interview, who they thought we represented (respondents were informed at the beginning of the interview that we represented the University of Florida), if they were interested in receiving information on the results of the study, and if they had been interviewed by other researchers. In an effort to distinguish the research team from other organizations working in the area, we wore matching T-shirts with a "Human Dimensions of Wildlife Research Project" logo and had the same logo on the research vehicle used to move about the study area.

Follow-up Interviews

Follow-up interviews were conducted in May 2005 with individuals and groups working and living in the study area. The purpose of the interviews was to clarify and support information gathered in the survey of local residents. Interviewees included lodge managers, the Olgulului public campsite manager, members of the Olgulului Group Ranch Committee, members of the Game Scouts Association, and senior elders from the community. Lodge managers were asked about their involvement in community and conservation projects (including the cultural bomas), and the number and types of positions held by local Maasai in their lodge. The public camp

manager was asked about the history of the campsite and the revenue generated by the camp. The group ranch committee was asked about their perceptions of conservation and development issues in the area, including wildlife in general, elephants in particular, subdivision of the group ranch, and future land use. The game scout interviews focused on the duties of the scouts, their interactions with people in the community, and perceptions of human-elephant conflict in the area. Finally, five senior elders were interviewed (one was apparently the oldest person in the region, stating he was 100+ years old) about the changes that have occurred in the Amboseli ecosystem since they were children, what wildlife means to the Maasai, and their perceptions of elephants (Figure 2-6).

GPS Mapping of HEC Locations

In addition to the GPS mapping of settlement sites, a second team of GPS assistants collected waypoints for each site of HEC recorded in the KWS occurrence books in Loitokitok (for the years 1999-2004) and using data from AERP's consolation records (for the years 1997-2004). It is recognized that these records do not provide a complete record of each occurrence of HEC. It is likely that many cases go unreported, especially less severe incidents. Nevertheless, because HEC is a highly salient issue, it is believed that a vast majority of cases are reported, providing an additional layer for analysis of the human dimensions of HEC in this region. Although it is not reported here, an examination of the reported sites of HEC and spatial variation in attitudinal variables examined in this dissertation should provide additional insight for stakeholders working to mitigate HEC.

Table 2-1. Population of Kajiado District 1969-1999 (adapted from Campbell et al. 2000)

Year	Kajiado District			Kenya
	Population	Inter-census growth (%)	Avg. annual growth (%)	Avg. annual growth(%)
1969	85,093 ^a			
1979	149,005 ^a	75.1	5.76	3.8
1989	258,659 ^a	73.6	5.67	3.4
1999	405,000 ^b	56.6	4.58	2.9 ^a

^a Kenya Central Business of Statistics, Population Census 1969, 1979, 1989

^b Ministry of Finance and Planning, February 2000. Provisional Results of the 1999 Population and Housing Census

Table 2-2. AERP consolation payments

Year	Livestock killed	Consolation payment
1997	7	75,000/-
1998	1	5,000/-
1999	4	30,000/-
2000	28	400,00/-
2001	3	35,000/-
2002	32	307,500/-
2003	18	250,000/-
2004	44	581,500/-
Total	137	1,684,000/-

Source: AERP records



Figure 2-2. Participatory mapping activity in Olgulului Group Ranch.



Figure 2-3. Focus group with women in Olgulului Group Ranch.



Figure 2-4. Wildlife identification cards.



Figure 2-5. Livelihood cards depicting a teacher, wildlife conservation workers, pastoralism, cultivation, selling produce, selling handicrafts, and beekeeping.



Figure 2-6. Follow-up interview with an elder conducted by George ole Lupempe (pictured).

CHAPTER 3
ATTITUDES TOWARD WILDLIFE AND CONSERVATION ACROSS AFRICA: A REVIEW
OF SURVEY RESEARCH¹

Introduction

Human-wildlife conflict is increasing across Africa (Ngure 1992; Waithaka 1993; Hoare 1995; Tchamba 1995; Barnes 1996; Madden 2004). As human populations and demands for land increase throughout the continent, human-wildlife conflict will continue to increase and less land will likely be available for parks and protected areas. Outside of protected areas, wildlife will increasingly depend on dispersal areas occupied by people; therefore, enlisting the support of local people is, and will continue to be, critical to management and conservation efforts. Part of this process entails understanding people's attitudes and beliefs as they are posited to influence human behavior (Fishbein and Ajzen 1975; Ajzen and Fishbein 1980); therefore, understanding individuals' attitudes can help managers better predict the response and support of local people to wildlife policies.

Data gathered from attitudinal surveys give guidance to management decisions and act as a baseline to test the effects of policy decisions. This information has shown to be effective in assessing the success of experimental policies such as increasing benefits to communities and using locally recruited game-guards (Lewis, undated). Information that describes the origin and links between public attitudes toward wildlife and the acceptability of management actions provides wildlife officials and stakeholders with the data needed to discuss competing public beliefs, address potential misunderstandings, and develop solutions (Vaske and Donnelly 1999;

¹ This chapter is reprinted by permission of the publisher, Taylor & Francis Ltd. The original citation is: Browne-Nuñez, C. and S.A. Jonker. 2008. Attitudes toward wildlife and conservation across Africa: A review of survey research. *Human Dimensions of Wildlife* 13(1): 47-70.

Zinn et al. 1998). Key to the successful application of survey data is to ensure the rigor of the methodology.

This article examines the use of attitude survey research in Africa, particularly in East and southern Africa where conservation attitude research is increasingly utilized. We focus on Africa for a number of reasons. First, this review was originally part of the preliminary research for a project examining the attitudes of local people toward elephants in a human-elephant conflict area in Kenya. Second, the original literature review revealed a variety of methodological approaches in previous studies, which lead to several questions regarding the basic canons of empirical research such as measurement, testing of theories, reliability, and validity. Third, we found that it is common practice in much of the literature to compare or lump findings from previous studies across cultures, regions, and countries leading to questions about their comparability or generalizability. This seems to be especially true of any discussions of Africa, scientific or otherwise. One often hears blanket statements about the continent, rather than specifics about a country, region, or culture. Another important issue that arose was that of sufficient disclosure to allow a study to be fully evaluated and replicated. Finally, with the growing body of literature in this area, we ask if it is possible, given the variation, to develop a standardized methodology for attitude research in Africa that can be extended to other developing regions.²

While survey research in Africa is not new (Richards 1935; Schapera 1935), it has only become a common tool in African wildlife conservation in the last few decades (Table 3-1, Table 3-2). It has been suggested that data from attitudinal studies such as these are useful for

² While it is beyond the scope of this paper to include survey research from other developing regions of the world, we believe the issues raised here are applicable in the global context.

comparing attitudes toward conservation in different regions and under different conditions (Hackel 1990, Harcourt et al. 1986). However, we caution that often only general trends in the data should be considered. Researchers face several difficulties when conducting social surveys in Africa - language barriers and cultural differences between researchers and the local people, population dispersal, lack of census information, transportation limitations, potential respondents' lack of experience with survey research and willingness to participate in surveys, and security concerns. Each of these concerns may affect methodology. Making meaningful comparisons when the specificity of methods and constructs vary or are unknown across studies may lead to misinformed decisions and recommendations.

This review of attitudinal studies from different parts of Africa should reveal the strengths and weaknesses of survey data thus far and identify future research needs. We begin with a brief overview of scientific principles and methodological issues in survey research in general. We then consider these as they are transferred to other countries and used cross-culturally. Next we examine if and how the studies in this review address these issues. Additionally, we will attempt to answer the aforementioned questions raised during the literature review for the preliminary research using insight gleaned from the studies reviewed here and by looking to the expertise of researchers from various fields of social science inquiry.

Methods

As part of the preliminary research, a search was initially performed in 2001 in the Web of Science database using the keywords 'attitudes', 'wildlife', 'conservation', and 'Africa'. No limitations on time frame were implemented. Our initial search identified five attitude studies, with the earliest published in 1990. A follow-up search was conducted in 2006 to obtain the most recent literature. Citations in the published studies were used to identify unpublished

findings. Where possible, copies of unpublished documents were solicited from the respective authors. Articles were excluded if they did not specifically use the term ‘attitude’ (i.e., papers were excluded if they used ‘opinion’ or ‘perceptions’), if the researcher(s) did not use a questionnaire, and if the sampled population did not include local people. Cases were also excluded if they failed to provide an adequate account of their methods. Studies were then compared across several categories related to survey development and implementation.

The Science of Survey Research

The many disciplines in the social sciences offer a wide variety of research methods, but perhaps none is more widely shared than the survey. With its origins in sociology, scientists from numerous disciplines employ the questionnaire survey in their research today. Some key features of Western survey research have been random samples, standardized questions measuring demographic and sociological variables, trained interviewers, and statistical analysis (Heath et al. 2005). As with all data collection techniques, survey research has advantages and disadvantages. Some strengths associated with surveys are that they permit large samples representative of populations; have the same questions and meanings, at least in theory, being applied to all respondents making results more reliable; and provide quantitative data allowing for efficient and rigorous statistical analysis. On the down side, standardization limits flexibility, not only limiting what you ask, who you ask, and how you ask, but, more broadly, the research design must stay the same throughout, even if field conditions warrant adjustment. For these and other reasons, the survey may not always be the method of choice. Awareness of the strengths and weakness of a chosen method is the first step in selecting the best method and in mitigating threats to the quality of research. Our objective here is not to argue that one method is better or more appropriate than another, as it is up to the researcher to determine the best methods depending on the research. Rather, we believe that the rapid increase in survey research in

African wildlife conservation and its varied approaches warrants a review so that we may examine survey quality and consider the implications for policy decisions for managing human-wildlife conflict and wildlife conservation in general.

As in all areas of empirical investigation, researchers conducting surveys must work under the central tenets of scientific inquiry and strive to obtain data that is reliable, valid, representative, and generalizable. In doing so they can ensure that findings will not only stand up to scrutiny, but also contribute to well-informed decisions and practices. Other important issues of empirical research are conceptualization and the use of theory. Specific to survey research are the additional issues of survey quality such as coverage error, sampling error, nonresponse error, and measurement error (Groves 1987). What constitutes quality survey research has largely been defined by Western researchers, particularly those in the U.S. (Harkness 1999). While survey research has a longer history in the West, there still remain quality issues requiring ongoing refinement. In cross-cultural research these issues must also be considered as they relate to translation and cultural appropriateness (Harkness 1999). While a thorough discussion of these concepts is not within the scope of this paper, we provide a brief overview, consider how quality issues can be exacerbated in developing countries, and examine these concepts in the context of the studies we review.

Reliability and Validity

We start with the concepts of reliability and validity as good research must be reliable and valid (Nunnally and Bernstein 1994). Data that is neither valid nor reliable is also not generalizable. Reliability refers to “whether a particular technique, applied repeatedly to the same object, would yield the same result each time.” (Babbie 1995, p. 124). A general definition of validity “refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration (Babbie 1995, p. 127). Several types of validity need

to be considered that include, but are not limited to internal, external, content, and construct validity. Reliability and validity are important in all disciplines that engage in scientific inquiry and are considerations in every aspect of the research process.

Conceptualization and Theory

Carefully defining what is being measured, grounding research in theory, and developing measurement items that are reliable and valid are important first steps in attitude research.

Deciding how to measure something depends on how we define it. Conceptualization is the “process through which we specify what we will mean when we use particular terms” (Babbie 1995, p.114). Many concepts measured in the social sciences are broad and varied in how they are defined. If we are to communicate logically about a given concept it is important that we agree upon its meaning and how to measure it. Conceptual definitions are most valuable when they are linked together to support theories that help to explain research results (Bernard 2002).

The concept of attitude has been defined many ways, but a commonality among definitions is that attitudes are evaluations or feeling states about an attitude object. Individuals may hold attitudes toward a wide variety of objects, including social issues, natural resource issues, categories of people or situations, specific individuals, animals, and physical objects (Fazio 1995). Depending on how one defines attitude, there are several ways to measure this construct. Bem (1970) defines an attitude using a simple evaluative statement such as “I like apples” or “I don’t like oranges.” Under this definition, a survey could have a single indicator for an attitude. Responses to a single item indicator as measures of attitudes are suspect, since they do not have the built-in potential of scales for reducing measurement error (Heberlein 1981). Moreover, these types of items merely ascertain single beliefs, rather than the organization of beliefs and affect which comprise an attitude. Another definition, which captures the complexity of attitude, is the organization of beliefs, evaluative beliefs, and affect about the attitude object

(Rokeach 1968). Under this definition, a combination of items, each measuring a different facet of attitude, would be used. A multiple-item indicator or scale approach provides a more valid and reliable measurement.

The definition of the concept being measured and the indicators being used in measurement are often determined by theory. For instance, many attitude-behavior studies in the United States are based on the Theory of Reasoned Action (Fishbein and Ajzen 1975; Ajzen and Fishbein 1980). Theory is important as it extends the generalizations of findings, enhances the rigor and confidence of research, offers structure for building upon earlier findings, and enables researchers to move beyond descriptive studies. An underlying assumption of many attitude studies in Africa is that there is a direct link between attitudes and behaviors. Therefore, it is important that attitude research is based on a theoretical framework that helps explain the various cognitive processes that influence behaviors (Decker et al. 2001; McCleery 2006).

Survey research is not new to Africa; nor is it limited to a specific discipline. Today, researchers in business/marketing; health sciences, especially related to HIV/AIDS; political science; education; and other fields frequently use the questionnaire survey to understand the values, knowledge, beliefs, attitudes, and behaviors of African peoples (Astrom and Okullo 2004; Jemmott et al. 2007; Murray-Johnson et al. 2000-2001; Orkin 1998; Rani et al. 2004; Uzoka 2007). With this global expansion in survey research, researchers are becoming more aware of the challenges of transferring measurement techniques developed in monocultural settings to cross-cultural research (Johnson 2006). We must consider the issues associated with exporting survey methods to other cultures, such as consistency of quality and, in the case of cross-cultural comparisons, equivalence of meaning (Heath et al. 2005).

Although there has been extensive attitude research and theory development in the U.S. regarding wildlife management/conservation, the transfer of theory developed in the West to wildlife conservation studies in Africa has not been widely tested. However, other disciplines (e.g., tourism, health sciences, psychology) have successfully applied theories such as the Theory of Reasoned Action (Lepp 2007), the Theory of Planned Behavior (Åstrom and Kiwanuka 2006; Jemmott et al. 2007), and the Theory of Basic Human Values (Schwartz et al. 2007). In their study of the cross-cultural validity of the Theory of Basic Human Values, Schwartz et al. (2007) found that although the theory did not prove applicable in rural areas of less developed countries, the use of a different measurement instrument proved the theory “more nearly universal than previous findings had suggested.” While theories may not be completely universal, further research is needed to clarify the limits of their applicability (Schwartz et al. 2007).

Most of the studies of attitudes toward wildlife and conservation in Africa are not based on theory and most do not define what is meant by the term attitude (Table 3- 1). One exception is a study of local peoples’ attitudes toward wildlife in Botswana (Mordi 1987). In this study, the researcher recognized the multiplicity of definitions of attitude in existence and offered a generic definition in an effort to “facilitate communication and promote shared usage.” Kellert’s (1985) typology of attitudes toward animals served as the conceptual framework (e.g., naturalistic, moralistic, utilitarian, etc.). The rationale for selecting Kellert’s typology over several others employed in the West was that its categories are “both mutually exclusive and collectively exhaustive of the universe of attitudes toward wild animals in Africa.” As an African, Mordi found this framework lacking in one dimension – fatalism – which he states is ever present in most African cultures. Therefore, he added an eleventh dimension he termed “theistic attitude.”

Although his study was grounded in Kellert's typology, Mordi used two theories on which to base his hypotheses: Roger's Diffusion of Innovation and Maslow's Hierarchy of Needs.

Mordi's (1987) original survey instrument contained ten agree-disagree statements for each item. Three pretests were conducted, and items that failed to yield consistent results were dropped. A different group of respondents was used in each pretest. The remaining fifty-one items reliably differentiated among respondents in a consistent manner (Table 3- 2). Mordi's use of different individuals to infer reliability may be considered dubious. Standard measures of reliability, such as the internal-consistency method and the split-halves method, were not performed. Measures, such as the split halves method and the test-retest method, involve using the same group of respondents.

The other studies reviewed here (Table 3- 1) did not define the concept of attitude nor ground their research in theory. For example, in a study of human-elephant conflict in Amboseli, Kenya, Kangwana (1993) included an examination of the attitudes of the Maasai toward wildlife and Amboseli National Park. The study was exploratory and, therefore, was not based on findings of previous work or on theory. The researcher recognized other attitude studies done in Africa, but stated that these surveys "were carried out with other peoples," implying that no comparisons could be made. Because of the exploratory nature of the research, Kangwana does not test hypotheses but puts forth four predictions.

Of course, the most important consideration in question development is, "Are you measuring what you think you are measuring?" – validity. Although there is no statistical procedure for measuring validity (Bernard 1995), factor analysis can be used to identify the number of constructs being measured by a set of items. Nevertheless, it is up to the researcher to define the nature of each construct. In Mordi's analysis, factor analysis indicated that his eleven

attitude types could only be explained by eight factors. The ecologicistic, humanistic, and naturalistic attitudes were not identified as independent types. He offered possible explanations for this outcome: (1) some questions may have measured more than one attitude type and (2) some indicators may have had stronger links to factors other than those they were intended to measure. As Mordi pointed out, this could have been avoided had the instrument been more intensively pretested. In the end, the issue of validity is left to the researcher's judgment and a review by recognized experts in the field of study. There are several ways to improve validity concerns that can be standardized across studies, such as improving external validity by drawing a random sample from the population, replicating the study, and so on.

Prior to developing her questionnaire, Kangwana (1993) conducted a pilot survey, which involved group interviews using an interview schedule and free discussion. During the pilot survey the Maasai were unwilling to answer Likert-scale, true/false, or agree/disagree questions. Some responses to these types of questions were, "That is a question without a head or a tail" and, "That depends..." therefore, questions on the final survey were open ended and the responses taken down in longhand. No tests for reliability were performed. Two questions each were asked to determine attitudes toward wildlife in general and elephants in particular, and three questions were asked to determine attitudes toward the park (Table 3-1). As was mentioned earlier, attitudes are complex constructs, and, in order to obtain a more comprehensive representation of attitudes, questions need to be asked that examine the various facets of an attitude, so, in this case, where there is a limited number of items measuring attitudes, results may be limited in contributing to the understanding of Maasai attitudes toward wildlife and Amboseli National Park.

Pennington (1983) used seven Likert-scale questions to measure attitudes (Table 3-1). No pretesting was undertaken, nor were any checks for reliability and validity performed.

Throughout the thesis, Pennington refers to attitude toward wildlife and conservation when all of her items are belief and opinion statements about Tanzania's national parks. To derive an aggregate attitude score, students were given points for their responses to each item, ranging from 2 (strongly agree) to -2 (strongly disagree), with "not sure" responses being assigned 0 points. No reliability analysis was conducted to test the internal consistency of this scale to ensure that all items were measuring the same concept.

Newmark et al. (1993) and Parry and Campbell (1992) used a combination of fixed response and open-ended questions. Parry and Campbell (1992) used eight questions to develop an attitude index in their investigation of attitudes toward animal wildlife in Botswana. Newmark et al. (1993) employed one question each to measure attitudes toward protected areas, protected area employees, and poaching.

Infield (1988), Akama et al. (1995), Gillingham and Lee (1999), Infield and Namara (2001), and Kaltenborn et al. (2006) are examples of research that used a fixed-response format. Infield selected this format for ease of interpretation of the data. He used two yes/no questions, ten agree/disagree statements, and five paired statements giving contradictory views in which the respondent was asked to pick the one with which they most agreed. In a study in Kenya (Akama et al. 1995), respondents were asked five questions related to their attitudes to an adjacent park. The questionnaires were supplemented with informal conversations.

Several researchers used an open-ended question format, including Omondi (1994), Hill (1998), De Boer and Baquete (1998), Holmes (2003), and Dickman (2005). Holmes (2003) only used one indicator to measure attitude toward a national park. De Boer and Baquete (1998)

determined a positive attitude associated with the term “liking.” Daily observations were conducted by De Boer and Baquete (1998) to validate the survey responses given by the local population. Hill’s (1998) rationale for the open-ended format was to “elicit more extensive discussions of some of the issues raised.” This reasoning is similar to Kangwana (1993) in wanting to “minimize the loss of information” (Kangwana 1993, p. 26).

Survey Quality

Coverage and Sampling Error

The level of coverage of a study depends on its sampling frame. Coverage can be a significant issue in any study, but may be an exceptional challenge in the developing world. Cost can be a limiting factor in the West and developing countries. It limits some studies to individuals with telephones or, for face-to-face interviews, can limit access to distant or hard to reach areas. A frequent limiting factor in the developing world is lack of any population registers. The primary issue when there is lack of coverage is whether the sample differs from the non-sampled portion of the population.

Sampling error reflects the effect of chance in the sampling process and is a measure of the degree to which a sample is unrepresentative of the target population. Confidence intervals and levels illustrate the degree of sampling error by relating how confident the researcher is that the sample statistics actually reflect the entire population’s characteristics. Adequate sample size provides greater confidence of representativeness so that conclusions drawn to inform policy are more likely to reflect the attitudes of the population rather than a minority or select few. When samples are smaller, the sampling error increases and this limitation needs to be recognized in many studies conducted in rural locations of developing countries.

Our review highlights the challenges in following standard sampling procedures in Africa (Table 3-2). Ensuring external validity may be one of the biggest challenges in developing

appropriate sampling procedures. The challenge lies in dealing with variables such as seasonal and long-term migration (e.g., moving with the rains) and lack of census information in developing countries. Unlike the typical U.S. survey, where an interview is conducted by phone or a mail survey is sent, in rural Africa where a majority of people do not have a phone, or a mailing address, researchers have to go directly to the respondent for personal interviews. For several studies examined in this paper, the sample unit was the household or family unit, with one person from each surveyed. The availability of population information varied, depending on location of the study. The following examples exemplify the variability in how researchers have addressed these issues.

Mordi (1987) sampled eleven sites in an attempt to obtain a representative sample of the economic, ecological, geographical, and cultural diversity of Botswana. The sites were the city of Gaborone, the University of Botswana, and nine rural areas. The population was stratified into age and gender subgroups. Each site required a different sampling method. Gaborone was divided into 103 geographical areas, of which thirty-one were randomly selected. In each area, every fifth house on each street was selected, and, at each selected house, an age-stratified schedule was used to select the target interviewee. At the university, one in every four students was selected from a composite list of all students. In large villages in the rural areas, one household in five was selected, and, in smaller villages, one in three was selected. At each hut, the respondent was selected if he/she met the statistics on a pre-defined questionnaire based on gender and age.

Kangwana (1993) had a listing of Maasai elders who were heads of homesteads around Amboseli National Park in Kenya. The list of homesteads was divided into two economic activity categories, predominantly pastoralist and predominantly agriculturalist. Using random

sequential sampling, homesteads were selected from the lists. Six homesteads were selected for a reserve list because of the fluid nature of Maasai settlement. To obtain a cross-sectional point of view, interviews were conducted with members from three sections of traditional Maasai society: elders, *ilmurran* (warriors), and women. On arriving at a homestead, the elder was interviewed first, out of respect for the structure of Maasai society. The first *ilmurran* encountered was interviewed next. *Ilmurran* were not always present and, in the end, were under-represented. Finally, the first woman encountered was interviewed.

Pennington (1983) selected fourteen of “20 or so” secondary schools in two regions. She did not explain how these two regions, or the fourteen schools, were selected. Because the Tanzanian government promotes de-tribalization, a bussing program mixes students from different regions/tribes; therefore, students at each school are not necessarily from that region. No further explanation of sampling methods was provided (e.g. selection of students within each school), although by the large sample size (n=800), it appears that each student present in each school was surveyed.

Newmark et al. (1993) investigated conservation attitudes of people living adjacent to five protected areas in Tanzania. An estimate of population for each area was available from a census conducted five years before the study, but dispersal information was not available. A proportional random-sampling design stratified by park was employed to obtain the sample size from each park and interviewees were selected by way of chance encounter.

Hill (1998) examined attitudes towards elephants in an area where elephants no longer reside. Similar to the previous example, Hill (1998) obtained the total population count from a census conducted a few years prior to her research. She interviewed 3.4% of the local population,

locating each participant by chance encounter while walking through the three villages in the study area, interviewing one adult per household.

Akama et al. (1993) in Kenya did not have any knowledge of population size or dispersal. Their study involved surveying people living adjacent to two national parks regarding their attitudes toward the state wildlife conservation program in Kenya. They chose areas that were attracting new settlers and selected interviewees by chance encounter at homesteads, on foot-trails, and in crop fields and livestock pastures.

Parry and Campbell (1992) examined attitudes of people in rural communities toward wildlife and its utilization in two different areas of Botswana. In one area, recent aerial photographs were available. Using the photographs, all household clusters were identified and clusters were then randomly selected. All of the households within the selected clusters were surveyed. No photographs were available for the other area, therefore, all households in which a resident was at home were surveyed.

Infield (1988) did not report the availability of population information in his study of attitudes of a rural community in South Africa towards conservation and a local conservation area. He established a study area 10-km wide around the conservation area, with the idea that “attitudes resulting from either positive or negative influences emanating from the conservation area will generally be most pronounced in those communities living in close proximity.” After dividing the study area into 140 numbered blocks, a simple random sample was taken. Thirteen households from each of the fourteen selected blocks were randomly selected.

Some samples were driven by availability of villages/households/people (Dickman, 2005; Gadd, 2005) or by wildlife activity (Lindsey, 2005). Sitati (2003) selected sampling areas by presence of human-elephant conflict areas and then randomized selection of households within

these areas. All but two of the remaining studies under review (Omondi 1994; De Boer and Baquete 1998; Gillingham and Lee 1999; Holmes 2003; Weladji 2003) randomly selected households across villages or ranches (Table 3-2).

Given the challenges of sampling in Africa, including obtaining an adequate level of coverage and large sample sizes, it is imperative that researchers carefully assess at what level their results will be meaningful in informing policy. As is evidenced here, various degrees of population information are available throughout Africa and researchers have to be resourceful in developing appropriate sampling designs for their studies that are based on the experience of previous research and theory. As we strive to standardize methodology where possible, we must ensure the highest level of randomization and representativeness. Maintaining this standard enables us to have confidence that our data are valid and generalizable.

Nonresponse Error

Another survey quality issue is non-response bias, which occurs when researchers generalize to a population without recognizing differences between respondents and non-respondents in attitudes, beliefs, and other related concepts. This weakens the validity of the information collected from a sample and limits the generalizability of the results. Response rates in the U.S. are declining (Heath et al. 2005) and the resulting non-response bias is a major concern. It is common practice in the U.S. to document nonresponse, but there is generally not good documentation in the global context (Heath et al. 2005). Most of the studies in this review did not address nonresponse, but of the few that did, the number of potential respondents that were unavailable or refused to be interviewed was low in each case.

Given that surveys in Africa are most often done through one-on-one interviews and therefore may have low refusal rates, documentation may seem less important, but nonresponse should be accounted for in all contexts. Documentation of the number of contacts, refusals,

unattainables, etc. needs to be maintained in order to determine the occurrence of non-response bias. If it is an issue, several statistical methods (e.g., weighting) are available to adjust the results so they are still valid and useful.

Response Bias

In addition, response bias can also impact survey results. It occurs when respondents perceive social pressure to provide responses that they think the researchers want to hear and therefore their answers may not reflect their true beliefs. Or respondents may be wary of who or what organization the researcher represents and may alter their responses accordingly, thereby biasing survey results. For example, in areas where conflict exists between local communities and the wildlife authority, respondents may fear retribution if they provide truthful responses when they believe the researcher is a representative of the wildlife authority. Newmark et al. (1993) state that some respondents in their study may have believed their interviewers, who were students and instructors at the College of African Wildlife Management, were affiliated with the wildlife and national parks officials. This sort of situation can be mitigated by establishing rapport and building trust in the community prior to data collection.

Interviewer Bias

Interviewer bias can also affect survey results. It occurs when respondent answers are influenced by interviewer characteristics such as appearance, behavior, and sex. In Africa, where researchers are often from another culture, this issue may be more pronounced. For example, women in rural Africa will likely feel more comfortable with a female enumerator; traditional people may be suspicious of people in Western clothing or those whose clothing is similar to government/wildlife officials; or when enumerators receive insufficient training, they are more likely to behave in ways that are inappropriate such as body language, prompting methods, and recording responses.

Interviewer bias can be limited by first being aware of its potential sources. The researcher(s) should have a thorough understanding of the local culture. A standardized program should be provided to each enumerator on the research team. Training should cover topics such as the purpose of the survey, explanation of the questionnaire, interviewing techniques, and how to record answers.

Other Error

Finally, there are other potential sources of error. For example, we note that there is a high degree of variation in study length (<1 month to 2 years) across the studies reviewed here (Table 3-2). The duration of the data collection period is a concern in attitude research because the integrity of the data can be compromised. The longer the data collection period, the more likely it is for other variables, such as stochastic events, immigration, and emigration to influence or bias study results. For example, Kangwana's (1993) interviews had to be completed before the Kenya Wildlife Service disbursed park revenue sharing benefits and started a new extension program.

Equivalence, Comparability, and Cultural Sensitivity

The globalization of survey research not only brings additional challenges to standard measurement protocols, but also requires special attention to other cultural considerations. Equivalence is increasingly recognized as a critical concept in cross-cultural research and lately has received significant attention by researchers across disciplines (Bulmer 1998; Heath et al. 2005; Johnson 2006; Peña 2007; Willgerodt 2003). Unfortunately, there is not a broad consensus on what this entails. Johnson (2006) provides a brief overview of various forms (n=62) of the concept he located in the literature. Examples include construct equivalence, cultural equivalence, linguistic equivalence, measurement equivalence, scale equivalence, and theoretical equivalence.

To demonstrate the importance of equivalence, we consider one of the broader conceptualizations, equivalence of meaning or linguistic and conceptual equivalence. In exporting home-grown instruments, researchers working cross-culturally need to consider if a term or a concept used in one society has the same meaning in another, how equivalence issues affect the validity of research results, and if the issues under investigation are culturally relevant. These are not new considerations. Scheuch (1968) called for functional equivalence rather than literal conversion, but given the abundant recent literature on the issue, it is an ongoing concern. Due to the “considerable disagreement, ambiguity, overlap, and contradiction among these various conceptualizations” there is obviously a need for further research and discussion among those conducting cross-cultural research (Johnson 2006, p. S17).

Awareness or cultural sensitivity is the first step in dealing with equivalence and finding mechanisms for overcoming problems. For example, in cases without an equal term or concept, equivalence may have to be achieved through circumlocution. A somewhat related topic often discussed in Western survey research is question wording. Survey researchers have found that even slight variations in question wording can produce dramatic changes in the distribution of answers (Weisburg et al. 1996).

Given the challenges and limitations associated with survey research in the typically rural African settings we are dealing with in our review, we must consider the validity of cross-cultural comparisons. It is likely safe to say that most studies are not designed with the intention of future comparisons with other studies. Even studies that are intended to be cross-national, with standardized instruments, face the same difficulties highlighted in this paper, such as equivalence and sampling (Bulmer 1998; Harkness 1999; Heath et al. 2005; Jowell, 1998; Kuechler 1998;

Scheuch 1989). With this in mind, we believe only broad comparisons can be made and, when doing so, variations and the resulting limitations of such comparisons should be reported.

A disregard for culture by researchers has been observed in various settings around the world (Rogler 1999). This disregard may take many forms such as when foreign researchers visit an area, collect their data, and return to their home countries to publish their findings with little or no benefit to the local culture. Another example is when researchers utilize Western concepts, theories, and methods in a culture different from where they were developed. Rogler (1999) discusses how such practices as relying on “expert opinion” in the case of developing content validity, standardizing instruments, errors in translation, and transferring concepts are acts of cultural insensitivity. Citing Manson (1997, p. 251) he states that “[standardized] instruments may be ‘incomprehensible’ and ‘unacceptable’ to respondents from a different culture, and sometimes they are downright ‘irrelevant’” (Rogler 1999, p. 427). Considerations of cultural insensitivity not only fall under the scope of our methodological interests in this paper, they also require us to consider the ethics of some cross-cultural research (Schooler et al. 1998). Adaptations must be made “that span the entire research process” (Rogler 1999, p. 430). Many of the considerations we propose in this paper should be part of this process.

Discussion

Good progress is being made in developing an understanding of Africans’ attitudes toward wildlife and wildlife conservation. The growing body of knowledge in this realm confirms the need for including social science research in African wildlife conservation and more specifically in mitigating human-wildlife conflict. While there has been a strong and concerted effort to better understand peoples’ values, perceptions, knowledge, attitudes, and

tolerance toward wildlife and conservation, the lack of a consistent methodology limits the generalizability of results.

Some methodologies that have been successful in the West may have varying application in developing countries, as was exemplified in Kangwana's (1993) pretesting of question format and Mordi's (1987) question modification. Given the existing global body of work on attitude research, we should avoid reinventing the wheel with each new attitude study. Future survey research in Africa should build upon existing theory and methods, use the lessons learned in the reviewed studies, and incorporate the recommendations provided herein to develop a rigorous theoretical and methodological framework for human dimensions of wildlife research.

The adaptability of the researchers discussed in this review speaks to their resourcefulness in uncharted territory. However, this also speaks to the challenge of ensuring these efforts are useful in the long-term, both practically and in terms of improving and building upon theoretical frameworks. What does this variability in methodology mean for future research and application of information? This review highlights the varying conditions in which survey research is taking place, which can lead to differences in survey quality (Heath et al. 2005). It also highlights the many challenges when attempting to develop a standardized methodology and points to the need for a framework for standards of best practice. For instance, it should be standard practice in survey research to include procedures such as pre-testing measurement instruments and checks for reliability and validity. Additional procedures such as sampling and the development of questionnaire items should also be a part of this framework. The more complex components of the framework will always have variability in culture and landscape, and require researchers to adapt accordingly. Again, any adaptations need to be grounded in theory and previous research. They also need to be well documented to allow for evaluation,

comparability, and replication in order to ensure long-term validity of the body of research that is being developed in Africa.

We have established that survey research has limitations that can be more pronounced in cross-cultural research. Using multiple methods is one way to strengthen a study. For example, focus groups can be used to develop culturally relevant instruments (Willgerodt 2003); Schumann and Presser (1981) recommend the use of supplementary open-ended questions; and, in dealing with equivalence, King et al. (2004) propose the use of fictional vignettes. There is a whole literature on innovative, participatory methods that can be used by the survey researcher to bolster a study (e.g., Slocum et al. 1998). An example from one of the reviewed studies is provided by Infield and Namara (2001) who used a suite of methods, including rapid rural appraisal, key informant interviews, and “other qualitative methods to provide supporting information for a deeper analysis of the questionnaire data” (Infield and Namara 2001, p. 51).

It is important to build a cohesive and enduring body of knowledge that can provide greater insight in conserving Africa’s natural resources for the long term. Often attitude studies in Africa are conducted in isolation. In order to achieve a comprehensive and robust understanding that will contribute to more effective conservation measures in both the short-term, for which many projects are designed, and the long-term, it is paramount for attitude studies in Africa to address the methodological issues we have discussed here. As described there are indeed challenges, but the groundwork has been laid by a multidisciplinary group of researchers who have conducted attitude surveys in numerous cultures around the world, including Africa. For example, scientists who conducted a survey in rural Mali concluded that “it is possible to carry out in a rural, preindustrialized, non-Western setting, using a representative sample of generally nonliterate respondents, a survey that parallels complex ones carried out in

the United States and other industrialized countries” (Schooler et al. 1998). This finding is confirmed by our own experience conducting an in-depth survey in rural Kenya.

Conclusions

As outlined earlier, human-wildlife conflict situations are increasing and several methods and tools need to be developed and applied in an attempt to decrease and resolve these management challenges (Madden 2004). Effective policy decisions rely on reliable and valid data. Especially in contentious conflict situations, the evidence to support decisions becomes even more important. As human dimensions research in Africa continues to develop, it is a critical to ensure rigor is incorporated so that effective and informed decisions can be applied. The goal is to make the collected information useful in effectively influencing human-wildlife conflict situations. Coordinated efforts will be needed to ensure these goals of garnering valid and reliable long-term data can be attained and have an impact on addressing human-wildlife conflict in Africa.

To further the science of human dimensions investigations in Africa, future studies should strive to attend to the most prominent characteristics of scientific inquiry: reliability, validity, representativeness, and generalizability. Additionally, more attention should be paid to survey quality that is guided by a framework for standards of best practice. The merit and integrity of studies in this realm of research will be judged on their ability to address these characteristics and their application in informing and driving policy.

In addition to addressing methodological issues, researchers should strive to understand “the why”, i.e., the underlying constructs, of peoples’ attitudes, as knowledge of attitudes alone is limited in its application. Most of the studies reviewed here examined the relationship between attitude and demographic variables such as education and sex. Some included prior experience (Kangwana 1993). Attitudes are based on beliefs about the attitude object. Therefore, gaining a

complete understanding of peoples' responses to wildlife and conservation requires looking at how all of these variables collectively influence attitudes. Developing a common theoretical framework will facilitate this understanding and allow for improved evaluation and comparison across studies.

This review highlights the necessary knowledge needed for conducting human dimensions of wildlife research in Africa. As most managers of human-wildlife conflict are not trained in the social sciences, there is a growing call for increased collaboration between social scientists and ecologists in managing wildlife, especially as it relates to human-wildlife conflict (Heberlein 2004; Manfredo and Dayer 2004; Mascia et al. 2003; Treves et al. 2006). Therefore we believe that the growing field of human dimensions of wildlife, with its interdisciplinary specialists, offers opportunity to carry out this social science research within the realm of African wildlife conservation, particularly in mitigating human-wildlife conflict.

Recommendations

Based on this review and borrowing from researchers in other disciplines, we offer a few recommendations for addressing the methodological issues covered in this paper. These suggestions are not intended to serve as a comprehensive list, but rather we propose them as a starting point for dialogue on methodological issues in cross-cultural human dimensions of wildlife research. Additionally, we do not purport them to be original suggestions, only that they have not been applied on a consistent basis. Many of them are basic components of scientific inquiry.

As already stated in this article, we need to build upon the knowledge and experience of researchers not only within wildlife conservation but also in the respective fields of social science investigation. In doing this, we need to avoid continuously reinventing the wheel (Scheuch 1989), while recognizing that some "re-engineering" is needed (Harkness, 1999).

Given the growing call for attention to be given to survey quality at the national and cross-national level (Harkness 1999; Lynn 2003), we recommend the adoption of a framework for standards of best practice in survey research (Harkness 1999; Heath et al. 2005; Lynn 2003).

The framework should include, but is not limited to the following components:

conceptualization, use of theory, standards for question development; use of appropriate sampling techniques, pretesting, interviewer training; attention to reliability, validity, and generalizability; documentation for monitoring, evaluation, and replication (Harkness 1999; Peña 2007); use of multiple methods; inclusion of researchers from the culture being investigated, attention to cross-cultural issues (e.g., equivalence, establishing rapport in communities sampled), and others.

Researchers with social science training have the capacity to contribute information essential for the design of policies for mitigating human-wildlife conflict. For this to be realized, human dimensions researchers need to demonstrate the rigor of their methodology and the validity of their data. We believe this review provides key considerations for this area of research.

Table 3-1. Comparison of use of concept and theory in attitudinal research studies conducted in Africa

Citation	Attitude object, Country	Define Attitude Concept	Theory	Measurement of Attitude	Sample Indicators
Pennington 1983	Wildlife and conservation, Tanzania	No	No	7 Likert-scale belief statements	-National park budgets should be increased -National parks cost the government too much money -Even if there were no tourists, national parks should continue
Mordi 1987	Wildlife, Botswana	Yes	Yes	51 agree/disagree statements to form 11 attitude types	-Termites serve no useful purpose in the forest -I agree with the person who says he dislikes lions -I feel cattle are more important than wild animals
Infield 1988	Conservation and conservation area, South Africa	No, recognized complexity of attitude concept, used several questions for measurement	No	8 fixed-response questions used to create index of general conservation attitude, 7 questions used to create index of attitude toward conservation authority	-is protection of animals a good or bad thing? -it is important to keep a place where animals and plants can live -the Conservation Area is a waste of land -it would be good to give the Conservation Area to the people who need land
Parry and Campbell 1992	Wildlife and wildlife utilization, Botswana	No	No	?	?
Newmark et al. 1993	Protected area and PA employees, Tanzania	No	No	3 open-ended questions, 1 question for ea. attitude object in question	-How would you feel if the park was abolished? -What good things do people from the park do? -Do poachers break the law?

Table 3-1. Continued

Citation	Attitude object, Country	Define Attitude Concept	Theory	Measurement of Attitude	Sample Indicators
Kangwana 1993	Wildlife and national park, Kenya	No	No	2 questions ea. for attitude toward wildlife in general and elephants, 3 questions for attitude toward park, all open-ended	-How would you feel if all of the animals were removed? -Are elephants the most dangerous animals? -Should the park be abolished?
Omondi 1994	Wildlife, PA, and wildlife authority, Kenya	No	No	3 open-ended questions, 1 question for ea. attitude object in question	- What would you say about wildlife? - Do you consider national parks/reserves as being of any value? - What does the wildlife authority do?
Akama et al. 1995	State wildlife conservation programs, Kenya	No	No	5 yes/no belief items, no scale created	-wildlife conservation is an appropriate use of land -national park is an asset to the family -park should be degazetted
De Boer and Baquete 1998	Maputo Elephant Reserve, Mozambique	indicated a positive attitude being expressed as “liking”	No	?	?
Hill 1998	Elephants, Uganda	No	No	3 open-ended questions	-should elephants be protected in Uganda? -would you like to see elephants living in Budongo? -are elephants dangerous?
Gillingham and Lee 1999	Wildlife and management institutions, Tanzania	No	No	5 yes/no belief items (4 were opposite statement pairs), 3 open-ended belief questions, no scale	-important to protect wildlife for children -people who poach should be punished -does wildlife benefit Tanzania, local people, you/your household?

Table 3-1. Continued

Citation	Attitude object, Country	Define Attitude Concept	Theory	Measurement of Attitude	Sample Indicators
Infield and Namara 2001 Conservation and Lake Mburu National Park, Uganda		No	No	9 agree-disagree “attitude” statements about park and conservation, scored 1 or -1, combined all to create an attitude index; 1 open- ended question regarding feelings about the park	-what the people and their livestock need are more important than saving plants and wild animals -it is important to protect the animals and plants so that our children may know and use them -what are your feelings about Lake Mburu National Park?
Holmes 2003 Katavi National Park, Tanzania		No	No	1 open-ended question	-how would you feel if Katavi National Park was degazetted?
Sitati 2003 Elephant conservation, Kenya		No	No	3 closed questions, no index created	-benefits from elephants -what is the future of elephants in the area? -do you wish to continue living with elephants as before?
Weladji et al. 2003 Wildlife policy and Bénoué Wildlife Conservation Area, Cameroon		No	No	series of closed and open-ended questions, number and wording not reported	?
Dickman 2005 Wildlife in general, protected area, carnivores, Tanzania		No	No	3 open-ended questions, 1 for each attitude object	-what do you think about wild animals living in the area around your village? -what do you think of Ruaha National Park -What do you think of the following [carnivores]?

Table 3-1. Continued

Citation	Attitude object, Country	Define Attitude Concept	Theory	Measurement of Attitude	Sample Indicators
Gadd 2005	Wildlife/elephants, Kenya	No	No	? various questions regarding beliefs about wildlife	-are there any good things about or benefits that you personally receive from elephants? -are any animals causing problems in your area?
Lindsey et al. 2005	Wild dogs and other carnivores, South Africa	No	No	1 scale question per species (6 species) scored from 0 (very negative) to 5 (very positive)	-indicate how you feel about having [species X] on your property
Kaltenborn et al. 2006	Wild and domestic animals, Tanzania	No	No ¹	5-point Likert scale questions for 21 species (do not like at all to like very much)	-indicate the degree to which you like [animal]

¹Although the authors were not explicit in defining a theoretical framework, they do cite the relevant literature.

Table 3-2. Comparison of methodology use in attitudinal research studies conducted in Africa

Citation Attitude object, Country	Pretest	Reliability and Validity	Sampling	Study Length
Pennington, 1983 Wildlife and conservation, Tanzania	?	No	n = 800 secondary school students from schools in 2 regions	15 mos. (part of larger study)
Mordi, 1987 Wildlife, Botswana	Yes	Yes	original n = 1,279 - urban areas oversampled, new sample = 555, 44 from urban area divided into 103 areas, using random number assignment, 31 areas selected, every 5 th house selected, age-stratified schedule used to select interviewee 37-89 from ea of 9 rural areas, houses randomly selected , interviewee selected by predetermined age-sex schedule 38 from a university every 4 th student selected from list	7 mos.
Infield, 1988 Conservation and conservation area, South Africa	No	No	n = 151, households selected though 2-phase random sample, study area divided into numbered blocks, from 14 selected blocks, 13 households randomly selected	7 mos.
Parry and Campbell, 1992 Wildlife and wildlife utilization, Botswana	No	No	n = 231, Site 1- every household w/adult present, Site 2 - all households w/in randomly selected clusters (aerial photos were avail for this site)	1 mo.

Table 3-2. Continued

Citation Attitude object, Country	Pretest	Reliability and Validity	Sampling	Study Length
Newmark et al., 1993 Protected area and PA employees, Tanzania	No	No	n = 866 around 3 national parks and reserves, proportional random sampling stratified by park, interviewees selected on basis of chance encounter	2 yrs.
Kangwana, 1993 Wildlife and national park, Kenya	Yes	No	n = 175, households randomly selected from list of households in 2 group ranches bordering park, 1 elder, 1 warrior, 1 woman	2 mos.
Omondi, 1994 Wildlife, PA, and wildlife authority, Kenya	Yes	No	n=500 randomly selected heads of households from 5 of 13 group ranches near protected area – randomization not explained	6 mos.
Akama et al., 1995 State wildlife conservation programs, Kenya	No	No	n=201 from perimeter of 2 parks (157 locals, 44 park officials), 1 individual of a household (selection process not provided)	11 mos.
De Boer and Baquete, 1998 Maputo Elephant Reserve, Mozambique	No	No	n = 200, 50 randomly-selected households in ea. of 4 villages	3 wks/ village
Hill, 1998 Elephants, Uganda	No	No	n = 116, from 3 villages, chosen upon encounter – 1 person of any household	1 week/ village
Gillingham and Lee, 1999 Wildlife and management institutions, Tanzania	No	No	n = 202, 190 local people, local leaders from randomly selected households from 4 of 11 villages in district. Mostly men because of Muslim faith	4 mos.

Table 3-2. Continued

Citation Attitude object, Country	Pretest	Reliability and Validity	Sampling	Study Length
Infield and Namara, 2001 ¹ Lake Mburu National Park, Uganda	Yes	No	n=243, 2 phase sample: 1 st sampled enumeration areas, 2 nd sampled households within areas within 6km of park (avg of 30 households per area) household heads or other senior members	3 mos.
Holmes, 2003 Katavi National Park, Tanzania	No	No	n=201, households randomly selected from generated lists of households in 3 villages	5 mos.
Sitati, 2003 Elephant conservation, Kenya	Yes	No	n=251, from areas experiencing elephant problems, 25 of 54 sub-locations randomly sampled with a minimum of 10 households per sub-location, any household member ≥ 18	?
Weladji et al., 2003 Wildlife policy and Bénoué Wildlife Conservation Area, Cameroon	No	No	n=114 across 3 communities, 20% of households randomly selected in 2 larger settlements, all available households selected in small settlement	4 mos.
Dickman, 2005 Wildlife in general, protected area, carnivores, Tanzania	Yes	No	n=60, 15 villages/sub-villages in three clusters, “as many as possible” households were visited, most senior member of household present was interviewed, mostly males	≤ 1 mo.
Gadd, 2005 Wildlife/elephants, Kenya	Yes	No	n=74, 34 herders selected via convenience sample (no census data available), 40 individuals at 2 other locations (every 10 th household)	2 mos. (1999) 2 mos. (2002)

Table 3-2. Continued.

Citation Attitude object, Country	Pretest	Reliability and Validity	Sampling	Study Length
Lindsey et al., 2005 Wild dogs and other carnivores, South Africa	Yes	No	n=209 across 6 areas in South Africa and Zimbabwe, in each area “as many ranchers as possible were interviewed”, contact information obtained from telephone directory	7 mos.
Kaltenborn et al., 2006 Wild and domestic animals, Tanzania	Yes	No	n=590 from 6 villages across 3 districts, 3 villages near protected area and 3 further away	?

¹Methods for this study were not included in this citation. We referred to Marquardt et al. 94 and Namara et al. 98 for details.

CHAPTER 4
THE MAASAI-ELEPHANT RELATIONSHIP: THE EVOLUTION AND INFLUENCE OF
CULTURE, LAND USE, AND ATTITUDES¹

Introduction

The African elephant evokes varied and deep emotion in people around the world (Adams and McShane 1992; Dublin 1994; Naughton-Treves et al. 1999). It is “characterized by the most extreme attitudes” (Dublin 1994, p. 5). To some, it is the symbol of wisdom, strength, and good luck. For others who see the elephant only in zoos, in books, and on television, it is a gentle giant, intelligent and nurturing, maintaining close family bonds. For people who live alongside elephants and those who work to manage and conserve them, the story is more complex.

One of the greatest challenges in conservation today is how to balance local concerns of security and development with international interests in conservation of threatened species (Treves et al. 2006). After the ban on ivory was implemented in 1990 and elephant populations across Africa began to recover, the incidence of human-elephant conflict began to rise. With this change in circumstances, wildlife managers and conservationists started looking for new ways to manage and conserve elephant populations. Several approaches have emerged to address this and other modern conservation challenges. These methods include community-based conservation, integrated conservation and development programs, and collaborative management (Mburu et al. 2003; Wells et al. 1992; Western and Wright 1994). Such programs are part of an effort to move away from the “fences-and-fines” approach, or “fortress conservation,” by involving local people in conservation (Adams and Hulme 2001; Bauer 2003; Gibson and Marks 1995; Holmes

¹ This chapter is reprinted by permission of the publisher The University of Chicago Press. The original citation is: Browne-Nuñez, C. In press. The Maasai-elephant relationship. In *The Amboseli Elephants*, eds. C. Moss, H. Croze, and P. Lee. Chicago: The University of Chicago Press.

2003; Songorwa 1999), with the goal of affecting the conservation attitudes and behaviors of local people (Abbot et al. 2001; Infield and Namara 2001). Amboseli is the setting for some of the earliest community conservation programs in Africa.

As the Amboseli landscape has evolved over time, so has the relationship between elephants and the Maasai. Understanding the dynamics of their interactions is critical to conserving the Amboseli elephants and ensuring the well-being of the human population with whom they coexist. This chapter considers the Maasai-elephant relationship by examining the attitudes and behaviors of the Maasai toward elephants over time by reviewing historical accounts of early European travelers through Maasailand, discussing the results of recent attitudinal research in the Amboseli ecosystem, and evaluating the notion of the Maasai as conservationists and considering the importance of culture, livelihood activities, conservation interventions, and land-use change in determining the future of the Maasai-elephant relationship in Amboseli.

Attitudes, Behavior, and Wildlife Conservation

There have been a number of attitudinal studies done in Africa regarding wildlife conservation (Akama et al. 1995; Ali 2006; DeBoer and Baquete 1998; Gillingham and Lee 1999; Hill 1998; Infield 1988; Kangwana 1993; Kideghesho et al. 2007; Kioko 2004; Lindsey et al. 2005; Mordi 1987; Newmark et al. 1993; Omondi 1994; Parry and Campbell 1992; Pennington 1981; Sitati 2003). Four studies (Browne-Nuñez 2010; Kangwana 1993; Kioko 2004; Sitati 2003) specifically investigated attitudes toward elephants in Maasailand. Two of these studies were conducted around the Amboseli National Park (results discussed later). Many of these studies found that people hold positive attitudes toward wildlife and the concept of conservation but are more negative toward wildlife authorities and conservation policy (Gillingham and Lee 1999; Infield 1988; Kangwana 1993; Newmark et al. 1993; Parry and

Campbell 1992). Where attitudes are found to be negative, it is often due to the costs local people incur as a result of conservation policy or wildlife damage such as loss of land or other constraints on livelihood activity (Anthony 2007; De Boer and Baquete 1998; Gadd 2005; Gillingham and Lee 1999; Kideghesho et al. 2007; Newmark et al. 1993; Parry and Campbell 1992) and loss of crops and livestock (De Boer and Baquete 1998; Infield 1988; Marquardt et al. 1994; Mugisha 2002; Naughton-Treves 1998; Newmark et al. 1993).

Methods suggested for improving attitudes toward wildlife include education and outreach, increasing benefits to local people, and involving local communities in conservation (Hulme and Murphree 2001; Parry and Campbell 1992). Positive attitudes have been found in communities that recognize benefits related to wildlife such as having a household member employed in a wildlife-related job (Anthony 2007; Infield 1988; Lewis et al. 1990), having access to game meat (Infield 1988; Kideghesho et al. 2007), and generation of foreign exchange from tourism (Gadd 2005; Newmark et al. 1993; Pennington 1983; Weber 1987), among others (Abbot et al. 2001; Bauer 2003). Programs that are successful in providing wildlife-related benefits to local communities not only highlight the importance of providing benefits that are valued by the communities but also demonstrate a clear link between the benefits and the wildlife resources (Gadd 2005).

Although there has been some success, a consistent link has not been demonstrated between improved or positive attitudes and conservation interventions (Kideghesho et al. 2007; Parry and Campbell 1992; Wells et al. 1992). Some reasons for the lack of success include the following: costs exceed benefits (Emerton 1998, Hulme and Infield 2001), broken promises (Kangwana and Browne-Nuñez, in press), lack of awareness of source of benefits (Archabald and Naughton-Treves 2001; Kangwana 1993), unrealized expectations (Gadd 2005; Songorwa

1999), limited community involvement (Parry and Campbell 1992; Songorwa 1999), lack of socioeconomic information (Wells et al. 1992), and lack of understanding of the link between conservation and development (Barrett and Arcese 1995; Newmark and Hough 2000; Songorwa et al. 2000; Wells et al. 1992).

The limited success of conservation may be attributed in part to a lack of understanding of the local context of conservation (e.g., the way local people value natural resources). Social science offers the tools for understanding these issues. Prior to developing new programs or modifying existing programs, there needs to be an “understanding of the community’s history and current dynamics, particularly in relation to the authority structures which influence peoples’ behavior and the patterns of resource use which form the basis for both conflicts and opportunities in wildlife management” (Kiss 1990, p. 25). The knowledge and experience derived from research and conservation programs in Amboseli can aid in the development of new conservation and development initiatives as we adapt our methods in this ever-changing environment.

The Elephant in Traditional Maasai Culture

The elephant appears in many Maasai stories and proverbs. Some stories demonstrate the cultural value of the elephant. Hollis (2003) retells the story of the elephant’s role in aiding the Maasai in acquiring their highly valued cattle, where at the beginning of the Earth, the elephant, along with a member of the Dorobo tribe and a snake, was one of three things *Enkai* (God) found upon the land when he came to prepare the world. In this story, the Dorobo kills the snake for breathing on him and the elephant for muddying a waterhole that was to be used by his cow. The elephant’s baby leaves the Dorobo for another land where he finds a Maasai. The young elephant takes the Maasai to the home of the Dorobo. The Maasai overhears a conversation between

Enkai and the Dorobo. The next day the Maasai goes to where the Dorobo had been instructed to go and, acting as the Dorobo, is given a herd of cattle.

Other stories are not as exalting and often involve the elephant being deceived by the clever hare and other small, less powerful animals (Greaves 1996; Hollis 1905; Kipury 1983). Such stories, while portraying the elephant as an easy mark, also portray it as a creature who “breeds no malice, but his mere size and little brain is a cause for constant ridicule” (Kipury 1983, p. 24).

The Maasai and the related Samburu people have a number of traditional beliefs and practices associated with elephants. Members of both groups have reported customs such as placing green branches or grass atop the remains of or in the orifices of the skull of a dead elephant (pers. observ., Kangwana 1993; Kioko 2004; Kuriyan 2002). The Maasai have explained this practice as a way of appeasing the spirit of the elephant—the only other creature with a soul like a human (C. Moss, personal communication). Elephants are seen as having physical characteristics similar to those of humans, such as two breasts (pers. observ., Kioko 2004; Kuriyan 2002), a trunk that operates like an arm, and comparable skin (Kuriyan 2002). Maasai believe it is good luck to find an elephant placenta (pers. observ., Chadwick 1992; Kangwana 1993; Kioko 2004; Sitati 2003). It is thought that if one finds an elephant’s afterbirth and then constructs a temporary *boma* and sleeps there overnight with his animals, he will become rich in cattle (Chadwick 1992; George Lupempe, personal communication; Sitati 2003).

Early Maasai used products made of ivory such as tobacco and snuff containers, fly-whisk handles, upper-arm bands, *rungus* (clubs), earlobe stretchers, and clappers hung around the necks of domestic animals (Bernsten 1976; Blackburn 1982; Hollis 1905; Kasfir 1992; Merker 1910; Mol 1981; Thomson [1885] 2006). These items no longer seem to be in frequent

use today (pers. observ., Kasfir 1992). Plastic containers have replaced snuff containers and earlobe stretchers, although one can occasionally observe a Maasai man wearing an ivory ring or see a pendant hanging from the neck a domestic animal (personal observation; George Lupempe, personal communication). Elephant products have reportedly been used by the Maasai for medicinal purposes (P. E. Glover in Mol 1981).

When discussing the use of elephant products, two questions arise: (1) how did the Maasai acquire these items and (2) what does their use indicate, if anything, about Maasai attitudes toward elephants? With pastoralism being the primary mode of subsistence, the Maasai have rarely hunted wild animals, viewing them as their second cattle upon which they could rely in times of severe famine (Baumann 1894; Berger 1996; Deihl 1985; Homewood and Rodgers 1991; Smith 1907; Waller 1976; Western 1997). It is even claimed that they have contempt for those, such as the Dorobo, who regularly hunt and consume wildlife (Kipury 1983; Saitoti and Beckwith 1993; Thomson [1885] 2006). In Laikipia, Kenya, some Maasai report having cultural taboos against consuming the meat of elephants because of their similarities to humans (Gadd 2005), but there are historical accounts of Maasai hunting wildlife, including elephants (Berger 1993; Hollis 1905; Huntingford 1953). For instance, in the early 20th century, Maasai boys reportedly killed elephants and would take only the tusks to exchange for cattle (Hollis 1905).

An exception to the rarity of hunting is the *ilmurran*, or Maasai warrior, tradition of hunting lions (*olamayio*) to demonstrate bravery and courage (Mol 1981; Saitoti and Beckwith 1993). The warriors also hunt elephants to retaliate against them when they injure or kill livestock or people. Elephants and other wildlife have also been targets of Maasai warriors (Mol 1981; Moss 1988; Simon 1963). The purposes of these hunts have been the same as for the lion hunt. Additionally, in more recent decades, spearing has been political in nature, with wildlife

being targeted in order to demonstrate unhappiness with government policy (Lindsay 1987; Peluso 1993; Western 1982a,b).

Other Maasai methods for obtaining ivory included finding it in the bush (Mol 1981) and acquiring it from their hunting neighbors, including the Waboni of the coast (Beachey 1967) and the various groups that fall under the name Dorobo (Blackburn 1982; Huntingford 1953; Mol 1981). Ivory acquired from the Dorobo and Waboni enabled the Maasai to participate in the lucrative ivory trade during the 19th century (Beachey 1967; Bernstein 1976; Waller 1976). Waller (1976, 533) reports that after a period (1884–94) referred to as The Disaster when two disease epidemics severely depleted livestock herds, the Maasai of Loitokitok were “kept alive by hunting, cultivating, and by selling ivory and rhino horn to traders.”

More recent discoveries of Maasai artifacts made of ivory and other materials are the source of debate. In his book, *The Art of the Maasai*, Turle (1992) claims that numerous ivory pieces are Maasai cultural artifacts. These include ivory pipes used by *laibons* (diviners or medicine men) to administer medicine, elephant vertebrae used for grinding bowls, elephant pelvic bones used for stools, and ivory *rungus*. Critics of Turle’s collection point to the numerous inaccuracies written about Maasai culture; they point out that anthropologists, who have spent years studying Maasai culture, have never come across such artifacts, and they ask why Turle never describes seeing the artifacts in use in his encounters with Maasai (Pido 1994). Turle (1992, 131) himself states that these artifacts “seem to have sprung into view from a past without clues.” While experts debate these more recent “discoveries” (Blackburn 1996; Kasfir 1995; Kurtis 1994; Kratz 1996; Pido 1994, 1995; Schildkrout 1996), there is no doubt that elephant products were used by the Maasai in the past and to a lesser degree today. For whatever reason, ivory has been replaced by other materials.

Sitati (2003) reports other traditional values and uses of elephants and elephant products in the Trans Mara District of Kenya, which include the following:

- Elephants locate salt licks and water for livestock use.
- Elephants thin forests.
- Elephant bones are used to treat trypanosomiasis.
- Elephant fat is used to treat skin disease and is mixed with herbs to increase growth in babies.
- Elephant dung is burned in order to smoke out bees for honey harvesting and to treat measles.
- Elephant tails have been used to make bangles.
- Ivory is a source of money.
- Elephants deter cattle rustlers.
- Elephant trails are used for ceremonies, as they are believed to be without obstacles.

It is evident that wildlife, including the elephant, is a valued element of traditional Maasai culture. Values in nature have been categorized to include cultural, utilitarian, economic, aesthetic, and religious values among others (Kellert 1976, 1996; Rolston 1988). For the Maasai, these values vary by species. The influence of the ever-present religiosity of the Maasai (pers. observ.; Berger 1993; Goldman 2003; Mol 1981; Saitoti and Beckwith 1993) is illustrated by the terms used to describe some wildlife. For example, small plains animals are referred to as *inkineji e Enkai*, the goats of God, or *inkishu e Enkai*, the cattle of God (Mol 1981). Furthermore, there is a degree of fatalism present in Maasai culture. It is not uncommon for Maasai to state that because God put them on earth together with wildlife, they must live together (pers. observ.). The oral literature and extensive use of elephant products provide examples of cultural and utilitarian values. Additionally, some cases of the spearing of elephants by the *ilmurran* demonstrate a value similar to what Rolston (1988) termed a character-building value.

The Maasai, Pastoralism, and Wildlife Conservation

“Being Maasai”

Over time, there have been various characterizations of the Maasai, their culture, and their impact on wildlife. From guardians of wildlife to irresponsible, overgrazing herders, these descriptions contain various degrees of accuracy and have resulted in several stereotypes. Some of these false perceptions are the bases of the modern and often romanticized image of the Maasai (Ole Ndaskoi 2006). While a complete discussion of the Maasai identity is not within the scope of this chapter (see Spear and Waller 1993 for a more exhaustive treatment), a brief overview provides a foundation for understanding the relationship between Maasai and elephants.

Defining what it is to be Maasai is complex, as “there are a series of political, cultural, and ecological divisions and subdivisions of the Maasai” (Talbot 1972, p. 702). Maasai interactions with their environment have been dynamic over space and time, depending on environmental and social conditions (see also Kangwana and Browne-Nuñez, in press). For instance, the Maasai of Ngorongoro have dealt with different environmental and political forces from the Maasai of Amboseli. Also, in times of disease and famine, Maasai have turned to other ethnic groups and adopted other means of subsistence; when they have become impoverished, they have sought employment in order to purchase livestock and return to pastoralism; when political pressure has required it, they have made superficial or temporary changes with their culture intact (Knowles and Collett 1989).

Europeans first became aware of the Maasai through the writings of Krapf (1854, 1860), who obtained his information from caravan leaders and a Wakwavi slave in Mombasa (Knowles and Collette 1989). He described the Maasai as hostile savages who were feared by their neighbors; subsisted strictly on milk, butter, honey, and meat (including hunted wildlife); and

detested agricultural foods (Collett 1987). Others described the Maasai as “warlike” (Lugard 1893) and as pure pastoralists (Hinde and Hinde 1901; Hollis 1905). Thomson (1885), who later traveled through Maasailand, provided a different, somewhat more accurate portrait. He noted that the Maasai were not hunters, and wildlife displayed little fear toward humans. Additionally, he reported that women, children, and married men consumed agricultural products that were acquired through trade from neighboring agriculturalists.

Thomson’s portrayal was not the one adopted by the British colonial administration, who concurred with Lugard and Krapf in viewing the Maasai as hostile and purely pastoral (Collett 1987; Knowles and Collett 1989). Such inaccurate accounts along with the belief that the Maasai failed to use their land properly (Eliot 1905; Lugard 1893) led to a history of policies resulting in land alienation and the breakdown of traditional Maasai culture (Browne-Nuñez 2010; Kangwana and Browne-Nuñez, in press).

Defining a Maasai identity is also dependent on how one views ethnicity. Galaty (1993, p. 174) states that the term Maasai marks “two different cultural realities, the first being the gamut of Maa-speaking people and groups in East Africa, the second [being] the set of central and primarily pastoral Rift Valley Maa-speaking sections for which the term marks their distinctiveness.” This second “reality”—the Maasai as “people of cattle”—is the most widely adopted, but as Galaty (1993, p. 179) states “. . . to speak Maa is increasingly equated with being Maasai, pastoral or not.” Therefore, as one considers the values, attitudes, and behaviors of the Maasai, it is important to keep the complexity and fluid boundaries of the Maasai ethnic identity in mind.

Maasai Pastoralism

Pastoralists have received much of the blame for “desertification,” with critics pointing to the theory of the “tragedy of the commons” (Hardin 1968), citing overstocking and overgrazing

as the primary—if not the only—causes of desertification (Lamprey 1983). Today, most who have studied and worked with the Maasai see this as a faulty contention, given that the Maasai have always had a system in place to control access to resources communally. Moreover, research shows that the ecological dynamics of savanna ecosystems have been misunderstood, and concepts such as equilibrium and carrying capacity used to describe temperate zones are not able to explain the functioning of savanna ecosystems (Behnke 1994; Homewood and Rodgers 1991; Little 1996). The complex relationships between humans and African savannas are better understood using theoretical concepts such as disequilibrium and disturbance, given that these ecosystems are inherently unstable (Little 1996).

Although some studies have concluded that there is competition between wild ungulates, such as wildebeests and zebras, and domestic animals (Fritz et al. 1996; Lamprey and Reid 2004; Prins 1992; Voeten and Prins 1999; Young et al. 2005), the idea of the compatibility of pastoralism and wildlife is increasingly supported (Deihl 1895; Goldman 2003; Little 1996; Nelson 2000; Reid et al. 2003). There is substantial evidence that light-to-moderate livestock grazing increases rangeland productivity (Mearns 1997) and that “the customary pastoral approach to resource management constitutes an efficacious adaptation to ecological stress” (Behnke 1994, p. 21). Other evidence of compatibility is offered by Homewood and Rodgers (1991), who found that pastoralist land use in the Ngorongoro Conservation Area was not a threat to wildlife populations or the environment. In fact, research has demonstrated that removal or decline of pastoralist populations can have negative effects on vegetation (Conant 1982; Lamprey and Waller 1990; Mearns 1997).

Speaking at the 2003 World Parks Congress, wildlife veterinarian Richard Kock stated, “Traditional pastoralism has very positive benefits to the environment and wildlife. You only

have to look at distributions of wildlife to see that they are often associated with pastoral systems. So, should we be doing wildlife? Should we be doing livestock? Should we be doing both? I think it's clear [researchers] have done good work on this over the years and have shown how the benefits—economically, environmentally—of mixed systems are there.” Mearns (1997) qualifies this position stating, “Under the right conditions, production systems relying on mobile livestock represent the most sustainable way to utilize arid rangelands and ought to be supported and enhanced through policy intervention designed to give greater decision-making power to local producer groups.”

Today, the nature of pastoralism is changing. Pastoralists of East Africa are diversifying their livelihood activities, depending less on their livestock than in the past (McCabe 2003; McCabe et al. 1992). This change is a result of several factors, including loss of grazing land resulting from conservation policy, subdivision of the group ranches, and immigration of people from farming groups (Campbell et al. 2000; Kangwana and Browne-Nuñez, in press). The “ideal model of pastoralism” is disappearing, if it ever existed at all (Hogg 1987, p. 293). As the Maasai of Amboseli diversify their livelihood practices—grow crops, rent land to cultivators who are members of other ethnic groups, develop small enterprises, and so on—the challenge for conservationists is to work with the Maasai to develop conservation strategies that will enable wildlife to continue to utilize the land outside the park. An important question is whether there exists a conservation ethic or attitude among the Maasai that can serve as the foundation of local conservation efforts.

The Maasai as Conservationists

Many have described the relationship between the Maasai, wildlife, and the environment they share as one of peaceful or harmonious coexistence (Amin et al. 1987; Berger 1993, 1996; Homewood and Rodgers 1991; IUCN 1987; Kinyua et al. 2000; KWS 1990; Lovatt Smith 1986;

Ole Dapash 2002; Orindi and Huggins 2005; Parkipuny 1997; Saitoti and Beckwith 1993).

Further, the Maasai have been described as the “custodians of Kenya’s wildlife” (Asiema and Situma 1994), the “greatest preservationists in Africa” (Simon 1963), “historic vanguards of conservation” (Parkipuny 1997), “par excellence conservationists” (Richard Leakey cited in Horgan 1989), and “more valuable to the cause of conservation than a whole army of paid game scouts” (Fosbrooke 1972).

The notion of harmonious coexistence is not accepted by all. Prins (1992) questions the harmony theory, pointing out that many pastoralists across Africa, including the Maasai, have at some time hunted and that livestock competes with wildlife. Some simply view coexistence as a romantic notion that was made possible by the fact that the pastoralists lacked the resources for change and had low population levels and low production demand that allowed them simply to ignore wildlife (Adams and McShane 1992; Norton-Griffiths 1998). Richard Leakey states, “I don’t know that people anywhere have ever lived in harmony with wild animals, despite our wishful belief that once this was so, but the Maasai came as close as anyone ever has” (Leakey and Morell 2001, p. 146). Early accounts of harmonious coexistence might be explained, in part, by a series of disasters that occurred in East Africa in the late 19th century, when disease wiped out most of the region’s cattle population and, together with colonial warfare and famine, drastically reduced pastoral populations (Enghoff 1990; Talbot 1972). This snapshot in time showed the land filled with wildlife and a sparse human population.

If we reject the notion of harmonious coexistence, we are still left to consider the Maasai as conservationists. Likely the most frequently offered evidence of Maasai conservation is the existence of large numbers of wildlife on their land (Asiema and Situma 1994; Bulte et al. 2006; Mol 1981; Organ and Fosbrooke 1963; Parkipuny 1989; Simon 1963). More than half of Kenya

and Tanzania's wildlife is found in Maasailand (Ole Parkipuny and Berger 1993). Explanations of this phenomenon include the compatibility of pastoralism and wildlife conservation, Maasai attitudes toward wildlife that permitted coexistence, low population densities that allowed enough space for coexistence (Mol 1981), and discouragement by the Maasai of the intrusion of others (Fosbrooke 1972), such as poachers (Beachey 1967; Homewood and Rodgers 1991; Western 1997) and agriculturalists (Organ and Fosbrooke 1963).

A useful approach for considering conservation among the Maasai and other indigenous societies is to ask whether there is intention to conserve. Hunn (1982) distinguishes between deliberate or true conservation and unintentional or epiphenomenal conservation. Deliberate conservation occurs when people pay an "enduring cost in the present so that some benefit will be realized in the future" (Alvard 1993, p. 358). Conversely, epiphenomenal conservation can be an artifact of low human population densities, high mobility, limited technology, abundance of or low demand for a resource, or security issues (Ruttan and Borgerhoff Mulder 1999; Smith and Wishnie 2000).

Although it is clear that Maasailand is home to abundant and diverse wildlife, many would agree that this is indeed an artifact of traditional Maasai pastoralism and low population densities. While the livelihood strategies and cultural institutions of the Maasai aim to manage grasslands, when possible, there is no evidence that conservation of wildlife is a principal goal of the Maasai. Mol (1981, p. 27) supports the idea of the Maasai as "preservationist . . . rather by accident than by purpose." He states, "From all this we can conclude that the Maasai did not interfere with the position of the game on their land. On the other hand it is also clear that the Maasai did not take any positive steps to maintain and preserve the game. The game happened to

exist peacefully alongside the Maasai . . . before [human] population pressure began to interfere with the status of the game” (Mol 1981, p. 26).

From Early Attitudes toward Elephants to Modern Attitudes and Interactions

Early Attitudes

The abundant wildlife found in Maasailand has also been offered as evidence of positive or at least tolerant attitudes toward wildlife (Mol 1981; Ole Dapash 2002; Parkipuny 1997; Simon 1963). Simon (1963, p. 93) states that “it is entirely due to [the Maasai] that substantial herds of plains game still exist in southern Kenya and northern Tanganyika. We owe an immense debt of gratitude to the Masai for being the only East African tribe to adopt an indulgent attitude towards wild animals.” Many authors have anecdotally described a traditionally tolerant attitude (Campbell et al. 2000; Capone 1972; Darling 1960; Fosbrooke 1972; Kipury 1983; Ndaskoi 2006; Western 1997). One proposed explanation for Maasai tolerance of wildlife is their reliance on wildlife as their second cattle (Western 1994). Simon (1963) and Myers (1973) suggest indifference among the Maasai toward wildlife. This descriptor corresponds with the view of the Maasai as “accidental” conservationists in that they did nothing to threaten wildlife, nor did they do anything to conserve it. An example of this *laissez-faire* attitude is that the Maasai took no action when soldiers in World War I killed large numbers of wildlife along the Kenya-Tanganyika border (Lovatt Smith 1997). It could be that tolerance or apparent indifference is based on the fatalistic orientation of many Maasai.

Not everyone agrees that the Maasai only tolerated or were simply uninterested in wildlife. Some who have studied and worked with the Maasai have argued that they have demonstrated positive feelings toward wildlife and recognize its intrinsic value (AWF 1999; Homewood and Rodgers 1991; Kipury 1983). When discussing the possible exclusion of the Maasai from the Ngorongoro Conservation Area, Homewood and Rodgers (1991, p. 248) state,

“The Maasai respect for wildlife and the strong aesthetic as well as practical sense of their environment are such a natural basis for local conservation support that it is counterproductive as well as hypocritical and unethical to exclude them.” Further, some argue that the Maasai love of wildlife is evidenced in their children’s songs and chants and that because of this positive feeling, they dislike other people who kill wildlife and “destroy what should be left to exist for its own aesthetic value” (Kipury 1983, p. 4). Again, these claims could be supported, in part, by the earlier discussion of values of wildlife.

A concern of conservationists working in Maasailand today is how much of the positive attitude toward, or at least tolerance of, wildlife remains. In the latter part of the 20th century, several authors noted the changing attitudes of the Maasai (Darling 1960; Mol 1981; Myers 1973; Simon 1963; Western 1994). Simon (1963) asserts that two beliefs held by the Maasai at the time were the basis for a change from tolerance to “veiled hostility”: (1) that wild animals consume resources that should be for cattle and (2) that Europeans were casting “envious eyes” in the direction of lands that were rich with wildlife. Others have attributed a change in attitudes to increased competition between the Maasai and wildlife brought about by rising human and livestock populations (Darling 1960; Mol 1981; Myers 1973).

Western (1994) describes three phases of the *Development Plans for Amboseli* that influenced attitudes from the late 1970s through the early 1990s. Phase 1, the implementation phase, which included the water pipeline and imposition of a wildlife utilization fee, had early success, including the generation of funding for the construction of the first school in the area and a decline in spearing and poaching of wildlife. After 1981, the plan began to fail. The water pipeline stopped operating, the wildlife utilization fee was no longer being paid, relations between the Maasai and wildlife officials deteriorated, and spearing of wildlife, especially rhino,

increased. The next phase saw the Maasai of Olgulului take an active role in a number of wildlife-related initiatives, such as assuming responsibility for the public campsite, constructing a fence at Namelok, and negotiating a tourist concession (Western 1994). There was a renewed tolerance for wildlife, and wildlife numbers, especially elephants, increased in Amboseli when poaching was rampant in other parts of the country.

The third phase came with the creation of the Kenya Wildlife Service (KWS) in 1990. Western (1994) cites some early successes of this phase that include the building of new schools and hiring of Maasai game scouts (paid for with monies from the revenue-sharing program), Olgulului's resistance to subdivision in order to protect wildlife corridors, plans for electric fences to protect crops, improved relations between the KWS and the Maasai, low poaching levels, and "fairly positive" attitudes toward wildlife (Western 1994). This last outcome is substantiated by Kangwana's 1991 attitude survey.

Measures of Attitudes

As part of her study of elephant-Maasai interactions around Amboseli National Park, Kangwana (1993) conducted an exploratory survey of Maasai attitudes toward wildlife and the park. Most respondents were not in favor of removing wildlife from the area, indicating "that the overall attitude towards wildlife is, if not positive, then at least tolerant" (p. 95). Surprisingly, agriculturalists were found to be more positive toward wildlife and the park than pastoralists. One possible explanation offered by Kangwana (1993) is that agriculturalists were less marginalized, having diversified livelihood activities (i.e., crops and livestock) and more access to water, as most lived in the better-watered Kimana Group Ranch. These individuals also tended to be more educated and aware of the benefits of conservation. Elders were found to be more positive than *ilmurran* and women, with women being the most negative. Elders and

agriculturalists were also more likely to be aware of benefits brought by wildlife, although respondents in general were more likely to believe that wildlife benefits the country of Kenya rather than the Maasai as a group or themselves as individuals. Additionally, some respondents who were receiving wildlife-related benefits did not recognize them as such, highlighting the importance of increasing awareness of the link between wildlife and benefits through education.

Overall attitudes toward elephants were found to be positive, with 58% of the people categorized as pastoralists and 47% categorized as agriculturalists saying that elephants should not be removed from the area. Those with a positive attitude believed that elephants were beneficial to the area, were gentle, and had always been there. Respondents with a negative attitude believed they should be removed because they were dangerous and destroyed crops. Elders had more positive attitudes than others who were surveyed. Kangwana posited that the elders were more aware of the benefits (e.g., opening up grazing land for cattle) of elephants than were younger individuals. This view is supported by the Maasai saying, “Cows grow trees, elephants grow grasslands” (Western 1997).

Change, Conflict, and Intervention

Many changes have occurred in the Greater Amboseli Ecosystem since Kangwana’s study. The most critical is that of land-use change. In addition to the influence of colonialism, conservation, and agriculture, the human population is continuing to grow. With rapid population growth resulting from immigration (Table 2-1), the rain-fed areas have become settled, which has reduced the area available for dry-season grazing and access to water for livestock and wildlife (Campbell et al. 2000). Intensifying the land-use problem is the more recent subdivision of the group ranches. As of 2006, of the 52 group ranches in the Kajiado District, 32 had completed subdivision and 15 were in the process and subdivision, leaving only 5 that had not

started the process (BurnSilver and Mwangi 2007). The two group ranches that immediately border Amboseli, Olgulului/Lolarashi, and Kimana, which were surveyed by Kangwana in 1991 and Browne-Nuñez in 2005, were among the last to begin subdivision. Kimana completed the process in 2005, and in 2007, the rain-fed and irrigated agricultural areas of Olgulului were being subdivided.

Changes in land use, along with the growing human and elephant populations, have significant implications for Amboseli's elephants. Conversion from pastoralism to agriculture is a critical threat to elephants as it contributes to habitat loss and decreased tolerance (Gadd 2005). Human-elephant conflict is a growing problem—perceptual, political, and actual—in Kenya and across Africa (Ngure 1992; Waithaka 1993; Hoare 1995; Tchamba 1995; Thouless and Sakwa 1995; Barnes 1996; Lee and Graham 2006) and threatens the conservation of elephants. Most incidents of conflict involve crop raiding or competition for water and grazing resources. Deaths and injury to both humans and elephants occur as a result of the negative interaction. Mortality among Amboseli's elephants caused by local people may be the result of retaliation for losses incurred directly from conflict but can also be a demonstration of unhappiness with a social or political situation. Historically, levels of spearing were associated with the circumstances of the *ilmurran* age set. For instance, in 1984, when there was an initiation of new *ilmurran*, there was an increase in the level of spearing (Lindsay 1987; Kangwana 1993). The opposite occurred in the six-year period prior to the 1984 initiation. In 1978, *ilmurran* were initiated into elderhood, and there was not another *ilmurran* initiation until 1984. Western (1982) attributes this low spearing level to positive attitudes resulting from the receipt of benefits allocated to the Maasai by the development plans for Amboseli.

Conflict with wildlife can cause negative attitudes toward wildlife and reduce support for conservation (Newmark et al. 1993; De Boer and Baquete 1998; Naughton-Treves 2001) and can affect the long-term success of conservation programs (Webber et al. 2007). Although the elephant is the species most often reported as being a problem by local people (Gadd 2005; Parry and Campbell 1992), it is not always the proven cause of most damage. Naughton-Treves et al. (1999, p. 7) offer two case studies that demonstrate “that elephants create distinctive, highly localized crop damage patterns that are cataclysmic for the affected individual farmers, but insignificant to the regional farming economy.” Although smaller animals tend to produce greater economic loss, they are better tolerated than elephants (Gillingham and Lee 1999, 2003; Hoare 2000; Naughton-Treves et al. 1999; Naughton-Treves and Treves 2005). This attitude can be explained, at least in part, by the fact that elephants are a high-profile species, and they can be more dangerous to people than can other “pest” species (De Boer and Baquete 1998; Naughton-Treves et al. 1999; Sitati et al. 2003).

In interviews conducted with Maasai around Amboseli in 2005, when asked which wildlife species cause problems, 44% of individuals surveyed reported they had personally experienced problems with elephants and 21% said someone else in their *boma* had had a problem. Later in the same interview, as survey questions became more focused on elephants, 65% of respondents stated that elephants had caused them problems. Part of the explanation for this increase is that some respondents consider other household members’ elephant problems to be their own problems. Another possible explanation is an awareness of the value of the elephant to others (e.g., the Kenyan government, tourists, researchers, and conservation organizations). The elephant is the symbol of conservation found on uniforms and vehicles of government and nongovernmental organizations. Elephants receive a great deal of attention from these groups,

and when one is killed, there is an instant reaction (killing other pest species does not elicit the same kind of reaction). Individuals suffering from wildlife damage, particularly from large species such as the elephant, are often hoping for compensation, which may lead to an increase in damage reports (De Boer and Baquete 1998; Gesicho 1991; Mascarenhas 1971 [cited in Naughton-Treves et al. 1999]).

While costs to agriculturalists are the chief complaint in many parts of the elephant's range, the leading costs reported by people living around Amboseli National Park in 2005 were human and livestock injuries and death. Additionally, 42% of respondents who believed that local people incur costs related to problems with elephants complained about damage to trees. Only 8% cited crop damage as a cost. Other costs included competition for water and grazing and damage to property such as water pipelines, fences, and houses. In addition to the direct costs of living alongside elephants, there are opportunity costs. "These costs are difficult to quantify but may outweigh the direct costs of agricultural damage and be a major component of conflict as it is perceived by local people" (Hoare 2000 p. 35 citing Dublin et al. 1997). Survey respondents reported such costs, including the inability to walk freely in the group ranches, interference with children attending school, and sleepless nights (guarding crops or property).

There have been numerous interventions initiated around Amboseli to improve attitudes toward elephants and mitigate conflict. These have been implemented by several organizations, including the KWS, the Amboseli Elephant Research Project (AERP), and the African Wildlife Foundation (AWF). While these interventions vary in their approaches and objectives, all have the long-term goal of ensuring continued tolerance of elephants outside of the relatively small protected area of the park.

In 1998, after a period of intensified conflict and long negotiations among community representatives and members of the KWS and the AERP, the elephant research project implemented a consolation scheme that pays for livestock killed by elephants outside the park. Twenty-four percent of local people, mostly men, who were surveyed in 2005, were aware that the AERP has a consolation program for livestock losses, with 73% of these individuals evaluating the AERP as being slightly good to very good.

In order to address human-elephant conflict in the nearby agricultural areas, an electric fencing project was started by the KWS in two areas in 1996. The two solar-powered fences, at Kimana and Namelok, were financed by the European Union and completed in 2000. The fences have had limited efficacy because they are often in disrepair due to vandalism and elephant damage. They have not solved the problem of human-wildlife conflict, as conflict has shifted to the Loitokitok-Olchorro area and made wildlife more vulnerable to poaching in nearby Tanzania (Ntiati 2002). Additionally, there is confusion among community members as to who owns the fence and who is responsible for its maintenance. Despite these issues, most of the 2005 survey respondents (99%) living within the fences believed the fences do a good job.

Another significant change around Amboseli is the growing number of cultural *bomas* established in the Olgulului Group Ranch along the southern park boundary. These business entities have been established by Maasai who are interested in entering the cash economy. Here, tourists can tour a “traditional” Maasai homestead, buy beadwork from the women (and other handicrafts brought in by outside sellers), and observe demonstrations, including dancing, singing, the building of fires, and home maintenance. While there are perceived and real benefits for the Maasai who participate, such as the provision of an alternative economic activity, these *bomas* are fraught with problems. A major issue that hinders their economic success is the

problem of the tour drivers who pocket most of the money charged to the tourists for entrance into the *bomas* (pers. observ., Onetu 1998; Ritsma and Ongaro 2002). Cultural *boma* members believe there is nothing that can be done about this situation, concluding that if they protest, drivers will take their groups to other *bomas*, so a little money is better than none at all.

A further criticism of the cultural *bomas* is their contribution to the erosion of Maasai culture (Onetu 1998; Ritsma and Ongaro 2002). While this claim is also directed at tourism in general, the cultural *bomas* are specifically blamed for splitting families, as women leave their homes to work in the *bomas*. Related to this problem is the concern among community members that cultural *bomas* provide a setting for prostitution—a new occurrence in Maasai culture—and a rise in the incidence of sexually transmitted diseases (Onetu 1998). Additionally, cultural *bomas* “act as collection points for idle sitters who in turn participate in petty crimes and other unapproved social behaviors” (Onetu 1998, p. 47). From a health and safety perspective, the cultural *bomas* have led to an increase in disease, as large numbers of people concentrate in small areas (Akama 2002; Onetu 1998). Finally, because they obstruct elephant corridors, they actually increase, rather than decrease, conflict (Douglass 2001; Ritsma and Ongaro 2002).

In 1999, the AWF proposed several activities aimed at “ensuring that the Maasai areas surrounding Amboseli National Park are ‘friendly’ to elephants (and other wildlife) by reducing conflicts between humans and elephants” (AWF 1999). Among these activities was an outreach program that would induce “change favorable to wildlife conservation,” including improving attitudes toward elephants through meetings, workshops, and educational tours. At the time of the 2005 survey, only 7 of 569 respondents identified the AWF as an organization that helps people who have problems with elephants, while 27 stated that the AWF helps elephants. When asked directly about the AWF’s activities in the area, many Maasai complained that they were

unsure exactly what members of the organization do, only that they drive their cars around and hold meetings.

Other activities and projects are in progress in the ecosystem that are designed to ensure that elephants and other wildlife are able to continue to share group ranch lands with the Maasai. Many of these involve providing alternative forms of income for local Maasai through employment in the conservation and tourism industries. For example, the Selenkei Group Ranch has set aside an area for a private wildlife sanctuary and rents land to Porini Ecotourism for a luxury tented camp. In addition to rent, the community receives an entry fee for each visitor. The Kimana Group Ranch also has a wildlife sanctuary and lodging, although local Maasai complain that not enough Maasai are employed in these establishments and that the jobs that are available are usually low-level, degrading positions (pers. observ.; Ole Dapash 2002; Onetu 1998). This complaint is a criticism of the positions held by most Kenyans working in the tourism industry (Sindinga 1994). Maasai are believed to be the least represented in the industry, even in the lowest-level jobs (Akama 1999). Another serious problem is the equitable distribution of benefits from tourism-generated revenues. Local authorities such as the county council often are the recipients of tourism money, with little going to the individual group ranch members. Resolutions to these issues are needed in order for tourism to be the viable alternative economic activity that government and conservation organizations promote.

Current Attitudes

In the 2005 survey, several questions were asked concerning attitudes. First, respondents were asked to arrange cards with drawings of wild animals into piles according to whether they liked or disliked the animals. Most respondents (57%) placed the elephant card in the “dislike” pile, while 42% of respondents placed the elephant card in the “like” pile (the remaining 1%

were either neutral or said they liked all animals). When asked specifically if they liked seeing elephants in their group ranch, there was a 50/50 split. The most common reason for liking to see elephants in the group ranch is the belief that elephants attract tourists and therefore generate revenue. This most likely explains why some who report not liking elephants say that they like to see them in their group ranch. The top reason for not wanting elephants in the group ranch is the danger they pose to people.

As in the survey conducted in 1991, where respondents were asked if elephants should be removed (Kangwana 1993), respondents in 2005 were asked about a hypothetical vote on whether to allow elephants to continue to enter their group ranch. A majority of people (53%) said they would vote to allow elephants to continue to be in the group ranch, the same percentage who were against removing elephants in 1991, while 46% said they would vote not to allow them access. In 1991, 45% of respondents stated that elephants should be removed or confined to the park (Kangwana 1993). Again, the top reason for a positive response was tourism revenue, and the top reason for a negative response was the problems caused by elephants. Individuals with an awareness of “organizations that help people when they have a problem with elephants” were more likely to say that they would vote to allow elephants in the group ranch. There was not a significant difference in voting intention between those who are primarily agriculturalists or pastoralists, between age groups, or between group ranches, but there was a significant difference between men and women, with more men being favorable to allowing elephants in the group ranches.

As mentioned earlier, it is essential to understand the complexity of the attitude-behavior relationship. Knowledge of attitudes alone is not sufficient for making policy decisions, as attitudes are not always straightforward. For example, 25% of respondents who stated they do

not like to see elephants in their group ranch stated they *would* vote to allow them in the group ranch. Of these individuals, 85% cited tourism revenue as their reason for toleration. Conversely, 18% of respondents who stated they do like elephants in their group ranch stated they *would not* vote to allow them in the group ranch. Seventy-three percent of these respondents would vote against elephants because of the danger they pose. Here it is evident that attitude alone does not predict behavior or, in this case, behavioral intention. Other variables, such as economic benefits and fear of human-elephant conflict, contribute to the level of tolerance of elephants.

As the context of Maasai-elephant interactions continues to evolve in the Greater Amboseli Ecosystem, it is important to understand to what degree Maasai behaviors toward elephants are a consequence of theoretically predicted attitudinal variables and the extent of influence of more dynamic situational variables such as socioeconomic status, prior experience, and land use. This understanding can contribute to the development of strategies to maintain the coexistence of the Maasai and elephants.

The Future of the Maasai and Elephants of Amboseli

Writing about the fate of Amboseli's elephants, Chadwick (1992, p. 85) stated, "The future of Amboseli's giants clearly hinges upon the attitudes and land use practices of the people surrounding the reserve." The future of the people of Amboseli is also dependent upon the fate of the elephants.

Maasai and wildlife have always competed to some degree but have also been very interdependent (Deihl 1985). Perhaps the best summary of the symbiotic relationship between the Maasai and wildlife was given over 30 years ago by a Maasai elder addressing a group of representatives from the World Bank (Western 1997):

Yes, the Maasai do intend to accommodate wildlife . . . as we always have. We protected wild animals from hunters, and wildlife protected us from drought, so we

see it as fatal that we should not be allowed to move back into Amboseli. We will leave the park to show our good intentions. We will allow wild animals onto our land, stop our young men from harassing them, and discourage poachers. But we expect that when it is seen that we cannot survive without Amboseli, we too shall be extended the same treatment as the animals and that we will derive the benefits from the park. If such reciprocity is not shown, we cannot make assurances for the future of wildlife outside Amboseli National Park. And if wild animals are restricted to the park, their numbers will fall. If we are excluded, our livestock will die. Coexistence is the essence of survival for us both.

This tone of cooperation and goodwill is still evident among the Maasai of Amboseli today. Although a large amount of modern tolerance of elephants appears to be explained by the perceived role of elephants in attracting tourists to the area (economic value), there is an element of cultural value present today. Traditional tales of the elephant are still told by the Amboseli Maasai. During survey follow-up interviews conducted in May 2005, senior elders told many of the stories and proverbs of the elephant described earlier.

The Maasai of Amboseli have indeed been “people of cattle.” Some have argued that Maasai throughout history have always made changes when necessary with the intention of returning to pastoralism (Knowles and Collett 1989). This notion is supported by research in northern Tanzania, where Maasai stated they began farming in order to save their livestock, that is, so that fewer animals would have to be sold in order to obtain food (McCabe 2003; O’Malley 2000), but this view is not universal among all Maasai. As one elder living near Tarangire National Park, Tanzania, stated, “You cannot expect us to remain in history. Many projects come and recommend we remain pastoralists, but we have discovered the new foods. Now we want to grow crops and keep our cows” (in Kangwana and Ole Mako 2001, p. 159).

If modern Maasai do indeed diversify their livelihood activities with the intention of returning to transhumant pastoralism, would such a transition even be possible in the Greater Amboseli Ecosystem, given the many changes, namely subdivision, in group ranches? The answer is obviously no. While it is impossible to turn back the clock and return to the days when

the Maasai, their livestock, and wildlife coexisted, unrestricted by boundaries created by outside policy, it may be feasible to nurture what remains in terms of traditional values and beliefs, develop sustainable opportunities for livelihood diversification, and encourage land-use planning that will minimize further loss of land available for wildlife and livestock.

Understanding, respecting, and including local people in decision making are requirements for successful conservation. In Amboseli, where culture and land use have played significant roles in the conservation of diverse and abundant wildlife populations, this holds especially true. “Aspects of Maasai communal social organization, their production system, and their culture are valuable human resources that can be a foundation for a modern livelihood which integrates livestock keeping with wildlife management and tourism” (Berger 1996, 175). Although changes in land tenure—communal property to private property—have weakened these “human resources,” many conservationists recognize these resources and are working to include the local people as partners in conservation.

Education can be an important part of conservation programs, although there are caveats as to how it should be done. The goal of environmental education programs is to influence behavior. Many variables influence behavior; therefore, addressing these other variables must be a component of conservation programs. There is a large body of literature on the efficacy of environmental education that cannot be adequately reviewed here, but the following excerpt from Byers (1996, p86) provides insight into the best approach to environmental education:

Modern environmental education recognizes that environmental behaviors are influenced not only by knowledge, but also by values, options, skills, and many other motivating factors (Hungerford and Volk 1990; Wood and Wood 1990). [It] attempts, therefore, to communicate more than just knowledge. It is a ‘process that enables people to acquire knowledge, skills, and positive environmental experiences in order to analyze issues, assess benefits and risks, make informed decisions, and take responsible actions to achieve and sustain environmental quality’ (North American Association for Environmental Education 1993)...[it] is

concerned with communicating environmental values and ethics, not just knowledge and information (Caduto 1985).

The results of the 2005 attitude survey show that while the cultural value of elephants does not appear to be highly prevalent among today's Amboseli Maasai, there is some degree of appreciation (e.g., beauty, role in ecosystem modification, etc.) and theistic value as demonstrated by the statement of an old woman in Kimana group ranch: "God created elephants and they belong to this earth just like us." An environmental education program in Amboseli-area schools and the greater community based on traditional knowledge, beliefs, and values as well as on science would not only increase knowledge of and cultivate positive attitudes toward elephants but also perhaps aid in the preservation of the culture that has been credited with conserving the diverse wildlife of the Greater Amboseli Ecosystem.

Economic Opportunities and Other Benefits

Improving knowledge and attitudes alone is not enough. As pastoralist families move closer to poverty, the need to diversify their livelihood activities increases. Many have turned their hopes to tourism as a source for alternative income. In the last few decades, there has been great emphasis on creating economic incentives for conservation in rural areas. This approach is based on a growing, but debated, effort to link conservation and development, but "most of Africa's protected areas do not and almost certainly will not contribute significantly to reducing poverty" (Infield 2001, p. 800). While the Maasai recognize the benefits or potential benefits of tourism, many do not see it as benefiting them personally or their household. Although a relatively small percentage (16%) mentioned selling handicrafts as the top personal benefit, many saw it as a benefit to the Maasai in general. About 10% mentioned school bursaries as a benefit to their household.

These results have implications for elephants, given that the most-cited reason for tolerating elephants is generation of tourism revenue. Amboseli is one of Kenya's top earners among parks in terms of annual gate fees (Bulte et al. 2006; Ole Dapash 2002), but benefits have been inconsistent, insufficient, and inequitably distributed (Mburu et al. 2003). These problems and others previously mentioned that are related to tourism in Amboseli need to be rectified if tourism is to be promoted as a viable alternative livelihood activity. There are, however, examples of ecotourism enterprises in the Greater Amboseli Ecosystem that not only limit the impact on the natural environment but respect local culture and provide more equitable sharing of benefits. These include the Oldonyo Wuas Camp in the Mbirikani Group Ranch and the Porini Camp in the Eselenkei Group Ranch. Additionally, some organizations working in the ecosystem, such as the Amboseli Trust for Elephants and the Maasai Wilderness Conservation Trust, provide benefits to the local community such as scholarships for school-age children and university students. There are also consolation and compensation schemes such as the one implemented by the trust and a scheme for lion damage operated by the Lion Guardians Project. Where benefits do exist, they should be promoted to increase awareness in the community.

Land-Use Planning

Recent research shows that pastoralists are unsure of the economic viability of individual land parcels after group ranch subdivision and are working to "re-aggregate their access to resources through pasture sharing and swapping mechanisms" (BurnSilver and Mwangi 2007, p. 4). These arrangements are based on reciprocity or, less commonly, monetary exchange. These findings refute the inevitability suggested by earlier research that changes in land tenure and livelihood activities would weaken social and cultural relationships among pastoralists (Kituyi 1990; Ensminger and Rutten 1991 [cited in BurnSilver and Mwangi 2007]). It is still early in the process of transition from communal to individual ownership. Challenges to these new

arrangements may become more evident. In the 2005 survey, 70% of respondents named pastoralism and 25% named cultivation as their primary economic activity. When asked what they thought their primary livelihood activity would be in five years' time, only 57% said pastoralism, while 35% predicted they would primarily be farmers.

Conclusion

The welfare of the Amboseli elephants has long been intertwined with the local human population. As noted here and by other authors (Campbell et al. 2003), the social context of Amboseli is changing. The human population is no longer a homogeneous society but rather comprises a diversified Maasai population with an ever-increasing population of cultivators from other ethnic groups. As the human dimensions of conservation in the Greater Amboseli Ecosystem continue to evolve and become more complex, local, national, and international stakeholders need to collaborate in order to continually monitor and adapt conservation and development strategies to ensure the well-being of both species.

CHAPTER 5
PREDICTING INTENTION TO ALLOW ELEPHANTS ON PRIVATE LAND:
AN INTEGRATED MODEL OF COGNITIVE AND CONTEXTUAL VARIABLES

Introduction

Conserving the African elephant (*Loxodonta africana*) is a critical and complex task due to its role in the natural world, its conservation status, and its relationship with people. From an ecological perspective, the elephant is recognized as a keystone species (Balfour et al. 2007) and ecosystem engineer (Owen-Smith 1988; Wright and Jones 2006; Pringle 2008), with complex effects on its habitat and species diversity (Laws 1970; Balfour et al. 2007; Stephenson 2007). It modifies its environment through activities such as seed dispersal, tree felling, bark stripping, and the creation of waterholes. It is an intelligent, social animal that communicates with others near and far, maintains strong family bonds throughout its life, and has life stages parallel to those of people. Additionally, many elephant behaviors, such as those demonstrated in greeting ceremonies or when standing over and covering a dead body or bones, are interpreted as displays of emotion. Elephants also have economic value at the local and national level by attracting tourists for consumptive and non-consumptive use. The elephant is admired by many people around the world, and is therefore used as a flagship and umbrella species in appeals for support of conservation initiatives (Waithaka 1993), but not all people view elephants positively. Many people living in proximity to elephants view them negatively, as elephants can be a threat safety and livelihood.

Conserving Africa's elephants is complex because of the variation in the elephant's status and habitats across countries, and because of the multifaceted social dimensions involved. Once occupying nearly the entire continent of Africa (Laws 1970; UNEP 1989; Cumming et al. 1990), today the elephant's range is estimated to be 22% of Africa's land area, with populations occurring in 37 sub-Saharan countries. Its distribution and abundance vary greatly – from

declining, fragmented populations in West Africa, to larger, more stable populations in central and southern Africa, to locally overabundant populations in areas where populations are confined to smaller areas with limited or no opportunity for dispersal (Balfour et al. 2007; Blanc et al. 2007; Stephenson 2007). Historically, declines in elephant numbers have been attributable to the ivory trade and habitat loss resulting from human population growth and expansion (Said et al. 1995). After the ban on trade in ivory was instituted by the Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES) in 1990, elephant numbers began to recover in many areas (Blanc et al. 2005), but poaching for meat and ivory remains a significant threat and has been on the rise in recent years (Stephenson 2007; Wasser et al. 2008). The African elephant is currently listed as *vulnerable* on the IUCN Red List of Threatened Species and remains on Appendix I of CITES in most range states¹ (Blanc 2008). In addition to poaching, other critical threats to elephants include habitat loss and fragmentation (Blanc 2008). Of the remaining habitat, it is believed that 70% of elephant range lies outside protected areas (Blanc et al. 2007), highlighting the importance of maintaining private lands as viable elephant habitat – land often occupied by people.

Humans and Elephants

Humans and elephants have coexisted for thousands of years with different levels and types of interaction, depending on variables such as human and elephant population densities and land use. Today, as the human population rises and more land is converted for agriculture and other human uses, recovering elephant populations are unable to occupy much of their former range (Omondi et al. 2004). The human-elephant interface is expanding along with the potential for conflict. Conflict with wildlife can cause negative attitudes to wildlife and reduce support for

¹ Elephant populations in four range states in southern Africa were transferred back to Appendix II: Botswana, Namibia, and Zimbabwe in 1997, and South Africa in 2000 (Blanc 2008).

conservation (Newmark et al. 1993; De Boer and Baquete, 1998; Naughton-Treves, 2001) and can affect the long-term success of conservation programs (Webber et al. 2007). Therefore, it is critical for wildlife managers and conservationists to have an understanding of the human dimensions of wildlife issues.

Although conflict between humans and elephants has a long history, human-elephant conflict (HEC) is perceived to be on the rise. This is especially apparent where agriculture is practiced (Naughton et al. 1999). There is extensive research on conflict between elephants and farmers (e.g., Brown 1968; Kinloch 1972; Barnes et al. 1995; Tchamba 1995; De Boer and Baquet 1998; Naughton-Treves 1998, 1999; Hoare and Du Toit 1999; Lahm 1996, O'Connell-Rodwell et al. 2000; Osborn and Parker 2002; Wunder 1996). Research has found that elephants can cause devastating damage at the level of the individual farmer, but elephant damage is typically negligible compared to the widespread damage caused by smaller pest species (Adjewodah et al. 2005; Bell 1984; DeBoer and Baquete 1998; Gillingham and Lee 1999; Lahm 1996; Naughton et al. 1999; Parker et al. 2007; Wunder 1996). Despite this fact, there is a great deal of animosity among farmers toward elephants (Barnes 1996; Gadd 2005; Naughton-Treves 1997; Wunder 1997). This may be due to the size and potential danger posed by the elephant (DeBoer and Baquete 1998; Hoare 2000; Naughton et al. 1999; Sitati et al. 2003), dread and increased perceptions of risk that occur where there are low probability-high consequence events (Slovic 1987), and resentment of local people related to the importance of the elephant to governments and conservationists (Matzke and Nabane 1996; Naughton et al. 1999; Naughton-Treves 1997; O'Connell-Rodwell et al. 2000).

Until recently, little attention has focused on the attitudes and behaviors of pastoralists regarding elephants and other wildlife. Historically, pastoralists have not been perceived as

having a positive influence on the environment and wildlife. They have received much of the blame for desertification, with critics, for example, pointing to the theory of the “tragedy of the commons” (Hardin 1968), citing overstocking and overgrazing as the primary, if not the only, causes of desertification (Lamprey 1983), but these ideas have been challenged in the last few decades (see Ostrom et al. 1999) with increased recognition and understanding of the pastoralist institutions that regulate access to communal resources. The compatibility of pastoralism and wildlife is increasingly supported (Barrow et al. 2007; Boone and Coughenour 2001; Gadd 2005; Goldman 2003; Homewood and Rodgers 1991; Little 1996; Nelson 2000; Reid et al. 2003), especially relative to agriculture. An oft-cited example of the compatibility of pastoralism with wildlife conservation is the long-term coexistence of East African pastoralists and some of the largest and most diverse concentrations of wildlife on the planet (Lindsay 1987; Little 1996). Research has found that with low to moderate use of grasslands, pastoralism is a sustainable land-use option in dryland savannas (Mearns 1997; Reid et al. 2003).

Ironically, the shift in thinking about pastoralism and wildlife conservation comes at a time when the nature of pastoralism is changing. Across Africa, there is a “widespread and irreversible” shift from nomadic and semi-nomadic pastoralism to sedentary agropastoralism (Young and Solbrig 1993), where traditional pastoralists are modifying their livelihood strategies to include other economic activities, such as agriculture and wage labor, and/or intensifying livestock production (Barrett et al. 2000; Du Toit and Cumming 1999; Little et al. 2001). In the midst of these changes, the incidence of human-wildlife conflict, including conflict with elephants, is on the rise (Kasiki 1998; Low 2000; Sitati 2003).

A prime example of this is occurring in East Africa, where Maasai pastoralists are diversifying their livelihood activities, depending less on livestock (McCabe 2003; McCabe et al.

1992) and increasingly on agriculture. This is the result of several factors, including population growth, loss of grazing land to wildlife conservation and agriculture, and subdivision and privatization of communal lands (Campbell et al. 2000; Kangwana and Browne-Nuñez, in press). Potential implications (for wildlife conservation) of shifting livelihood strategies were highlighted by research in Laikipia, Kenya. Individuals from two pastoralists groups, the Maasai and Turkana, were found to be more tolerant of elephants than agriculturalists (Gadd 2005). Former pastoralists, who had converted to agriculture, were more similar in attitude to individuals from traditional agricultural groups such as the Kikuyu. These results provide evidence of the increasing threat posed to elephants and other wildlife that formerly coexisted with humans on pastoral lands. Not only did the shift in livelihood strategy result in habitat loss, it also led to decreased tolerance of elephants (Gadd 2005).

Similar to the situation in Laikipia, the human context around Amboseli National Park, Kenya, is changing. The traditionally pastoral Maasai are shifting livelihood strategies, people from farming groups are increasingly immigrating to the area, and less land is available for elephants and other wildlife outside the park. As a result of these changes, there is a mounting focus on HEC (Chapter 2). Several organizations are working to ensure that elephants have continued access to the private lands surrounding the park, which include critical seasonal dispersal areas. There are a number of interventions aimed at reducing negative interactions and improving attitudes toward elephants, with the ultimate goal of increasing tolerance of elephants on private land. Given the dependence of the Amboseli elephants on the tolerance of local people and the substantial efforts of wildlife authorities and conservationists to increase this tolerance, an empirical measure of tolerance and an analysis of the factors that influence tolerance is needed.

In 1993, Kangwana provided a preliminary assessment of the attitudes of the Maasai of Amboseli toward wildlife in general and elephants specifically. She found that the overall attitude towards wildlife in general was “if not positive, then at least tolerant” (p. 95). Agriculturalists were slightly more positive than pastoralists, possibly because they were less marginalized, having diversified livelihood activities (i.e., crops and livestock) and more access to water (Kangwana 1993). They also tended to be more educated and aware of the benefits of conservation. Attitudes towards elephants specifically were interpreted as positive, with 58% of pastoralists and 47% of agriculturalists stating that elephants should not be removed from the area. My study builds on this work, providing a current assessment of attitudes toward elephants that is grounded in social psychological theory, allowing for an analysis of other variables that predict tolerance of elephants.

In this chapter, I provide an assessment of attitudes toward elephants around Amboseli. The overall goal is to identify variables, including attitudes, that predict Maasai willingness to allow elephants on private land, measured by intention to vote to allow or not allow elephants in group ranches immediately bordering the park. A secondary goal is to test the transfer of social science theory and methods commonly used in human dimensions research in North America to a rural African setting. Based on theory and previous research, I test an integrated predictive model of cognitive and contextual variables to explain variation in local peoples’ willingness to accept elephants on the private lands around Amboseli National Park. This study has practical, theoretical, and methodological implications. The practical value lies in identifying variables that predict willingness to tolerate elephants to provide stakeholders with a means for evaluating current, and planning future, interventions. This study demonstrates that it is possible to extend social psychological theory and research methods developed in the West to a rural African

setting to survey of a representative sample of a widely dispersed, partially mobile population that parallels complex surveys carried out in industrialized countries. It also contributes to advancing a standardized framework for cross-cultural attitudinal research, especially in situations of human-wildlife conflict.

Conceptual and Theoretical Framework

The Cognitive Hierarchy

Studies of attitudes are the most common line of research in human dimensions of natural resource management (Manfredo et al. 2004). Implicit in these studies is the goal of understanding behavior. A proven theoretical framework in this realm of study in North America is the cognitive hierarchy. The cognitive hierarchy posits that an individual's view of the environment can be organized into an inverted pyramid that consists of values, value orientations, attitudes, norms, and behaviors (Figure 5-1). At the foundation of this pyramid lie values, enduring beliefs about the world which tend to be shared by a culture. The influence of values on attitudes and norms occurs indirectly via value orientations, which are patterns of basic beliefs toward an object that provide meaning to fundamental values. Attitudes and norms then influence behavioral intentions, the most direct predictor of actual behavior. Support for the validity of attitudes and norms in predicting behavior has been provided by a large body of research based on Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA). However, researchers have suggested that expanding this theoretical framework to include additional variables may help improve understanding and prediction of behaviors and other constructs in the hierarchy (Eagly and Chaiken 1993; Fazio 1990; Vaske and Donnelly 1999).

My proposed model of predictors of willingness to allow elephants in Maasai group ranches, while largely based on the cognitive hierarchy, tests the inclusion of additional variables that have been used to predict behaviors, including demographic variables, prior experience,

knowledge, and perceived risk. In addition, I examine the influence of HEC mitigation interventions on attitudes, norms, and behaviors. The model is visually represented in Figure 5-2, with arrows representing the hypothesized relationships between variables. The following is a brief overview of each concept within the model and includes my corresponding hypotheses.

Value Orientations

Values tend to be widely shared by all members of a culture and, therefore, are unlikely to account for much of the variability in specific attitudes and behaviors. Rather, the influence of values on attitudes and behavior occurs indirectly via patterns of basic beliefs. Research conducted in the U.S. has found that the basic beliefs that give meaning to values can be organized into patterns of beliefs, which can in turn form value orientations. These value orientations can be represented on a continuum such as protection / use and existence / benefits (Fulton et al. 1996), and biocentric / anthropocentric (Vaske and Donnelly 1999). Procedures to measure these orientations have not translated to developing countries, where research has found that individuals can hold more than one value orientation concurrently, possibly suggesting that as societies become more complex and removed from the natural world, such as in the U.S., their values concerning wildlife become less complex (Finchum 2002; Manfredo and Fulton 1997). Hence, where societies maintain a closer link to the natural environment, such as in rural Africa, a framework for capturing more complex value orientations may be required.

Kellert's (1980) typology of attitudes toward animals (Table 5.1) has been repeatedly adapted for use in varying settings around the world, such as Botswana (Mordi 1987), Costa Rica (Drews 2002), the Dominican Republic, Trinidad and Tobago (Rauwald and Moore 2002), Germany (Kellert 1993), Japan (Kellert 1993), Norway (Bjerke and Kaltenborn 1999), and Peru (Frost 2000), with researchers, including Kellert himself, using various terms to describe the categories, including wildlife values, value orientations, and attitudes (Kellert 1980, 1985, 1993,

1996; Manfredo et al. 2004; Rauwald and Moore 2002). Mordi (1987, p. 52), discussing his study in Botswana, stated that the categories of Kellert's typology "are both mutually exclusive and collectively exhaustive of the universe of attitudes toward wild animals in Africa," although he added an eleventh type that he termed "theistic" to capture the fatalism that is present in most African cultures. Even though the attitude types collapsed into eight new factors, Mordi felt the abstractness and mutually exclusive nature of the attitude types made them valid measures for cross-cultural research. I adapted the items used by Mordi to measure wildlife value orientations. Based on previous research and the proposed predictive model (Figure 5-2), the following hypotheses were examined:

- **H₁:** Maasai basic beliefs about wildlife can be organized into distinct wildlife value orientations.
- **H₂:** Wildlife value orientations will predict attitudes towards elephants and allowing elephants in group ranches.
- **H₃:** Wildlife value orientations will predict norms for allowing elephants in group ranches

Attitudes

A general definition of the attitude concept is the tendency to respond favorably or unfavorably to an object, where an attitude object can be any abstract or concrete object of thought (Eagly and Chaiken 1993). In the present study, there are two attitude measures: (1) general attitudes toward elephants (targets) and (2) specific attitudes toward allowing elephants in group ranches (behavior). Fishbein and Manfredo (1992) provide a behavior-oriented definition of the attitude concept, based on the TRA, which defines an attitude as the product of an individual's salient beliefs about the potential outcomes that result from a behavior and the corresponding evaluations of those outcomes. Research based on the TRA has repeatedly

demonstrated that specific attitudes toward behaviors can be strong predictors of specific behaviors (Eagly and Chaiken 1993, Fishbein and Manfredo 1992).

General attitudes toward targets are not explicitly considered in the TRA. Ajzen and Fishbein (1980) view attitudes toward targets, along with personal characteristics, as variables external to their model, only influencing behaviors as they relate to the variables within the TRA. However, other researchers continue to examine the predictive ability of more general attitudes toward targets with regard to specific behaviors directed at the target (Fazio 1986; Fazio et al. 1989; Fazio and Towles-Schwen 1999). According to Fazio (1986, 1990), in situations where motivation and opportunity for deliberative (MODE) processing are lacking, behaviors are spontaneous and attitude accessibility and attitude strength become important in determining to what degree behavior is based on attitude. Therefore, where an attitude is strong, it is more accessible and likely to be automatically activated and direct behavior. In addition to affecting behavior, strongly held general attitudes may influence attitudes and norms for a behavior toward a target (Ajzen and Fishbein 2005; Eagly and Chaiken 1993). In short, the Fazio model describes automatic, spontaneous processes, and the TRA is concerned with deliberative processes.

Both deliberative and spontaneous processing may occur in situations of human-wildlife conflict. Where there is a high degree of salience and volatility among stakeholders, one would expect strong general attitudes toward the wildlife species of concern. These attitudes would be more accessible and more likely to influence attitudes toward a behavior and guide performance of the behavior concerning the attitude object (Ajzen and Fishbein 2005). On the other hand, the complexity of managing such conflict may invoke thoughtful consideration of possible behavior outcomes among certain individuals. The predictive model (Figure 5-2) tests the following hypotheses:

- **H₄:** General attitudes toward elephants will predict attitudes and norms for allowing elephants in group ranches.
- **H₅:** Specific attitudes toward allowing elephants will directly predict intention to allow elephants in group ranches.

Norms

Researchers define norms (e.g., social vs. personal) and measure norms in different ways (Vaske 2008). Under the TRA, which focuses on social norms, a subjective norm is a set of beliefs about the normative expectations of certain referents (an individual's most important others) and one's motivation to comply with those referents (Ajzen and Fishbein 1980). It is an injunctive social norm concerned with perceived social pressure for whether one should or should not engage in a behavior. It has been suggested that some individuals may be primarily influenced by attitudes while others are more strongly influenced by injunctive norms (Hui 1988; Trafimow and Finlay 1996). Terry et al. (2000) demonstrated that norms have a stronger influence when people identify strongly with their groups. The influence of such norms is an important consideration in the present study, as it is a common assertion that African cultures, with variation between ethnic groups and exceptions throughout, are more collectivist than individualist (Brislin 1993; Gannon and Pillai 2010; Myers 2002), and, in such cultures, subjective norm should play a stronger role (Aarø et al. 2007; Giles et al. 2005).

Empirical support was provided by a study on individualism and collectivism in Kenya (Ma and Schoeneman 1997), where Maasai and Samburu pastoralists' conceptions of self were found to be more collective and less individualized than the self-concepts of Westerners. A critical component of Maasai culture is a system of social organization, which creates groups such as clans, sections, and age-sets. Each of these groups provides common bonds among all Maasai, with the age system providing the deepest "sense of unity" (Spencer 2003, p. 3). There are two terms for 'age-set': *ol-poror* refers to the friendships of the peer group, and *ol-aji*

denotes “the sterner expectations of the age-set with the ultimate threat of a curse following any breach” (Spencer 2003). This latter term underscores the potential significance of normative expectations. Further evidence of the importance of norms in Maasai society lies in the many Maasai proverbs that teach the value of group membership and altruism (see Rainy 1989).

Given the collectivist elements of Maasai culture which support cooperation and reciprocity, which in turn have facilitated transhumant pastoralism and a communal land-tenure system, it is expected that subjective norm will be a significant predictor of intention to allow elephants. The model tests the following hypothesis:

- **H₆:** Norms for allowing elephants will predict intention to vote to allow elephants in group ranches.

External Variables

Ajzen and Fishbein (2005), while maintaining that the influence of external or background variables on behaviors occurs indirectly via attitudes and norms rather than directly on behavior, recognize that there are a multitude of variables that could potentially influence other variables in models such as the TRA. They also note that no theory exists to guide selection of potential background or external variables. Therefore, the selection of additional variables to include in my predictive model was based on the findings of previous research, including research on human-wildlife conflict.

Demographic variables

It is common practice in attitude studies to examine the relationship between demographic variables and attitudes, and, more recently, with other variables within the cognitive hierarchy. For example, research in North America has often demonstrated that gender influences attitudes and other variables in the hierarchy (Bright et al. 2000; Czech et al. 2001; Dougherty et al. 2003; Kellert and Berry 1987; Lauber et al. 2001; Vaske et al. 2001; Zinn and

Peirce 2002). Studies of wildlife conservation attitudes in rural Africa have found correlations between attitudes and gender (Gillingham and Lee 1999), affluence/wealth (Infield 1988, Kideghesho et al. 2007; Mordi 1987), education (Akama et al. 1995; Infield 1988; Mordi 1987), ethnic group (Akama et al. 1995), level of westernization (Infield 1988), and livelihood/land-use activity (Infield and Namara 2001). Studies specific to attitudes toward elephants in Africa have found that gender (Hill 1998; Kangwana 1993; Kioko 2004), age (Kangwana 1993; Kioko 2004), and livelihood/land-use activity (Gadd 2005; Kangwana 1993; Kioko 2004) explained some of the variance in attitudes.

Age and gender are important organizing principles within Maasai society (Hodgson 2001, 2005; Spencer 1993) and have been found to be related to attitudes toward wildlife (Kangwana 1993). In Amboseli, Kangwana (1993) found that older men were more positive than *ilmurran* (commonly referred to as “warriors”) and women toward wildlife in general and elephants specifically. Spencer (1993) provides a “gerontocratic” model that represents major groupings by sex and age grade among the Maasai (Figure 5.3). It illustrates the important divisions between the young and old, and men and women. These divisions represent the partitioning of traditional rights, responsibilities, and activities of daily life in Maasai pastoralism. For example, *ilmurran* are traditionally responsible for protecting the homestead, middle age-sets are responsible for managing resources for herding, and members of the “retired” age-sets are responsible for broad-decision making through the council of elders. Women are responsible for the operation of the household, including house construction, caring for children, preparing meals (including collecting water and firewood), and milking cows.

Although there is on-going change in the traditional age and gender rights and roles,² divisions between young and old, and men and women, remain strong. These divisions are hypothesized to affect how individuals perceive, understand, and evaluate things, given that they determine access to knowledge, experience, and so on.

As described earlier, Kangwana (1993) and Gadd (2005) found differences in attitudes between pastoralists and agriculturalists, with pastoralists more likely to have favorable attitudes toward elephants than agriculturalists. The present research identifies current livelihood strategies in the study area and, given the shift toward livelihood diversification, inquires into future livelihood plans. It examines the influence of primary livelihood activity on variables of the cognitive hierarchy and considers the implications of future livelihood intentions.

Traditionally, community decisions in Maasailand were decided by councils of elders. When the group ranch system was created by the Land Adjudication Act of 1968, elected group ranch committees became responsible for the management of group ranch affairs, including encouraging sound land-use practices, allocating funds for new projects, and registering new members (Mwangi 2005). The group ranch is also the local institution that receives and disburses wildlife benefits to the community (Kangwana 1993). Following Kangwana (1993), I examine the potential influence of group ranch residence on variables in the cognitive hierarchy.

² Examples of change for men include an extremely limited security role for modern *ilmurran* and the transfer of decision making from senior elders to elected officials. For women, who prior to the 20th century, enjoyed shared rights and benefits associated with livestock production, today, while maintaining many of the same responsibilities for livestock production, have been disenfranchised and marginalized by men, and are excluded from political and economic affairs (Hodgson 1999, 2005).

Based on previous research, and given the importance of age and gender stratification in Maasai culture, it is expected that age and gender, along with livelihood activity and group ranch of residence, will influence the constructs of the cognitive hierarchy.

- **H₇:** Age, sex, primary livelihood strategy, and group ranch will predict value orientations, attitudes, and norms.

Prior experience

Research has demonstrated that in individuals with prior (direct) experience with an attitude object, attitude-behavior correlations tend to be higher than for individuals who lack such experience (Bentler and Speckart 1979; Borgida and Campbell 1982; Bright and Manfreda 1995; Fazio and Zanna 1978). Fazio and his colleagues have attributed this to increased attitude strength and accessibility to higher levels of direct experience (see Eagly and Chaiken 1993 for review). Another explanation is related to attitude stability. Individuals who have had direct experience with an attitude object are more likely to have stable, difficult-to-change attitudes (Doll and Ajzen 1992). Conversely, individuals who have no, or only, indirect experience might be more likely to change their attitudes upon directly experiencing an attitude object (Ajzen and Fishbein 1980). It is expected, given the context of the current study, where most respondents have lived alongside elephants for their entire lives, that there will be a strong attitude-behavior relationship due in part to a high level of experience with elephants. The type of experiences (positive or negative) is expected to differentiate those who are positive toward elephants and those who are negative.

- **H₈:** Type of prior experience with elephants will predict attitudes toward elephants and allowing elephants in the group ranches.

Knowledge of elephants

Knowledge is a common variable in attitude research regarding wildlife and the environment (Aipanjuguly et al. 2003; Barney et al. 2005; Brooks et al. 1999; Casey et al. 2005;

Drews 2002; Kellert 1993; Kellert and Berry 1987; McDuff et al. 2008; Papageorgiou 2001; Reading and Kellert 1993). Several studies have found low correlations between knowledge and attitudes (see Tarrant et al. 1997 for review), with exceptions. For instance, Thompson and Mintzes (2002), using Kellert's typology, found relationships between knowledge and attitude types. Aipanjiguly et al. (2003) found a positive correlation between boaters' knowledge of manatees and their support for manatee conservation. Knowledge has been shown to have a moderating effect on the relationship between values and wildlife attitudes, with variation between constituent groups (Tarrant et al. 1997). This could be explained in part by differing levels of reliance on factual information by different types of individuals in the formation of attitudes. Individuals with more information about an attitude object may have more stable and more accessible attitudes (Eagly and Chaiken 1993).

Environmental education and communication programs seek to increase knowledge, influence attitudes, and ultimately influence environmental behaviors (Byers 1996; Jacobson 2009; Monroe 2003). Studies have demonstrated that increasing environmental knowledge can improve environmental attitudes (Bradley et al. 1999; Mangas and Martinez 1997; Petrzella and Korsching 1996), but several studies also have shown that education alone does not change behavior (see McKenzie-Mohr and Smith 1999; Schultz 2002). This discrepancy highlights the need to understand the range of factors that may influence behavior in a given context, including knowledge, normative beliefs, and factors (barriers to behavior) that may moderate the relationship between knowledge, attitudes, and behavior (McKenzie-Mohr and Smith 1999; Schultz 2002).

When discussing knowledge of wildlife and conservation in traditional cultures, it is important to consider the distinction between traditional ecological knowledge, also referred to

as local or indigenous knowledge, and modern, scientific, or “Western” knowledge (Gadgil et al. 1993; Hunn et al. 2003; Semali and Stambach 1997). Traditional knowledge is generally defined as local knowledge regarding the natural world that has been developed over time through close interaction with, and observation of, the natural world and passed down through generations, while modern knowledge is obtained through empirical methods and formal, Western-style education. Many community-based conservation programs promote the integration of local and modern knowledge, but have been criticized for their lack of success in meeting this goal (Goldman 2003; Kellert et al. 2000).

I examined knowledge of elephants using items deemed to represent a mix of local and modern knowledge. It is expected that the Maasai, in general, will exhibit a high level of knowledge of elephants given their level of experience with the natural environment and a history of extension and educational outreach interventions in the region. Maasai traditional environmental knowledge is evident in the understanding of seasonal wildlife movements, the use of medicinal plants, the use of a communal land management system, and, as evidenced here, their understanding of wildlife ecology. This is especially true for males who are out in the bush as young herd boys and *ilmurran* learning the layout of Maasailand (Kipuri 1983). While the duties and responsibilities of females in Maasai society require them to spend most of their time in the homestead, they too experience the bush when gathering water, firewood, and building materials, or when called on to assist with herding. Given the variation between men and women to have opportunities to be in contact with elephants, it is expected that women will demonstrate less knowledge of elephants than men (similar to Gillingham and Lee 1999). The following hypotheses are advanced:

- **H₀:** Men will have a higher level of knowledge of elephants than women.

- **H₁₀**: Knowledge will predict attitudes toward elephants (targets).

Risk perceptions

Risk perceptions regarding wildlife are important to understand, as they can influence attitudes and behaviors toward wildlife and receptivity to educational communications (Gore et al. 2006; Knuth et al. 1992; Lohr et al. 1996; Riley and Decker 2000; Saberwal et al. 1994). Slovic (1987) suggests that when attempting to understand and address public risk perceptions, researchers should attend to a broader conception of risk, one that would require a more comprehensive measure (as opposed to the technical measurements of experts, e.g., fatalities). Furthermore, Sjöberg (1998) points to the need to differentiate between emotional and cognitive dimensions of risk perceptions, where cognitive risk perceptions are judgments about the probability of experiencing a risk and emotional perceptions involve a “preoccupation with thoughts about uncertain and unpleasant events,” hereafter described as “worry” (Sjöberg 1998). Additional constructs have been related to risk perception, including voluntariness, dread, knowledge, and controllability (Slovic 1987). Research on risk perception has been limited by difficulties in conceptualization and measurement (Baird et al. 2009), but there have been several efforts to advance this area in studies of human-wildlife conflict (Gore et al. 2006; Riley and Decker 2000; Stout et al. 1993; Zinn and Pierce 2002). My study contributes to this effort by examining the influence of constructs previously related to risk perception on attitudes and behavioral intention toward elephants.

Drawing on the earlier discussion of HEC, the probability of experiencing conflict with elephants, compared to other species, tends to be low. Viewed in a broader perspective, the risk of dying from disease, especially HIV/AIDS, and road accidents in Kenya is far greater (WHO 2006), but the impact of a single encounter with an elephant can be catastrophic. In such

situations where there is a low probability, but the potential for severe consequences exists, risk perceptions tend to increase (Decker et al. 2002). Additionally, perceptions of risk are higher when the threat is perceived to be uncontrollable and involuntary (Slovic 1987). In such situations, self-efficacy beliefs in dealing with a situation may be affected, thereby influencing how an individual behaves.³ The perceived controllability of HEC could be a significant issue for local people, given that the elephant is such a large and potentially dangerous animal. This, considered together with the high level of fatalism present in many African cultures (Gannon and Pillai 2010; May 2003; Mordi 1987), may influence attitudes and behaviors toward elephants. Kangwana (1993, p. 81) suggests that the Maasai are indeed fatalistic in their attitudes toward conflict with wildlife, stating that the Maasai seem to view conflict and its outcomes as “their lot as people that live with wildlife.”

Similar to Gore et al. (2006) and following the recommendation of Slovic (1987), I examine multiple constructs to gain a more comprehensive understanding of perceptions of risk related to HEC. I explore the influence of perceived incidence of HEC, perceived level of risk to personal safety and economic livelihood, level of worry, and beliefs about general and personal controllability of HEC.

- **H₁₁:** Constructs associated with risk perception will predict attitudes toward elephants and allowing elephants in the group ranches.

HEC mitigation interventions

The disproportionate costs, including costs resulting from human-wildlife conflict, borne by local people living alongside protected areas are well recognized (Archabald and Naughton-

³ There are numerous approaches for defining and measuring concepts related to self-efficacy, locus of control, and perceived behavioral control (a concept of the TPB) (see Rhodes and Courneya 2003 for a review). Formal conceptualization and measurement of these concepts is beyond the scope and purpose of this paper, but a preliminary exploration is provided.

Treves 2001; Nyhus et al. 2005). For pastoralists and agropastoralists such as the Maasai, these costs may include competition for grazing and water, personal safety, crop damage, and livestock losses from depredation and disease (Campbell et al 2002). When elephants are involved – an intelligent, potentially dangerous and costly species of conservation concern (Osborn and Hill 2005) – the situation is especially complex. Interventions are needed that address the needs and concerns of local people and the conservation requirements of elephants (Parker et al. 2007, Tchamba 1995). Several strategies for mitigating human-elephant conflict have been tested throughout the elephant's range, including methods aimed at reducing damage (e.g., lethal and non-lethal deterrents such as noise, fences, controlled shooting) and increasing tolerance (e.g., compensation, environmental education, tourism revenue). There have been various levels of success, but, in general, research has demonstrated that a variety of methods, both long- and short-term, should be used in combination (Omondi et al. 2004; Osborn and Parker 2003; Parker et al. 2007). The methods selected should be site-specific and be based on interdisciplinary research so that there is an understanding of the true nature of conflict, perceptions of conflict, and the acceptability of proposed mitigation interventions.

Amboseli National Park has been the site of many conservation schemes. Cited as one of the earliest examples of an integrated conservation and development program (ICDP), Amboseli was initially touted as a model for local participation (Western 1982b, 1994), but, as time has passed, it has proven to be an example of limited successes (Adams 1998; Kangwana and Browne-Nuñez, in press; Lindsay 1987; Wells et al. 1992). Today, a number of organizations are working in the ecosystem to conserve wildlife by gaining the support of the local people, largely by increasing wildlife conservation benefits (through tourism) and reducing costs. Several of these efforts are specific to elephants, with the goal of improving attitudes toward, and tolerance

of, elephants (see Study Area and Chapter 2). I provide a preliminary assessment of these interventions in the present analysis by first identifying the perceived costs and benefits of living with elephants. I then explore the impact of awareness of conflict interventions on attitudes and behavioral intentions.

- **H₁₂:** Awareness of conflict mitigation interventions will predict attitudes toward elephants and allowing elephants in the group ranches.

Methods

Results presented in this chapter are based on a survey of local attitudes and behaviors toward elephants which took place from August 2004 to June 2005. A more detailed description of the study area and methods is provided in Chapter 2.

Study Area

The Greater Amboseli Ecosystem is located in southern Kenya at the north foot of Mt. Kilimanjaro on the Kenya-Tanzania border (a more detailed description of the study area is provided in Chapter 2). At the heart of the ecosystem is Amboseli National Park (Figure 5.4), encompassing 390 km² area of the approximately 8,000 km² ecosystem (see Chapter 2 for more detailed description). Several species of the park's wildlife, including elephants, migrate seasonally, along with Maasai livestock, between the basin and the surrounding rangelands, which are divided into Maasai group ranches.

The Amboseli elephants are a key component of this ecosystem. They are emblematic of the critical and complex role of elephants at the local, national, and international level – coexisting with pastoral people for thousands of years, increasingly in conflict with transitioning human neighbors, and drawing attention and revenue from abroad. At the time of my survey, there were approximately 1,500 elephants in the population, with over 1,000 primarily using the private lands outside the park (C. Moss, pers. comm.).

Pastoralists have occupied present day Maasailand for thousands of years (Ehret 1971; Foley 1981; Jacobs 1975; Kesby 1977). It is believed that the Maasai, as they are known today, moved into the Amboseli ecosystem several hundred years ago (Jacobs 1975; Kituyi 1990). The Maasai have been credited for the abundant wildlife present in Maasailand (Chapter 4). Explanations for coexistence range from tolerant attitudes (Mol 1981; Ole Dapash 2002; Parkipuny 1997; Simon 1963) to the compatibility of pastoralism with wildlife conservation (Chapter 4). While tolerant and indifferent are the most common anecdotal descriptors of Maasai attitudes toward wildlife (Campbell et al. 2000; Capone 1972; Darling 1960; Fosbrooke 1972; Kipury 1983; Myers 1973; Ndaskoi 2006; Western 1994, 1997), some maintain that the Maasai hold positive attitudes toward wildlife (AWF 1999; Homewood and Rodgers 1991; Kipury 1983). Kangwana (1993) provided the first empirical findings on attitudes of the Maasai of Amboseli, stating “the overall attitude towards wildlife is, if not positive, then at least tolerant” (p. 95).

As mentioned, many changes have occurred in the Greater Amboseli Ecosystem since Kangwana conducted the first assessment of Maasai attitudes toward elephants around Amboseli in 1991. The most critical is that of land-use change. As described in Chapter 2, the Maasai have a long history of land alienation resulting from colonial and post-independence government policy that has led to land ownership, cultivation, and the development of protected areas (see Chapter 2; Lindsay 1987; Western 1994 for a review). Today, former communally owned group ranches, which were created, in part, to keep land under Maasai ownership (Ntiati 2002), are largely subdivided. As of 2006, of the 52 group ranches in the Kajiado District, 32 had completed subdivision and 15 were in the process of subdivision, leaving only 5 that had not started the process (BurnSilver and Mwangi 2007). Olgulului-Lolarashi and Kimana-Tikondo,

the two group ranches that immediately border the park, hereafter referred to as Olgulului and Kimana, were among the last to begin subdivision. Kimana completed the process in 2005, and in 2007, the agricultural areas of Olgulului were being subdivided. With a growing human population, largely from immigration of non-Maasai (Chapters 2), and decreasing land availability, many Maasai are shifting from livestock-based livelihoods to more diversified livelihood strategies, including agriculture. The settlement of the rain-fed areas has reduced the area available for dry-season grazing and access to water for livestock and wildlife (Campbell et al. 2000).

In addition to the long-standing effort to increase conservation-related benefits to local Maasai, several organizations, such as the Kenya Wildlife Service (KWS), the Amboseli Elephant Research Project (AERP), and the African Wildlife Foundation (AWF) have implemented interventions to reduce human-elephant conflict around Amboseli and maintain or increase tolerance of elephants in the group ranches (Chapter 2). KWS has used several strategies to conserve elephants and manage conflict, including revenue sharing through a school bursary program, chasing and scaring problem elephants, and erecting fences around agricultural areas at Kimana and Namelok. The Kimana fence is located on the east side of Kimana Group Ranch and the fence at Namelok straddles the Kimana-Olgulului border (Figure 5-4). AERP implemented a consolation scheme in 1998 that pays for livestock (cattle, goats, and sheep) killed by elephants outside of the park in an effort to end the retaliatory spearing of elephants (AERP made retro-active payments for 1997, when negotiations for the consolation program began). At the beginning of the study reported here, AERP had paid out 1,684,000 KSh (approximately 22,000 USD) over the course of eight years (see Chapter 2 for a breakdown across years), and the director of AERP believed that the program was positively influencing

Maasai attitudes and helping to reduce the number of elephants being speared (C. Moss, pers. comm.). Although the spearing of elephants has not completely stopped (*ilmurran* spear elephants for other reasons - see Chapter 4), retaliatory spearing of elephants due to HEC came to an end in the three group ranches participating in the program (both group ranches in the present study participate in the consolation scheme). Finally, AWF developed an outreach program in 1999, where the goal was to promote awareness and communication through meetings, workshops and educational tours. Another goal was to promote benefit sharing. One planned activity was to assist the Maasai in improving the planning and operation of cultural bomas (Chapter 2).

In light of the many changes in Amboseli, a current assessment of attitudes and the factors influencing them, along with plans for future livelihood activity, is critical to informing successful conservation and conflict mitigation policy and interventions. The present study, following Kangwana (1993), was conducted in Olgulului and Kimana group ranches (Figure 5-4).

Sampling Procedure

A current sampling frame did not exist, so a census was conducted of all the households in the study area by collecting GPS waypoints for each residential site⁴. Two local field assistants, equipped with Garmin GPS receivers and census worksheets, collected 519 waypoints that were integrated into the Amboseli Elephant Research Project's GIS database. A map of the study area, including residences, was produced (Figure 5.4). From the census sheets, I

⁴ A waypoint could represent a traditional *enkang*, comprised of single or multiple households, a *manyatta*, or a non-traditional, "modern" residence (Chapter 2).

determined that there were 2,444 households in the study area, 1,606 (66%) in Olgulului and 838 (34%) in Kimana.

A multi-stage area sample (Weisburg et al. 1996) was selected to capture the increasing heterogeneity of the widely scattered, sometimes hard-to-reach, members of the population. Every effort was made to obtain a random, representative sample. I selected the largest sample size possible, given the limits in resources and time, to increase the possibilities of analysis and decrease the sampling error (Piel et al. 1982). A sample of 293 households (12% of total) was selected, with the goal of interviewing two adults (one male, one female) in each household ($n = 586$). This was first stratified by group ranch, following Kangwana (1993). Therefore, 193 households (66%) were selected in Olgulului and 100 (34%) in Kimana. While many studies seek to interview the household head, this limitation can cause serious bias, as the sample will likely be over-represented by elderly men, who differ significantly from other adults living in the household (Piel et al. 1982). Therefore, in addition to targeting both male and female respondents, all adults in a household were eligible for interviews.

Questionnaire Design

Nine focus groups were conducted in the study area to elicit salient beliefs about wildlife, elephants in particular, and related issues in Amboseli, and to acquire appropriate, culturally-relevant, local vocabulary for the survey instrument. Questionnaire items were developed using the knowledge gained from the focus group discussions, the review of the records and documents of various organizations involved in elephant conservation in Amboseli, and key informant interviews. Cognitive items were based on hypotheses grounded in social-psychological theory. The questionnaire started with general questions regarding wildlife, progressed to questions specific to elephants, and concluded with socio-demographic questions (Appendix C). Questions were a combination of open- and fixed-response (yes/no, true/false, agree/disagree, etc.)

questions. Open-ended questions were either field coded, where enumerators selected response from pre-coded lists, or were coded during data analysis (for longhand responses). Picture cards were used to elicit responses to questions regarding identification of wildlife that occurs in the group ranches, wildlife that is liked/disliked (card sorting), problematic wildlife (ranking), and current and future livelihood activities. Every effort was made to minimize measurement error, including asking two practice questions at the beginning of the interview to ensure understanding of the Likert-scale response format (see Chapter 2 for further details). All Likert-scale items included a neutral midpoint, with an additional “don’t know” response option where applicable.

Variables of the Cognitive Hierarchy

Wildlife value orientations. Following Mordi (1987), the measure of value orientations was modeled after Kellert’s work. Forty-four agree-disagree belief statements, many adapted from Mordi, were used to develop eleven possible scales, with four belief statements per scale (Appendix C - questionnaire). Response choices ranged on a seven-point scale from “strongly disagree” (1) to “strongly agree” (7).

General attitudes toward elephants. Two measures were used to assess attitudes toward elephants. The purpose of the first measure, which was obtained early in the interview, was to obtain a preliminary indicator of attitudes toward elephants. Respondents first identified wildlife species found in their group ranch using animal picture cards, then sorted the cards to create “like” and “dislike” piles. This was done before questions specific to elephants were asked.

The second measure was developed from 25 agree-disagree belief statements that were used to develop an attitude index. The belief statements were designed to capture cognitive, affective, and behavioral components of attitudes toward elephants. Response choices ranged on a seven-point scale from “strongly disagree” (-3) to “strongly agree” (+3). The belief statements

were based on information obtained from the preliminary research and focus group discussions. The attitude index was the measure used in the model.

Specific attitudes toward allowing elephants. Following procedures put forth by Ajzen and Fishbein (1980) and tested by Whittaker (2000), belief-evaluation (BE) scores regarding possible outcomes of allowing elephants in group ranches were created by asking two sets of questions regarding eight possible outcomes of tolerating elephants (e.g., cause more tourists to visit group ranches). The first series asked respondents to indicate their beliefs regarding the outcomes on a seven-point scale from “extremely unlikely” (-3) to “extremely likely” to (+3). In the second series, respondents were asked to evaluate each outcome on a scale from “extremely bad” (-3) to “extremely good” (+3). An attitude score was generated for each respondent by multiplying each belief score by the corresponding evaluation and then summing the products.

Subjective norms for tolerating elephants. Procedures for creating norm scores for allowing elephants in the group ranches were adapted from Ajzen and Fishbein (1980). First, respondents were asked to identify five important referents in a free-response format⁵. They were then asked to what degree their referents would approve or disapprove of the respondent allowing elephants to come into the group ranch without harm. Responses could range from “strongly disapprove” (-3) to “strongly approve” (+3). Respondents were then asked how motivated they were to comply with each referent. Motivation could range from “not at all” (1) to “very much” (4) with a “don’t know” option. The norm score was created by multiplying the

⁵ Each respondent was allowed to identify referents freely rather than identifying referents from a pretested list of modal salient referents to avoid a possibly incorrect assumption that all individuals in the sample had the same set of referents (Terry et al. 2000).

normative belief score by the motivation to comply, summing the product scores for each referent, and calculating the average.⁶

Intention to tolerate elephants. Following Whittaker (2000), the behavior of interest (allowing elephants in group ranches) was signified by the reported intention to vote to allow or not allow elephants in the group ranches. Respondents were asked how they would vote if there was a vote on whether or not elephants should be allowed or not allowed inside the group ranch. Responses were coded as “allow” (1), “not allow” (2), or “don’t know” (99). A hypothetical vote was used to measure intentions to make willingness to allow elephants “as concrete and action-oriented as possible” (Whittaker 2000, p. 48).

Variables External to the Hierarchy

Demographic Variables. Four sociodemographic variables were examined: gender, group ranch, livelihood activity, and age. Gender was measured as “male” (0) or “female” (1). Group ranch was coded as “Olgulului” (0) and “Kimana” (1). For livelihood, respondents were asked in-depth questions regarding the herding and cultivation activities of their households. They were then asked if they, or any other member of the household, were involved in any other livelihood activities using picture cards representing the various economic opportunities available in the region. After listing all forms of household livelihood activities, respondents ranked the importance of each activity by sorting the cards. Primary livelihood activities are listed in the demographic summary in Table 5.2.

It was anticipated that a large number of individuals would not know their ages. Therefore, three approaches were used to measure age. First, respondents were asked to provide their age in years. Second, men were asked their age-grade. Third, enumerators assigned a

⁶ Diverging from Ajzen and Fishbein (1980), an average score was obtained, rather than just a sum of the product scores, because of the variation in the number of referents per respondent.

“person type” classification to each individual based on age provided, age-set, or subjectively⁷. The categories for men were “elder” (1) or “young man” (2). For women, the categories were “old woman” (3), “middle woman” (4), or “young woman” (5). These categories were cross-checked responses to the first two age measures where provided. Based on the three measures, the sample was divided into two groups for analysis: ‘younger’ and ‘older.’

Prior Experience. There were multiple measures of experience. Two broad measures were used in the causal model. First, respondents who reported seeing elephants in the group ranch during the card sorting activity were asked if they enjoyed seeing elephants in their group ranch (a measure of positive experience). Second, respondents were asked if they had problems with elephants (a measure of negative experience). This second measure was assessed at two points during the interview to examine the possible effects of question order. On the first occasion, following the wild animal card sorting activity, respondents were asked if they had problems with any of the wild animals that they see in the group ranch, “no” (0) or “yes” (1) – these codes were used for all yes/no questions on the questionnaire. If they stated they did have problems, they were instructed to select the cards of problem animals. Enumerators ticked the selected animals on a pre-coded list. After a series of questions regarding interactions with elephants (e.g., where have you seen elephants – near the *enkang*, in the bush, etc.), respondents were asked, “would you say that it is true that elephants cause you problems?” To understand possible effects of location, respondents were asked about the specific locations where they see elephants and if they liked/disliked seeing elephants at each location.

⁷ It was assumed that this would be a reasonable approximation given that women know that age-sets of the young men (*ilmurran*) they “dated” when they were young girls. The female enumerators were aware of this and, as all Maasai do, knew the age-grades for the men of their age, their mothers’ ages, and their grandmothers’ ages.

Knowledge. There were ten true-false statements measuring knowledge of general elephant ecology. Responses were coded as “true” (1), “false” (2), and “don’t know” (99).

Risk perceptions. There were six questions regarding risk associated with living alongside elephants. One question asked about the rate of HEC in the last 5 years (1 = increased, 2 = the same, 3 = decreased, 99 = don’t know). Two questions asked about perceived personal risk – physical and economic – associated with HEC (1 = great risk, 2 = little risk, 3 = no risk, 99 = don’t know). One question asked how much the respondent worries about HEC (1 = a great deal, 2 = a little, 3 = not at all, 99 = don’t know). Finally, two questions asked about the controllability of HEC, one about general controllability (1 = very, 2 = somewhat, 3 = not at all, 99 = don’t know) and one regarding self-efficacy (yes/no/don’t know).

HEC mitigation interventions. There were five questions regarding the costs and benefits of living with elephants. They were: do elephants bring costs to people in this group ranch (yes/no/don’t know); if yes, what are the costs; do elephants bring benefits to people in this group ranch (yes/no/don’t know); and, if yes, what are the benefits (open response). Respondents were asked if their household receives benefits from tourism (yes/no/don’t know).

Ten questions measured awareness and evaluations of interventions. Respondents were asked if they were aware of any organizations that help people who have problems with elephants (yes/no/don’t know); if yes, which organizations and what actions the organizations take (there were a pre-coded lists of organizations and interventions – see questionnaire, Appendix C); if they had ever asked for help from any of the organizations (yes/no/don’t know); and, if yes, were they satisfied with the organization’s action. Responses could range from “very unsatisfied” (-3) to “very satisfied” (+3). A series of questions specific to interventions (electric fences, cultural bomas, and compensation and consolation payments) was asked to assess

awareness of specific interventions and general evaluations of the interventions. The questions were: does your group ranch have an electric fence (yes/no/don't know); if yes, does the fence do a good job (yes/no/don't know); does your group ranch have any cultural bomas (yes/no/don't know); and are there benefits to having cultural bomas (1 = money, 2 = teaches tourists Maasai culture, 3 = other, 99 = don't know). Finally, respondents were asked if receiving money for elephant damage makes people in their group ranch more tolerant of elephants in the group ranch (yes/no/ don't know).

Future Land Use

Following the livelihood ranking activity, respondents were asked which livelihood activity they thought would be most important to their household in five years.

Validity and Reliability

As discussed in Chapter 3, it is important to address the issues of validity and reliability when conducting scientific inquiry. The validity of the present survey was evaluated based on three types of validity: content, criterion, and construct validity. Content validity is concerned with the degree to which a measurement instrument captures the full meanings of concepts it is intended to measure (Bernard 2001; Vaske 2008). The content validity of my survey was evaluated by a panel of experts, which included individuals with expertise in human dimensions research, elephant ecology, and Maasai culture. Adjustments were made to the survey instrument based on reviewer feedback. Criterion validity in the present study has to do with ability to predict a criterion. Therefore, an estimate of criterion validity is provided by the predictive ability of the proposed model. Construct validity is concerned with concepts and relationships supported by theory. Two forms of construct validity addressed in my survey are convergent validity, supported by correlations between concepts, and factorial validity, demonstrated by meaningful groupings of items (see Vaske 2008 for discussion of various forms of validity).

Finally, to determine the reliability of multiple-item indicators, measures of internal consistency are examined using Cronbach's alpha reliability coefficients. Alpha is influenced by the number of items in a scale, with a higher alpha for scales with more variables. In human dimensions research, an alpha of 0.65 can be considered "adequate," although some researchers accept a cut-off of 0.60 (Vaske 2008, p. 518).

Analysis

Data were analyzed using SPSS Grad Pack v. 14 for Windows (2006). Frequencies and descriptive statistics were obtained to check for errors in the data, to understand the distributions of the study variables, and for discussion purposes.

Exploratory factor analysis (EFA) with varimax rotation was conducted to assess the underlying structure for the 44 Kellert-type items. EFA is recommended when the goal is to identify latent constructs underlying measured variables and when the assumption of normality is violated, as was the case for several of the belief variables (Costello and Osborne 2005; Fabrigar et al. 1999). Cronbach's alpha was calculated for each factor suggested by the EFA to assess internal consistency. Based on these analyses, responses for items within each factor that was found to have a satisfactory level of reliability ($\geq .60$) were averaged and the resulting scores were used as indicators of respondents' general wildlife values. EFA was also used to examine the structure of general attitudes toward elephants based on responses to 25 belief statements regarding elephants. The internal consistency of the resulting factors was examined using Cronbach's alpha reliability coefficients.

Following the methods suggested by Fishbein and Ajzen (1980) and described above, attitudes and norms for allowing elephants in the group ranches were measured for each respondent. Comparisons of beliefs and evaluations for each potential outcome of allowing elephants were made by charting means scores for those who vote to allow and not allow

elephants. Average belief-evaluation scores were also graphed to visually summarize differences between voting groups. T-tests were used to compare mean scores of voting intention groups (allow or not allow elephants in group ranch) for attitudinal and normative variables.

A path analysis was conducted to test the hypothesized model of predictors of intention to vote to allow elephants in the group ranches (Figure 5-2). A series of regression analyses were performed to obtain path coefficients. All independent variables were entered into the regressions simultaneously, as all variables, based on theory and previous research, were expected to be important. To examine predictors of wildlife value orientations, dummy variable regression was conducted using three dichotomous demographic variables (age: young/old, gender: male/female, and livelihood: pastoralism/cultivation). Multiple regression analysis was used to show the effect of predictor variables on the dependent attitude and norm variables. Finally, logistic regression analysis was used to predict voting intention (dichotomous) using the attitude and norm variables (continuous). The first model tested the TRA by examining the effects of attitude toward the behavior (specific attitude) and norm on behavior intention. The second model included the additional predictor variable, attitude toward elephants (general attitude).

Results

We interviewed individuals at the desired number of households (n=293). There was a 2.7% (n = 8 households) non-response rate.⁸ These households were replaced with alternate households that were randomly selected at the time the original sample was drawn. In seventeen households, we were only able to interview one adult – three males and fourteen females. The reasons for single interviews per household were: 1) eight individuals were away at a job or

⁸ One household head was intoxicated and members of two households were absent during two attempts to schedule interviews. Five households had relocated.

herding, 2) three were deceased, and 3) the remaining six either were not home or declined to be interviewed. A total of 569 interviews were conducted. Table 5-2 shows the demographic characteristics of the sample. The number of respondents from each group ranch was proportionate to the number of households counted in the census. The level of education was low, with 76% of respondents having less than a primary school education. The sample was predominantly Maasai (98%) with a nearly equal representation of males (49%) and females (51%), and young and older adults.

Only 34% of respondents provided their age, with 66% stating they did not know their age. Of these, ages ranged from 18 to 67, with 30.73 as the mean. Table 5-3a shows the age-grades present in Amboseli in 2004-2005 and their representation in the study sample. Most male respondents (92%) fall into one of the younger three age-sets, which are considered the “active” groups, with *ilmurran* comprising the Ilkiponi age-set and the men responsible for decision making (e.g., for herding) comprising the Ilkishimu and Ilkishuri/Ilkidotu age-sets (Table 5-3a). Most men in the sample are below the age of 50, which is expected, given that Kenya’s average life expectancy for men is 51 (WHO 2006), with estimates for the Maasai being even lower. Table 5-3b shows the results of the “person type” measure. When this measure was cross-tabulated with the age-set variable, results showed that the division between “young” and “elder” occurred among the Ilkishuri/Ilkidotu age-set (age range = 20-35). For women who provided their ages, which only included middle and young women, the divide occurred at age 30. Based on these findings, and given the mean age of 30.74 (n = 193), respondents were grouped into two groups, “older” and “young,” with an approximate cutoff of age 30 (Table 5-3c).

Voting Intention and Demographics

If a vote were held at the time of the survey on whether to allow elephants in the group ranches, results indicate that a slight majority of respondents (53%) would have voted to allow

elephants, while 47% would have voted against allowing elephants in the group ranches. There were two cases of item non-response; therefore, the total sample size for analysis was 567. Table 5-2 shows that gender ($p < 0.001$) and school attendance ($p = 0.04$) were statistically related to voting intention. Most men (72%) indicated they would vote to allow elephants in the group ranch, while most women (65%) stated they would vote to not allow elephants. The effect size of gender on voting intentions was medium or “typical” ($\phi = -0.36$)⁹. Although school attendance was statistically significant ($p = 0.04$), it had a minimal effect on voting intention. ($\phi = 0.09$). No statistical differences were observed between other demographic variables (group ranch, age, and livelihood activity) and voting intention (Table 5-2).

Wildlife Value Orientations

The exploratory factor analysis of the 44 Kellert-type items produced a 13-factor solution accounting for 42% of the variance, with elements of Kellert’s typology collapsing together. Examination of the scree plots indicated a maximum of four factors. Reliability analysis of the four factors revealed good to moderate internal consistency for the first three factors, as indicated by Cronbach’s alpha reliability coefficients greater than 0.60 (Table 5-4), and low for the fourth factor, which was excluded from further analysis. Table 5-4 displays the items and factor loadings for the three factors, with loadings of less than 0.40 omitted to improve clarity. The three remaining factors explain 20% of the variance, with Factor 1 explaining the largest percentage of the variance (12%). These results provide limited support for hypothesis 1, in that there is preliminary evidence (as provided by “exploratory” factor analysis) that at least three orientations of wildlife values may exist among the study population, but they fall short of demonstrating the suggested eleven orientations. The three wildlife belief orientations and their

⁹ See Vaske et al. (2002) for discussion of modifications to Cohen’s (1988) suggested labels for effect sizes in behavioral studies (small = “minimal,” medium = “typical,” large = “substantial”).

relationship to other variables in the model should be interpreted with caution, as they have not undergone further analysis (e.g., confirmatory factor analysis) and they are based on variables with non-normal distributions.

The three composite basic belief scales were interpreted, based on item content, and labeled as new wildlife value orientations to be included in the predictive model. The first scale (Factor 1) was comprised predominantly of items originally operationalized as *neutralistic* and *naturalistic* (Table 5-4). An apt label for this new category is ‘indifference.’ Factor 2 is dominated by *negativistic* items, although the statements are species specific, necessitating additional caution in interpretation. Factor 3 is fully comprised of *dominionistic* statements, but based on the content of the items used to measure this orientation and knowledge of Maasai culture, it was renamed “skills/bravery.”

A statistical comparison of voting intention groups on each value orientation is presented in Table 5-5. The groups differed significantly ($p < 0.001$) on each orientation, with the indifference orientation having “much larger than typical” effects ($d = 1.32$), the skills/bravery orientation having “larger than typical” effects ($d = 0.79$), and the negativistic orientation having “typical” effects ($d = 0.59$). Scores could range from one to seven, with higher scores indicating a high level of indifference and low scores indicating lack of indifference. The “allow” group had lower indifference scores ($M = 3.41$, $SD = 1.42$) than the “not allow” group ($M = 5.27$, $SD = 1.39$). On the negativistic orientation, both voting intention groups scored high, with an overall mean of 6.13 ($SD = 1.40$). The “allow” group was less negativistic ($M = 5.77$, $SD = 1.55$) than the “not allow” group ($M = 6.55$, $SD = 1.07$). The mean for skills/bravery orientation occurs at the neutral point ($M = 4.09$, $SD = 2.13$), with the “allow” group having lower scores ($M = 3.36$, $SD = 2.07$) than the “not allow” group ($M = 4.92$, $SD = 1.88$).

Gender and age were statistically related to the indifference value orientation ($t = -19.46$, $p < 0.001$, $d = 1.62$ and $t = 4.30$, $p < 0.001$, $d = 0.36$, respectively). Females ($M = 5.32$, $SD = 1.38$) and older respondents ($M = 4.59$, $SD = 1.67$) were more indifferent than males ($M = 3.20$, $SD = 1.23$) and younger respondents ($M = 3.99$, $SD = 1.65$). Gender, age, and group ranch were related to the negativistic orientation ($t = -12.11$, $p < 0.001$, $d = 1.02$; $t = 3.51$, $p < 0.001$, $d = 0.30$; $t = 3.87$, $p < 0.001$, $d = 0.36$, respectively). Females ($M = 6.76$, $SD = 0.67$), older respondents ($M = 6.35$, $SD = 1.27$), and Olgulului residents ($M = 6.32$, $SD = 1.15$) were more negativistic than males ($M = 5.48$, $SD = 1.65$), younger respondents ($M = 5.94$, $SD = 1.50$), and Kimana residents ($M = 5.79$, $SD = 1.73$). On the skills/bravery orientation, gender and group ranch were significant, suggesting that females ($M = 4.95$, $SD = 1.86$) and Kimana residents ($M = 4.39$, $SD = 2.18$) valued demonstrations of skills and bravery with wildlife more than males ($M = 3.20$, $SD = 2.02$) and Olgulului residents ($M = 3.93$, $SD = 2.08$) ($t = -10.70$, $p < 0.001$, $d = 0.90$ and $t = -2.46$, $p = 0.02$, $d = 0.22$). Primary livelihood was not statistically related to any of the wildlife value orientations. These results provide partial support for hypothesis 7.

General Attitudes toward Elephants

In the animal card sorting activity, 99.8% (all but one) of respondents reported seeing elephants in their group ranch. Of these respondents, 56% ($n = 321$) placed the elephant card in the “don’t like” pile, 43% ($n = 242$) placed the card in the “like” pile, and 1% ($n = 5$) stated they neither liked nor disliked the elephant. Most respondents who reported liking elephants (80%) stated they would vote to allow elephants in the group ranch, while most who indicated they didn’t like elephants (67%) stated they would vote to not allow elephants. The relationship is significant ($\chi^2 = 119.58$, $p < 0.001$), and this preliminary measure of attitudes toward elephants had a substantial effect on voting intention ($\phi = 0.46$).

Exploratory factor analysis of the 25 belief statements regarding elephants produced a seven-factor solution accounting for 37% of the variance. Examination of the scree plots indicated a maximum of two factors. Fourteen of the 25 belief statements comprised the two factors, which are shown in Table 5-6, along with the factor loadings for the two rotated factors (loadings of less than .40 are omitted to improve clarity). The two factors explained 22% of the variance, with Factor 1 explaining the largest percentage of the variance (14%). Two elephant belief scales were computed to create elephant attitude dimensions. Reliability analysis revealed good to moderate internal consistency as indicated by Cronbach's alpha reliability coefficients greater than 0.65 (Table 5-6). The scales were interpreted, based on item content, and labeled "negative" (factor 1) and "positive" (factor 2). With attitude scores ranging from 1 to 7, the mean of the negative ($M = 4.39$, $SD = 1.64$) and positive ($M = 4.41$, $SD = 1.49$) dimensions was close to the midpoint. However, the negative attitude scores formed a bimodal distribution, with large percentages of respondents on either side of the neutral point. This suggests that the mean has little value in interpretation of the results. Another approach is to examine the percentages of respondents who scored above and below the mean. Using this method demonstrates that a majority (52%) of respondents scored higher on the negative dimension, with the remaining respondents scoring low (36%), or near the neutral point (12%). In comparison, 50% of respondents scored high on the positive dimension, 31% scored low, and 19% were neutral.

A statistical comparison of the two voting intention groups on each attitude dimension is presented in Table 5-5. The groups differed significantly ($p = 0.001$) on each dimension, with the negative dimension demonstrating "much larger than typical" effects ($d = 1.85$) and the positive dimension having "larger than typical" effects ($d = 0.81$). The "not allow" group scored higher on the negative attitude dimension ($M = 5.56$, $SD = 1.06$) than the "allow" group ($M = 3.34$, SD

= 1.33), while the “allow” group scored higher on the positive dimension ($M = 4.94, SD = 1.30$) than the “not allow” group ($M = 3.82, SD = 1.46$). Each elephant attitude dimension was included in the causal model to predict specific attitudes, norms, and behavioral intentions for allowing elephants in the group ranches (Figure 5-7).

Age and gender were statistically related to the negative dimension of attitude toward elephants (hypothesis 7). Females ($M = 5.35, SD = 1.17$) and older respondents ($M = 4.56, SD = 1.56$) were more negative than males ($M = 3.38, SD = 1.44$) and younger respondents ($M = 4.21, SD = 1.69; t = -17.86, p < 0.001, d = 1.50$ and $t = 2.54, p = 0.01, d = 0.22$ respectively). For the positive dimension of attitudes toward elephants, males ($M = 4.56, SD = 1.34$) and Kimana residents ($M = 4.93, SD = 1.58$) were more positive than females ($M = 4.26, SD = 1.60$) and Olgulului residents ($M = 4.13, SD = 1.35$) ($t = 2.41, p = 0.02, d = 1.00$ and $t = -6.08, p < 0.001, d = 0.54$, respectively). Age was not significantly related to the positive dimension and livelihood was not related to either dimension.

Specific Attitude toward Allowing Elephants in Group Ranches

Respondents could score between -9 and 9 on the measure of attitude toward elephants in the group ranches. The actual range was -8 to 9, with the overall mean occurring near the midpoint ($M = 0.38, SD = 3.26$). Examination of the distribution revealed that those with an unfavorable attitude (42%) were generally less extreme in their attitude than respondents with a favorable attitude (45%).

The mean scores for the voting intention groups for the beliefs and evaluations regarding allowing elephants in the group ranches are graphically displayed in Figure 5-5. The charted scores generally indicate if the groups believe an outcome is likely or unlikely, and if the outcome is good or bad. The figure also provides a visual depiction of differences between groups. Table 5-7 shows significant differences in mean belief and evaluation scores between the

vote groups. The groups differed significantly ($p < 0.05$) on five of the eight outcome beliefs. For the other three outcome beliefs, mean scores suggest that both vote groups believe that allowing elephants in the group ranches will increase potentially dangerous encounters with elephants, cause more tourists to visit the group ranches, and increase the number of elephant speared by Maasai (Figure 5-5). Measures of effect size show larger effects for the beliefs that allowing elephants will increase people-people conflict ($d = 0.64$) and increase costs to local people ($d = 0.52$). The groups differed significantly ($p < 0.05$) on all but one of the evaluations of outcomes (increasing the number of elephants speared by Maasai) (Table 5-7). Effect sizes were minimal for six of the eight evaluations. The largest difference between the vote groups was for “allow elephants to increase in number” ($d = -1.42$). There was a substantial effect for “increase opportunities to see elephants” ($d = -0.71$).

The mean scores for the summed belief-evaluation product scores for each group are visually represented in Figure 5-6, with statistical comparisons in Table 5-7. The group means for the belief-evaluation product scores differed significantly ($p < 0.05$) for all but one outcome (increase the number of elephants speared by Maasai). Effect sizes ranged from minimal ($d = -0.14$) to much larger than typical ($d = -1.20$), with “allow elephants to increase in number” having the largest effect. The average of the belief-evaluation scores for each respondent was used to create individual attitude scores. Attitude scores could range from -9 to +9. The overall mean for attitude toward allowing elephants in the group ranches was 0.38 ($SD = 3.26$). The mean attitude score for the “allow” group ($M = 1.74$, $SD = 3.07$) was significantly more positive than the mean attitude of the “not allow” group ($M = -1.18$, $SD = 2.71$; $t = -12.05$, $p = 0.001$ - equal variances not assumed) (Table 5-5). Outcomes most strongly associated with support for allowing elephants in the group ranches included: “cause more tourists to visit group ranch,”

“increase opportunities to see elephants,” and “allow elephants to increase in number.” While those opposed to allowing elephants in the group ranches also thought these outcomes were likely, they were less positive in evaluating these outcomes, especially “allow elephants to increase in number.”

Although males ($M = 0.72$, $SD = 3.05$) were significantly more positive toward allowing elephants in the group ranches than females ($M = 0.06$, $SD = 3.42$), the effect size was minimal ($t = 2.40$, $p = 0.02$, $d = 0.20$). Age, livelihood, and group ranch were not statistically related to attitude toward allowing elephants.

Subjective Norm

A total of 568 respondents named at least one referent, with 95% naming at least four and 87% naming five. The referents most frequently identified by respondents were immediate family members. Most respondents (78%) named their fathers and/or mothers, and many named brothers (44%) and husbands (75% of women). Other individuals frequently mentioned included elders and local leaders ($n = 163$), friends and age-set members ($n = 152$), children ($n = 151$), brothers-in-law ($n = 123$), fathers-in-law ($n = 116$), and mothers-in-law ($n = 106$). There were several other person types named as important referents, highlighting the variation that could have been lost with a fixed list of potential referents.

Norm scores could range from -12 to +12, with negative scores indicating a norm against allowing elephants in the group ranches and positive scores indicating a norm of support. The overall mean was 4.29 ($SD = 8.05$). There was a significant difference ($p = 0.001$) between voting groups, with those who would vote to allow elephants having a substantially higher norm score than those who would vote against allowing elephants (Table 5-5). Voting groups also differed significantly ($p < 0.05$) on the two components of the norm measure: the normative belief, where scores could range from -3 to +3, and the motivation to comply, where scores could

range from 1 to 4 (Table 5-5). Respondents in favor of allowing elephants believed that their referents would more strongly approve of him/her allowing elephants in the group ranch than those who were against allowing elephants. Although there was a significant difference ($p = 0.04$) between voting intention groups in motivation to comply, both groups indicated a high level of motivation to comply (Table 5-5).

Gender and group ranch were the only significant demographic predictors of the norm for allowing elephants ($t = 6.31, p < 0.001, d = 0.53$ and $t = -3.73, p < 0.001, d = 0.32$). Men ($M = 6.42, SD = 7.38$) and Kimana residents ($M = 5.93, SD = 7.19$) were more likely than women ($M = 2.27, SD = 8.16$) and Olgulului residents ($M = 3.41, SD = 8.36$) to have a stronger norm for allowing elephants in the group ranches.

Prior Experience

Table 5-8 shows differences between vote groups for each measure of prior experience with elephants. Respondents were evenly divided when asked if they liked seeing elephants in the group ranches, with 284 individuals stating they liked to see elephants and 284 stating they did not like to see elephants. Those who liked seeing elephants in their group ranch were significantly ($p = 0.001$) more likely to vote to allow elephants in the group ranch than those who did not like seeing elephants. Gender was the only demographic variable associated with this positive experience measure. Men were more likely than women to report that they enjoyed seeing elephants ($\chi^2 = 84.66, p < 0.001, \phi = 0.39$). The most frequently cited reasons for liking to see elephants included: elephants draw tourists ($n = 168$), elephants are attractive ($n = 34$), they have always been here/God put them here ($n = 16$). The primary reasons for not liking to see elephants were: elephants are dangerous to people ($n = 188$), elephants injure/kill livestock ($n = 103$), elephants destroy crops ($n = 26$) and elephants break trees ($n = 21$).

Most respondents (93%) indicated they had problems with wildlife in general during the animal card sorting activity. Of these respondents, less than half (47%) identified the elephant as one of the problem species, but later in the interview, when questions were specific to interactions with elephants, this number increased significantly ($\chi^2 = 192.60, p < 0.001, \phi = 0.58$), with 65% of all respondents stating that elephants had caused them problems. Men were more likely than women to report having problems with elephants ($\chi^2 = 36.28, p < 0.001, \phi = 0.25$), with 77% of men and 53% of women reporting direct negative experience. Respondents in Kimana (82%) were more likely than respondents in Olgulului (57%) to report that elephants cause them problems ($\chi^2 = 40.53, p < 0.001, \phi = 0.27$). Other demographic variables were not associated with prior negative experience with elephants. There was not a statistical relationship between the second negative experience measure and voting intention (Table 5-8).

Table 5-9 shows the locations where respondents reported seeing elephants and, if they see them in a location, if they liked or disliked seeing them there. Most respondents (91%) reported seeing elephants in the bush, about half see them near their home, and about one-fifth (21%) see them near waterholes. Few respondents (5%) reported seeing elephants near their shamba. A majority (62%) of those who see elephants in the bush stated that they like to see them in this location. Most respondents who reported seeing elephants near their home, at waterholes, or near their shamba, stated they did not like to see them in these locations.

Knowledge of Elephants

The mean score for responses to the ten general knowledge statements regarding elephants (Table 5.10) was 7.37 ($SD = 1.51$), with males having significantly higher scores ($M = 7.85, SD = 1.55$) than females ($M = 6.92, SD = 1.32$) ($t = 7.65, p < 0.001, d = 0.65$). Other demographics were not statistically related to knowledge. There was a significant difference

between the knowledge scores of voting intention groups ($t = -7.44, p < 0.001, d = 0.62$). Individuals who would vote to allow elephants had higher knowledge scores ($M = 7.8, SD = 1.41$) than those who vote to not allow elephants ($M = 6.9, SD = 1.47$). Table 5-10 shows that respondents, in general, had a good understanding of the elephant's dietary requirements and its role as an ecosystem engineer, but less understanding of their social behavior.

Risk Perceptions

Table 5-11 displays the results of the series of questions regarding risk beliefs associated with elephants. About half (51%) of respondents believed that HEC had increased in the previous five years, while 26% believed it had stayed at the same level and 23% believed it had decreased. The relationship between voting intention and one's belief regarding the level of HEC in the previous five years was significant, but the effect size was minimal ($\chi^2 = 14.64, p = 0.002, \phi = 0.16$). The "not allow" group was more likely to believe that HEC had increased than the "allow" group. Men, older respondents, and Olgulului residents were more likely to believe there was an increase in problems with elephants than women, younger respondents, and Kimana residents ($\chi^2 = 8.49, p = 0.04, \phi = 0.13$; $\chi^2 = 9.06, p = 0.03, \phi = 0.13$; $\chi^2 = 14.79, p = 0.002, \phi = 0.16$, respectively).

Less than half (45%) of respondents felt their personal safety was at great risk, while 28% believed there was a small amount of risk to their personal safety and 27% believed they were at no risk at all. Results were similar when respondents were asked about the risk to their livelihoods, with 49% stating their livelihood was at great risk, 27% stating there was a small risk, and 23% stating their livelihood was not at risk. There was a significant relationship between voting intention and beliefs about risks to personal safety and livelihood, with minimal effect sizes ($\chi^2 = 16.76, p = 0.001, \phi = 0.17$ and $\chi^2 = 18.56, p = 0.001, \phi = 0.18$, respectively). A

higher percentage of “not allow” respondents believed their personal safety and livelihood were at great risk. Kimana residents (58%) were more likely than Olgulului residents (38%) to feel their personal safety was at risk, while Olgulului residents (30%, 32%) were more likely than Kimana residents (24%, 17%) to feel their personal safety was at “little” or “no” risk ($\chi^2 = 25.54$, $p < 0.001$, $V = 0.21$). There were no statistical differences between gender, age, or livelihood and personal and livelihood risk beliefs.

About half of respondents stated that they worry about problems with elephants a great deal, while 26% stated they only worried a little and 24% stated they did not worry at all. There was a significant relationship between voting intention and level of worry regarding HEC among respondents ($\chi^2 = 26.13$, $p = 0.001$, $\phi = 0.22$), with the “not allow” group reporting a higher level of worry. Women (52%, 28%) were more likely than men (49%, 23%) to report worrying about problems with elephants “a great deal” or “a little,” while men (29%) were more likely than women to state they did not worry at all ($\chi^2 = 7.41$, $p = 0.03$, $V = 0.11$). Kimana residents (63%) were more likely than Olgulului residents (44%) to state that they worry about elephant problems “a great deal,” while Olgulului residents (29%) were more likely than Kimana residents (15%) to state that they did not worry at all ($\chi^2 = 22.11$, $p < 0.001$, $V = 0.20$). Age and livelihood were not statistically related to worry.

When asked about the general controllability of problems with elephants, 39% of respondents stated that problems were very controllable, 19% believed they were somewhat controllable, 39% stated they were not at all controllable, and 4% stated that they did not know if they were controllable. There was not a statistical relationship between voting intention and one’s belief regarding the general controllability of HEC ($\chi^2 = 3.29$, $p = 0.35$, $\phi = 0.08$). Women and men had significantly different beliefs regarding the level of controllability of elephant

problems ($\chi^2 = 7.41, p = .03, \phi = .11$), with women more likely to believe that elephant problems were controllable. Kimana residents (48%, 26%) were more likely than Olgulului residents (33%, 14%) to believe problems were “very” or “somewhat controllable, while Olgulului residents were more likely to believe elephant problems were “not at all” controllable ($\chi^2 = 40.59, p < 0.001, V = 0.27$). There was not a statistical relationship between controllability and age or livelihood.

Most respondents (95%) did not feel they were personally able to reduce problems with elephants. There was not a relationship between voting intention and one’s belief regarding their personal ability to control problems with elephants ($\chi^2 = 0.02, p = 0.88, \phi = 0.01$). Gender was the only demographic variable with a statistical relationship to belief regarding personal ability ($\chi^2 = 5.11, p = 0.02, \phi = -0.10$), with men (6%) slightly more likely than women (2%) to believe they were personally able to reduce elephant problems.

HEC Mitigation Interventions

Most respondents (94%) believed that elephants bring costs to people in their group ranch (Table 5-12). The most often cited cost was the injury or death of a person (n = 409), followed by injury or death of livestock (n = 387), damage to trees (n = 226), and crop losses (n = 155). Other costs included competition for water (n = 54), damage to fences (n = 38), damage to other property (n = 36), chasing people (n = 34), interference with travel on foot (n = 33), and competition for grazing (n = 29). While only a small number of individuals (n = 26) believed that elephants do not bring costs to people in the group ranch, those who held this view were more likely to vote to allow elephants than those who did not (Table 5-12). There was no statistical relationship between perceived costs and gender, age, livelihood, or group ranch.

A majority (62%) of respondents believed that elephants brought benefits to people in their group ranch. The most frequently mentioned benefit was attraction of tourists ($n = 235$), followed by school bursaries ($n = 117$), and the creation of jobs ($n = 87$). There was a substantial relationship ($\phi = 0.59$) between perception of benefits from elephants and intention to vote for elephants, with those believing there were benefits being more likely to vote to allow elephants than those who did not believe there were benefits brought by elephants. Men (85%) were more likely than women (44%) to believe that there were benefits to having elephants in the group ranch ($\chi^2 = 99.43$, $p < 0.001$, $\phi = 0.43$). Only 36% of respondents believed their household directly received tourism benefits, with those who believed they received benefits being more likely to vote to allow elephants than those who did not believe they received benefits. Men ($n = 130$) were more likely than women ($n = 75$) to believe their household received tourism benefits ($\chi^2 = 19.89$, $p < 0.001$, $\phi = 0.19$). Age, livelihood, and group ranch were not related.

Results indicate that 56% of respondents ($n = 318$) were aware of organizations in Amboseli that assist people who experience problems with elephants, while 31% ($n = 173$) were not aware and 13% ($n = 75$) stated they did not know. The primary groups named were the Government of Kenya (GOK), KWS, and AERP (Table 5-13). Other groups mentioned included AWF ($n = 7$) and the Game Scouts Association ($n = 6$). For the purposes of this analysis, the GOK and KWS were combined, as KWS is a government parastatal, or state-owned enterprise, and many respondents viewed them as one in the same (pers. observ.). Based on this, the GOK/KWS was the organization most often named by respondents as helping people with HEC, followed closely by AERP (Table 5-13). Respondents who were aware of these organizations were more likely to vote to allow elephants in the group ranches than those who lacked such awareness (Table 5-12). There was a substantial and significant difference between men and

women ($\chi^2 = 79.47, p = 0.001, \phi = 0.37$), with 75% of men and 38% of women stating there were organizations helping people with elephant problems. Younger respondents (64%) were more likely than older respondents (47%) to be aware of organizations with interventions ($\chi^2 = 15.83, p = 0.001, \phi = 0.17$). Livelihood and group ranch were not related to awareness of organizations.

There was a considerable amount of confusion regarding the actions or interventions taken by each organization. Table 5-13 shows that several people erroneously believed that the GOK and KWS pay for livestock losses. The only action the government takes in relation to HEC is to pay compensation for loss of human life. Other misconceptions include the belief that organizations other than the GOK pay compensation for loss of human life and that AERP shoots problem elephants. The only organization with a mandate to shoot wildlife is KWS. Of the respondents who were aware of these organizations, only 20% ($n = 65$) reported ever asking for help with elephants. Most of these individuals had requested help from either KWS ($n = 30$) or AERP ($n = 28$). Eighteen people who requested assistance from KWS reported feeling unsatisfied with the organization's actions, while one individual felt neutral, and 10 reported feeling satisfied. Fourteen people were satisfied with AERP's actions and 12 were unsatisfied.

Approximately 50% of respondents ($n = 282$) were aware of the electric fences. Most of these respondents (87%, $n = 245$) believed the primary purpose of the fence was to keep wildlife out, with 37% ($n = 91$) of these respondents specifically mentioning elephants. Almost all (99%, $n = 280$) believed that the fences did a good job, even though a majority of people listed problems with the fences (e.g., no electricity). Respondents with awareness of the fences were more likely to vote to allow elephants in the group ranches (Table 5-12). Gender and livelihood were significantly related to awareness of the electric fences ($\chi^2 = 10.62, p = 0.01, \phi = 0.14$ and

$\chi^2 = 27.96, p < 0.001, \phi = 0.23$, respectively). More men (56%) and cultivators (68%) knew of the fences than women (44%) and pastoralists (42%). Kimana residents (94%) were more likely than Olgulului residents to be aware of the fences ($\chi^2 = 232.39, p < 0.001, \phi = 0.64$). Age was not related to awareness of the fences.

A large majority of respondents (90%, $n = 511$) correctly stated that their group ranch had at least one cultural boma, with 9% ($n = 51$) stating their group ranch did not have any cultural bomas and 1% ($n = 6$) stating they did not know. Of those who knew of the cultural bomas, 96% ($n = 493$) perceived benefits associated with the bomas, with the most frequently named benefit being generation of revenue/employment ($n = 477$). Some respondents ($n = 56$) believed there were costs associated with having cultural bomas, including exploitation of the Maasai, changes in Maasai culture, and transmission of sexually transmitted diseases. Respondents who were aware of the cultural bomas were more likely to vote to allow elephants in the group ranches (Table 5-12). Men (97%) were more likely than women (83%) to be aware of the cultural bomas ($\chi^2 = 38.33, p = 0.001, \phi = 0.26$). Age, livelihood, and group ranch were not related to awareness of the bomas.

Finally, a majority of respondents (61%, $n = 344$) felt that receiving money for elephant damage made people more tolerant of elephants in the group ranches, while 36% ($n = 203$) did not believe it increased tolerance, and 4% ($n = 20$) stated that they “didn’t know.” Respondents who believed money for elephant damage increased tolerance were significantly more likely to vote to allow elephants in the group ranches than those who did not agree (Table 5-12). Men (80%) were more likely than women (42%) to believe elephant damage compensation increases tolerance of elephants ($\chi^2 = 86.33, p < 0.001, \phi = 0.39$). Age, livelihood, and group ranch were

not statistically related to one's belief regarding the influence of damage compensation on tolerance of elephants.

The Model

Results of the path analysis are visually represented in Figure 5-7. The path coefficients shown in the figure are limited to the paths between cognitive variables, and the R^2 values indicate the variance explained by all of the independent variables represented in the figure. Results of the dummy variable regression analyses indicated that gender was the only variable that significantly predicted the indifference value orientation ($\beta = 0.63$, $t = 19.42$, $p = 0.001$) and explained 40% of the variance. The negativistic and the skills/bravery orientations were predicted by gender ($\beta = 0.46$, $t = 12.60$, $p < 0.001$ and $\beta = 0.41$, $t = 10.74$, $p < 0.001$, respectively) and group ranch of residence ($\beta = -0.19$, $t = -5.07$, $p < 0.001$ and $\beta = 0.10$, $t = 2.57$, $p = 0.01$, respectively), partially supporting hypothesis 7. These results suggest that women had a higher level of indifference toward wildlife, were more negativistic, and had a higher value for demonstrations of skills and bravery with wildlife, while residents of Kimana were less negativistic and had a higher value for skills and bravery.

Results of the multiple regression analyses for the attitude and norm variables are shown in Table 5-14 and Figure 5-7. The negative dimension for general attitude toward elephants was predicted by the indifference wildlife orientation, the skills/bravery wildlife value orientation, gender, prior negative experience, worry, knowledge, and awareness of organizations with HEC interventions. This combination of variables significantly predicted the negative attitude dimension, with 62% of the variance explained. The beta weights presented in Figure 5-7 and Table 5-14 suggest that the indifference wildlife value orientation contributed the most to predicting the negative dimension of attitude towards elephants, with respondents who had a

higher level of indifference toward wildlife being more negative toward elephants. Respondents who were more indifferent toward wildlife, female, had a higher value for skills and bravery related to wildlife, had negative experience with elephants, were not aware of organizations with HEC interventions, had less knowledge of elephants, and had a higher level of worry were more likely to have a negative attitude toward elephants.

The positive dimension of attitude toward elephants was predicted by group ranch of residence, worry about elephant problems, gender, prior negative experience, awareness of organizations with HEC interventions, and the indifference value orientation (Table 5-14, Figure 5-7). These variables explained 22% of the variance, with group ranch demonstrating the most predictive ability (Table 5-14). Respondents who lived in Kimana, had a lower level of worry, were female (unexpected result—see below), had awareness of organizations with HEC interventions, did not have negative experience with elephants, and who were less indifferent toward wildlife scored higher on the positive dimension of attitudes toward elephants.

Attitude toward allowing elephants in the group ranch was predicted by gender, the positive dimension of attitude toward elephants, group ranch, the belief that compensation for elephant damage increases tolerance, awareness of the electric fences, prior negative experience, the skills/bravery value dimension, worry, the negativistic wildlife value orientation, and the negative dimension of attitude toward elephants (Table 5-14, Figure 5-7). These variables explained 37% of the variance in attitude, with the negative dimension of attitudes toward elephants contributing the most to this prediction. The negative coefficient for gender suggests that females were more likely to have a positive attitude toward allowing elephants in the group ranch, contradicting earlier t-test results showing men were more likely to be in favor of allowing elephants than women. This is most likely attributable to response distributions, with the

distribution for females being “moderately) skewed to the left (skewness = 0.60). More specifically, a larger number of women had negative attitude scores than positive scores, but negative scores were less extreme than positive scores. With this caveat in mind, the regression results suggest respondents who were female, had higher scores on the positive dimension of attitudes toward elephants, were residents of Kimana group ranch, believed that compensation increases tolerance, were not aware of the fences, did not have negative experience with elephants, were low on the skills bravery orientation, had less worry about elephants, were low on the negativistic dimension and the negative dimension of attitude toward elephants were more positive toward allowing elephants in the group ranch.

The norm for allowing elephants in group ranches was predicted by the positive elephant attitude dimension, the negative elephant attitude dimension, and group ranch of residence, explaining 30% of the variance (Table 5-14, Figure 5-7). The negative dimension of attitudes toward elephants was the strongest predictor of norm, with those with a more negative attitude having a lower norm for allowing elephants in their group ranch. Individuals who were residents of Kimana and were higher on the positive dimension of attitudes toward elephants were more likely to have a higher norm for allowing elephants. None of the wildlife value orientations were predictors of the norm variable.

Logistic regression was used to test two models of the relationships between intention to vote to allow elephants, and attitudes toward elephants, attitudes toward allowing elephants, and norms regarding allowing elephants. The first model generated in the logistic regression analysis tested the TRA, i.e. it did not include the general attitude variables. It revealed that attitude toward allowing elephants in the group ranch (specific) and norm significantly predicted intention to vote to allow elephants in the group ranches ($\chi^2 = 180.82$, $p < .001$), explaining 37%

of the variance. Table 5-15 presents the odds ratios, which suggest that the odds of voting to allow elephants increase as attitude toward allowing elephants and norm for allowing elephants increase. The model was able to correctly classify 79% of respondents who would vote to “allow” and 71% who would vote to “not allow” elephants in the group ranches, with an overall success rate of 75%.

The second model produced by logistic regression, which included the addition of attitude toward elephants (general), revealed that both the positive and the negative dimensions of attitude toward elephants, attitude toward allowing elephants, and norm for allowing elephants, significantly predicted intention to vote to allow elephants in the group ranches ($\chi^2 = 348.35$, $p < .001$). Table 5-15 shows that in addition to the previously described effects of specific attitude and norm, the odds of voting to allow elephants are increasingly greater as the positive dimension of attitude toward elephants increases. Overall, 82% of respondents were correctly classified by voting intention. Figure 5-7 depicts the relationships in this second model and shows that 62% of the variance in voting intention is explained by the four predictor variables.

Future Livelihood Activity

A considerable percentage (16%) of respondents who identified pastoralism as their primary livelihood activity indicated that they planned to shift to agriculture within five years. Table 5-16 shows the current and future livelihood activities reported by respondents. More than half (57%) of respondents stated that pastoralism would be their household’s primary livelihood activity in five years, with 35% identifying cultivation as their primary future livelihood activity. The remaining respondents identified other activities (7%), such as working in a cultural boma or wage labor, or stated that they did not know (1%). There was a significant difference between

current and future primary livelihood activity ($\chi^2 = 301.14$, $p < .001$, $V = .52$), with a decrease in those planning to depend primarily on pastoralism and an increase in those planning to be primarily dependent on cultivation.

Discussion

The overall purpose of this chapter was to examine the antecedents of willingness to allow elephants on private land by using an integrated predictive model of behavior. A second goal was to test the transferability of theory and methods developed in the West to a rural African setting. The cognitive hierarchy provided a theoretical framework of cognitive variables in which to integrate additional variables found to be related to attitudes and behavior in previous human dimensions research. The model was tested using data from a survey of 569 people, of which a slight majority stated that they would vote to allow elephants in the group ranches. Overall, the survey results support the conceptual relationships posited by the cognitive hierarchy and the addition of several “external” variables, such as demographics, worry, and awareness of HEC mitigation, which were found to be important in explaining variation in value orientations, attitudes, and norms regarding willingness to tolerate elephants on private land.

Wildlife Value Orientations

Kellert’s (1980) typology of attitudes toward animals was used as the conceptual framework for measuring wildlife value orientations. A concern with the typology has been whether the measurement items are reliable and valid. Similar to other studies (Drews 2002; Frost 2000; Mordi 1987; Rauwald and Moore 2002), the theorized attitude types collapsed together in factor analysis, producing only three reliable factors and only partially supporting hypothesis 1. While all of the value types proposed by Kellert (1980) and Mordi (1987) did not prove to be distinct orientations among the Maasai of Amboseli, three meaningful orientations were identified and contributed to the prediction of attitudes toward elephants and allowing

elephants in the group ranch, partially supporting hypothesis 2. However, norms were not predicted by the value orientations as postulated in hypothesis 3.

The orientation explaining the most variance, the indifference value orientation (neutralistic/naturalistic), provides empirical support for anecdotal descriptions of Maasai indifference toward wildlife (Myers 1973, Western 1994). Although it could also be interpreted as representing a spectrum from highly indifferent (“Going outdoors just to see wild animals is a waste of time”) to not at all indifferent (“When I am walking in the bush, I enjoy seeing wildlife around”), or, in other words, appreciative. This orientation was the strongest predictor of the negative dimension of attitude toward elephants.

The second wildlife value orientation identified by factor analysis suggests a degree of negativity toward, at least, certain species of wildlife. Although a “positive” orientation was not identified, there is evidence in Maasai culture of species preferences. According to Berger (1993), species such as the hedgehog and the mole are bringers of good luck and species such as the jackal and the cape hare bring bad luck. During focus groups, several individuals described positive and negative characteristics of certain animals, such as the “greedy” hyena that kills more livestock than it can eat or the “polite” giraffe that brings no harm.

The third orientation was based on three items intended to measure Kellert’s *dominionistic* orientation, but based on the content of the items used to measure this orientation and the traditional view of wildlife belonging to God (Berger 1993) and, today, the government (pers. observ.), *dominionistic* may not be the most appropriate label for this orientation. For example, the time-honored tradition of the *olamayio*, the lion hunt of the *ilmurran* to test bravery, is more representative of Rolston’s (1985; 1988a,b) *recreational* and *character building* values, where an individual is interested demonstrating skills and finding “one’s place under the

sun.” Two of the *dominionistic* measurement items in the survey refer to lion hunting. Therefore, this orientation was labeled “skills/bravery.”

The existence of the skills/bravery wildlife value orientation has potential implications for Amboseli’s elephants, as elephants are also speared by *ilmurran* for the purpose of demonstrating skills and bravery (Kangwana 1993; Bates et al. 2007). The Amboseli elephants have demonstrated avoidance behavior in experiments using playback sounds of Maasai cow bells, the presence of *ilmurran*, olfactory cues (worn Maasai clothes), and visual cues (typical bright red Maasai clothing) (Kangwana 1993; Bates et al. 2007). Kangwana (1993) suggested that spearing may influence elephant avoidance of the Maasai, although individual elephants with experience with spearing have demonstrated a variety of responses (Bates et al. 2007). The value of the elephant to the Maasai for demonstrating skills and bravery combined with the avoidance response of elephants when encountering signs of Maasai presence point to the potential of maintaining fear of the Maasai among elephants as a way to reduce HEC. Further research into this area may provide additional, site-specific tools for mitigating HEC.

The failure of the Kellert-type items to capture a positive dimension, or the other Kellert categories, could be attributable to conceptual or measurement issues, or both. Further pretesting may have clarified this issue. It is possible that some of the Kellert value types simply do not exist among the Maasai, although some of the other value types conceptualized by Kellert were evident. Factor analysis produced two additional factors that were wholly comprised of the intended measurement items, the moralistic and theistic value types. Each of these scales had low reliability ($\alpha = 0.49$ and 0.43 , respectively), but they each contained only three measurement items. When added to the model, they explained a minimal, but statistically significant, amount of variance in attitudes and norms. It is noteworthy that the theistic value, in particular, did not

prove to be a significant factor, given the deep religiosity among the Maasai. This result perhaps supports suggested problems with measurement.

Future research using the Kellert-value types, or other approaches currently under exploration (e.g., see Teel et al. 2007), should improve the reliability and validity of measurement items and, in turn, our understanding of value orientations among cultures in the developing world.

General Attitudes Toward Elephants

Two dimensions of attitudes toward elephants, based on beliefs regarding elephants, were identified – a negative dimension and a positive dimension. The two general attitude dimensions predicted specific attitudes, norms, and behavioral intentions regarding allowing elephants in group ranches, fully supporting hypothesis 4. The negative dimension was the strongest predictor of attitudes and norms for allowing elephants in the group ranches. Knowledge of the underlying belief structures of the attitude dimensions provides managers and conservationists with information for developing interventions. That is, addressing potential misconceptions regarding elephants may help improve attitudes and influence subsequent variables in the cognitive hierarchy. For example, respondents with a high score in this dimension tended to believe that “the only reason elephants come out of the park is to disturb people” and that “elephants are always angry toward people.” They did not believe that elephants have an important role in the environment.

The inclusion of the general attitude variable in the model demonstrated that, in the current research setting, general attitudes toward elephants greatly improved the prediction of intention to allow elephants in the group ranches, with the positive dimensions serving as the strongest predictor of behavioral intention. There are a number of possible explanations for the strong influence of general attitudes, as the relationship between general attitudes and specific

behaviors is influenced by several variables (Eagly and Chaiken 1993). Consistent with previous research, two of these variables, direct experience with and knowledge of the target (which may be increased with direct experience), were found to be significant predictors of attitudes toward elephants. The Maasai of Amboseli have a high level of experience with and knowledge of elephants, allowing for highly accessible, easily activated attitudes. In such situations, research has found that individuals may rely on spontaneous rather than deliberative processing (see Fazio 1995; Fazio and Towles-Schwen 1999). This finding supports the continued examination of the role of general attitudes, or attitudes toward targets, in predicting behavior, including the effects of potential mediators and moderators of the attitude-behavior relationship (Eagly and Chaiken 1993). It also suggests direction for conservationists and managers in planning interventions. Given that the positive dimension of attitude toward elephants was the strongest predictor of intention to vote to allow elephants and the negative dimension was the strongest predictor of attitudes and norms for allowing elephants, interventions aimed at improving attitudes toward elephants may increase overall tolerance. Additionally, understanding the processes (e.g., spontaneous vs. deliberate) which guide the attitude-behavior relationship may inform the design of interventions. For example, program planners could target individuals with negative attitudes toward elephants for persuasive communications that provide the motivation and opportunities for more careful thought about potential positive outcomes of tolerating elephants.

Specific Attitudes toward Allowing Elephants in Group Ranches

Respondents were fairly evenly divided in their attitudes toward allowing elephants in the group ranches, with a significant percentage of individuals falling into the neutral category. This attitude measure was the second strongest predictor of intention to vote to allow elephants (hypothesis 5). It was based on beliefs and evaluations of potential outcomes of having elephants in the group ranches. For instance, respondents against tolerating elephants believed that

allowing elephants would increase people-people conflict and costs to local people, suggesting that efforts to foster favorable attitudes should address these and other beliefs that underlie negative attitudes. There were several independent variables that predicted respondents' attitudes toward allowing elephants, with the negative dimension of attitude toward elephants having the most substantial relationship, followed by gender and the positive dimension of attitude toward elephants. Several external variables (discussed below) were less strongly associated with attitude toward allowing elephants, but demonstrate the complexity of, and opportunities for, increasing tolerance.

Subjective Norm

Human dimensions research (Campbell and Mackay 2003; Hrubes et al. 2001) and research in other fields of study (Ajzen 1991; Armitage and Conner 2001; Farley et al. 1981) have found that subjective norm is a weaker predictor of behavior than attitudes. Suggested explanations include concerns of conceptualization and measurement (Manfredo 2008; Terry and Hogg 1996), and different person types (Trafimow and Finlay 1996). Conceptualization was not anticipated to be an issue in the current study, given the collectivist nature of Maasai culture. Two measurement concerns cited in the literature, the use of modal salient referents (Terry et al. 2000) and the use of a global measure of subjective norm (Armitage and Conner 2001), were addressed in my study by allowing each respondent to free list their referents and by creating an index measure of norms. Results suggested that subjective norm was a strong predictor among the Maasai of intention to vote to allow elephants in their group ranches (hypothesis 6). This finding provides support for the assertion that norms can play a stronger role in influencing behaviors in collectivist cultures, such as the Maasai culture, than in individualistic cultures, and that the measurement procedure suggested by Ajzen and Fishbein (1980) is a valid one.

Norms for tolerating elephants were based on beliefs regarding respondents' perceived social pressure to tolerate or not tolerate elephants. Family members were most often identified as referents, and there was a strong motivation to comply with referents among both voting intention groups. These results suggest that interventions, including education and communication programs, may be improved by targeting social networks, including families, age-sets, and group ranches associations. The negative dimension of attitude toward elephants was the strongest predictor of norm; therefore, efforts aimed at improving attitudes toward elephants may increase the norm for allowing elephants in the group ranch.

Demographics

This analysis examined the influence of four demographic variables: gender, age, primary livelihood activity, and group ranch of residence. Similar to other studies (Vaske et al. 2001), including demographic variables in the model provided an understanding of who holds which beliefs regarding wildlife, elephants in particular, and tolerance of elephants in the group ranches (hypothesis 7). As expected, gender proved to be an important variable across analyses as the only demographic variable with a significant relationship with each dependent variable in the model, including wildlife value orientations. A few studies have examined the determinants of environmental value orientations (Bright et al. 2000; Manfredo and Zinn 1996; Mohai 1992; Steel et al. 1994; Vaske et al. 2001). Of these, causal models have identified gender, education, income, and length of residence as influences on value orientations (Vaske et al. 2001; Steel et al. 1994). In the present analysis, gender was the strongest of two predictors of value orientations, with women scoring higher than men on all three scales, indicating that they were more indifferent (less appreciative), more negativistic, and had a higher value for demonstrations of skills and bravery. Women also had more negative attitudes toward elephants. This is contrary to findings in North America, where women tend to be more environmentally oriented (Mohai

1992; Vaske et al. 2001; Steger and Witt 1989), but consistent with other research in Africa (Gillingham and Lee 1999). This could be attributable to several factors including gendered differences in resource use, interactions with wildlife, and access to knowledge and conservation benefits (Hunter et al. 1990; Nabane and Matzke 1997; Ogra 2008). Maasai women had a lower level of knowledge of elephants, were less likely to perceive benefits associated with elephants, had a higher level of worry about HEC, and had less awareness of HEC interventions, pointing to the need for increased efforts to address the concerns of women, include them in outreach and planning processes, and increase their perceived and actual benefits.

Group ranch of residence was a significant predictor of several variables, including two of the value orientations, attitudes toward elephants and allowing elephants, norm, and several risk beliefs. Interestingly, Kimana residents were more positive toward elephants and had a stronger norm for allowing elephants in the group ranch, even though they were more likely to report problems with elephants, perceived a higher personal safety risk, and had a higher level of worry. This may be partially explained by the belief that elephant problems are controllable, the belief that elephants bring benefits (not statistically different from Olgulului residents), and awareness and a positive evaluation of the two electric fences in the group ranch.

Age and livelihood were predictors of a more limited set of variables. For instance, older respondents were more negative toward wildlife in general and to elephants specifically. This is contrary to the earlier findings of Kangwana (1993), who found older respondents to be more positive. A possible explanation for this difference is that older respondents in my survey were more likely to believe that HEC had increased in recent years and were less aware of organizations providing HEC mitigation interventions.

Information on differences between demographic groups can be used by conservation professionals to more effectively develop conservation and conflict mitigation interventions. It can be used to target specific segments of the population and better predict responses of members of these groups to potential management policies (Bright et al. 2000). The present analysis, although limited to only four demographic variables, suggests communication and education needs for different segments of the population. Examination of additional demographic variables (e.g., wealth) may improve the ability of planners to target interventions. Future research should also sample a larger portion of the non-Maasai population to consider differences between ethnic groups.

Prior Experience

Respondents were evenly divided in whether or not they liked to see elephants (positive experience) in the group ranch. The primary reason for liking to see elephants was that elephants draw tourists, and the most oft cited reason for not liking to see elephants was the danger they pose to people. Positive experience did not predict attitudes, but negative experience, having problems with elephants, did (hypothesis 8). Respondents were asked about problems with elephants at two points in the interviews. On the first occasion, when questions were concerned with wildlife in general, 47% of respondents categorized the elephant as a problem animal. Later, when questions became more specific to elephants and human-elephant interactions, 65% of respondents stated that elephants caused them problems. It is unclear why this variation in responses occurred, but potential explanations may be related to question-order effects (Schuman and Presser 1981). For instance, questions prior to the second negative experience question may have activated memories that were not immediately accessible at the time the first question was asked. Another possibility may be that when some respondents realized that the survey was

becoming more focused on elephants, they were more likely to complain about elephants, given the local, national, and international attention focused on the Amboseli elephant population.

While it is not possible to explain the variation in responses, it is important to be cognizant of it when interpreting related results. It was presumed that question order simply increased the salience of beliefs regarding elephants and that bias was kept to a minimum with careful attention to question wording. The second measure of negative experience with elephants was used in the causal model, as this question was posed later in the interview, in closer proximity to the voting intention question, and it was based on a larger number of responses.

Knowledge of Elephants

The relatively high level of knowledge of elephants among the study sample provides support for the assertion that the Maasai are “natural ecologists” (Berger 1993), possessing a high degree of ecological knowledge. Survey results demonstrated that men had a higher level of knowledge than women (hypothesis 9). Knowledge was a significant, albeit weaker, predictor of the negative dimension of attitude toward elephants (hypothesis 10). Education and communication are often the suggested approach for influencing attitudes and behaviors (Gardner and Stern 1996; Jacobson 1999; Manfredi et al. 1995). Based on the current findings, efforts to improve knowledge of elephants would likely have a minimal impact on attitudes and behaviors toward elephants. Instead, such efforts would be better directed at improving knowledge of strategies for mitigating HEC (see below), which may, in turn, affect motivation, confidence, and locus of control (Boerschig and DeYoung 1993; Hwang et al. 2000).

Risk Perceptions

The influence of several constructs related to risk perception associated with living alongside elephants was explored. The voting intention groups differed in their beliefs regarding the incidence of HEC, risks to personal safety and livelihood, and worry. They did not differ in

their beliefs regarding the general controllability of HEC and their personal ability to control elephant problems, with nearly all respondents stating that they were not personally able to control elephant problems. Worry was the only risk-related construct to remain in the predictive model, explaining a portion of the variance in each of the attitude variables, partially supporting hypothesis 11.

Although there is lack of perceived personal ability to manage elephant problems, most respondents indicated that problems with elephants are controllable to some degree, implying a belief that only “others,” most likely KWS, can manage elephant problems. Wildlife managers and conservationists are faced with the challenge of reducing actual and perceived risks of living alongside elephants. As previously mentioned, where there is low probability of an incident occurring, but potential for severe consequence, risk perceptions may increase (Decker et al. 2002). Such is the case with HEC, where elephants cause less damage to crops than other pest species, but a single raid can be catastrophic for some individuals (Naughton et al. 1999). Additionally, elephants are not the most dangerous animals in Africa, in terms of human mortality (Croze et al. 2007), but an encounter with an elephant can be fatal.

Several approaches, past and present, have been utilized to reduce HEC in Amboseli, with most interventions aimed at physically reducing negative human-elephant interactions (e.g., fences) and offsetting the costs of HEC (compensation, promoting wildlife-based tourism). While these approaches demonstrate some efficacy in reducing HEC, this examination of risk beliefs suggests that additional interventions aimed at reducing risk perceptions and increasing perceived controllability (general and personal) may improve attitudes and tolerance of elephants. These could include educating local people on the actual risk level associated with elephants and current and potential methods for reducing negative human-elephant encounters.

HEC Mitigation Interventions

Consistent with hypothesis 12, three HEC mitigation variables predicted attitudes. Awareness of organizations with HEC mitigation interventions was a significant predictor of the two dimensions of attitude toward elephants, but it did not directly predict attitude toward allowing elephants in the group ranches. Awareness of the fences and the belief that damage compensation increases tolerance contributed to the prediction of attitude toward allowing elephants in the group ranches. Overall, there was a considerable lack of awareness and understanding of HEC interventions. For example, just under half of the respondents surveyed were not aware of any of the organizations working to mitigate HEC, and, among those who were aware of these organizations, there was a significant amount of confusion regarding the specific interventions of each organization. The fact that very few individuals named AWF was unexpected, given the organization's long history in the region and the amount of resources it directs toward its Kilimanjaro Heartlands Program.

There is an overall need to improve the implementation of current strategies for reducing HEC and maintaining elephant habitat outside the park boundaries. First, program staff need to improve awareness and knowledge of interventions. The lack of awareness of organizations with HEC interventions underscores this need. The most frequently cited costs associated with elephants were injury and death to people and livestock, but only 26 respondents knew of the government compensation program for human injury and death, and only 88 correctly knew that AERP makes consolation payments for livestock losses. Obviously, compensation for loss of a human life provides little solace, but it can, at least, alleviate some of the increased financial burden brought by funeral costs and loss of a source of income. While it is well known that rural Kenyans who suffer such losses are generally dissatisfied with the government compensation program, critical of both the claims process and the payment amount (KWS 2000; Sindiga 1995),

improvement of this program may at least offset the commonly voiced belief that the government cares more about its wildlife than its people.

Maasai pastoralists are becoming increasingly poor (BurnSilver et al. 2008) and are seeking ways to diversify their livelihoods. Wildlife authorities and conservationists have promoted wildlife-based tourism as a way to address this need, but, as demonstrated here, a limited number of households perceive any direct benefits from tourism (nor do they actually receive such benefits – Akama 1999, Bulte et al. 2008). It is evident that conservationists have been effective in communicating the tourism value of elephants in Amboseli by the large percentage of respondents offering this as their reason for being positive toward elephants and/or tolerating elephants. The question then is, if the tourism value of elephants is critical for toleration, how long will tolerance last if this benefit is never realized by the individual? Amboseli generates a substantial amount of revenue, especially in comparison to most other protected areas in Kenya. While tourism revenue may not be substantial enough to offset all costs (Barrett and Arcese 1995), increasing wildlife (and cultural) tourism benefits to the people who suffer the costs of tolerating wildlife and ensuring that they understand the link between benefits and wildlife conservation is imperative if wildlife-based tourism is to be a viable tool in maintaining tolerance. The challenge is in determining who should receive these benefits and how should they be disbursed (Archabald and Naughton-Treves 2001).

Almost all of the respondents who were aware of the fences offered a positive evaluation of the fences. As recommended elsewhere (Kioko et al. 2008), improved maintenance of the electric fences is needed. A limitation in meeting this need is the uncertainty among respondents, including those who live in the fenced areas, as to who owns the fences and who is responsible for fence maintenance. The position of KWS is that the organization assisted the community in

building the fence and, upon its completion, it became the property and responsibility of the community (P. Omondi, KWS, pers. commun). While most people who were aware of the fences had a positive evaluation of the fences, a limited number perceived personal ownership or responsibility. The fences were effective in reducing crop damage up to the time of this study (Kioko 2004), but if problems with fence repair and maintenance are not addressed, the fences and their efficacy will likely decline, especially as more elephants become aware that the fences do not pose any harm to them (Hoare 2001). Further research is needed to address questions on this issue. For example, does the community have the knowledge and resources to maintain the fences? If not, what are the options for funding fence maintenance (e.g., government or donor support) and providing training to community members?

In addition to improving existing interventions, new approaches are needed that address the needs identified in this study, including addressing both perceived and actual risks, costs, and benefits associated with elephants, and changing erroneous beliefs regarding elephants upon which attitudes are based. Additional consideration should be given to gendered differences in the cognitive and contextual variables that influence tolerance of elephants. New measures should be developed in collaboration with local people (“bottom-up”) rather than being imposed by outsiders (“top-down”), so there is a higher likelihood for increased tolerance and successful interventions (Gillingham and Lee 2003; Osborn and Parker 2003; Taylor 1993; Thouless 1999; Treves et al. 2006). This includes developing elephant and conflict management actions that are acceptable to local people.¹⁰

Finally, in order to regain the trust and confidence of the local people, managers, conservationists, and researchers must make every effort to avoid raising false expectations and

¹⁰ Acceptable elephant and conflict management actions were examined in the survey and will be reported separately.

to follow through on promises (e.g., providing water sources outside of the park). This may seem obvious, but given the local history of land alienation, broken promises, and failed interventions, and the resulting lack of access for water and grazing resources in the park and costs from wildlife damages, the tolerance and goodwill of the Maasai may reach its limit. The Maasai do indeed exhibit a great deal of tolerance of wildlife with a hint of appreciation, especially for specific species. Interventions that take this into account are likely to be more successful.

The Model

The integrated model demonstrated that the addition of other variables to the cognitive hierarchy was useful in understanding and predicting intention to tolerate elephants, with a substantial amount of variance in behavioral intention explained. Intention to allow elephants in group ranches was strongly determined by the positive dimension of general attitude towards elephants, specific attitudes toward allowing elephants in group ranches, subjective norm for allowing elephants, and, to a lesser degree, by the negative dimension of attitude towards elephants – relationships supported by the Theory of Reasoned Action (Fishbein and Ajzen 1975) and Fazio's spontaneous processing model (Fazio 1986, 1990). These results suggest that the inclusion of a general attitude variable may be a stronger predictor of behaviors than specific attitudes in certain contexts. They also demonstrate that interventions aimed at maintaining or increasing tolerance of elephants should target attitudes and norms, and their underlying constructs.

Further support for the model was demonstrated by the ability of the value orientations to predict general and specific attitudes. The strongest relationship was between the indifference value orientation and the negative dimension of attitude toward elephants, which, in turn, was the strongest predictor of attitude and norm for allowing elephants. While the negative attitude

dimension was the weakest of the four predictors of behavioral intention, its effects may be partially mediated through the attitude and norm for allowing elephants variables.

Several external variables were identified as predictors of value orientations, attitudes and norms, including gender, group ranch, knowledge of elephants, prior negative experience, worry, awareness of organizations, and belief that damage compensation increases tolerance. While they were weaker predictors, they are useful in assisting wildlife officials and conservationists with managing elephants and HEC by indentifying areas of concern for local people and the content requirements and targets for education and communication.

Future Livelihood Activity

Results indicate that fewer people believed that pastoralism would be their primary livelihood activity in five years, with a significant number of respondents stating that they planned to shift to agriculture or another economic activity. This is consistent with the general trend of livelihood diversification among African pastoralists (McCabe 2003). Some argue, based on historical evidence, that the Maasai have always made superficial change when necessary (e.g., in times of disease and drought) with the intention of returning to pastoralism (Knowles and Collett 1989). This is supported by research among Maasai in Tanzania, where Maasai agropastoralists expressed the goal of adopting agriculture to avoid selling livestock (McCabe 2003) and livestock remained the priority “for all but the poorest and commercially oriented farmers” (O’Malley 2000, p. 245). No matter what intentions are, the continued adoption of agriculture, combined with subdivision and privatization of land, has serious implications for wildlife and pastoralists as competition for land and water increases. The feasibility of the historical strategy of temporary shifts in livelihood with the intention of returning to pastoralism is highly questionable given modern-day circumstances (e.g., increasing human population, increasing poverty, and changing land tenure).

Several strategies are in discussion or development to address the social and ecological needs of the Amboseli ecosystem. A priority issue is the development of a land-use plan. The Government of Kenya currently does not have a national land-use policy, although discussions of a plan have been on-going for several years (P. Omondi pers. commun., 2002). In the meantime, a local-level plan, developed collaboratively by all stakeholders and based on social and ecological research, is needed to protect both wildlife and people. Without a land-use plan and viable, alternative economic activities that are compatible with wildlife conservation, local attitudes toward wildlife may become irrelevant.

A Note on Gender

In 1987, in discussing the results of their study on the influence of gender on American attitudes toward wildlife, Kellert and Berry (p. 370) stated that “gender is among the most important demographic factors in determining attitudes about animals in our society.” They recommended that “major efforts to broaden the scope and effectiveness of wildlife management should thus consider and understand the influence of gender.” Since this early study, gender is increasingly recognized as an important consideration in wildlife and protected area management (Badola and Hussain 2003; Biermayr-Jenzano 2003; Czech et al. 2001; Dougherty et al. 2003; Hunter et al. 1990; Nabane and Matzke 1997; Ogra 2008; Zinn and Pierce 2002).

In the present study, gender was significantly related to multiple variables, including voting intention, with a majority of women (65%) stating they would vote against allowing elephants in the group ranches. Gender was the only predictor across all three of the wildlife value orientations. Women were more negative toward wildlife in general, and elephants specifically, had lower knowledge scores, a higher level of worry, less awareness of HEC interventions, and were less likely to believe elephants bring benefits to people. In Uttarakhand, India, Ogra (2008) found that women bear the disproportionate burden of hidden costs associated

with conflict with wildlife, such as fear and increased workload. For example, when elephants break water pipes, women are forced to fetch water from an alternate site. Research in southern Africa, found that gendered differences in human-wildlife conflict were related to ownership of resources, with men primarily concerned with livestock and women with crops (Muruthi 2005). These results highlight the need for a gendered perspective in developing policy and interventions.

Nabane and Matzke (1997, p. 521) state that “as a social construct, gender roles are malleable and potentially responsive to changes in natural resource management activities.” This is supported by research on the impact of development interventions in Maasailand, where Wangui (2008) found that development interventions in Loitokitok Division of Kajiado District, Kenya (just to the east of the study area) had altered livelihood activities and contributed to unforeseen shifts in gender roles, with women increasingly responsible for small stock. Future research and interventions should focus on women to understand their roles and perceptions related to the environment and to ensure that they are also beneficiaries of conservation.

Limitations and Future Research

This study has a number of significant strengths, such as the test of an integrated model, the transfer of theory to a new setting, and implications for conservation practice, but it also has several limitations. As a test of an integrated theoretical model, there were numerous measures and constructs, which limited the parsimony of the model. Further work is needed to refine the constructs of the model and the sets of items that measure each construct. This was particularly evident with the value orientations scales. Additionally, the influence of the risk-related concepts was examined individually, with a single indicator for each concept. While this contributes to the understanding of the various dimensions of risk perception in settings of human-wildlife conflict, additional research is needed to develop a comprehensive measure that captures the full scope of

risk perception, which may, in turn, increase its explanation of attitudes and behaviors to potentially dangerous or costly wildlife.

Results provide support for the model tested here, but it could be improved through refinement of the measurement items and the addition of other variables suggested by research and other theories (e.g., past behavior). Researchers have called for an expansion of the cognitive hierarchy and related theories, such as the Theory of Reasoned Action, in order to improve understanding and prediction. This study tested only a small set of additional variables, while there are a multitude of variables that can influence values, attitudes and behaviors. Of particular note was inclusion of the general-attitude-toward-elephants variable, which proved to be significant in explaining attitude toward allowing elephants on private land and the intention to allow elephants, possibly indicating a more spontaneous or automatic response to tolerance of elephants. Further examination of factors influencing the dual processes between attitudes and behaviors is needed.

Another limitation of measurement is that this study predicted behavioral intentions, rather than actual behaviors. Although intention-behavior correlations have varied, with some being quite high (e.g., $r = 0.85$; Ajzen and Fishbein 1980), there is not a perfect correlation between behavioral intention and actual behavior (Vaske and Donnelly 1999). Additionally, a hypothetical vote, a single-item indicator, was used as a proxy for willingness to allow elephants in the group ranches. An index of tolerance behaviors may provide a better measure of willingness to tolerate elephants.

Another limitation of this study is the length of the questionnaire. While the questionnaire items were thoughtfully included to measure the variables in the theoretical model, the survey was a little too ambitious and taxing on the ever-patient and cooperative respondents. The

survey length, combined with the fact that the Maasai are a highly researched group, and therefore at increased risk for survey fatigue, may have affected responses, especially in the latter portion of the interviews.

There are limitations inherent to survey research itself, such as lack of flexibility (e.g., in asking questions) and being subject to multiple sources of error and bias. Face-to-face interviews present additional opportunities for bias attributable to the behavior of the enumerator. While I attempted to address this by providing enumerator training, maintaining close supervision, and using male and female enumerators for the corresponding respondents, there was, no doubt, some degree of interviewer bias introduced. Another source of bias in the present study was response bias. I tried to minimize this source of bias by differentiating my project from other researchers and organizations working in the area by using local enumerators, communicating my role as a university student, and by using a “human dimensions” logo on my team’s t-shirts and on my vehicle. Despite these efforts, 15% of respondents stated that they believed the government sent us to interview them.

Finally, the random sampling procedure only resulted in the selection of 13 non-Maasai respondents. This is an important limitation because, while the study area was formerly comprised of a generally homogenous Maasai population, since independence, this area has become increasingly heterogeneous. This change is due mainly to the immigration of Kikuyu and Kamba farmers, who have settled primarily in areas of high agricultural potential and urban centers (Ntiati 2002) and rent land from predominantly Maasai owners (Campbell et al. 2003). Campbell et al. (2003) point out that organizations that implement community-based wildlife management schemes in the Amboseli area have continued to focus on the Maasai, ignoring the increasing heterogeneity of culture and livelihoods. While it was not my intention to exclude

non-Maasai from this survey, the sampling procedure did not result in the selection of the only urban center, Kimana town, in the study area. It is unclear how many non-Maasai live in Kimana town, but future research should address this shortcoming by purposefully sampling non-Maasai residents in Kimana and nearby Loitokitok town.

Conclusions

The integrated model, based on the cognitive hierarchy, provides a sound foundation for understanding tolerance of potentially dangerous and costly wildlife on private lands. By adding demographics, risk perceptions, prior experience, and beliefs and awareness about conflict mitigation interventions, I was able to assess the relative influence of some of the determinants of tolerance of elephants. However, modification of the model may improve its theoretical value and practical utility. This may include the addition of other variables proposed by theory, such as perceived behavioral control and actual behavior. The findings presented here should help managers and program staff with improving current and planning future interventions aimed at reducing conflicts and conserving Amboseli's elephants. The extension of this model to other settings of HEC will provide further evaluation of its reliability and validity.

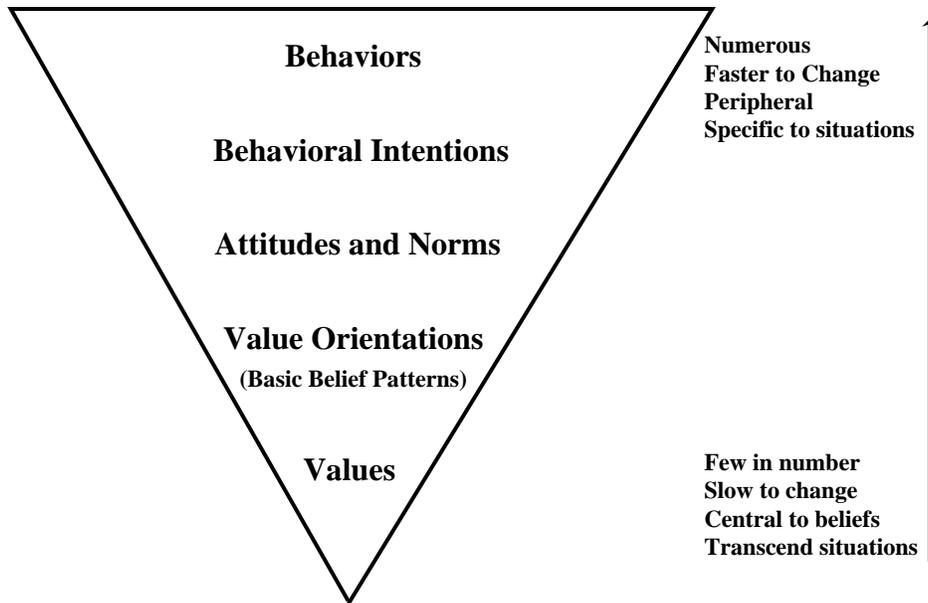


Figure 5-1. The cognitive hierarchy model of human behavior (adapted from Fulton et al. 1996, Vaske and Donnelly 1999).

Table 5-1. Kellert's typology of attitudes toward animals

Attitude	Description
Naturalistic	Primary interest and affection for wildlife and the outdoors
Ecologicistic	Primary concern for the environment as a system
Humanistic	Primary interest and strong affection for individual animals, principally pets
Moralistic	Primary concern for the right and wrong treatment of animals
Scientistic	Primary interest in physical attributes and biological functioning of animals
Aesthetic	Primary interest in the artistic and symbolic characteristics of animals
Utilitarian	Primary concern for practical and material value of animals or its habitat
Dominionistic	Primary interest in mastery and control of animals
Negativistic	Primary orientation an active avoidance of animals due to dislike or fear
Neutralistic	Primary orientation a passive avoidance of animals due to indifference

Source: Kellert (1980)

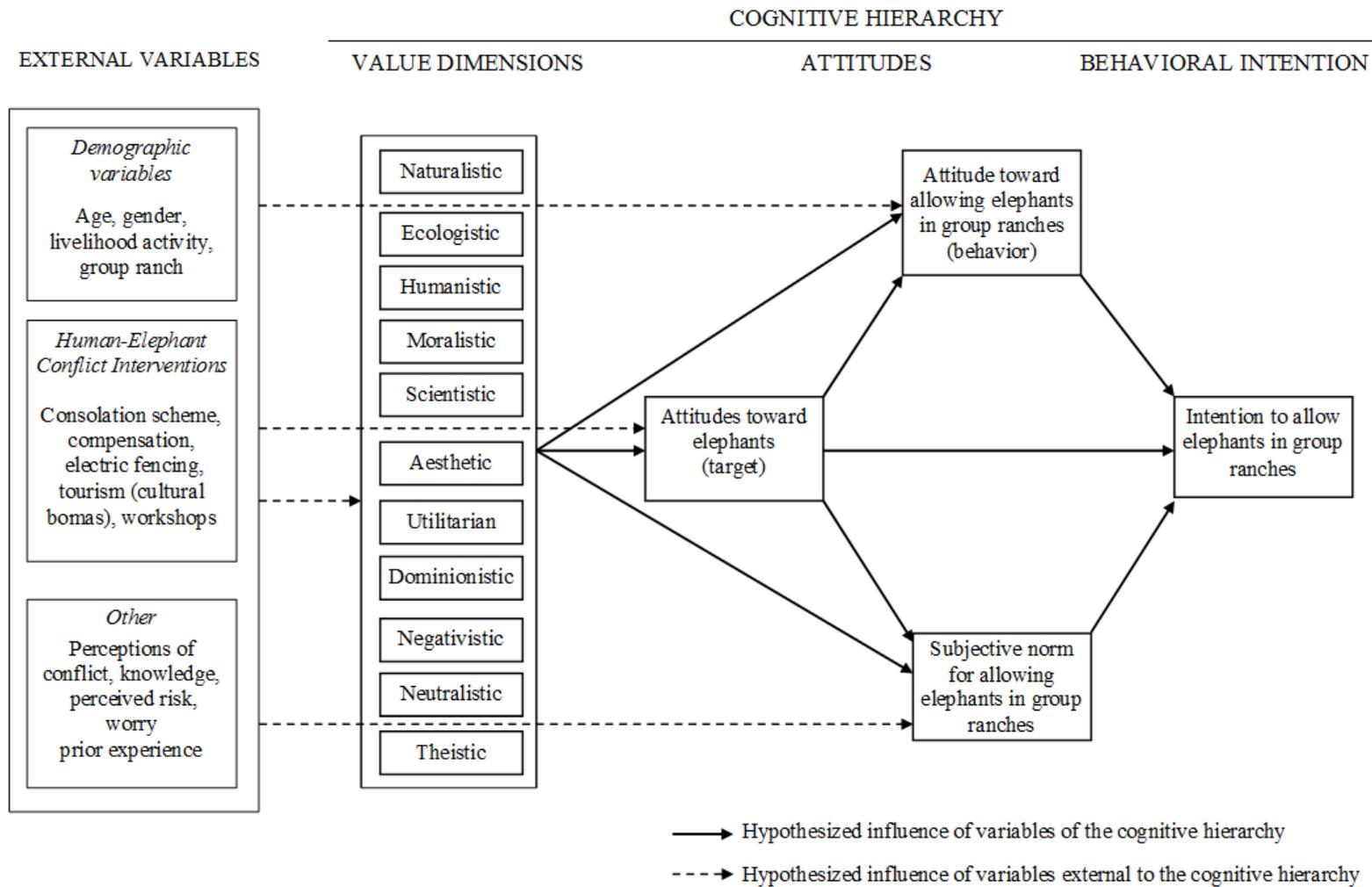


Figure 5-2. Hypothesized model of predictors of willingness to allow elephants in group ranches.

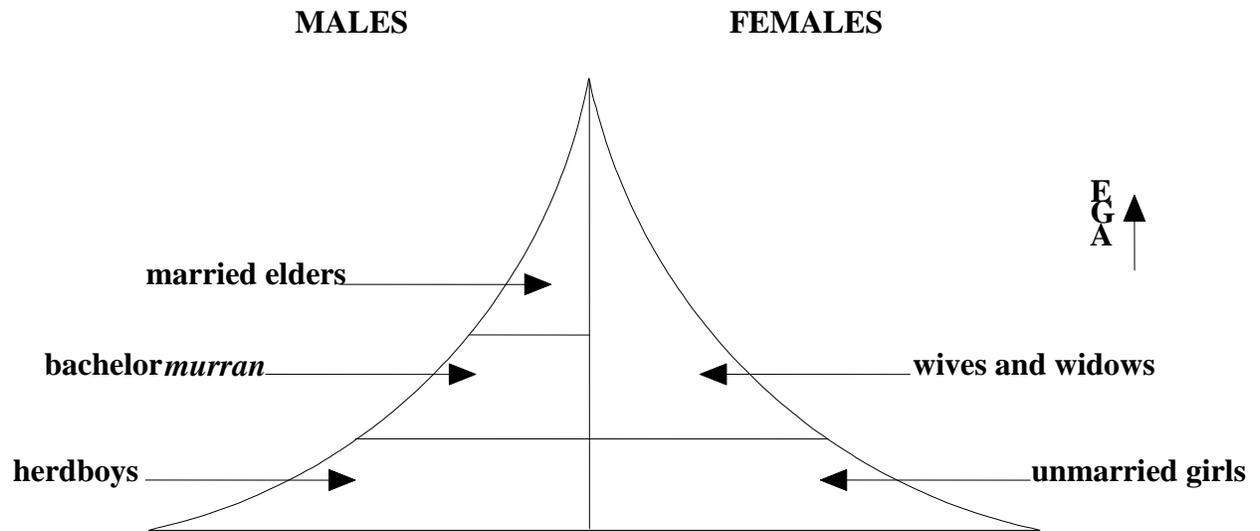


Figure 5-3. The Gerontocratic Model: Distribution of Status by Age and Gender (adapted from Spencer 1993).

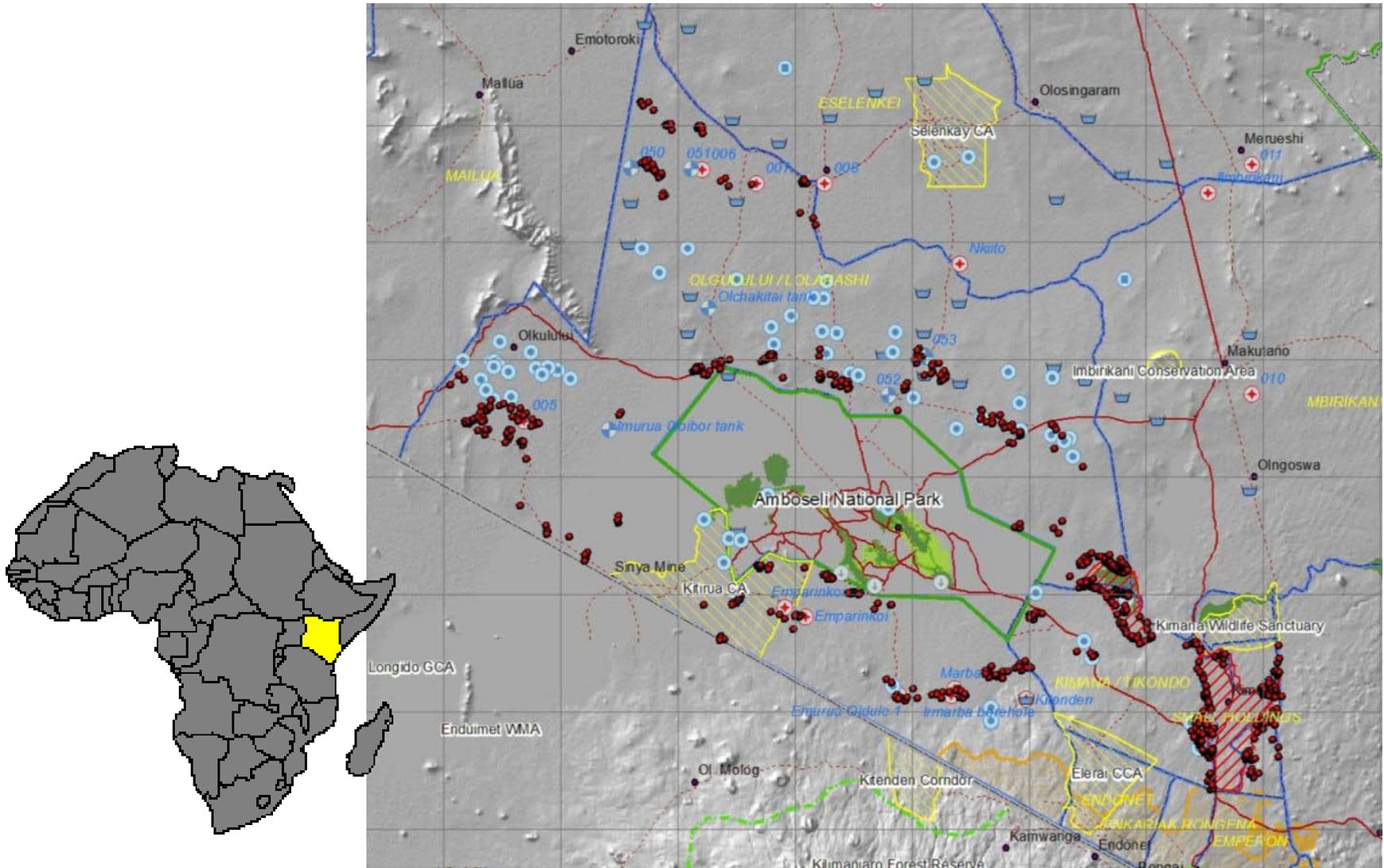


Figure 5-4. Map of study area – Amboseli National Park and surrounding group ranches, with Maasai *enkangs* in darkened circles.

Table 5-2. Demographic characteristics by voting intention groups

Demographic characteristic	n % ^a	Voting Intention		χ^2	<i>p</i>
		Allow n % ^b	Not allow n % ^b		
Ethnicity					
Maasai	555 (98)	296 (53)	258 (47)	3.50	0.18
Kamba	10 (2)	5 (50)	5 (50)		
Kikuyu	3 (1)	0 (0)	3 (100)		
Group Ranch					
Olgulului	370 (65)	188 (51)	180 (49)	1.68	0.20
Kimana	199 (35)	113 (57)	86 (43)		
Gender					
Male	279 (49)	199 (72)	79 (28)	74.92	0.001
Female	290 (51)	102 (35)	187 (65)		
Age					
Mean ^c = 30.73					
Young <30	293 (52)	161 (55)	131 (45)	1.10	0.29
Older >30	275 (48)	139 (51)	135 (49)		
Attended school					
No	430 (76)	218 (51)	212 (49)	4.08	0.04
Yes	137 (24)	83 (61)	54 (39)		
Level completed					
Primary	104 (77)				
Secondary	22 (16)				
A level	4 (3)				
Technical college	4 (3)				
Other	2 (1)				
Livelihood (primary)					
Pastoralism	399 (70)	210 (53)	189 (47)	4.04	0.13
Cultivation	139 (24)	70 (50)	69 (50)		
Other	25 (5)	18 (72)	7 (28)		

^a Column percentages.^b Row percentages.^c Based on 193 responses.

Table 5-3a. Age-set representation in the study sample

	Age-set	Approx. age range	Number in sample
Retired ^a	Iterito	80+	0
	Inyangusi	65-80	5
	Iseuri	50-65	16
Active ^{b,c}	Ilkishimu	35-50	59
	Ilkishuri/Ilkidotu	20-35	102
	Ilkiponi	<20	97

^a Members of the council of elders come from these age-sets.

^b The Ilkishimu and Ilkishuri/Ilkidotu age-sets control resources.

^c The Ilkiponi age-set is comprised of *ilmurran*

Table 5-3b. Person type

Person type	n
Elder	97
Young man	182
Old woman	34
Middle woman	145
Young woman	111

Table 5-3c. Young and older age groups for analysis

Age Groups ^a	Total	Gender	
		n	Age-set n
Young (ages 18-30)	293		
Women		111	
Men		182	
Ilkiponi			97
Ilkishuri/Ilkidotu ^b			85
Older (ages 30-67)	276		
Women		179	
Men		97	
Ilkishuri/Ilkidotu ^b			17
Ilkishimu			59
Iseuri			16
Inyangusi			5

^a Age 30 is the approximate cut-off. This estimation is based on the limited number of women who provided their ages and the age range of the Ilkishuri/Ilkidotu age-set

^b This group was divided based on the subjective measure “person type.”

Table 5-4. Factor analysis of basic beliefs about wildlife

Variable	Factor loadings		
	Factor 1 Indifference	Factor 2 Negativistic	Factor 3 Skills/bravery
Standardized item alpha reliability	0.82	0.62	0.73
Going outdoors just to see wild animals is a waste of time. <i>Naturalistic</i>	0.753		
I would rather be in a place without wildlife than one with wildlife. <i>Negativistic</i>	0.727		
Watching wild animals during my free time strikes me as a waste of time. <i>Naturalistic</i>	0.694		
When I am walking in the bush, I enjoy seeing wildlife around. <i>Naturalistic</i> ^a	0.624		
It is not important to me whether elephants are many or few in number. <i>Neutralistic</i>	0.503		
I do not care if we have many or few rhinoceros in Kenya. <i>Neutralistic</i>	0.487		
Having fewer wild animals around in the future is nothing to worry about. <i>Neutralistic</i>	0.484		
I do not agree with the person who says he dislikes the hyena. <i>Negativistic</i> ^a	0.446		
I think poisonous snakes are wicked by nature. <i>Negativistic</i>		0.635	
I dislike places where wild animals like hyenas are abundant. <i>Negativistic</i>		0.611	
Termites serve no useful purpose in the environment. <i>Ecologicistic</i>		0.486	
I admire the hunter who is able to kill a lion. <i>Dominionistic</i>			0.683
A man who can kill a lion with a spear or arrow deserves praise. <i>Dominionistic</i>			0.641
I would like to watch hunters as they hunt large animals like the buffalo. <i>Dominionistic</i>			0.505

^a Reverse coded items.

Table 5-5. Wildlife values orientations, attitudes, and norms by voting intention groups

Variable	Overall mean	Allow		Not Allow		<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i> ^a
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Wildlife value orientations ^{b,c}									
Indifference	4.28	3.41	1.42	5.27	1.39	15.72	565	0.001	1.32
Negativistic	6.13	5.77	1.55	6.55	1.07	7.05 ^b	534	0.001	0.59
Skills/bravery	4.09	3.36	2.07	4.92	1.88	9.37 ^b	564	0.001	0.79
Attitudes									
Toward elephants ^c									
Negative dimension	4.39	3.34	1.33	5.56	1.06	22.07 ^b	560	0.001	1.85
Positive dimension	4.41	4.94	1.30	3.82	1.46	-9.67 ^b	535	0.001	0.81
Toward allowing elephants in group ranch ^d	0.38	1.74	3.07	-1.18	2.71	-12.05 ^b	564	0.001	1.01
Norm for allowing elephants in group ranch ^e									
Belief ^f	1.11	2.00	1.72	0.11	2.13	-11.48 ^b	505	0.001	0.98
Motivation to comply ^g	3.62	3.67	0.62	3.55	0.66	-2.12	536	0.04	0.19

^a Effect sizes *d* computed indirectly from the t-test.

^b Levene's test for equality of variances indicated that the variances of the two groups were significantly different. The reported values are the result of t-tests with equal variances not assumed.

^c Range = 1 to 7.

^d Range = -9 to +9.

^e Range = -12 to +12.

^f Range = -3 to +3.

^g Range = 1 to 4.

Table 5-6. Factor analysis of basic beliefs regarding elephants

	Factor loadings	
	Factor 1 Negative	Factor 2 Positive
Standardized item alpha reliability	0.85	0.66
People in my group ranch would be better off if there were no elephants.	0.712	
Moving elephants somewhere else is the best way to stop problems caused by elephants.	0.704	
This would be a better place without elephants.	0.673	
Killing elephants is a good way to stop problems caused by elephants.	0.622	
It is not possible for people and elephants to stay together.	0.584	
The only reason elephants come out of the park is to disturb people.	0.556	
Elephants and livestock owners can live together. (reverse coded)	0.554	
Elephants have an important role in the environment. (reverse coded)	0.472	
Elephants are always angry toward people.	0.400	
Elephants are gentle unless they are provoked.		0.565
Elephants chase people because they have been treated badly by people.		0.537
No elephant around Amboseli should be killed.		0.513
If people did not grow crops, there would not be problems with elephants.		0.493
Elephants have a right to exist around Amboseli just as people do.		0.401

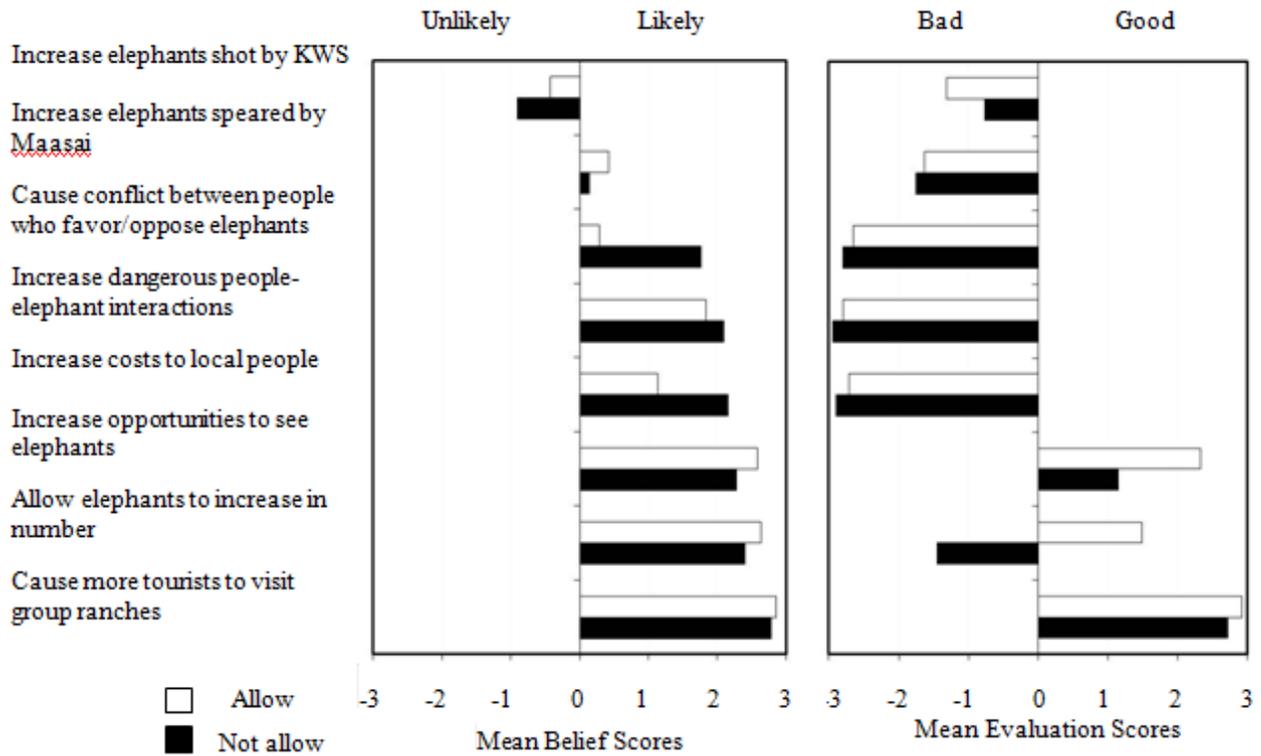


Figure 5-5. Mean belief expectancy and evaluation scores for voting groups regarding potential outcomes of allowing elephants in group ranches.

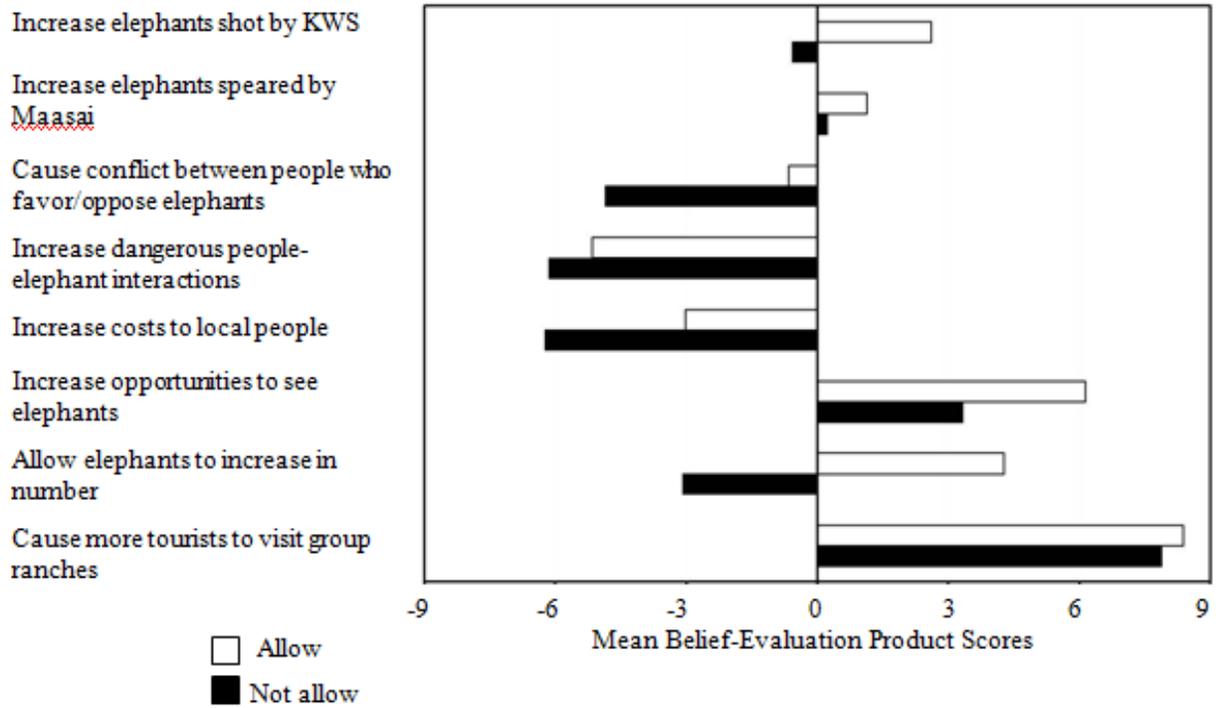


Figure 5-6. Mean belief-evaluation products for voting groups regarding potential outcomes of allowing elephants in the group ranches.

Table 5-7. Comparisons of mean expectancy, evaluation, and belief-evaluation product scores between respondents for and against allowing elephants in Group Ranches

Outcome Item	Belief Scores			Evaluation Scores			BE Product Scores		
	<i>t</i>	<i>p</i>	<i>d</i>	<i>t</i>	<i>p</i>	<i>d</i>	<i>t</i>	<i>p</i>	<i>d</i>
Allowing elephants would increase/cause...									
number of elephants shot by KWS	-2.31	0.02	-0.20	2.61	0.009	0.22	-5.70	0.001	-0.48
number of elephants speared by Maasai	-1.43	0.16	-0.12	-0.65 ^a	0.52	-0.06	-1.64	0.10	-0.14
conflict between people who favor/oppose elephants	7.67 ^a	0.001	0.64	-2.26 ^a	0.02	-0.19	-7.52 ^a	0.001	-0.63
potentially dangerous people-elephant interactions	1.75	0.08	0.15	-3.37 ^a	0.001	-0.26	-2.23	0.03	-0.19
increase costs to local people	6.15 ^a	0.001	0.52	-3.01 ^a	0.003	-0.24	-6.51 ^a	0.001	-0.55
opportunities to see elephants	-3.43 ^a	0.001	-0.29	-8.30 ^a	0.001	-0.71	-7.10 ^a	0.001	-0.61
elephants to increase in number	-2.44 ^a	0.02	-0.21	-16.77 ^a	0.001	-1.42	-14.16 ^a	0.001	-1.20
more tourists to visit group ranch	-1.41 ^a	0.16	-0.12	-2.90 ^a	0.004	-0.26	-2.07 ^a	0.04	-0.18

^a Levene's test for equality of variances indicated that the variances of the two groups were significantly different. The reported values are the result of t-tests with equal variances not assumed.

Table 5-8. Prior experience with elephants and voting intention groups

Experience variable	n	% ^a	Voting intention		χ^2	<i>p</i>	ϕ
			Allow	Not allow			
			n % ^b	n % ^b			
Like to see elephant (n = 568)							
Yes	284	(50)	232	(82)	188.53	0.001	0.58
No	284	(50)	69	(24)			214 (75)
Problems with elephants							
Card sort (n = 531)							
Yes	250	(47)	115	(46)	10.10	0.001	0.14
No	281	(53)	168	(60)			113 (40)
Direct questions (n = 566)							
Yes	368	(65)	199	(54)	0.34	0.56	0.02
No	198	(35)	102	(52)			96 (48)

^a Column percentages.

^b Row percentages.

Table 5-9. Locations where respondents see and like to see elephants

Location of experience	n	% ^b	Like to see in location ^a			
			No		Yes	
			n	% ^c	n	% ^c
Near home						
No	283	(50)				
Yes	285	(50)	243	(85)	42	(15)
Near shamba						
No	539	(95)				
Yes	29	(5)	28	(97)	1	(3)
At waterhole						
No	447	(79)				
Yes	119	(21)	66	(55)	53	(45)
In the bush						
No	53	(9)				
Yes	515	(91)	195	(38)	320	(62)

^a Based on “yes” responses to location question.

^b Column percentages.

^c Row percentages.

Table 5-10. Correct responses to ten knowledge statements regarding elephants

Knowledge statements	% correct ^a
Male elephants live alone most of the time.	64
Elephants can live to be more than 65 years old.	72
Male elephants lead the elephant family group.	28
Elephants only eat grass.	75
Elephants open up the bush for other animals.	92
Sometimes elephants must get water outside the park to survive.	86
Elephants have long memories.	48
The Amboseli elephants need water inside and outside the park.	94
Elephants have to spend most of their time eating to survive.	96
Adult elephants need about 100 liters of water each day.	82

^a Based on n = 568.

Table 5-11. HEC risk beliefs by voting intention groups

Belief ^a	n	% ^b	Voting intention		χ^2	<i>p</i>	ϕ^d
			Allow	Not allow			
	n	% ^c	n	% ^c			
Problems in last 5 years have							
increased	287 (51)		137 (46)	150 (56)	14.64	0.002	0.16
stayed the same	146 (26)		79 (26)	67 (25)			
decreased	128 (23)		84 (28)	44 (17)			
don't know	6 (<1)		1 (<1)	5 (2)			
Personal safety at							
great risk	256 (45)		113 (38)	143 (56)	16.76	0.001	0.17
little risk	158 (28)		100 (33)	58 (22)			
no risk	150 (26)		87 (29)	63 (24)			
don't know	3 (<1)		1 (<1)	2 (<1)			
Livelihood at							
great risk	279 (49)		123 (41)	156 (59)	18.56	0.001	0.18
little risk	155 (27)		97 (32)	58 (22)			
no risk	132 (23)		80 (27)	52 (19)			
don't know	1 (<1)		1 (<1)				
Worry							
a great deal	286 (50)		122 (40)	164 (62)	26.13	0.001	0.22
a little	145 (26)		90 (30)	55 (21)			
not at all	135 (24)		89 (30)	46 (17)			
Controllability of elephant problems							
very	218 (38)		124 (41)	94 (35)	3.29	0.35	0.08
somewhat	105 (19)		58 (19)	47 (18)			
not at all	219 (39)		107 (36)	112 (42)			
don't know	25 (4)		12 (4)	13 (5)			
Personally able to control							
yes	22 (4)		12 (4)	10 (4)	0.02	0.88	0.01
no	542 (96)		287 (96)	255 (96)			

^a *N* = 567 for each risk belief variable except “worry” and “personally able to control,” where *N* = 566 and 564, respectively.

^b Column percentages.

^c Row percentages.

^d The values for Phi and Cramer's *V* were equal.

Table 5-12. Knowledge and beliefs regarding HEC mitigation by voting intention groups

Variable	n % ^a		Voting intention		χ^2	<i>p</i>	ϕ
			Allow	Not allow			
	n	% ^b	n	% ^b			
Elephants bring costs							
Yes	532	(94)	279	(52)	9.46	0.01	0.13
No	26	(4)	20	(77)			
Don't know	9	(2)	2	(22)			
Elephants bring benefits							
Yes	351	(62)	267	(76)	195.50	<0.001	0.59
No	189	(33)	29	(15)			
Don't know	27	(5)	5	(18)			
Household receives tourism benefits							
Yes	208	(39)	144	(69)	26.24	<0.001	0.22
No	322	(61)	150	(47)			
Organizations helping people							
Yes	318	(56)	210	(66)	49.50	<0.001	0.30
No	248	(44)	90	(36)			
Electric fence(s)							
Yes	282	(50)	164	(58)	6.19	0.01	0.11
No/don't know ^c	283	(50)	135	(48)			
Cultural bomas							
Yes	510	(90)	278	(55)	4.13	0.04	0.04
No/don't know ^c	57	(10)	23	(40)			
Compensation increases tolerance							
Yes	344	(61)	231	(67)	73.63	<0.001	0.36
No	202	(36)	59	(29)			
Don't know	20	(3)	10	(50)			

^a Column percentages.

^b Row percentages.

^c "Don't know" responses were provided by two respondents on the electric fence question and by six respondents on the cultural bomas question.

Table 5-13. Frequencies for awareness organizations with HEC interventions

	Organization			
	GOK	KWS	AERP	AWF
Organizations that help people with HEC	27	143	152	7
Interventions				
Nothing		2	1	
Make a report		6	6	2
Chase/scare elephant(s)	6	47	19	1
Shoot elephant	1	14	7	
Erect fence		5		
Take injured to hospital	2	13	11	1
Pay compensation (for people)	8	26	19	1
Pay consolation (for livestock)	8	25	88	1
Have meetings/workshops		2		1
Other		1		
Don't know	2	2	1	

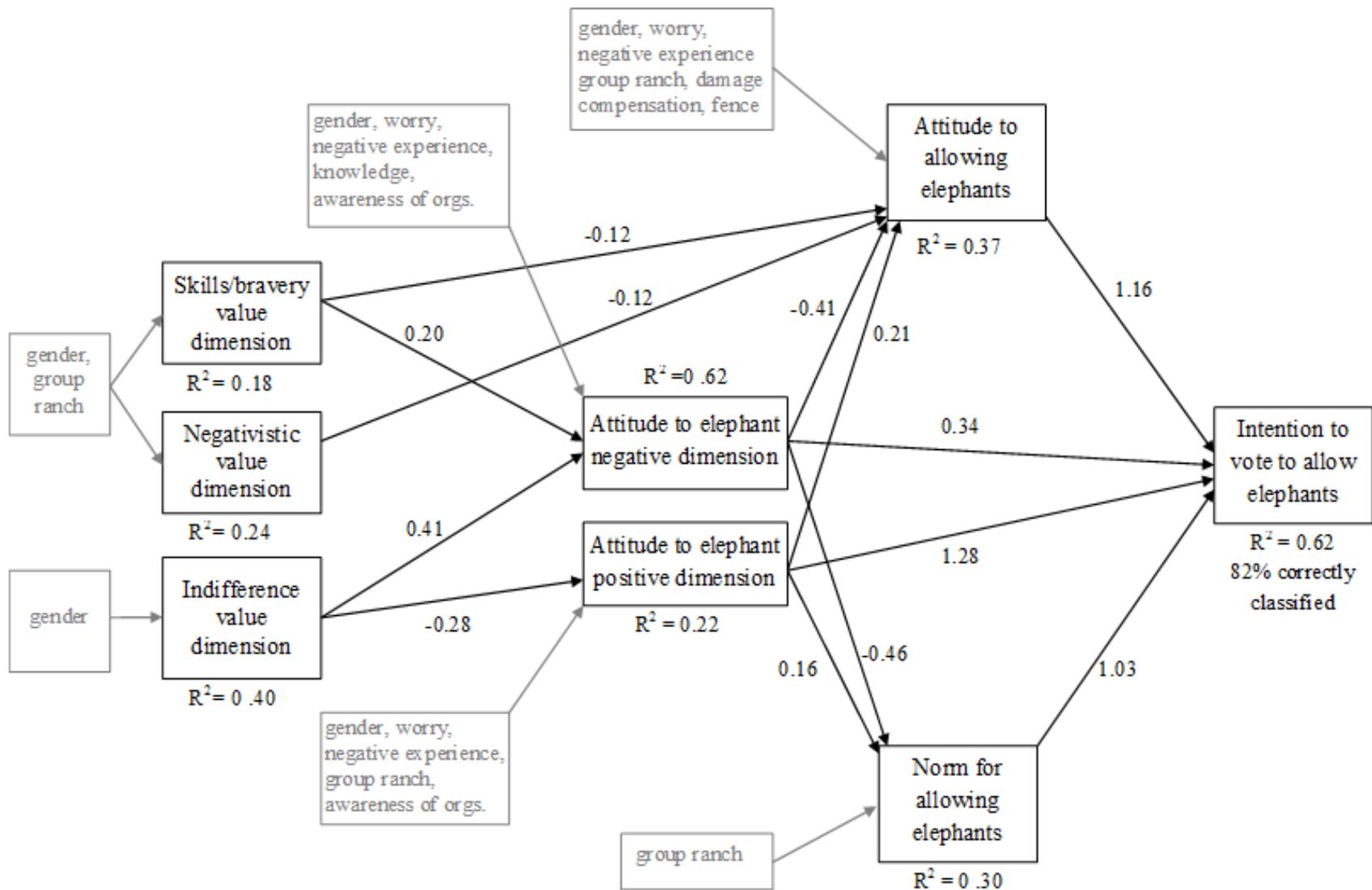


Figure 5-7. Relationships between wildlife value orientations, attitudes, norms, and behavioral intentions, with external variables shown in gray.

Table 5-14. Multiple regression analysis results for attitude and norm variables

Independent variable	B	SE B	β^a	Adj. R^2	F	df	p
Attitude toward elephants – negative dimension				0.62	130.85	7, 555	<0.001
Indifference wildlife value orientation	0.40	0.04	0.41***				
Gender	0.78	0.12	0.24***				
Skills/bravery value orientation	0.15	0.02	0.20***				
Prior negative experience	0.32	0.10	0.09***				
Awareness of organizations with HEC interventions	-0.21	0.10	-0.06*				
Knowledge of elephants	-0.08	0.03	-0.08**				
Worry about elephants (reversed)	0.17	0.05	0.08**				
Attitude toward elephants – positive dimension				0.22	26.74	6, 558	<0.001
Group ranch	1.00	0.12	0.32***				
Worry about elephants (reversed)	-0.40	0.07	-0.22***				
Gender	0.31	0.15	0.10*				
Awareness of organizations with HEC interventions	0.27	0.12	0.09*				
Prior negative experience	-0.31	0.13	-0.10*				
Indifference wildlife value orientation	-0.25	0.04	-0.28***				

^a * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5-14. Continued

Independent variable	B	SE B	β^a	Adj. R^2	F	df	p
Attitude toward allowing elephants in group ranches				0.37	32.97	10, 551	<0.001
Gender	1.66	0.31	0.26***				
Attitude toward elephants – positive dimension	0.46	0.09	0.21***				
Group ranch	0.67	0.26	0.10***				
Belief elephant damage compensation increases tolerance	0.01	0.01	0.08*				
Awareness of electric fences	-0.05	0.02	-0.09**				
Prior negative experience	-0.61	0.26	-0.10*				
Skills/bravery wildlife value orientation	-0.18	0.06	-0.11**				
Worry about elephants (reversed)	-0.47	0.15	-0.12***				
Negativistic wildlife value orientation	-0.27	0.09	-0.12**				
Attitude toward elephants – negative dimension	-0.83	0.10	-0.41***				
Norm for allowing elephants in group ranches				0.30	81.28	3, 555	<0.001
Attitude toward elephants – positive dimension	0.84	0.21	0.16***				
Group ranch	2.32	0.63	0.14***				
Attitude toward elephants – negative dimension	-2.25	0.19	-0.46***				

^a * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5-15. Logistic regression predicting voting intention

Variable	B	SE	Wald's χ^2	<i>df</i>	<i>p</i>	Odds ratio
Model 1 ^a						
Attitude toward allowing elephants	0.29	.04	53.71	1	<0.001	1.33
Norm for allowing elephants	0.10	.01	49.79	1	<0.001	1.10
Model 2 ^b						
Attitude toward elephants- positive dimension	0.24	0.09	7.13	1	0.01	1.28
Attitude toward elephants-negative dimension	-1.08	0.11	104.49	1	0.001	0.34
Attitude toward allowing elephants	0.15	0.05	10.40	1	0.001	1.16
Norm for allowing elephants	0.03	0.02	3.74	1	0.05	1.03

^a Nagelkerke $R^2 = 0.37$

^b Nagelkerke $R^2 = 0.62$

Table 5-16. Current and future primary livelihood activity

Livelihood activity	Current ^a		Future		χ^2	<i>p</i>	<i>V</i>
	n	%	n	%			
Pastoralism	391	(70)	322	(57)	301.14	<0.001	0.52
Cultivation	138	(24)	197	(35)			
Other	25	(5)	35	(8)			

^a The total does not equal 100% due to rounding.

CHAPTER 6 CONCLUSIONS

This study examined Maasai tolerance of elephants in group ranches adjacent to Amboseli National Park, Kenya. The overall goal was to provide stakeholders with critical human dimensions information for conserving elephants and reducing human-elephant conflict. A cultural and historical context for this study was provided to allow a broader perspective for considering tolerance in a changing landscape. A questionnaire survey was conducted among the predominantly pastoral and agropastoral Maasai population in the two group ranches bordering the park to identify predictors of intention to allow elephants in the group ranches. The results of the survey provide a snapshot view of the current level of tolerance and a baseline on which to compare future assessments. They also provide a means for evaluating the impact of interventions on attitudes and behaviors.

A secondary goal of this study was to test the transferability of theory and methods often used in North American human dimensions research to a rural African setting. A review of wildlife conservation attitude research in Africa provided an assessment of methods used in this area of study on which to build the present study. The cognitive hierarchy provided a theoretical framework in which to add other variables suggested by previous research. The results of the survey have implications for conservation practice and for research theory and methods. While results, conclusions, and recommendations are presented throughout the dissertation, the following summarizes the overall results and implications of the study.

General Results and Implications for Elephant Conservation

Predicting Tolerance of Elephants

A slight majority (53%) of respondents indicated that they would vote to allow elephants in the group ranch, leaving a substantial minority against allowing elephants outside of the park.

My theoretical model, based on the cognitive hierarchy, provided a valid framework for understanding tolerance of elephants, as indicated by the predictive ability of the model. Intention to allow elephants in the group ranches was predicted by the variables of the cognitive hierarchy and the related Theory of Reasoned Action. That is, attitudes toward elephants, attitudes toward tolerating elephants, and the norm for allowing elephants explained a substantial portion of the variance in voting intention. Wildlife value orientations, along with external variables, predicted attitudes.

This study provides empirical evidence of indifference toward wildlife among the Maasai. It identified an indifference wildlife value orientation, which represents a spectrum from not at all indifferent to very indifferent (and perhaps even appreciative). The indifference orientation was the strongest predictor of attitudes toward elephants, which in turn predicted attitudes, norms, and behavioral intention to tolerate elephants. While gender explained a significant amount of variance in this value orientation, the basis for indifference is not clear. While the specialized pastoralism of the Maasai is often offered as an explanation for indifference toward, and coexistence with, wildlife, livelihood strategy was not a predictor of indifference in my analysis. This may be attributable to a lack of congruency in the way I measured livelihood and the way in which the Maasai view themselves. That is, if most Maasai continue to view themselves as traditional pastoralists or have the intention of returning to pastoralism, even when their livelihood is derived primarily through other means, a measure of primary livelihood would fail to explain variance. Perhaps a measure based on culture would serve as a better predictor of value orientations. A comparative study with a larger subsample of non-Maasai would allow for the examination of the predictive ability of culture.

Two other wildlife value orientations were identified, *negativistic* and *skills/bravery*, and there were indications that additional orientations, such as *moralistic* and *theistic*, were present. There is further evidence in Maasai culture of other values such as *aesthetic* value. This was expressed on several occasions in the survey, such as when describing the attractiveness of the elephant and when agreeing with the Kellert-type statements regarding the beauty of gazelles (97% of respondents) and leopards (80% of respondents). *Utilitarian* value has been demonstrated in the past when wildlife was used as “second cattle” in times of disease and drought and today in viewing wildlife as a source of revenue. More research is needed to identify other orientations that were not captured in this study and to understand the basis for wildlife value orientations. This information may help wildlife managers and conservationists develop policy and interventions that are in line with and can preserve traditional wildlife value orientations.

Attitudes toward elephants proved to be important in predicting subsequent variables in my theoretical model, including willingness to tolerate elephants. Therefore, they have important implications for the future of elephants on private lands around Amboseli. A slight majority of respondents were negative toward elephants. Negative attitudes were based on certain beliefs, such as “people in my group ranch would be better off if there were no elephants,” and were related to external variables such as gender, worry, knowledge, and awareness of organizations with HEC interventions. This information suggests targets and content for interventions, which can be incorporated into current interventions and used to develop new interventions. For example, AERP had been operating its consolation scheme for livestock losses for seven years (at the time of the survey), yet only 15% of respondents had accurate knowledge of this program. Given that awareness of organizations with HEC interventions was related to more positive

attitudes and that livestock loss was one of the primary concerns of those against allowing elephants in the group ranches, it would be expected that increasing awareness and knowledge of this intervention would positively influence attitudes and behaviors toward elephants.

My findings regarding the level of support for elephants in the group ranches are similar to those of Kangwana (1993). In 1991, 53% of Kangwana's respondents stated that elephants should not be removed from the area, the same percentage of respondents in favor of allowing elephants in the group ranches in the 2005 survey. The most commonly voiced reason for being positive toward elephants in both studies was the perception of benefits (largely to others) associated with elephants, but only 36% of respondents in the 2005 survey stating that their household received such benefits. If the tourism value of elephants is going to continue to be a selling point for tolerating elephants, there needs to be an increase in actual and perceived benefits. This has proven to be a challenging endeavor for community-based conservation in general (Parry and Campbell 1992, Songorwa 1999, Wells et al. 1992), but research supports the notion that increasing benefits can increase support for conservation (Archabald and Naughton-Treves 2001; Gillingham and Lee 1999; Holmes 2003; Kideghesho et al. 2007). While most protected areas do not generate enough surplus income to reduce local poverty (Barrett and Arcese 1995; Infield 2001), increased and equitable revenue sharing should be directed, at a minimum, at offsetting costs incurred from tolerating wildlife on private land and forgoing access to resources in protected areas. However, given the limitations of benefits-based approaches, it would be unwise to limit the value of elephants, and other wildlife, to purely economic value. In addition to evidence of general wildlife values, results suggest certain values specific to elephants. As discussed in Chapter 4, there is some degree of appreciation (e.g., beauty, role in ecosystem modification, etc.) and theistic value. For example, an old woman in

Kimana group ranch stated, “God created elephants and they belong to this earth just like us.” An education program based on traditional knowledge, beliefs, and values as well as on science could increase knowledge of and cultivate positive attitudes toward elephants, and could also work to preserve the culture that has been credited with conserving the diverse wildlife of the Greater Amboseli Ecosystem.

Mitigating Human-Elephant Conflict

While benefits were cited as the principal reason for tolerating elephants, the costs associated with elephants were the primary reason given for being against elephants in the group ranches. Respondents’ were concerned about the dangers posed to both humans and livestock. Negative attitudes toward elephants and allowing elephants in the group ranches were related to prior negative experience with elephants and worry about problems with elephants. These results demonstrate that more effort is needed to reduce actual and perceived levels of HEC. Current interventions are either insufficient or are not well-known or understood by the community. The electric fences are not fully operational (and they have deflected problem elephants to other locations), compensation for human injury and death is meager, the consolation program for livestock losses is not well-known or understood, and projects related to tourism benefits have a history of failures, which include corruption, inequitable distribution of benefits, and short-term implementation. Additionally, interventions have generally been developed and implemented through a “top-down” approach, with little ownership and responsibility held by local people. This may perhaps explain the belief among almost all of the survey respondents (95%) that they were not personally able to control problems with elephants (this is also probably related to the nature of conflict with such a large animal), even though more than half of respondents felt that elephant problems were at least somewhat controllable.

If tolerance is to be maintained and improved, problems with interventions need to be addressed. Barriers (electric fencing) and deterrents in cultivated areas need to be better managed and adapted as elephants learn new ways of bypassing them. This can help reduce human mortalities that occur in guarding crops during a raid, in addition to reducing crop losses. At the time of this study, other strategies, which included community involvement, were being tested in cultivated areas in nearby Loitokitok (Kiiru, in progress). These may prove to be promising methods to be used alongside the electric fences at Kimana and Namelok.

While it is not clear where most conflicts occur, a fairly accurate assessment can be obtained from the KWS occurrence books and AERP records. This information can be used to develop additional measures for reducing conflict. For instance, if most livestock losses occur at waterholes, then alternate, wildlife-only waterholes may be feasible. This management action was found to be “highly acceptable” among 78% of survey respondents, with another 10% stating that it was “slightly” to “moderately” acceptable. Education and communications related to HEC can provide local residents with knowledge of ways to avoid encounters with elephants and increase awareness of HEC mitigation interventions. Such a program is currently being implemented in schools around the Maasai Mara to the west of Amboseli. If local people have accurate information on the incidence of HEC (i.e., it is a rare occurrence), feel empowered by knowledge and tools for reducing and coping with HEC, and obtain primary responsibility for mitigating problems, not only would the level of HEC be expected to decrease, but so too might the level of anxiety.

In Amboseli and elsewhere, if HEC or the perception of HEC continues to increase, it is highly likely that attitudes toward elephants will become increasingly negative and result in reduced tolerance of elephants outside of protected areas. HEC will escalate if land conversion

(i.e., communal to private, pastoral to cultivation) continues unchecked. Land-use is a critical issue for elephant conservation in Amboseli and across the elephant's range. As human and elephant populations increase, land-use policy that limits land-use practices in critical elephant habitat, including corridors, is key to mitigating HEC and ensuring the long-term survival of elephants. The survey results reported in Chapter 5, along with historical and cultural evidence presented in earlier chapters, supports the notion that Maasai indifference, facilitated by specialized pastoralism, has allowed the coexistence of pastoral Maasai and wildlife. If land continues to be converted for private use, including cultivation, Maasai specialized pastoralism will become increasingly unfeasible, HEC will continue to increase, and elephants will have reduced access to private land. As stated in Chapter 4, it is impossible to return to the days when the Maasai, their livestock, and wildlife coexisted, unrestricted by boundaries created by outside policy, but it may be feasible to nurture what remains in terms of traditional values and beliefs and to encourage land-use that will minimize further loss of land available for wildlife and livestock. This includes encouraging the continuation of transhumant pastoralism, where possible, and supporting the development of wildlife-based enterprise.

The implications of these findings are likely generalizable to other settings of human-elephant conflict and demonstrate that, with potentially dangerous and costly animals such as elephants, reducing risk and implementing effective conflict mitigation interventions will influence attitudes and, potentially, behaviors toward wildlife. While these results may be generalizable for broad-scale planning, each setting of HEC needs to be examined at the local level because of great variation in circumstances across the elephant's range.

Theory and Methods in Attitude Research in Africa

Human dimensions research aimed at understanding attitudes and predicting behaviors provides important and complex information for wildlife managers and conservation program

staff. Data from attitude surveys can guide management decisions and serve as a baseline to test the effects of policy and interventions. Key to the successful application of survey data is ensuring the rigor of the methodology. Attitudes and behaviors vary between individuals and between situations, with a multitude of other variables influencing the beliefs upon which attitudes and behaviors are based. Theory guides the selection of concepts to be examined. This study tested a model for understanding attitudes and behaviors in situations involving human-wildlife conflict in a rural African setting by transferring theory and methods often employed in North American human dimensions research.

Chapter 3 provided a review of conservation attitude research in Africa and highlighted the many challenges of conducting surveys in rural African settings. These include, but are not limited to, lack of census information, widely distributed study populations, transportation limitations, and lack of experience in surveys among study populations. The chapter also included several recommendations for future research, with the main point being that this growing body of research should be guided by the central tenets of scientific inquiry, which include considerations of validity, reliability, representativeness, and generalizability. Other important issues discussed included use of theory and issues of survey quality.

The results presented in Chapter 5 demonstrated that my theoretical model based on the cognitive hierarchy provided a valid framework for understanding tolerance of elephants on private land. The proximal variables, attitudes and norms, predicted voting intention, while more distal variables, such as value orientations and external variables, helped explain it. The model provides a good starting point for understanding behavior toward wildlife in the context of human-wildlife conflict. As discussed in Chapter 5, further development and testing of measurement items is needed. Additionally, other variables proposed by theory and previous

research may improve its theoretical value. Extension of the model to other settings will provide further assessment of the model's utility and the reliability, validity, and generalizability of the study results.

Overall, this study demonstrated that the challenges of survey research in rural Africa can be overcome and rigorous methods can be employed. However, it should be noted that adequate funding and time were key to surmounting some issues. First, I was able to produce a sampling frame for selecting a representative, random sample by mapping each home in the study area and collecting census information. This required hiring two experienced local Maasai who were familiar with the entire study area and equipping them with GPS units and bicycles (and more than a few spare tire tubes). Second, I was fortunate to be able to rent a 4-wheel drive vehicle to transport my team around the study area (and to serve as a local taxi). Without a vehicle, it would have been impossible to cover the entire area, which would have resulted in significant coverage error. Third, I was able to offer a one-week enumerator training course for local Maasai, which included room and board, as necessitated by logistical circumstances. This training, along with other measures, should have limited interviewer bias. Finally, adequate funding allowed me to hire four enumerators and my assistant, allowing me to collect an adequate sample size, thereby reducing sampling error.

Feedback from Respondents

Most respondents (81%) had a positive evaluation of the research, with 14% expressing a neutral evaluation and 1% a negative evaluation. Even though each respondent was informed that this was a University of Florida student research project at the beginning of each interview (as required by the IRB), responses to the question "who do you think sent us for this interview?" were mixed and included the white person/researcher (n = 232), the government (n = 66), God (n

= 21), KWS (n = 19), among others. A large number of respondents (n = 178) stated they did not know who sent us. The fact that a total of 85 people thought we represented the government, even with all of our efforts to distinguish ourselves as an independent project, may indicate a high level of mistrust and could have had an impact on the data. This highlights the importance of being aware of the history of a region when conducting research. A considerable number of individuals (n = 103) stated that they had been interviewed by another researcher. A common complaint among these individuals was that nothing ever resulted from the research. They complained that they were promised a report, but never received one. This complaint was also voiced by the park warden. A preliminary report of the present research was provided to the park warden, AERP, and the group ranch committees in June 2008. At the completion of this dissertation, a final report is being provided to all stakeholders, with plans for presentations for community members in both group ranches.

APPENDIX A
PRELIMINARY RESEARCH REPORT OCTOBER 1, 2002

For my dissertation, I am planning to conduct an attitudinal survey of people living adjacent to Amboseli National Park toward elephant conservation, and possibly use a second site as a comparison. In preparation for this research, I traveled to my proposed research sites in Kenya to conduct preliminary research. My objectives were to identify stakeholders through stakeholder analyses, identify salient issues and critical locations of human-elephant conflict, and to test survey questions. In addition to these objectives, I planned to investigate logistical requirements for fieldwork in Kenya.

I spent six weeks in Kenya (April 29-June 11). During the first two weeks, I conducted interviews with key informants in Nairobi, including the head scientist of the Amboseli Elephant Research Project, the program director of the African Wildlife Foundation, and the director of the International Fund for Animal Welfare – Kenya. These interviews were part of the stakeholder analysis and led to the identification of other stakeholders. It was during this period that I was invited to attend a meeting of decision makers in elephant policy and management at the Kenya Wildlife Service Headquarters. They were meeting to discuss a crisis with crop-raiding elephants outside Amboseli National Park. Here, I met the Elephant Programme Coordinator for the Kenya Wildlife Service (KWS). This was a key contact as the coordinator is involved in all aspects of elephant management in Kenya and he is the individual from whom I would need to request affiliation – it is a requirement of the Kenya government that all foreign researchers have an affiliation with an approved Kenyan institution. I interviewed the coordinator a few days after the meeting. At this time, I explained my objectives and provided him a copy of my draft research proposal. He was keen to have the proposed research carried out, but his support came with a warning not to stir up any trouble, meaning, do not make people

who are not complaining about elephants start complaining. He provided me a letter granting me permission to enter the national parks and conduct interviews with local people.

The third week was spent in the Tsavo-Kasigau Corridor in southern Kenya – a potential research site for a comparative study. This area lies between Tsavo East and Tsavo West National Parks and is occupied by elephants moving between the parks and by people in several villages in the central and northern section of the corridor. I stayed at the Taita Discovery Center (TDC), which is located on a private ranch. The Center typically hosts university student groups from Europe and the U.S. who do volunteer work in the local villages and participate in the Center's wildlife research activities. A portion of the Center's income goes to the local villages in hopes of creating positive attitudes toward conservation, making the Center's owner a stakeholder in elephant conservation in this area.

While in Tsavo-Kasigau, I conducted stakeholder interviews with the owner of TDC, the chairman of Kasigau Ranch, and the district officer who serves the Office of the President. The interview with the owner of TDC represented business enterprise in the area, the chairman of the ranch represented the local people, and the district officer offered the position of the government. Each of the interviewees perceived the elephant as a problem and all were supportive of my research. I also did a mapping activity with residents of two communities to identify sites of human-elephant conflict and to promote discussion of the issue. Two assistants from the village were hired to help with communication. – one male and one female. Both had recently completed their final year of school before university. I did a brief interview with them and explained my project and told them that, if they were available, I would be interested in hiring them when I returned for my fieldwork. There was not time for extensive training, but I did explain the purpose of the mapping activity and demonstrated how it was to be conducted. There

were some problems. One tried to “lead” some of the mapping participants and the other was very shy and did not speak often. This, of course, made glaringly evident the need for thorough training when I return to conduct my survey. Another critical lesson learned was that, as an outsider, I would need to spend time at the research site gaining the trust of the local people before conducting a survey. At the commencement of the activity, I found the people to be guarded, but as it progressed, participants became more relaxed and more open in their responses. The mapping activity was not only useful in gathering information about elephant conflict, key resources, and settlement areas, but because the participants seemed to enjoy the activity, it aided the progression of discussions.

I returned to Nairobi for a week of meetings. I met again with the Elephant Programme Coordinator to discuss my proposal and he gave me some reports to review. He also agreed to grant me affiliation with KWS for my fieldwork given he approves the final draft of my research proposal. I did a stakeholder interview with the program coordinator for the East African Wildlife Society. Finally, I interviewed a Maasai graduate student, Leonard Onetu, from the University of Nairobi for the job of assisting me on my trip to Amboseli. He is from the Amboseli region and was recommended by one of the researchers with the Amboseli Elephant Research Project.

The next week was spent in Amboseli National Park. Leonard and I traveled around the settlement areas bordering the park. Leonard introduced me to community leaders and assisted with the mapping activity. Without his assistance, it would have been extremely difficult, if not impossible, to gain entrance into the Maasai community.

This trip was invaluable in preparing me for my fieldwork. I was able to establish working relationships with government officials, representatives of conservation NGOs, and

community leaders critical to the success of my project. I will be better able to plan for the logistical and methodological details such as sampling design, hiring research assistants, establishing a camp, transportation, powering a computer, and obtaining a research permit. The groundwork has been laid and I will be able to hit the ground running upon my return to Kenya. I gratefully acknowledge the financial support provided by three programs at the University of Florida: a Jennings Scholarship from the Department of Wildlife Ecology and Conservation, a TCD field research grant from Tropical Conservation and Development Program, and the Niddrie Award from the Center for African Studies.

APPENDIX B GPS DATA COLLECTION WORKSHEET

GPS Data Collection Worksheet

Name of recorder _____ Date _____

GPS coordinates X _____ Y _____ Elevation _____

Boma number (assigned by GPS receiver) KIM Accuracy _____

Place/boma name _____ Boma (circle): *temporary or permanent*

Household composition (only people living in this boma): # of households _____

Household #1

Name of household head _____ Age-set _____

Total number of adults in household _____ Age of wife _____

Age-set of other adults in household

Men	Women (young or old)

Description of house:	
Dung walls	
Dung roofs	
Wooden walls	
Grass walls	
Grass roof	
Mabati walls	
Mabati roof	
Cinder block walls	
Other:	

Household #2

Name of household head _____ Age-set _____

Total number of adults in household _____ Age of wife _____

Age-set of other adults in household

Men	Women (young or old)

Description of house:	
Dung walls	
Dung roofs	
Wooden walls	
Grass walls	
Grass roof	
Mabati walls	
Mabati roof	
Cinder block walls	
Other:	

Household #3

Name of household head _____ Age-set _____

Total number of adults in household _____ Age of wife _____

Age-set of other adults in household

Men	Women (young or old)

Description of house:	
Dung walls	
Dung roofs	
Wooden walls	
Grass walls	
Grass roof	
Mabati walls	
Mabati roof	
Cinder block walls	
Other:	

Household #4

Name of household head _____ Age-set _____

Total number of adults in household _____ Age of wife _____

Age-set of other adults in household

Men	Women (young or old)

Description of house:	
Dung walls	
Dung roofs	
Wooden walls	
Grass walls	
Grass roof	
Mabati walls	
Mabati roof	
Cinder block walls	
Other:	

Household #5

Name of household head _____ Age-set _____

Total number of adults in household _____ Age of wife _____

Age-set of other adults in household

Men	Women (young or old)

Description of house:	
Dung walls	
Dung roofs	
Wooden walls	
Grass walls	
Grass roof	
Mabati walls	
Mabati roof	
Cinder block walls	
Other:	

Household #6

Name of household head _____ Age-set _____

Total number of adults in household _____ Age of wife _____

Age-set of other adults in household

Men	Women (young or old)

Description of house:	
Dung walls	
Dung roofs	
Wooden walls	
Grass walls	
Grass roof	
Mabati walls	
Mabati roof	
Cinder block walls	
Other:	

*If this boma contains more than 6 households, use blank sheets to record data on remaining households.

Additional comments:

Interviewee Selection Worksheet

Place name _____

X Coord _____

Y Coord _____

GPS number _____

My name is _____. I am working on a project with a student from the University of Florida. We are conducting interviews in Olgulului and Kimana Group Ranches to ask people about what they think about wildlife and the experiences they have had with wildlife. We do not represent the Kenya government, KWS, or any other organization. Your boma has been randomly selected to participate in this project. The people we interview will not be identified in our report – answers will be confidential. We expect the interview to take about an hour and a half. There is no compensation for the interview, but we will be providing a report of what we learn to your community.

Can we have your permission to return tomorrow to interview people in this boma? ___ Yes ___ No

[If no] Could you please tell me the reason?

We would like to interview people from _____ household(s) in this boma. Could you please pick _____ number(s) between _____ and _____? [Write number(s) on line(s) below next to 'Household'.]

We are only interviewing people who are 18 years old and above. Would you please tell me the names of all the adults who presently live in this/these household(s)? [List all eligible household members, even those not presently at home but who will be present tomorrow.]

Household 1 _____

Men	Age set	Women	Age
1		1	
2		2	
3		3	
4		4	
5		5	

Household 2 _____

Men	Age set	Women	Age
1		1	
2		2	
3		3	
4		4	
5		5	

Household 3 _____

Men	Age set	Women	Age
1		1	
2		2	
3		3	
4		4	
5		5	

Selection Rules

- o If a husband and his wife occupy the household, interview each of them. If the man does not have a wife, interview another adult female in the household, if available.
- o If the head of household is a woman, try to interview another adult male in the household (ex. a son), if available.

Thank you for your time and for agreeing to participate in our project. What time would you like us to come tomorrow? Ok, we will return tomorrow at _____ to begin the interviews. Could you please tell _____ (names of randomly selected adults) that we will be coming to speak with them tomorrow? What language should we use in our interviews? _____ Maa _____ Swahili _____ English

APPENDIX C
ATTITUDE QUESTIONNAIRE – ENGLISH VERSION

GPS # _____

Survey No.	Interviewer	Date	Time started
GPS: X _____	Group Ranch: 1 = Olgulului 2 = Kimana	Village _____	
Y _____	Boma name _____	Head of household _____	

Person type: 1 = Elder 2 = Young man 3 = Old woman 4 = Middle woman 5 = Young woman
Age-set _____ Age/Year born _____

My name is _____. I am working on a project for the University of Florida in America. I do not represent the Kenya government, KWS, or any other organization. We are conducting interviews on what people think about wildlife. Your household has been randomly selected to participate in this survey and will not be identified in our report. Your answers will be confidential. The interview takes one hour and a half. There is no compensation for the interview, but your community will receive a copy of our report. Can I include your opinions in this study? _____ [initial if permission granted]

Wildlife Value Orientations. Please tell me if you agree or disagree with the following statements.

	strongly disagree	moderately disagree	slightly disagree	neutral	slightly agree	moderately agree	strongly agree	DK
1. An animal like the porcupine does not play an important role in the environment. <i>Ecoll</i>	-3	-2	-1	0	1	2	3	99
2. I like animals like gazelles because of their beauty. <i>Aest1</i>	-3	-2	-1	0	1	2	3	99
3. In the past 6 months, I cannot remember ever stopping somewhere just to watch a bird or wild animal. <i>Nat1</i>	-3	-2	-1	0	1	2	3	99
4. I dislike places where wild animals like hyenas are abundant. <i>Neg1</i>	-3	-2	-1	0	1	2	3	99
5. Cattle are more important than wild animals because we can use cattle. <i>Util1</i>	-3	-2	-1	0	1	2	3	99
6. I have never been interested in keeping a pet. <i>Hum1</i>	-3	-2	-1	0	1	2	3	99
7. The ability of the hippo to live both on land and in water fascinates me. <i>Sci1</i>	-3	-2	-1	0	1	2	3	99
8. The giraffe is not a beautiful animal. <i>Aest2</i>	-3	-2	-1	0	1	2	3	99
9. It is not important to me whether elephants are many or few in number. <i>Neut1</i>	-3	-2	-1	0	1	2	3	99
10. When God is happy with our attitudes toward animals, he gives us more of them. <i>Theis1</i>	-3	-2	-1	0	1	2	3	99
11. Going outdoors just to see wild animals is a waste of time. <i>Nat2</i>	-3	-2	-1	0	1	2	3	99
12. A pet is one of the closest friends I have. <i>Hum2</i>	-3	-2	-1	0	1	2	3	99
13. I would rather be in a place without wildlife than one with wildlife. <i>Neg2</i>	-3	-2	-1	0	1	2	3	99
14. I would like to watch hunters as they hunt large animals like the buffalo. <i>Dom1</i>	-3	-2	-1	0	1	2	3	99
15. I do not care if we have many or few rhinoceros in Kenya. <i>Neut2</i>	-3	-2	-1	0	1	2	3	99
16. I dislike hunters who kill an innocent animal such as the gazelle. <i>Morall</i>	-3	-2	-1	0	1	2	3	99
17. I am fascinated by the fact that elephants play an important role in where grass and trees grow. <i>Sci2</i>	-3	-2	-1	0	1	2	3	99
18. I do not agree with the person who says he dislikes the hyena. <i>Neg3</i>	-3	-2	-1	0	1	2	3	99
19. Having fewer animals around in the future is nothing to worry about. <i>Neut3</i>	-3	-2	-1	0	1	2	3	99

	strongly disagree	moderately disagree	slightly disagree	neutral	slightly agree	moderately agree	strongly agree	DK
20. I care about the wildebeest only because people eat its meat in times of drought. <i>Util2</i>	-3	-2	-1	0	1	2	3	99
21. A man who can kill a lion with a spear or arrow deserves praise. <i>Dom2</i>	-3	-2	-1	0	1	2	3	99
22. I care about a hyena because it clears away the carcasses and cleans the environment. <i>Ecol2</i>	-3	-2	-1	0	1	2	3	99
23. A disobedient animal should be beaten as punishment. <i>Moral2</i>	-3	-2	-1	0	1	2	3	99
24. The tradition of using a buffalo's skin to make shields must not be discouraged. <i>Util3</i>	-3	-2	-1	0	1	2	3	99
25. Watching wild animals during my free time strikes me as a waste of time. <i>Nat3</i>	-3	-2	-1	0	1	2	3	99
26. The only reason I care for animals is because God wants me to. <i>Theis2</i>	-3	-2	-1	0	1	2	3	99
27. Termites serve no useful purpose in the environment. <i>Ecol3</i>	-3	-2	-1	0	1	2	3	99
28. I think poisonous snakes are wicked by nature. <i>Neg4</i>	-3	-2	-1	0	1	2	3	99
29. It is against the law to hunt animals. I think killing wildlife is not worth going to jail. <i>Neut4</i>	-3	-2	-1	0	1	2	3	99
30. The smaller numbers of wildlife that is around today compared to the past may be due to the anger of God over the way wildlife has been cared for. <i>Theis3</i>	-3	-2	-1	0	1	2	3	99
31. I find it very interesting that the giraffe has such a long neck so that it can reach leaves that are high up in the trees. <i>Sci3</i>	-3	-2	-1	0	1	2	3	99
32. People should not hunt an animal like the gazelle for pleasure because animals deserve better treatment. <i>Moral3</i>	-3	-2	-1	0	1	2	3	99
33. When droughts destroy many animals it is certainly due to the anger of God. <i>Theis4</i>	-3	-2	-1	0	1	2	3	99
34. I admire the hunter who is able to kill a lion. <i>Dom3</i>	-3	-2	-1	0	1	2	3	99
35. The leopard is a beautiful animal. <i>Aest3</i>	-3	-2	-1	0	1	2	3	99
36. I think love is an emotion people should feel for other people not for animals. <i>Hum3</i>	-3	-2	-1	0	1	2	3	99
37. I like animals that have some use to people more than other animals. <i>Util4</i>	-3	-2	-1	0	1	2	3	99
38. I like learning about the way different wild animals live. <i>Sci4</i>	-3	-2	-1	0	1	2	3	99
39. I believe a person must demand strict obedience and mastery over donkeys. <i>Dom4</i>	-3	-2	-1	0	1	2	3	99
40. I enjoy seeing animals like the giraffe, but I have little interest in learning about them. <i>Ecol4</i>	-3	-2	-1	0	1	2	3	99
41. It is wrong to use painful methods to capture wild animals. <i>Moral4</i>	-3	-2	-1	0	1	2	3	99
42. The idea of loving animals is strange to me. <i>Hum4</i>	-3	-2	-1	0	1	2	3	99
43. If given the choice between seeing a beautiful animal like the zebra or an unattractive animal like the hyena, I would much prefer to see the zebra. <i>Aest4</i>	-3	-2	-1	0	1	2	3	99
44. When I am walking in the bush, I enjoy seeing wildlife around. <i>Nat4</i>	-3	-2	-1	0	1	2	3	99

Perceptions of Human-Wildlife Interactions Around Amboseli

45. Which animals do you see in the group ranch? [Give respondent picture cards. Tell them to arrange them on the ground. Tick animals selected. Put away the unselected cards]

1. Elephant _____	13. Wildebeest _____	25. Giraffe _____
2. Buffalo _____	14. Zebras _____	26. Grant's gazelle _____
3. Spotted hyena _____	15. Hippo _____	27. Thomson's gazelle _____
4. Stripped hyena _____	16. Snake _____	28. Waterbuck _____
5. Leopard _____	17. Honey badger _____	29. Bushbuck _____
6. Lion _____	18. Mongoose _____	30. Lesser kudu _____
7. Cheetah _____	19. Porcupine _____	31. Impala _____
8. Serval cat _____	20. Squirrels _____	32. Gerenuk _____
9. Jackal _____	21. Ostrich _____	33. Eland _____
10. Bat-eared fox _____	22. Hare _____	34. Dikdik _____
11. Baboons _____	23. Hedgehog _____	35. Hartebeest _____
12. Vervet monkeys _____	24. Warthog _____	36. Other: _____

45a. Can you say you like or dislike any of the animals that you see? [No, go to 46]

1 = Yes

0 = No

99 = DK

45a1. [If yes] Please arrange these animals into piles based on whether you like them or don't like them? [Allow respondent to arrange cards in any way they want. Record the results below.]

Like

Dislike

Other: _____

- | | |
|-----|-----|
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
| 4. | 4. |
| 5. | 5. |
| 6. | 6. |
| 7. | 7. |
| 8. | 8. |
| 9. | 9. |
| 10. | 10. |
| 11. | 11. |
| 12. | 12. |
| 13. | 13. |
| 14. | 14. |
| 15. | 15. |
| 16. | 16. |
| 17. | 17. |
| 18. | 18. |

46. Have you had problems with any of these wild animals? _____

1 = Yes 0 = No

46a. [If yes] Which animal(s)? [Have respondent select cards of animals that cause problems. [Tick next to animals selected] [No, go to 47]

Animal	46b. What problem? [write code]	Problems
1. Wildebeest _____		1 = injure livestock
2. Hyena _____		2 = kill livestock
3. Elephant _____		3 = injure people
4. Hippo _____		4 = kill people
5. Snake _____		5 = damage crops
6. Baboons _____		6 = damage property
7. Zebras _____		7 = destroy trees
8. Lions _____		8 = bring disease
9. Cheetah _____		9 = eat grass for cattle
10 Tortoise _____		10 = other (list in 46b)
11. Jackal _____		
12. Porcupine _____		
13. Other(s): _____		

47. Has someone else in your boma had problems with wild animals? [No, go to 48] _____

1 = Yes 0 = No 99 = DK

47a. [If yes] Which animal(s)? [tick next to animal selected]

Animal	47b. What problem? [write code]	Problems
1. Wildebeest _____		1 = injure livestock
2. Hyena _____		2 = kill livestock
3. Elephant _____		3 = injure people
4. Hippo _____		4 = kill people
5. Snake _____		5 = damage crops
6. Baboons _____		6 = damage property
7. Zebras _____		7 = destroy trees
8. Lions _____		8 = bring disease
9. Cheetah _____		9 = eat grass for cattle
10 Tortoise _____		10 = other [list in 47b]
11. Jackal _____		
12. Porcupine _____		
13. Other(s): _____		

48. [If yes to Q. 46 or Q. 47, ask this question. Otherwise, go to Q. 49.] You have said that these animals cause problems. [Give respondent cards of animals they selected.] Please put these animal cards in order, starting with the animal that causes the most problems. [Record results below.]

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

49. Thinking back to when you first came to live at this boma, have problems with wildlife in general been reduced, stayed the same, or increased?

1 = reduced 2 = same 3 = increased 99 = DK _____

Experience with Elephants in Group Ranch

50. [If respondent stated that s/he sees elephants in the group ranch in last section, place on '1' in the answer blank and go to question 50a. If not, ask this question.] Do you ever see elephants in the group ranch?

1 = Yes 0 = No, go to question 52 _____

50a. [If yes] Do you like to see elephants in the group ranch? _____

1 = Yes 0 = No 99 = DK

50a1. Why?

51. Where do you see elephants in the GR?	☞ Near your boma	☞ Near your shamba	☞ At a watering hole	☞ In the bush	☞ Other _____
51a. Do you like to see elephants...? 1 = Yes 0 = No 99 = DK	_____	_____	_____	_____	_____
51b. What time of day do you see elephants...? 1 = Dawn 2 = Day 3 = Dusk 4 = Night 5 = All 99 = DK	_____	_____	_____	_____	_____
51c. In the last 6 months, how many times have you seen elephants ...? <i>[write response in space]</i>	_____	_____	_____	_____	_____
51d. Which months/seasons do you see elephants...? 1=Jan-Mar/dry 2=Apr-Jun/rainy 3=Jul-Oct/dry 4=Nov-Dec/rainy 99=DK	_____	_____	_____	_____	_____
51e. Do the elephants come alone or in groups? 1 = Alone 2 = Groups 3 = Both 99 = DK	_____	_____	_____	_____	_____
51f. What do elephants do when they come...? <i>(list all that apply)</i> 1 = Just pass 5 = Eat crops 10 = Injure people 2 = Rest/sleep 6 = Drink water 11 = Kill people 3 = Eat grass/trees 7 = Damage property 12 = Other <i>(list →)</i> 4 = Destroy trees 8 = Injure/kill livestock 13 = damage fence 9 = Chase people 99 = DK	_____	_____	_____	_____	_____
51g. In the past, what have you done when you have seen elephants...? 1 = Nothing 6 = Chased them 2 = Hid 7 = Reported to KWS 3 = Watched them 8 = Injured/killed them 4 = Ran away 9 = Other <i>(list under location)</i> 5 = Scared them 99 = DK	_____	_____	_____	_____	_____
51g1. [If answered, "scared them" on Q. 51g] How did you scare them...? 1 = Drums 4 = Shouting 2 = Fire 5 = Other <i>(list under location)</i> 3 = Torches 99 = DK	_____	_____	_____	_____	_____
51h. What will you do next time you see elephants...? 1 = Nothing 6 = Chase them 2 = Hide 7 = Report to KWS 3 = Watch them 8 = Injure/kill them 4 = Run away 9 = Other <i>(list under location)</i> 5 = Scare them 99 = DK	_____	_____	_____	_____	_____
51i. Do you do anything to prevent elephants from coming...? 1 = Nothing 6 = Make noise 2 = Fence area <i>(type)</i> 7 = Move to a new location 3 = Guard area 8 = Do not grow crops 4 = Erect puppets 9 = Other <i>(list under location)</i> 5 = Light fires 99 = DK	_____	_____	_____	_____	_____

52. Would you say that it is true that elephants cause you problems? [No, go to Q. 53] _____
 1 = Yes 0 = No 99 = DK

52a. [If yes] when was the last time you had a problem with elephants? _____

53. Has anyone in this group ranch had problems with elephants? [No, go to Q. 54] _____
 1 = Yes 0 = No 99 = DK

53a. [If yes] what problems? *(tick all responses)*

1 = Eat grass/trees _____	6 = Chase people _____
2 = Destroy trees _____	7 = Injure people _____
3 = Eat crops _____	8 = Kill people _____
4 = Injure/kill livestock _____	9 = Other _____
5 = Damage property _____	99 = DK _____

53b. [If yes to Q. 53a] How do you know about this/these problems?

1 = Friends/relatives _____	4 = Radio _____
2 = Baraza _____	5 = Other _____
3 = Newspaper _____	99 = DK _____

Perceived and Acceptable Risk of Human-Elephant Conflict

54. Do elephants bring costs to people in this group ranch? [No, go to Q. 55] _____
 1 = Yes 0 = No 99 = DK

54a. [If yes] what are the costs? *(tick all responses)*

1. Grazing competition _____	8. Children cannot walk to school _____
2. Water competition _____	9. Damage home _____
3. Destroy trees _____	10. Injure/kill livestock _____
4. Sleepless nights (guarding) _____	11. Injure kill/people _____
5. Damage water pipes _____	12. Destroy crops _____
6. Break fence _____	13. Other _____
7. Can't walk some places _____	99. DK _____

55. Do elephants bring benefits to people in this group ranch? [No, go to Q. 56] _____
 1 = Yes 0 = No 99 = DK

55a. [If yes] what are the benefits? *(tick all responses)*

1. Bring tourists _____	6. Open the bush for livestock _____
2. Jobs with KWS _____	7. Dig watering holes _____
3. Jobs with game scouts _____	8. Other _____
4. Jobs with researchers _____	99. DK _____
5. School bursaries _____	

55b. Are the costs of having elephants in the group ranch more than, equal to, or less than the benefits?
 1 = more 2 = equal to 3 = less 99 = DK _____

56. In the last 5 years, have the problems with elephants increased, stayed the same, or decreased?
 1 = increased 3 = decreased _____
 2 = stayed the same 99 = DK _____

57. In the next 5 years, do you think problems with elephants will increase, stay the same, or decrease?
 1 = increase 3 = decrease _____
 2 = stay the same 99 = DK _____

58. I would like to know how serious you think the risk of elephant conflict is to your personal safety. Would you say you are at great risk, little risk, or no risk? _____

1 = great risk 2 = little risk 3 = no risk 99 = DK

59. How serious do you think the risk of elephant conflict is to your economic livelihood? Would you say you are at great risk, little risk, or no risk? _____

1 = great risk 2 = little risk 3 = no risk 99 = DK

60. Do you worry about problems with elephants a great deal, a little, or not at all? _____

1 = a great deal 2 = a little 3 = not at all 99 = DK

61. Are problems with elephants controllable very controllable, somewhat controllable, or not at all controllable? _____

1 = very 2 = somewhat 3 = not at all 99 = DK

61a. Are you personally able to reduce problems with elephants? [No, go to Q. 62] _____

1 = Yes 0 = No 99 = DK

61a1. If yes, how?

Knowledge of and Experience with Elephant Management, HEC Interventions, and Conservation

62. Are there organizations that are working to help elephants? [No, go to Q. 63] _____

1 = Yes 0 = No 99 = DK

62a. [If yes] which organizations? *(tick all responses)*

Organization	62b. What is their job?	Jobs
1. Government of Kenya _____		1 = Protect wildlife
2. KWS _____		2 = Attract tourists
3. AERP _____		3 = Research
4. AWF _____		4 = Conservation
5. ACC _____		5 = Other <i>(write in space)</i>
6. Game Scouts Assoc. _____		99 = DK
7. Other: _____		

63. Do any organizations help people who have problems with elephants? [No, go to Q. 64] _____

1 = Yes 0 = No 99 = DK

63a. [If yes] Who? *(tick all responses)*

63a. [If yes] Who? [tick]	Q. 63a1. What do they do? (Interventions)	Q63a2. Good or bad job? Bad Good	Q63a3. Why do you think so?
1. GOK _____		-3 -2 -1 0 1 2 3 DK	
2. KWS _____		-3 -2 -1 0 1 2 3 DK	
3. AERP _____		-3 -2 -1 0 1 2 3 DK	
4. AWF _____		-3 -2 -1 0 1 2 3 DK	
5. ACC _____		-3 -2 -1 0 1 2 3 DK	
6. Game Scouts _____		-3 -2 -1 0 1 2 3 DK	
7. Other: _____		-3 -2 -1 0 1 2 3 DK	

Interventions

1 = Nothing	5 = Put up a fence	9 = Have meetings/workshops
2 = Make a report	6 = Take people to hospital	10 = Fieldtrips
3 = Chase/scare elephants away	7 = Pay compensation (for people)	11 = Other <i>(write in space in 63b)</i>
4 = Shoot elephants	8 = Pay consolation (for livestock)	99 = DK

63b. Have you asked for help from this/these organizations for elephant problems? [No, go to Q. 63c] _____

1 = Yes 0 = No 99 = DK

63c. [If respondent did ask for help, skip this question.] Why did you not ask for assistance?

1 = do not need help	_____	5 = slow response	_____
2 = do not know <i>who</i> to call	_____	6 = do not do anything when they come	_____
3 = do not know <i>how</i> to call	_____	7 = Other _____	_____
4 = do not come when called	_____	99 = DK	_____

64. Have you participated in any workshops/meetings about elephants? [No, go to Q. 65] _____
 1 = Yes 0 = No 99 = DK

[Complete this table if respondent answered "Yes" to Q. 64.]

64a. Who sponsored the meeting(s)?	∃KWS	∃AWF	∃AERP	∃ACC	∃Other _____
64b. How many did you attend?	_____	_____	_____	_____	_____
64c. When was/were the meeting(s)? 1 = last 6 months 2 = 6-12 months ago 3 = more than a year 99 = DK	_____	_____	_____	_____	_____
64d. What was/were the topics?					
64e. Was it helpful? 1 = Yes 0 = No 99 = DK	_____	_____	_____	_____	_____
64e1. Why?					

65. [If respondent did not mention the AERP consolation scheme and/or the Kenya government's compensation program in question 63, ask:] Do you know if anyone gives money for elephant damage? [No, go to Q. 66]
 1 = Yes 0 = No _____

65a. [If yes] Who? [Tick next to the name of the organization]

∃ GOK	65b. What do they pay for?	65c. How much?	65d. Good or bad?							65d1. Why?	
			Bad				Good				
	1. Human injury	_____	-3	-2	-1	0	1	2	3	DK	
	2. Human death	_____	-3	-2	-1	0	1	2	3	DK	
	3. Goat death	_____	-3	-2	-1	0	1	2	3	DK	
	4. Sheep death	_____	-3	-2	-1	0	1	2	3	DK	
	5. Cattle death	_____	-3	-2	-1	0	1	2	3	DK	
	6. Crop loss	_____	-3	-2	-1	0	1	2	3	DK	
	7. Property damage	_____	-3	-2	-1	0	1	2	3	DK	
	8. Other:	_____	-3	-2	-1	0	1	2	3	DK	

KWS	65b. What do they pay for?	65c. How much?	65d. Good or bad?		65d1. Why?
			Bad	Good	
	1. Human injury _____		-3	-2 -1 0 1 2 3 DK	
	2. Human death _____		-3	-2 -1 0 1 2 3 DK	
	3. Goat death _____		-3	-2 -1 0 1 2 3 DK	
	4. Sheep death _____		-3	-2 -1 0 1 2 3 DK	
	5. Cattle death _____		-3	-2 -1 0 1 2 3 DK	
	6. Crop loss _____		-3	-2 -1 0 1 2 3 DK	
	7. Property damage _____		-3	-2 -1 0 1 2 3 DK	
	8. Other: _____		-3	-2 -1 0 1 2 3 DK	

AERP	65b. What do they pay for?	65c. How much?	65d. Good or bad?		65d1. Why?
			Bad	Good	
	1. Human injury _____		-3	-2 -1 0 1 2 3 DK	
	2. Human death _____		-3	-2 -1 0 1 2 3 DK	
	3. Goat death _____		-3	-2 -1 0 1 2 3 DK	
	4. Sheep death _____		-3	-2 -1 0 1 2 3 DK	
	5. Cattle death _____		-3	-2 -1 0 1 2 3 DK	
	6. Crop loss _____		-3	-2 -1 0 1 2 3 DK	
	7. Property damage _____		-3	-2 -1 0 1 2 3 DK	
	8. Other: _____		-3	-2 -1 0 1 2 3 DK	

Other	65b. What do they pay for?	65c. How much?	65d. Good or bad?		65d1. Why?
			Bad	Good	
	1. Human injury _____		-3	-2 -1 0 1 2 3 DK	
	2. Human death _____		-3	-2 -1 0 1 2 3 DK	
	3. Goat death _____		-3	-2 -1 0 1 2 3 DK	
	4. Sheep death _____		-3	-2 -1 0 1 2 3 DK	
	5. Cattle death _____		-3	-2 -1 0 1 2 3 DK	
	6. Crop loss _____		-3	-2 -1 0 1 2 3 DK	
	7. Property damage _____		-3	-2 -1 0 1 2 3 DK	
	8. Other: _____		-3	-2 -1 0 1 2 3 DK	

66. The GOK gives people *compensation* when a person is injured or killed by an elephant and the elephant research project gives people *consolation* when livestock is killed by an elephant outside of the park. Is there a difference between *compensation* and *consolation*? [No, go to Q. 67]

1 = Yes 0 = No 99 = DK

66a. [If yes] please explain the difference.

66b. Is one better? [No, go to Q. 67]

1 = Yes 0 = No 99 = DK

66b1. [If yes] Which one?

1 = Compensation 2 = Consolation

66b1.1. Please explain.

67. Do you think receiving money for elephant damage makes people in your group ranch more tolerant of elephants when they come into the group ranch?

1 = Yes 0 = No 99 = DK

67a. Why?

68. Does your group ranch have an electric fence? [No, go to Q. 69]

1 = Yes 0 = No 99 = DK

68a. [If yes] What is the purpose of the electric fence?

1 = Keep wildlife out	_____	4 = Protect crops	_____
2 = Keep elephants out	_____	5 = Other	_____
3 = Protect people	_____	99 = DK	_____

68a1. Does the fence do a good job?

1 = Yes 0 = No 99 = DK

68b. Are there any problems with the electric fence? [No, go to Q. 68c]

1 = Yes 0 = No 99 = DK

68b1. [If yes] What is/are the problem(s)?

1 = No electricity	_____	4 = Does not get repaired	_____
2 = Ownership conflict	_____	5 = Other	_____
3 = Elephants break	_____	99 = DK	_____

68c. Who owns the electric fence?

1 = GOK	_____	4 = Other	_____
2 = KWS	_____	99 = DK	_____
3 = Group Ranch	_____		

68d. Who is responsible for maintaining the fence?

1 = GOK	_____	4 = Other	_____
2 = KWS	_____	99 = DK	_____
3 = Group Ranch	_____		

68e. Do you live inside the electric fence?

1 = Yes 0 = No 99 = DK

69. Why do tourists come to Amboseli?

1 = To see wildlife	_____
2 = To see elephants	_____
3 = To see birds	_____
4 = To see Maasai	_____
5 = To see Mt. Kilimanjaro	_____
6 = For leisure	_____
7 = Other:	_____
99 = DK	_____

70. Are there benefits to having tourists come to Amboseli? [No, go to Q. 71] _____

1 = Yes 0 = No 99 = DK

[If yes, complete this table.]

70a. What are the benefits? [tick]	70a1. Who receives the benefits?	1 = GOK
1. Jobs _____		2 = KWS
2. Buy handicrafts _____		3 = Maasai
3. Pay park fees _____		4 = GR officials
4. Pay sanctuary fees _____		5 = GR members
5. School bursaries _____		6 = Me/my household
6. Other _____		7 = Other
		99 = DK

70b. [If respondent does not state that s/he or her/his household receives benefits, ask this question.]
Does your household receive benefits? [No, go to Q. 71] _____

1 = Yes 0 = No 99 = DK

70b1. If yes, which benefits?

- 1.
- 2.
- 3.
- 4.

71. Are there bad things about having tourists come here? [No, go to Q. 72] _____

1 = Yes 0 = No 99 = DK

71a. [If yes] What are they?

1 = Tourists can be rude	_____
2 = Brings changes to our culture	_____
3 = Brings environmental destruction	_____
4 = Take the land	_____
5 = Other: _____	_____

72. Does your group ranch have cultural bomas for tourists to visit? [No, go to Q. 73] _____

1 = Yes 0 = No 99 = DK

72a. [If yes] Are there benefits to having cultural bomas? [No, go to 72b] _____

1 = Yes 0 = No 99 = DK

72a1. [If yes] What are the benefits?

1 = Brings money	_____
2 = Teaches tourists Maasai culture	_____
3 = Other _____	_____
99 = DK	_____

72a2. Who receives the benefits?

1 = People in cultural bomas _____	4 = Other _____
2 = All Maasai _____	99 = DK _____
3 = Tourists _____	

72b. Are there costs to having cultural bomas? [No, go to Q. 73] _____

1 = Yes 0 = No 99 = DK

72b1. [If yes] What are the costs?

1 = Exploits Maasai _____
2 = Affects Maasai culture _____
3 = Other _____
99 = DK _____

72b2. Who bears the costs?

1 = People in cultural bomas _____	3 = Other _____
2 = All Maasai _____	99 = DK _____

Knowledge About Elephants

I am going to read some statements about elephants and I would like for you to tell me if they are true or false.

73. Male elephants live alone most of the time. T F DK
74. Elephants can live to be more than 65 years old. T F DK
75. Male elephants lead the elephant family group. T F DK
76. Elephants only eat grass. T F DK
77. Elephants open up the bush for other animals. T F DK
78. Sometimes elephants must get water outside of the park in order to survive. T F DK
79. Elephants have long memories. T F DK
80. The Amboseli elephants need water inside and outside of the park. T F DK
81. Elephants have to spend most of their time eating in order to survive. T F DK
82. Adult elephants need about 100 liters of water each day. T F DK

Beliefs About Elephants, Human-Elephant Conflict, and Management

Please tell me if you agree or disagree with the following statements.

		strongly disagree	moderately disagree	slightly disagree	neutral	slightly agree	moderately agree	strongly agree	DK
83.	There are too many elephants around Amboseli.	-3	-2	-1	0	1	2	3	99
84.	Elephants have the right to exist around Amboseli just as people do.	-3	-2	-1	0	1	2	3	99
85.	Elephants are a problem around Amboseli.	-3	-2	-1	0	1	2	3	99
86.	Elephants have an important role in the environment.	-3	-2	-1	0	1	2	3	99
87.	God put elephants here so we must live with them.	-3	-2	-1	0	1	2	3	99
88.	It would be sad if all of the elephants were taken away from Amboseli.	-3	-2	-1	0	1	2	3	99
89.	Elephants are gentle unless they are provoked.	-3	-2	-1	0	1	2	3	99

		strongly disagree	moderately disagree	slightly disagree	neutral	slightly agree	moderately agree	strongly agree	DK
90.	Elephants feel pain when one of their family members is killed.	-3	-2	-1	0	1	2	3	99
91.	It is not possible for people and elephants to stay together.	-3	-2	-1	0	1	2	3	99
92.	Elephants bring tourists to Amboseli.	-3	-2	-1	0	1	2	3	99
93.	People in my group ranch would be better off if there were no elephants.	-3	-2	-1	0	1	2	3	99
94.	The only reason elephants come out of the park is to disturb people.	-3	-2	-1	0	1	2	3	99
95.	People who grow crops have more problems with elephants than people who do not.	-3	-2	-1	0	1	2	3	99
96.	Elephants chase people because they have been treated badly by people.	-3	-2	-1	0	1	2	3	99
97.	If people did not grow crops, there would be no problems with elephants.	-3	-2	-1	0	1	2	3	99
98.	If there were no elephants in Amboseli, tourists would not come.	-3	-2	-1	0	1	2	3	99
99.	Most people in the group ranch like elephants.	-3	-2	-1	0	1	2	3	99
100.	Elephants and farmers can live together.	-3	-2	-1	0	1	2	3	99
101.	Elephants and livestock owners can live together.	-3	-2	-1	0	1	2	3	99
102.	This would be a better place without elephants.	-3	-2	-1	0	1	2	3	99
103.	Elephants get into the group ranch just for pleasure.	-3	-2	-1	0	1	2	3	99
104.	Elephants are always angry toward humans.	-3	-2	-1	0	1	2	3	99
105.	No elephant around Amboseli should be killed.	-3	-2	-1	0	1	2	3	99
106.	Killing elephants is a good way to stop problems caused by elephants.	-3	-2	-1	0	1	2	3	99
107.	Moving elephants somewhere else is the best way to stop problems caused by elephants.	-3	-2	-1	0	1	2	3	99

108. Why do the Maasai morans spear elephants? _____

1 = to show bravery 5 = for fun/sport

2 = retaliation 6 = other _____

3 = political 99 = DK

4 = self-defense

108a. Is it good or bad for moran to spear elephants? _____

1 = Good 2 = Neither 3 = Bad 99 = DK

108a1. Why?

Norms Regarding Elephants

109. Now I would like to talk about who is important to you. Please tell me five people who you respect most or care about what they think? [e.g. parent, husband, etc. – not names]

109a. Please tell me what each of these people think you should do when it comes to elephants. I am going to read some statements and I would like you to tell me if the people who are important to you would approve or disapprove of you taking each action.

109b. How much do you want to do what your _____ thinks you should do?

Q. 109. Person	Behavior	Q 109a.							Q. 109b.					
		strongly disapprove	-3	-2	-1	0	1	2	3	DK	not at all	slight	mod.	very much
1 =	1 = Allow elephants to come to the GR without harm	-3	-2	-1	0	1	2	3	DK	1	2	3	4	DK
	2 = Try to prevent elephants from coming to the GR without harming them	-3	-2	-1	0	1	2	3	DK					
	3 = Injure or killing elephants when they come into the GR.	-3	-2	-1	0	1	2	3	DK					
2 =	1 = Allow elephants to come to the GR without harm	-3	-2	-1	0	1	2	3	DK	1	2	3	4	DK
	2 = Try to prevent elephants from coming to the GR without harming them	-3	-2	-1	0	1	2	3	DK					
	3 = Injure or killing elephants when they come into the GR.	-3	-2	-1	0	1	2	3	DK					
3 =	1 = Allow elephants to come to the GR without harm	-3	-2	-1	0	1	2	3	DK	1	2	3	4	DK
	2 = Try to prevent elephants from coming to the GR without harming them	-3	-2	-1	0	1	2	3	DK					
	3 = Injure or killing elephants when they come into the GR.	-3	-2	-1	0	1	2	3	DK					
4 =	1 = Allow elephants to come to the GR without harm	-3	-2	-1	0	1	2	3	DK	1	2	3	4	DK
	2 = Try to prevent elephants from coming to the GR without harming them	-3	-2	-1	0	1	2	3	DK					
	3 = Injure or killing elephants when they come into the GR.	-3	-2	-1	0	1	2	3	DK					
5 =	1 = Allow elephants to come to the GR without harm	-3	-2	-1	0	1	2	3	DK	1	2	3	4	DK
	2 = Try to prevent elephants from coming to the GR without harming them	-3	-2	-1	0	1	2	3	DK					
	3 = Injure or killing elephants when they come into the GR.	-3	-2	-1	0	1	2	3	DK					

Attitudes Toward Elephants in Group Ranch

110. Please tell me whether you think allowing elephants in the group ranch is likely or unlikely to cause the following outcomes.

Allowing elephants on our lands will...

	extremely unlikely	moderately unlikely	slightly unlikely	neither	slightly likely	moderately likely	extremely likely	DK
a. cause more tourists to visit the group ranch	-3	-2	-1	0	1	2	3	99
b. allow the elephants to increase in numbers	-3	-2	-1	0	1	2	3	99
c. provide more opportunities for people in the GR to see elephants	-3	-2	-1	0	1	2	3	99
d. increase costs to people in the GR	-3	-2	-1	0	1	2	3	99
e. increase the number of potentially dangerous encounters between people and elephants	-3	-2	-1	0	1	2	3	99
f. cause conflict between people who favor and oppose tolerating elephants	-3	-2	-1	0	1	2	3	99
g. cause an increase in the number of elephants speared by Maasai	-3	-2	-1	0	1	2	3	99
h. cause an increase in the number of elephants shot by KWS	-3	-2	-1	0	1	2	3	99

111. Please tell me whether each of these outcomes is good or bad.

	extremely bad	moderately bad	slightly bad	neutral	slightly good	moderately good	extremely good	DK
a. Causing more tourists to visit the group ranch is...	-3	-2	-1	0	1	2	3	99
b. Allowing elephants to increase in numbers is...	-3	-2	-1	0	1	2	3	99
c. Providing more opportunities for people in the GR to see elephants is...	-3	-2	-1	0	1	2	3	99
d. Increasing costs to people in the GR is...	-3	-2	-1	0	1	2	3	99
e. Increasing the number of potentially dangerous encounters between people and elephants is...	-3	-2	-1	0	1	2	3	99
f. Causing conflict between people who favor and oppose tolerating elephants is...	-3	-2	-1	0	1	2	3	99
g. Causing an increase in the number of elephants speared by Maasai is...	-3	-2	-1	0	1	2	3	99
h. Causing an increase in the number of elephants shot by KWS is...	-3	-2	-1	0	1	2	3	99

112. If there was a vote in the group ranch on whether or not elephants should be allowed or not allowed inside the group ranch, how would you vote?

1 = To allow

2 = To not allow

99 = DK

112a. What is the main reason you would vote this way?

119. Do you have a shamba? [No, go to Q. 120] _____
 1 = Yes 0 = No

119a. If yes, how long have you been cultivating? _____

119b. Do you own or rent the shamba? _____
 1 = own 2 = rent 3 = Other _____

119c. Who looks after the shamba/grows the crops? _____
 1 = self 4 = hired help
 2 = member of household 5 = other _____
 3 = renter

119d. Crop(s)

119d. Crop	119d1. Acres	119d2. For 1 = food, 2 = cash, 3 = both	119d3. Month(s) harvested	119d4. 1 = Rainfed 2 = Irrigated	119d5. Location
1.					
2.					
3.					
4.					
5.					
6.					
7.					

119e. Do wild animals eat the crops in your shamba? [No, go to Q. 119f] _____
 1 = Yes 0 = No

119e1. [If yes] Which animals? [tick]	119e2. Which crop(s)	119e3. Please rank starting w/animal that eats your crops most.
1. Birds _____	_____	1. _____
2. Baboon _____	_____	2. _____
3. Buffalo _____	_____	3. _____
4. Monkey _____	_____	4. _____
5. Eland _____	_____	5. _____
6. Elephant _____	_____	6. _____
7. Gazelle _____	_____	7. _____
8. Porcupine _____	_____	8. _____
9. Dikdik _____	_____	9. _____
10. Squirrel _____	_____	10. _____
11. Other(s): _____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

119f. Do you do anything to protect your shamba from wildlife? [No, go to Q. 120] _____
 1 = Yes 0 = No

119f1. [If yes] What do you do?	119f2. Is this method effective against elephants?
1 = Fence <i>type</i> _____	1 = Yes _____ 0 = No _____ 99 = DK _____
2 = Guard <i>who</i> _____	1 = Yes _____ 0 = No _____ 99 = DK _____
3 = Puppets _____	1 = Yes _____ 0 = No _____ 99 = DK _____
4 = Light fire _____	1 = Yes _____ 0 = No _____ 99 = DK _____
5 = Make noise <i>how</i> _____	1 = Yes _____ 0 = No _____ 99 = DK _____
6 = Other _____	1 = Yes _____ 0 = No _____ 99 = DK _____

120. Do you keep livestock? [No, go to Q. 121] _____

1 = Yes 0 = No

120a. [If yes] which kind?	120a1. How many?	120a2. Where do you graze them?	120a3. During which months?
Cattle			
Goats			
Sheep			
Donkeys			

120b. Are there places you do not take your livestock for grazing or water because of wildlife? _____

1 = Yes 0 = No 99 = DK

120b1. [If yes] where?	120b2. Why?
1.	
2.	
3.	
4.	

120c. Do you sell animals? _____

1 = Yes 0 = No

121. [Show respondent livelihood cards and ask...] Do you or anyone else in your household do any of these activities? [No, go to Q. 121c] _____

1 = Yes 0 = No 99 = DK

121a. [If yes] who? _____

1 = Self 2 = Other family member _____

121b. Which activity?

1. Sell handicrafts to tourists _____	8. Work in conservation _____
2. Work in cultural boma _____	KWS _____
3. Beekeeping _____	Game Scouts Assoc. _____
4. Sell crops from shamba _____	NGO _____
5. Have duka _____	Wildlife Sanctuary _____
6. Work in a lodge _____	9. Other _____
7. Teacher _____	

121c. Please rank your household livelihood activities according to their importance to your household.

[This question pertains to ALL economic activities including livestock and agriculture.]

Activity
1.
2.
3.
4.
5.

121c1. You have said that _____ is your household's most important livelihood activity.

Would you say it provides more than half, half, or less than half of your livelihood?

1 = more than half 4 = all [if only 1 livelihood activity] _____

2 = half 99 = DK
3 = less than half

121d. Which activity do you think will be most important to your household in 5 years? _____

122. Does anyone in your household own the following items?

122. Items owned [tick]	122a. How many?	122b. Value if sold today	[Indicate if this is the value per unit or all units combined]	
1. Cooking pots	_____	KSh	1 unit	all
2. Water container	_____	KSh	1 unit	all
3. Thermoflask	_____	KSh	1 unit	all
4. Box	_____	KSh	1 unit	all
5. Spade	_____	KSh	1 unit	all
6. Torch	_____	KSh	1 unit	all
7. Gas lamp	_____	KSh	1 unit	all
8. Radio	_____	KSh	1 unit	all
9. Chair	_____	KSh	1 unit	all
10. Table	_____	KSh	1 unit	all
11. Sofa	_____	KSh	1 unit	all
12. Wheelbarrow	_____	KSh	1 unit	all
13. Bicycle	_____	KSh	1 unit	all
14. Telephone	_____	KSh	1 unit	all
15. Cell phone	_____	KSh	1 unit	all
16. Television	_____	KSh	1 unit	all
17. Generator	_____	KSh	1 unit	all
18. Motorcycle	_____	KSh	1 unit	all
19. Car	_____	KSh	1 unit	all

123. Are you a member of any group ranches? [No, go to Q. 124] _____

1 = Yes 0 = No

123a. If yes, which one(s)? _____

1 = Olgulului 2 = Kimana 3 = Other _____

123b. Does your group ranch make money? [No, go to Q. 124] _____

1 = Yes 0 = No 99 = DK

123b1. If yes, how?

1. Concessions	_____
2. Wildlife Sanctuary	_____
3. Park revenue sharing	_____
4. Public campsite	_____
5. Other _____	_____
99. DK	_____

123c. How is the money used?

1. To build schools	_____
2. To build clinics	_____
3. Medical expenses	_____
4. School bursaries	_____
5. Water projects	_____
6. Other _____	_____
99. DK	_____

123 d. Do you or any member of your household benefit from this/these? [No, go to Q. 124] _____
1 = Yes 0 = No 99 = DK

123 d1. [If yes] Which one(s)?

1. Schools	_____
2. Clinics	_____
3. Medical expenses	_____
4. School bursaries	_____
5. Water projects	_____
6. Other _____	_____
99 = DK	_____

124. Has this group ranch subdivided? [No, go to Q. 124b] _____
1 = Yes 0 = No 99 = DK

124a. [If yes] Are you happy about it? _____

1 = Yes 0 = No 99 = DK

124a1. Why?

124b. [If no] Do you want it to be subdivided? _____

1 = Yes 0 = No 99 = DK

124b1. Why?

125. What do you think about this research we are doing today?

126. Who do you think sent us for this interview? _____

127. Would you like to receive information about the results of this research when it has been completed? _____

1 = Yes 0 = No 99 = DK

128. Have you ever been interviewed by another researcher? [No, complete interview] _____

1 = Yes 0 = No 99 = DK

128a. [If yes] When?

128b. What were you interviewed about?

128c. Did you receive any information about the research when it was completed? _____

1 = Yes 0 = No 99 = DK

THANK YOU VERY MUCH. YOUR ANSWERS HAVE BEEN VERY HELPFUL.

END OF INTERVIEW

Time interview ended _____

Complete the next section immediately after the interview is completed.

1. In what type of house does the respondent live? (*tick all that apply*)

Mud/dung walls	_____
Mud/dung roof	_____
Wooden walls	_____
Wooden roof	_____
Grass walls	_____
Grass roof	_____
Mabati walls	_____
Mabati roof	_____
Cinder block walls	_____
Other:	_____

Office use only

Household wealth		Lifestyle	
1 = Poor	_____	1 = Traditional	_____
2 = Medium	_____	2 = Mixed	_____
3 = Rich	_____	3 = Modern	_____

2. Describe the clothing worn by the respondent. [For example, traditional (shukas), Western, mixed.]

3. Were there any other people immediately present who have listened to the interview?

1 = Yes 0 = No

3a. [If yes] Who?

	Q. 3b. Did this person interfere (provide answers)?			
1. Spouse	_____	Y	N	DK
2. Children	_____	Y	N	DK
3. A few other adults	_____	Y	N	DK
4. Several adults	_____	Y	N	DK
5. Other	_____	Y	N	DK

3c. Did the respondent ask other people for assistance with any questions?

1 = Yes 0 = No

4. What was the respondent's attitude toward you during the interview?

Was he or she	1 Friendly	2 In between	3 Hostile
Was he or she	1 Interested	2 In between	3 Bored
Was he or she	1 Cooperative	2 In between	3 Uncooperative
Was he or she	1 Patient	2 In between	3 Impatient
Was he or she	1 Relaxed	2 In between	3 Suspicious
Was he or she	1 Honest	2 In between	3 Misleading
Was he or she	1 Talkative	2 In between	3 Quiet

5. Do you have any other comments on the interview? For example, did anything else significant happen just before or during the interview?

1 = Yes 0 = No

5a. If yes, please explain.

6. I hereby certify that this interview was conducted following the instruction received during training. All responses were recorded here as stated by the respondent who was randomly selected for this interview.

Enumerator Signature _____

After signing below the statement above, submit this questionnaire to the supervisor.

7. Supervisor: Do you have any comments on this interview? For example, did anything significant happen during the interview?

1 = Yes 0 = No

7a. If yes, please explain:

7b. Are there any errors or questions that need to be addressed before submitting this survey for data entry?

0 = No. Please read and sign the statement below.

1 = Yes. Please have the enumerator return to the respondent to request clarification and make the necessary corrections. Please directly observe this process. After the corrections are made and you feel confident that the survey is ready for data entry, please sign below.

8. I hereby certify that this interview was conducted following the instruction given during training. All responses have been checked for completeness and accuracy. The respondent for this interview was randomly selected.

Supervisor Signature _____

REFERENCES

- AWF. 1999. *People, elephants and conservation in the Greater Amboseli Ecosystem*. Unpublished research proposal. Washington, D.C.: African Wildlife Foundation.
- Abbot, J.I., D.H.L. Thomas, A.A. Gardner, S.E. Neba, and M.W. Khen. 2001. Understanding the links between conservation and development in the Bamenda Highlands, Cameroon. *World Dev.* 29(7):1115-1136.
- Adams, W.M. 1998. Conservation and development. In *Conservation science and action*, ed. W.J. Sutherland. Oxford: Blackwell Publishing.
- Adams, W.M. and D. Hulme. 2001. If community conservation is the answer in Africa, what is the question? *Oryx* 35(3):193-200.
- Adams, J. S. and T. O. McShane. 1992. *The myth of wild Africa: Conservation without illusion*. New York: W. W. Norton & Co.
- Adams, W. and M. Infield. 2001. Park outreach and gorilla conservation: Mgahinga Gorilla National Park, Uganda. In *African wildlife and livelihoods: The promise and performance of community conservation*, eds. D. Hulme and M. Murphree, 313-147. James Currey, Oxford, UK.
- Adjewodah, P., P. Beier, M.K. Sam & J.J. Mason 2005. Elephant crop damage in the Red Volta Valley, north-eastern Ghana. *Pachyderm* 38:39-48.
- Aipanjiguly, S., S.K. Jacobson, and R. Flamm. 2003. Conserving manatees: Knowledge, attitudes, and intentions of boaters in Tampa Bay, Florida. *Conserv. Biol.* 17(4):1098-1105.
- Ajzen, I. 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 50:179-211.
- Ajzen, I. 1988. *Attitudes, personality, and behavior*. Chicago: Dorsey.
- Ajzen, I. and M. Fishbein. 1980. *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ:Prentice-Hall.
- Ajzen, I. and M. Fishbein. 2005. The influence of attitudes on behavior. In *The Handbook of Attitudes*, eds. Albarracin, D. B.T. Johnson, and M.P. Zanna, 173-221. Mahwah, NJ: Lawrence Erlbaum Associates.
- Akama, J.S. 1999. Marginalization of the Maasai in Kenya. *Ann. Tourism* 26(3):716-718.
- Akama, J. 2002. The creation of the Maasai image and tourism development in Kenya. In *Cultural tourism in Africa: Strategies for the new millennium*, eds. J. Akama and P. Sterry, 43-53. Arnheim: Association for Tourism and Leisure Education.

- Akama, J.S., C.L. Lant, and G.W. Burnett. 1995. Conflicting attitudes toward state wildlife conservation programs in Kenya. *Society and Nat. Resources* 8:133-144.
- Alexander, J. and J. McGregor. 2000. Wildlife and politics: CAMPFIRE in Zimbabwe. *Development and Change* 31:605-627.
- Ali, I.M. 2006. An anthropocentric approach to saving biodiversity: Kenyan pupils' attitudes towards parks and wildlife. *Appl. Environ. Educ. Commun.* 5:21-32.
- Alpert, P. 1996. Integrated conservation and development projects: Examples from Africa. *BioScience* 46(1):845-855.
- Alvard, M. 1993. Testing the "Ecologically noble savage" hypothesis: Interspecific prey choice by Piro hunters of Amazonian Peru. *Hum. Ecol.* 21(4):355-387.
- Amin, M., D. Willetts, and J. Eames. 1987. *The Last of the Maasai*. Nairobi: Camerapix Publishers International.
- Anthony, B. 2007. The dual nature of parks: Attitudes of neighboring communities toward Kruger National Park, South Africa. *Environ. Conserv.* 34(3):236-245.
- Archabald, K. and L. Naughton-Treves. 2001. Tourism revenue-sharing around national parks in Western Uganda: Early efforts to identify and reward local communities. *Environ. Conserv.* 28(2):135-149.
- Armitage, C. J. and M. Conner. 2001. Efficacy of the theory of planned behavior: A meta-analytic review. *Brit. J. Soc. Psychol.* 40:471-499.
- Asiema, J.K. and F.D.P. Situma. 1994. Indigenous peoples and the environment: The case of the pastoral Maasai of Kenya. *Colo. J. Int. Environ. Law Policy* 5:149-171.
- Ástrom, A. N., & Okullo, I. 2004. Temporal stability of the theory of planned behavior: A prospective analysis of sugar consumption among Ugandan adolescents. *Community Dent. Oral* 32(6): 426-434.
- Babbie, E. 1995. *The practice of social research*. Belmont, CA: Wadsworth.
- Badola, R. and S.A. Hussain. 2003. Conflict in paradise: Women and protected areas in the Indian Himalayas. *Mt. Res. Dev.* 23(3): 234-237.
- Bagozzi, R.P. 1992. The self-regulation of attitudes, intentions, and behavior. *Soc. Psychol. Quart.* 55:178-204.
- Baird, T.D., P.W. Leslie, and J.T. McCabe. 2009. The effect of wildlife conservation on local perceptions of risk and behavioral response. *Hum. Ecol.* 37:463-474.

- Balfour, D. H. T. Dublin, J. Fennessy, D. Gibson, L. Niskanen, and I. J. White. 2007. Review of options for managing impacts of locally overabundant African elephants. Gland, Switzerland: IUCN.
- Bandura, A. 2007. Much ado over a faulty conception of perceived self-efficacy grounded in faulty experiment. *J. Soc. Clin. Psychol.* 26(6):641-658.
- Bannerman, D.A. 1910. On a collection of birds made by Dr. A.B. Percival in British East Africa. *Ibis* 52(4):676-710.
- Barnes, R. F. W. 1996. The conflict between humans and elephants in the central African forests. *Mammal Rev.* 26:67-80.
- Barney, E.C., J.J. Mintzes, and C.F. Yen. 2005. Assessing knowledge, attitudes, and behavior toward charismatic megafauna: The case of dolphins. *J. Environ. Educ.* 36(2):41-55.
- Barrett, C.B., and P. Arcese. 1995. Are ICDPs Sustainable? On The Conservation of Large Mammals in Sub-Saharan Africa. *World Dev.* 23(7):1073-85.
- Barrow, E. J. Davies, S. Berhe, V. Matiru, N. Mohamed, W. Olenasha, M. Rugadya. {Su,Eth, Som} 2007. *Pastoralism as conservation in the Horn of Africa*. Policy Brief No. 1. Nairobi, Kenya: IUCN Eastern Africa Regional Office.
- Barrow, E., H. Gichohi, and M. Infield. 2000. *Rheoric or reality: A review of community conservation policy and practice in East Africa*. World Conservation Union. IUCD Biodiversity and Livelihoods Group, Evaluating Eden Series No. 5.
- Barnes, R. F. W., S. Azika, and B. Asamoah-Boateng. 1995. Timber, cocoa, and crop-raiding elephants: A preliminary study from southern Ghana. *Pachyderm* 19:33-38.
- Barrett, C.B., T. Reardon, P. Webb. 2001. Nonfarm income diversification and household livelihood strategies in rural Africa: Concepts, dynamics and policy implications. *Food Policy* 26(4):315-331.
- Bates, L.A., K.N. Sayialel, N.W. Njiraini, C.J. Moss, J.H. Poole, and R.W. Byrne. 2007. Elephants classify human ethnic groups by odor and garment color. *Curr. Biol.* 17:1938-1942.
- Bauer, H. 2003. Local perceptions of Waza National Park, northern Cameroon. *Environ. Conserv.* 30(2):175-181.
- Baumann, C. 1894. *Durch Masailand zur Nilquelle. Reisen und Forschungen der Masai Expedition des deutschen Antisklaverei-Komite in den Jahren 1891-1893*. Berlin: Reimer.
- Beachey, R.W. 1967. The east African ivory trade in the nineteenth century. *J. Afr. Hist.* 3(2):269-290.

- Behnke, R. 1994. Natural resource management in Africa. *Dev. Policy Rev.* 12:5-27.
- Bekure, S., P.N. De Leeuw, B.E. Grandin, and P.J.H. Neate, eds. 1991. *Maasai herding: An analysis of the livestock production system of Maasai pastoralists in eastern Kajiado District, Kenya*. ILCA Systems Study 4. Addis Ababa, Ethiopia: International Livestock Centre for Africa.
- Bell, R.H.V. 1984. The man-animal interface: An assessment of crop damage and wildlife control. In *Conservation and Wildlife Management in Africa*, eds. R.H.V. Bell and E. McShane-Caluzi, 387-416. Malawi: U.S. Peace Corps.
- Bem, D. J. 1970. *Beliefs, attitudes, and human affairs*. Belmont, CA: Brooks/Cole.
- Bennetts, L. 1996. African dreamer. *Vanity Fair*. New York: Vanity Fair Pub. Co.
- Bentler, P.M. and G. Speckart. 1979. Models of attitude-behavior relations. *Psychol. Rev.* 86:452-464.
- Berger, D.J. 1993. *Wildlife extension: Participatory conservation by the Maasai in Kenya*. Nairobi, Kenya: African Centre for Technology Studies.
- Berger, D.J. 1996. The challenge of integrating Maasai tradition with tourism In *People and tourism in fragile environments*, ed. Price, M., 175-197. Chichester: John Wiley & Sons.
- Berger, I. and R.M. Corbin. 1992. Perceived consumer effectiveness and faith in others as moderators of environmentally friendly responsible behaviors. *J. Public Policy Mark.* 11(2):79-89.
- Bernard, H. R. 1995. *Research methods in anthropology: Qualitative and quantitative approaches*. Walnut Creek, CA: AltaMira Press.
- Bernsten, J.L. 1980. The enemy is us: Eponymy in the historiography if the Maasai. *Hist. Afr.* 7:1-19.
- Bernsten, J.L. 1976. The Maasai and their neighbors: Variables of interaction. *Afr. Econ. Hist.* No. 2:1-11.
- Biermayr-Jenzano, P. 2003. Maximizing conservation in protected areas: Guidelines for gender considerations. Policy Brief. San Jose, Costa Rica: IUCN-ORMA.
<http://www.prb.org/pdf/IUCNGenderFolleto.pdf>. Last accessed July 20, 2010.
- Bjerke, T. and B.P. Kaltenborn. 1999. The relationship of ecocentric and anthropocentric motives to attitudes toward large carnivores. *J. Environ. Psychol.* 19:415-421.
- Blackburn, R.H. 1996. Maasai/Dorobo objects: The ethnographic perspective. *Afr. Arts* 29(1):12-15.
- Blackburn, R.H. 1982. *Okiek*. London: Evans Brothers Ltd.

- Blanc, J., R. F. W. Barnes, G. C. Craig, H. T. Dublin, C. R. Thouless, I. Douglas-Hamilton, and J. A. Hart. 2007. African elephant status report 2007: An update from the African Elephant Database. Occasional Paper Series of the IUCN Species Survival Commission, No. 33. IUCN/SSC African Elephant Specialist Group. Gland, Switzerland: IUCN.
- Blanc, J. 2008. *Loxodonta africana*. In IUCN 2010. IUCN Red List of Threatened Species. Version 2010.1. <http://www.iucnredlist.org> Last accessed 6/09/10.
- Boone. R. and M. Coughenour, eds. 2001. *A System for Integrated Management and Assessment of East African Pastoral Lands*. Final Report to the Global Livestock Collaborative Research Support Program, U.S. Agency for International Development, U. California, Davis.
- Bordiga, E. and B. Campbell. 1982. Belief relevance and attitude-behavior consistency: The moderating role of personal experience. *J. Pers. Soc. Psychol.* 42(2):239-247.
- Bradely, J.C., T.M. Waliczek, and J.M. Waliczek. 1999. Knowledge and environmental attitude of high school students. *J. Environ. Educ.* 30(3):17-23.
- Bright, A.D., and M.J. Manfredo. 1995. Moderating effects of personal importance on the accessibility of attitudes toward recreation participation. *Leisure Sci.* 17:281-294.
- Bright, A.D., M.J. Manfredo, and D.C. Fulton. 2000. Segmenting the public: An application of value orientations to wildlife planning in Colorado. *Wildl. Soc. Bull.* 28(1):218-226.
- Brislin, R. 1993. *Understanding culture's influence on behavior*. Fort Worth, TX: Harcourt Brace College Publishers.
- Brooks, J.J., R.J. Warren, M.G. Nelms, and M.A. Tarrant. 1999. Visitor attitudes toward and knowledge of restored bobcats on Cumberland Island National Seashore, Georgia. *Wildl. Soc. Bull.* 27(4):1089-1097.
- Brown, D. W. J. 1968. Game control in Kenya. *Afr. Agr. For. J.* Special Issue: 209-212.
- Browne-Núñez, C. and Jonker, S. 2008. Attitudes toward wildlife and conservation across Africa: A review of survey research. *Hum. Dim. Wildl.* 13:49-72.
- Browne-Núñez, C. and K. Kangwana. in press. The human context of the Amboseli elephants In *The Amboseli Elephants: A Long-Term Perspective on a Long-Lived Mammal*, eds. C. Moss, H. Croze, and P. Lee. Chicago, IL: University of Chicago Press.
- Bulmer, M. 1998. Introduction: The problem of exporting social survey research. *Am. Behav. Sci.* 42(2):153-167.
- Bulte, E.H., R.B. Boone, R. Stringer, and P.K. Thornton. 2008. Elephants or onions? Paying for nature in Amboseli, Kenya. *Environ. Dev. Econ.* 13:395-414.

- Bulte, E.H., R.B. Boone, R. Stringer, and P.K. Thornton. 2006. *Wildlife conservation in Amboseli, Kenya: Paying for nonuse values*. Roles of Agriculture Project, Agricultural and Development Economics Division (ESA), Food and Agriculture Organization of the United Nations. Rome: United Nations.
- BurnSilver, S. and E. Mwangi. 2007. *Beyond group ranch subdivision: Collective action for livestock mobility, ecological viability, and livelihoods*. CAPRI Working Paper No. 66. Washington D.C.: International Food Policy Research Institute.
- BurnSilver, S.B., J. Worden, and R.B. Boone. 2008. Process of fragmentation in the Amboseli ecosystem, Southern Kajiado District, Kenya. In *Fragmentation in semi-arid and arid landscapes: Consequences for human and natural systems*, ed. K.A. Galvin, 225-253. Dordrecht, The Netherlands: Springer.
- Byers, B. 1996. *Understanding and influencing behaviors in conservation and natural resources management*. African Biodiversity Series No. 4, Biodiversity Support Program, Washington, D.C.: United States Agency for International Development.
- Caduto, M.J. 1985. *A guide on environmental value education*. UNESCO-UNEP International Environmental Education Series 13. Paris, France: UNESCO.
- Campbell, D.J., H. Gichohi, A. Mwangi, and L. Chege. 2000. Land use conflict in Kajiado District, Kenya. *Land Use Policy* 17:337-348.
- Campbell, D.J., H. Gichohi, R. Reid, A. Mwangi, L. Chege, and T. Sawin. 2002. Competition and conflict between people and wildlife in S.E. Kajiado District, Kenya. Working Paper Number 18, Nairobi: ILRI. <http://www.lucideastafrica.org> . Last accessed July 20, 2010.
- Campbell, D.J., H. Gichohi, R. Reid, A. Mwangi, L. Chege, and T. Sawin. 2003. Interactions between people and wildlife in Southeast Kajiado District, Kenya. Land Use Change Impacts and Dynamics (LUCID) Project Working Paper 18. Nairobi, Kenya: International Livestock Research Institute.
- Campbell, J.M. and K.J. Mackay. 2003. Attitudinal and normative influences on support for hunting as a wildlife management strategy. *Hum. Dim. Wildl.* 8:181-197.
- Capone, D.L. 1972. *Wildlife, man and competition for land in Kenya: A geographical analysis*. PhD dissertation, Michigan State University, East Lansing, MI.
- Casley, D.J. and D.A. Lury. 1987. *Data collection in developing countries 2nd edition*. Oxford: Oxford University Press.
- Chadwick, D. H. 1992. *The Fate of the Elephant*. San Francisco, CA: Sierra Club Books.
- Chambers, R. 1997. *Whose reality counts? Putting the last first*. London: IT Publications.

- Cinner, J. E., M.J. Marnane, T. R. McClanahan, T. H. Clark, and J. Ben. 2005. Trade, tenure, and tradition: Influence of sociocultural factors on resource use in Melanesia. *Conserv. Biol.* 19(5):1469-1477.
- Coast, E. 2002. Maasai socioeconomic conditions: A cross-border comparison. *Hum. Ecol.* 30(1):79-105.
- Cochrane, K., Nkedianye, D., Partoip, E., Sumare, S., Kiruswa, S., Kaelo, D., Onetu, L., Nesele, M., Said, M., Homewood, K., Trench, P., Reid, R.S., and Herrero, M. 2005. *Family Fortunes: Analysis of Changing Livelihoods in Maasailand*. Final Project Report ZC0275. Livestock Production Programme. Department for International Development, United Kingdom.
- Cohen, J. 1988. *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, N.J.: Lawrence Erlbaum.
- Collett, D. 1987. Pastoralists and wildlife: Image and reality in Kenya Maasailand In *Conservation in Africa: People, policies, and practice*, eds. D. Anderson and R Grove, 129-148. Cambridge: Cambridge University Press.
- Conant, F. 1982. Thorns paired, sharply recurved: Cultural controls and rangeland quality in East Africa In *Desertification and development: Dryland ecology in social perspective*, eds. B. Spooner and H. Mann, 111-122. New York: Academic Press.
- Conner, M. and C.J. Armitage. 1998. Extending the theory of planned behavior: A review and avenues for further research. *J. Appl. Social Psychol.* 28:1429-64.
- Costello, A.B. and J.W. Osborne. 2005. Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment Research & Evaluation* 10(7). <http://pareonline.net/getvn.asp?v=10&n=7> . Last accessed July 20, 2010.
- Croze, H., S. Sayialel, and D. Sitonik. 2007. *What's on in the ecosystem: Amboseli as a Biosphere Reserve. A Compendium of Conservation and Management Activities in the Amboseli Ecosystem v. 1.2*. Nairobi, Kenya: ATE/AERP, UNESCO/MAB.
- Cumming, D. H. M., R. F. Du Toit, and S. N. Stuart. 1990. African elephants and rhinos: Status survey and conservation action plan. IUCN/SSC action plans for conservation and biological diversity. Gland, Switzerland: IUCN.
- Czech, B., P.K. Devers, and P.R. Krausman. 2001. The relationship of gender to species conservation attitudes. *Wildl. Soc. Bull.* 29(1):187-194.
- Darling, F.F. 1960. An ecological reconnaissance of the Mara Plains in Kenya Colony. *Wildlife Monogr.* 5:1-41.

- De Boer, W. F. and D. S. Baquete. 1998. Natural resource use, crop damage and attitudes of rural people in the vicinity of the Maputo Elephant Reserve, Mozambique. *Environ. Conserv.* 25:208-218.
- Decker, D.J., T.B. Lauber, and W.F. Siemer. 2002. *Human-wildlife conflict management: A practitioner's guide*. Ithaca, NY: Northeast Wildlife Damage Management Research and Outreach Cooperative.
- Decker, D., Brown, T.L., and Siemer, W.F., eds. 2001. *Human dimensions of wildlife management in North America*. Bethesda, MD: The Wildlife Society.
- Deihl, C. 1985. Wildlife and the Maasai: The story of East African parks. *Cult. Survival Q.* 9(1):37-40.
- Dickman, A. J. 2005. *An assessment of pastoralist attitudes and wildlife conflict in the RungwaRuaha Region, Tanzania, with particular reference to large carnivores*. M.Sc. thesis, Oxford, UK: University of Oxford.
- Dietz, T., E. Ostrom, and P. C. Stern. 2003. The struggle to govern the commons. *Science* 302:1907-1912.
- Distefano, J.A. 1990. Hunters or hunted? Towards a history of the Okiek of Kenya. *Hist. Afr.* 17:41-57.
- Doll, J. and I. Ajzen. 1992. Accessibility and stability of predictors in the theory of planned behavior. *J. Pers. Soc. Psychol.* 63:754-765.
- Dougherty, E.M., D.C. Fulton, and D.H. Anderson. 2003. The influence of gender on the relationship between wildlife value orientations, beliefs, and the acceptability of lethal deer control in Cuyahoga Valley National Park. *Society Nat. Resources* 16:603-623.
- Douglis, C. 2001. Cultural bomas: Business and show biz. *Afr. Wildl. News* 36(2):3 Washington D.C.: African Wildlife Foundation.
- Drews, C. 2002. Attitudes, knowledge and wild animals as pets in Costa Rica. *Anthrozoös* 15(2):119-138.
- Dublin, H. 1994. In the eye of the beholder: Our image of the African elephant. *Endangered Species Tech. Bull.* 19(1):5-6.
- Dublin, W.T; McShane T. O. and Newby J. 1997. *Conserving Africa's Elephants: Current Issues & Priorities for Action*. Report prepared for WWF International: Gland, Switzerland.
- Du Toit, J.T. and D.H.M. Cumming. 1999. Functional significance of ungulate diversity in African savannas and the ecological implications of the spread of pastoralism. *Biodivers. Conserv.* 8:1643-1661.

- Eagly, A.H. & S. Chaiken. 1993. *The psychology of attitudes*. New York: Harcourt, Brace, Jovanovich.
- Ehret, C. 1971. *Southern Nilotic History*. Evanston, IL: Northwestern University Press.
- Eliot, C. 1905. *The East African Protectorate*. London: Edward Arnold.
- Ellen, P.S. J.L. Wiener, and C. Cobb-Walgren. 1991. The role of perceived consumer effectiveness in motivating environmentally conscious behaviors. *J. Public Policy Mark.* 10(2):102-117.
- Eagly, A.H. and S. Chaiken. 1994. *The psychology of attitudes*. Fort Worth, TX: Harcourt College Publishers.
- Ehret, C. 1971. *Southern Nilotic history: Linguistic approaches to the study of the past*. Evanston, IL: Northwestern University Press.
- Emerton, L. 1998. *The nature of benefits and the benefits of nature: Why wildlife conservation has not economically benefited communities in Africa. Community conservation in Africa: Principles and comparative practice*. Discussion paper 7. Institute for Development Policy and Management, Manchester, UK: University of Manchester.
- Enghoff, M. 1990. Wildlife conservation, ecological strategies and pastoral communities: A contribution to the understanding of parks and people in East Africa. *Nomadic Peoples* 25(7): 93-107.
- Ensminger, J. and A. Rutten. 1991. The political economy of changing property rights: Dismantling a pastoral commons. *Am. Ethnol.* 18(4):683-699.
- Fabrigar, L.R., D.T. Wegener, R.C. MacCallum, and E.J. Strahan. 1999. Evaluating the use of exploratory factor analysis in psychological research. *Psychol. Methods* 4(3):272-299.
- Fazio, R.H. 1986. How do attitudes guide behavior? In *The handbook of motivation and cognition: Foundations of social behavior*, eds. R.M. Sorrentino and E.T. Higgins, 204-243. New York: Guilford.
- Fazio, R.H. 1990. Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. In *Advances in Experimental Social Psychology*, ed. Zanna, M.P., 75-108. New York: Academic Press.
- Fazio, R. H. 1995. Attitudes as object-evaluation associations: Determinants, consequences, and correlates of attitude accessibility. In *Attitude strength: Antecedents and consequences*, eds. R. Petty and J. Krosnick, 247-282. Mahwah, NJ: Erlbaum.
- Fazio, R.H. and M.P. Zanna. 1978. On the predictive validity of attitudes: The roles of direct experience and confidence. *J. Pers.* 46:228-243.

- Fazio, R.H., M.C. Powell, & C.J. Williams. 1989. The role of attitude accessibility in the attitude-to-behavior process. *J. Consum. Res.* 16:280-288.
- Fazio, R.H. and T. Towles-Schwen. 1999. The MODE model of attitude-behavior processes. In *Dual-process theories in social psychology*, eds. S. Chaiken and Y. Trope, 97-116. New York: Guilford.
- Finchum, R. 2002. *The beliefs and perceptions of fishermen regarding management actions, regulations, and the protection of the Galapagos Marine Reserve, Ecuador*. M.Sc. Thesis, Department of Natural Resource Recreation and Tourism, Colorado State University, Ft. Collins, CO.
- Fishbein, M. and I. Ajzen. 1975. *Beliefs, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Fishbein, M. and M.J. Manfredo. 1992. A theory of behavior change. In *Influencing Human Behavior*, ed. M.J. Manfredo, 29-50. Champaign, IL: Sagamore Press.
- Foley, R. 1981. *Off-site archaeology and human adaptation in eastern Africa*. Oxford: British Archaeological Research.
- Fosbrooke, H. 1948. An administrative survey of the Masai social system. *Tanganyika Notes and Records* 26:1-50.
- Fosbrooke, H. 1972. *Ngorongoro – The eighth wonder*. London: Andre Deutsch Ltd.
- Fratkin, E. 1994. Pastoral land tenure in Kenya: Maasai, Samburu, Boran, and Rendille experiences 1950-1990. *Nomadic Peoples* 34:55-68.
- Fratkin, E. and R. Mearns. 2003. Sustainability and pastoral livelihoods: Lessons from East African Maasailand and Mongolia. *Hum. Organ.* 62(2):112-122.
- Fritz, H., M. De Garine-Wichatitsky, and G. Letessier. 1996. Habitat use by sympatric wild and domestic herbivores in an African savanna woodland: The influence of cattle spatial behavior. *J. Appl. Ecol.* 33:589-598.
- Frost, C.J. 2000. *Comparing attitudes about forests between young adults in north-central Florida and the Peruvian Amazon*. M.Sc. Thesis, School of Forest Resources and Conservation, University of Florida, Gainesville, FL.
- Fulton, D.C., M.J. Manfredo, and J. Lipscomb. 1996. Wildlife value orientations: A conceptual and measurement approach. *Hum. Dim. Wildl.* 1:24-47.
- Gadd, M. 2005. Conservation outside of parks: Attitudes of local people in Laikipia, Kenya. *Environ. Conserv.* 32(1):50-63.
- Gadgil, M. F. Berkes, and C. Folke. 1993. Indigenous knowledge for biodiversity conservation. *Ambio* 22(2-3):151-156.

- Galaty, J.G. 1981. Pastoral orbits and deadly jousts: Factors in the Maasai expansion. In *Herdsmen, warriors, and traders: Pastoralism in Africa*, eds. J.G. Galaty and P. Bonte, 171-198. Boulder, CO: Westview Press.
- Galaty, J.G. 1992. The land is yours: Social and economic factors in the privatisation, subdivision and sale of Maasai ranches. *Nomadic Peoples* 30:26-40.
- Galaty, J.G. 1993. Maasai Expansion and the new East African pastoralism. In *Being Maasai* eds. T. Spear and R. Waller, 61-86. London: James Currey Ltd.
- Galaty, J.G. 1993. 'The eye that wants a person, where can it not see?' In *Being Maasai* eds. T. Spear and R. Waller, 174-194. London: James Currey Ltd.
- Galvin, K.A., P. K. Thornton, J. Roque de Pinho, J. Sunderland, and R. B. Boone. 2006. Integrated modeling and its potential for resolving conflicts between conservation and people in the rangelands of East Africa. *Hum. Ecol.* 34(2):155-183.
- Gannon, M.J. and R. Pillai. 2010. *Understanding global cultures: Metaphorical journeys through 29 nations, continents, and diversity*. (4th ed.). Thousand Oaks, CA: Sage Publications.
- Gardener, G.T. and P.C. Stern. 1996. *Environmental problems and human behavior*. Boston, MA: Allyn and Bacon.
- George, S.L. and K.R. Crooks. 2006. Education and conservation on the urban-wildlife interface: Testing the efficacy of informational brochures. *Southwest. Nat.* 51(2):240-250.
- Gesicho, A. 1991. *A survey of the Arabuko Sokoke elephant population*. KWS Elephant Programme, Nairobi, Kenya: Kenya Wildlife Service.
- Gibson, C.C. and S.A. Marks. 1995. Transforming rural hunters into conservationists: An assessment of community-based wildlife management programs in Africa. *World Devel.* 23(6):941-957.
- Giles, M., C. Liddell, and M. Bydawell. 2005. Condom use in African adolescents: The role of individual and group factors. *AIDS Care* 17(6): 729-739.
- Gillingham, S. and P.C. Lee. 1999. The impact of wildlife-related benefits on the conservation attitudes of local people around the Selous Game Reserve, Tanzania. *Environ. Conserv.* 26(3):228-228.
- Gillingham, S. and Lee, P.C. 2003. People and protected areas: A study of local perceptions of wildlife crop-damage conflict in an area bordering the Selous Game Reserve, Tanzania. *Oryx* 37(3), 316-325.
- Goldman, M. 2003. Partitioned nature, privileged knowledge: Community based conservation in Tanzania *Dev. Change* 34(5):833-862.

- Gore, M.L., B.A. Knuth, P.D. Curtis, and J.E. Shanahan. 2006. Stakeholder perceptions of risk associated with human-black bear conflicts in New York's Adirondack Park campgrounds: Implications for theory and practice. *Wildl. Soc. Bull.* 34(1):36-42.
- Government of Kenya. 1989. *Kenya Gazette Supplement Acts, 1989*. Nairobi, Kenya: Government of Kenya.
- Grandin, B. 1986. Land tenure, subdivision and residential change on a Maasai group ranch. Development Anthropology Network, *Bulletin of the Institute for Development Anthropology* 4 (2):9-13.
- Greaves, N. 1996. *When elephant was king and other elephant tales from Africa*. Cape Town: Struik Publishers, Ltd.
- Groves, R. M. 1987. Research on survey data quality. *Public Opin. Quart.* 51:S156-172.
- Hackel, J. 1990. Conservation attitudes in Southern Africa: A comparison between KwaZulu and Swaziland. *Hum. Ecol.* 18(2):203-209.
- Harcourt, A. H., H. Pennington and A.W. Weber. 1986. Public attitudes to wildlife conservation in the Third World. *Oryx* 20:152-154.
- Hardin, G. 1968. The tragedy of the commons. *Science* 162:1243-48.
- Harkness, J. 1999. In pursuit of quality: Issues for cross-national survey research. *Int. J. Soc. Res. Methodol.* 2(2):125-140.
- Heath, A., S. Fisher, and S. Smith. 2005. The globalization of public opinion research. *Annu. Rev. Polit. Sci.* 8:297-333.
- Heberlein, T. A. 1981. Environmental Attitudes. *J. Environ. Policy* 2:241-270.
- Heberlein, T. A. 2004. Fire in the Sistine Chapel: How Wisconsin responded to chronic wasting disease. *Hum. Dim. Wildl.* 9:165-179.
- Hill, C.M. 1998. Conflicting attitudes towards elephants around the Budongo Forest Reserve, Uganda. *Environ. Conserv.* 25(3):244-250.
- Hinde, S.L. and H. Hinde. 1901. *The last of the Masai*. London: William Heinemann.
- Hoare, R. 1995. Options for the control of elephants in conflict with people. *Pachyderm* 19:54-62.
- Hoare, R. 2000. African elephants and human in conflict: The outlook for co-existence. *Oryx* 34(1):34-38.
- Hoare, R.E. 2001. *A decision support system for managing human-elephant conflict situations in Africa*. Nairobi: IUCN/African Elephant Specialist Group.

- Hoare, R. E. and J. T. DuToit. 1999. Coexistence between people and elephants in African Savannas. *Conserv. Biol.* 13:633-639.
- Hodgson, D.L. 2005. *The church of women: Gendered encounters between Maasai and missionaries*. Bloomington, IN: Indiana University Press.
- Hodgson, D.L. 2001. *Once intrepid warriors: The cultural politics of gender, ethnicity and Maasai development in Tanzania*. Bloomington, IN: Indiana University Press.
- Hogg, R. 1987. Settlement, pastoralism and the commons: The ideology and practice of irrigation development in northern Kenya. In *Conservation in Africa: People, policies and practice*, eds. D. Anderson and R. Grove, 293-306. Cambridge: Cambridge University Press.
- Hollis 1905. *The Masai: Their Language and Folklore*. Oxford: Clarendon Press.
- Hollis, A.C. 2003. *Masai myths, tales, and riddles*. Mineola, NY: Dover Publications.
- Holmes, C. M. 2003. The influence of protected area outreach on conservation attitudes and resource use patterns: A case study from western Tanzania. *Oryx* 37(3):305-315.
- Homer, P.M. and L. R. Kahle. 1988. A structural equation test of the value-attitude-behavior hierarchy. *J. Pers. Soc. Psych.* 54:638-646.
- Homewood, K.M. and W.A. Rodgers. 1984. Pastoralism and conservation. *Hum. Ecol.* 12(4):431-441.
- Homewood, K.M. and W.A. Rodgers. 1991. *Maasailand ecology: Pastoralist development and wildlife conservation in Ngorongoro, Tanzania* Cambridge: Cambridge University Press.
- Homewood, K., P. Kristjanson, and P.C. Trench. 2009. Changing land use, livelihoods and wildlife conservation in Maasailand. In *Staying Maasai? Livelihoods, conservation and development in East African rangelands*, eds. Homewood, K., P. Kristjanson, and P.C. Trench, 1-42. New York: Springer Press.
- Horgan, J. 1989. The Maasai: These pastoralists are key to the future of Kenya's wildlife. *Sci. Am.* 261:38-44.
- Hui, C.H. 1988. Measurement of individualism-collectivism. *J. Res. Pers.* 22:17-36.
- Hulme, D. and M. Infield 2001. Community conservation, reciprocity, and park-people relationships: Lake Mburo National Park, Uganda. In Hulme, D. and M. Murphree. (Eds.), *African wildlife and livelihoods: The promise and performance of community conservation* (pp. 106-130). Portsmouth, NH: Heinemann.
- Hulme, D. and M. Murphree. 2001. *African wildlife and livelihoods: The promise and performance of community conservation*. Portsmouth, NH: Heinemann.

- Hungerford, H.R. and T.L. Volk. 1990. Changing learner behavior through environmental education. *J. Environ. Educ.* 21(3):8-21.
- Hunn, E. 1982. Mobility as a factor limiting resource use in the Columbia Plateau of North America. In *Resource Managers: North American and Australian hunter-gatherers*, eds. N. Williams and E. Hunn, 17-43. Boulder: Westview Press.
- Hunn, E.S., D.R. Johnson, P.N. Russell, and T.F. Thornton. 2003. Huna Tlingit traditional environmental knowledge, conservation, and the management of a "wilderness" park. *Curr. Anthropol.* 44:S79-S103.
- Hunter, L.M. and J.M. Brehm. 2004. A qualitative examination of value orientations toward wildlife and biodiversity by rural residents of the intermountain region. *Hum. Ecol. Rev.* 11(1):13-26.
- Hunter, M.L., R.K. Hitchcock, and B. Wyckoff-Baird. 1990. Women and wildlife in southern Africa. *Conserv. Biol.* 4(4):448-451.
- Huntingford, G.W.B. [1953] 1969. *The Southern Nilo-Hamites*. London: International African Institute.
- Infield, M. 1988. Attitudes of a rural community towards conservation and a local conservation area in Natal, South Africa. *Biol. Conserv.* 45:21-46.
- Infield, M. 2001. Cultural values: A forgotten strategy for building community support for protected areas in Africa. *Conserv. Biol.* 15(3):800-802.
- Infield, M. and A. Namara. 2001. Community attitudes and behaviours towards conservation: An assessment of a community conservation programme around Lake Mburo National Park, Uganda. *Oryx* 35: 8-60.
- Irungu, C.N. 1992. A Hydrogeological Study of the Amboseli Basin (Kenya). MSc thesis, ITC, Netherlands.
- IUCN. 1987. *IUCN directory of Afrotropical protected areas*. Gland: IUCN.
- Jaccard, J., G.W. King, and R. Pomazal. 1977. Attitudes and behavior: An analysis of specificity of attitudinal predictors. *Hum. Relat.* 30(9):817-824.
- Jacobs, A.H. 1965. *The traditional political organization of the pastoral Maasai*. Unpub. Ph.D. diss. Oxford, University of Oxford.
- Jacobs, A.H. 1968. A chronology of the pastoral Maasai. In *Hadith I: Proceedings of the annual conference of the Historical Association of Kenya 1967*, ed. B.A. Ogot, 10-31. Nairobi: East African Publishing House.
- Jacobs, A. H. 1975. Maasai pastoralism in historical perspective. In *Pastoralism in tropical Africa*, ed. T. Monod, 406-25. London: Oxford University Press.

- Jacobson, S.K. and S.B. Maryonowski. 1997. Public attitudes and knowledge about ecosystem management on Department of Defense land in Florida. *Conserv. Biol.* 11(3):770-781.
- Jacobson, S.K. 2009. *Communication skills for conservation professionals*. 2nd Edition. Washington, D.C.: Island Press.
- Jemmott III, J.B., G.A. Heeren, Z. Ngwane, N. Hewitt, L.S. Jemmott, R. Shell, and A. O'Leary. 2007. Theory of planned behaviour predictors of intention to use condoms among Xhosa adolescents in South Africa. *AIDS Care* 19(5):677-684.
- Johnson, T. P. 2006. Methods and frameworks for crosscultural measurement. *Med. Care* 44(11):S17-S20.
- Jowell, R. 1998. How comparative is comparative research? *Am. Behav. Sci.* 42(2): 168-177.
- Kaltenborn, B.P., T. Bjerke, J.W. Nyahongo, and D.R. Williams. 2006. Animal preferences and acceptability of wildlife management actions around Serengeti National Park, Tanzania. *Biodivers. Conserv.* 15:4633-4649.
- Kangwana, K. 1993. *Elephants and Maasai: Conflict and conservation in Amboseli, Kenya*. Ph.D. Thesis, Univ. Cambridge, Cambridge, U.K. 157 pp.
- Kangwana, K. and C. Browne-Nuñez. in press. The human context of the Amboseli elephants In *The Amboseli Elephants: A Long-Term Perspective on a Long-Lived Mammal*, eds. C. Moss, H. Croze, and P. Lee. Chicago, IL: University of Chicago Press.
- Kangwana, K. and R. Ole Mako. 2001. Conservation, livelihoods and the intrinsic value of wildlife Tarangire National Park, Tanzania In *African wildlife and livelihoods: The promise and performance of community conservation*, eds. D. Hulme and M. Murphree, 148-159. Oxford: James Currey Ltd.
- Kasfir, S.L. 1995. Rethinking the Maasai ivories. *Afr. Arts* 28(2):12-15.
- Kasfir, S.L. 1992. Ivory from Zariba Country to the Land of the Zinj. In *Elephant: The animal and its ivory in African Culture*, ed. D.H. Ross, 309-327. Los Angeles, CA: University of California.
- Kasiki, S.M. 1998. *Human-elephant conflict in areas adjacent to the Tsavo National Parks, Kenya*. PhD thesis, University of Kent, UK.
- Kellert, S.R. 1976. Perceptions of animals in American society. *T. N. Am. Wildl. Nat. Res.* 41:533-546.
- Kellert, S.R. 1980. Contemporary values of wildlife in American society. in *Wildlife values*, eds. W.W. Shaw and E.H. Zube, 31-60. Tucson, AZ: Center for Assessment of Noncommodity Natural Resource Values, University of Arizona.

- Kellert, S. R. 1985. Public perceptions of predators, particularly the wolf and coyote. *Biol. Conserv.* 3:167-189.
- Kellert, S.R. 1993. Attitudes, knowledge and behavior toward wildlife among the industrial superpowers: United States, Japan, and Germany. *J. Soc. Issues* 49:53-69.
- Kellert, S.R. 1996. *The value of life*. Washington, D.C: Island Press.
- Kellert, S.R., J.N. Mehta, S.A. Ebbin, and L.L. Lichtenfeld. 2000. Community natural resources management: Promise, rhetoric, and reality. *Society Nat. Resources* 13(8):705-715.
- Kellert, S.R. and J.K. Berry. 1987. Attitudes, knowledge, and behaviors toward wildlife as affected by gender. *Wildl. Soc. Bull.* 15:363-371.
- Kesby, J.D. 1977. *The cultural regions of East Africa*. London: Academic Press.
- Kideghesho, J.R., E. Røskaft, and B.P. Kaltenborn. 2007. Factors influencing conservation attitudes of local people in Western Serengeti, Tanzania. *Biodivers. Conserv.* 16: 2213-2230.
- Kinloch, B. 1972. *The shamba raiders*. London: Collins & Harvill Press.
- Kinyua, P.I.D., G.C. van Kooten, and E.H. Bulte. 2000. African wildlife policy: Protecting wildlife herbivores on private game ranches. *Eur. Rev. Agric. Econ.* 27(2):227-244.
- Kioko, J. 2004. *Spatial-temporal distribution of African elephants (Loxodonta africana) and their interaction with human in Kuku-Kimana area of Tsavo-Amboseli Ecosystem, Kenya*. Ph.D. Thesis, University of Greenwich, London, UK.
- Kioko, J., P. Muruthi, P. Omondi, and P.I. Chiyo. 2008. The performance of electric fences as elephant barriers in Amboseli, Kenya. *S Afr. J. Wildl. Res.* 38(1):52-58.
- Kipury, N. 1983. *Oral literature of the Maasai*. Nairobi, Kenya: East African Educational Publishers, Ltd.
- Kiss, A. 1990. *Living with wildlife: Wildlife resource management with local participation in Africa*. Washington, D.C.: The World Bank.
- Kituyi, M. 1990. *Becoming Kenyans: Socio-economic transformation of the pastoral Maasai*. Nairobi, Kenya: ACTS Press.
- Knowles, J.N. and D.P. Collett. 1989. Nature as myth, symbol and action: Notes towards a historical understanding of development and conservation in Kenyan Maasailand. *Africa* 59(4):433-460.
- Knuth, B.A., R.J. Stout, W.F. Seimer, D.J. Decker, and R.C. Stedman. 1992. Risk management concepts for improving wildlife population decisions and public communication strategies. *T. N. Am. Wildl. Nat. Res* 57: 63-74.

- Krapf, J.L. 1854. *Vocabulary of the Engutuk Eloikob: Or language of the Wakaufi-nation of the interior of Equatorial Africa*. Tübingen: Ludwig Fried Fues.
- Krapf, J.L. 1860. *Travels, researches and missionary labours during eighteen years residence in East Africa*. London: Trubner.
- Kratz, C.A. 1996. The troublesome Turle collection. *Afr. Arts* 29(1):17, 87-89.
- Kraus, S.J. 1995. Attitudes and the prediction of behavior: A meta-analysis of the empirical literature. *Pers. Soc. Psychol. B.* 21:58-75.
- Kuechler, M. 1998. The survey method. *Am. Behav. Sci.* 42(2):178-200.
- Kuriyan, R. 2002. Linking local perceptions of elephants and conservation: Samburu pastoralists in northern Kenya. *Society Nat. Resources* 15(10):949-957.
- Kurtis, B. 1994. [videorecording] *Maasai: Secrets of an ancient culture*. Chicago: Public Media Education.
- KWS. 1990. *Policy framework and Development Programme 1991-1996*. Nairobi, Kenya: Kenya Wildlife Service.
- KWS. 2000. *Wildlife-human conflicts: Sources, solutions, and issues*. Nairobi, Kenya: Kenya Wildlife Service.
- LaHart, D.E. 1978. *The influence of knowledge on young people's perceptions about wildlife*. Report to the National Wildlife Federation. The Florida State University, College of Education.
- Lahm, S.A. 1996. A nationwide survey of crop-raiding by elephants and other species in Gabon. *Pachyderm* 21:69-77.
- Lamprey, H. 1983. Pastoralism yesterday and today: The overgrazing problem. In *Ecosystems of the World 13, Tropical savannas*, ed. F. Bourlière, 643-666. Amsterdam: Elsevier.
- Lamprey, R.H. and R.S. Reid. 2004. Expansion of human settlement in Kenya's Maasai Mara: What future for pastoralism and wildlife? *J. Biogeogr.* 31:997-1032.
- Lamprey, R. and R.D. Waller. 1990. The Loita-Mara Region in historical times: Patterns of subsistence, settlement and ecological change. In *Early Pastoralists of South-western Kenya*, ed. P. Robertshaw, 16-35. Nairobi, Kenya: British Institute of East Africa.
- Lauber, T.B., M.L. Anthony, and B.A. Knuth. 2001. Gender and ethical judgments about suburban deer management. *Society Nat. Resources* 14(7):571-584.
- Laws, R. M. 1970. Elephants as agents of habitat and landscape change in East Africa. *Oikos* 21:1-15.

- Leakey, R. and V. Morell. 2001. *Wildlife wars: My fight to save Africa's national treasures*. New York: St. Martin's Press.
- Lee, P. and M. Graham. 2006. African elephants and human-elephant interactions: Implications for conservation. *Int. Zoo Yearbook* 40:9-19.
- Lepp, A. 2007. Residents' attitudes towards tourism in Bigodi village, Uganda. *Tourism Management* 28:876-885.
- Lewis, D. M. (undated). *Survey of perceptions towards wildlife for two village communities with different exposure to a wildlife conservation project*. Lupande Development Project, Nyamalum, Zambia.
- Lewis, D.M., G.B. Kwaweche, and A.N. Mwenya. 1990. *Wildlife conservation outside protected areas: Lessons from an experiment in Zambia*. Report, ADMADE Project, National Parks of Zambia, Lusaka.
- Lazarus, R. 1966. *Psychological stress and the coping process*. New York: McGraw-Hill.
- Lindsay, W.K. 1987. Integrating parks and pastoralists: Some lessons from Amboseli In *Conservation in Africa: People, policies, and practice*, eds. D. Anderson and R. Grove, 149-167. Cambridge: Cambridge University Press.
- Lindsey, P.A., J.T. du Toit, and M.G.L. Mills. 2005. Attitudes of ranchers toward African wild dogs *Lycaon pictus*: Conservation implications on private land. *Biol. Conserv.* 125:113-121.
- Little, P.D. 1996. Pastoralism, biodiversity, and the shaping of savanna landscapes in East Africa. *Africa* 66(1):37-51.
- Little, P.D., K. Smith, B.A. Cellarius, D.L. Coppock, and C. Barrett. 2001. Avoiding disaster: Diversification and risk management among East African herders. *Dev. Change* 32(3):401-433.
- Lohr, C., W.B. Ballard, and A. Bath. 1996. Attitudes toward gray wolf reintroduction to New Brunswick. *Wildl. Soc. Bull.* 24:414-420.
- Lovatt Smith, D. 1986. *Amboseli: Nothing short of a miracle*. Nairobi: East African Publishing House Ltd.
- Low, B. 2000. Investigating the role of elephant migration routes in determining human-elephant conflict spatial patterns in Taita Taveta District, Kenya. Msc. Thesis, UK, University of Kent, Durrell Institute of Conservation and Ecology.
- Low, D.A. 1963. The northern interior 1840-1884. In *History of Africa* v. 1., eds. R. Oliver and G. Mathew, 297-351 London: Oxford University Press.

- Lugard, F.D. 1893. *The rise of our East African empire: Early efforts in Nyasaland and Uganda*, 2 vols. London: Blackwood.
- Lusiola, G.J. 1996. Management of wildlife outside protected areas in Kenya: Relationship between local communities and wildlife resources. In *Community-based conservation in Tanzania: Proceedings of workshop held in February 1994*, eds. Leader-Williams, N, J.A. Kayera, and G.L. Overton, 147-156. Gland: IUCN.
- Lynn, P. 2003. Developing quality standards for cross-national survey research: Five approaches. *Int. J. Soc. Res. Method.* 6(4):323-336.
- Madden, F. 2004. Creating coexistence between humans and wildlife: Global perspectives on local efforts to address human-wildlife conflicts. *Hum. Dim. Wildl.* 9:247-257.
- Makacha, S., M.J. Msingwa, and G.W. Frame. 1982. Threats to the Serengeti herds. *Oryx* 16(5):437-444.
- Manfredo, M.J. 2008. *Who cares about wildlife? Social science concepts for exploring human-wildlife relationships and conservation issues*. New York: Springer.
- Manfredo, M. J. and A.A. Dayer. 2004. Concepts for exploring the social aspects of human-wildlife conflict in a global context. *Hum. Dim. Wildl.* 9:317-328.
- Manfredo, M.J., J.J. Vaske, and D.J. Decker. 1995. Human dimensions of wildlife management: Basic concepts. In *Wildlife and recreationists: Coexistence through management and research*, eds. R.L. Knight and K.J. Gutzwiller, 33-50. Covelo, CA: Island Press.
- Manfredo, M. J., J.J. Vaske, and L. Sikorowski. 1996. Human dimensions of wildlife management. In *Natural Resource Management: The Human Dimension*, ed. A. Ewert, 53-72. Boulder, Colorado: Westview Press.
- Manfredo, M.J. and D.C. Fulton. 1997. A comparison of wildlife values in Belize and Colorado. *Hum. Dim. Wildl.* 2:62-63.
- Manfredo, M.J., T.L. Teel, and A.D. Bright. 2004. Application of the concepts of values and attitudes in Human Dimensions of Natural Resources research. In *Society & Natural Resources: A summary of knowledge*, eds. M.J. Manfredo, J.J. Vaske, B.L. Bruyere, D.R. Field, and P. Brown, 271-282. Jefferson City, MO: Litho.
- Mangus, V.J. and P. Martinez. 1997. Analysis of environmental concepts and attitudes among biology degree students. *J. Environ. Educ.* 29(1):28-34.
- Manson, S.M. 1997. Ethnographic methods, cultural context, and mental illness: Bridging different ways of knowing and experience. *Ethos* 25:249-258.
- Marquardt, M., M. Infield, and A. Namara. 1994. *Socio-economic survey of communities in the buffer zone of Lake Mburo National Park*. Lake Mburo Community Conservation Project. Uganda National Parks, Kampala.

- Mascarenhas, A. 1971. Agricultural vermin in Tanzania. In *Studies in East African Geography and Development*, ed. S.H. Ominde, 259-267. Berkeley: University of California Press.
- Mascia, M.B., J.P. Brosius, T.A. Dobson, B.C. Forbes, L. Horowitz, M.A. McKean, and N.J. Turner. 2003. Conservation and the social sciences. *Conserv. Biol.* 17(3):649-650.
- May, A. 2003. *Maasai Migrations: Implications for HIV/AIDS and Social Change in Tanzania*. Institute of Behavioral Science, Working Paper PAC2003-0001, University of Colorado, Boulder.
- Mburu, J., R. Birner, and M. Zeller. 2003. Relative importance and determinants of landowners' transaction costs in collaborative wildlife management in Kenya: An empirical analysis. *Ecol. Econ.* 45:59-73.
- McCabe, J.T. 2003. Sustainability and livelihood diversification among the Maasai of Northern Tanzania. *Hum. Organ.* 62(2):100-111.
- McCabe, J.T., S. Perkin, and C. Schofield. 1992. Can conservation and development be coupled among pastoral people? An examination of the Maasai of the Ngorongoro Conservation Area, Tanzania. *Hum. Organ.* 51(4):353-366.
- McCleery, R.A., R.B. Ditton, J. Sell, and R.R. Lopez. 2006. Understanding and improving attitudinal research in wildlife sciences. *Wildl. Soc. Bull.* 34(2):537-541.
- McDuff, M.M., G.S. Appelson, S.K. Jacobson, and G.D. Israel. 2008. Watershed management in north Florida: Public knowledge, attitudes, and information needs. *Lake Reserv. Manage.* 24(1):47-56.
- McKenzie-Mohr, D. and W. Smith. 1999. *Fostering sustainable behavior: An introduction to community-based social marketing*. Gabriola Island, British Columbia: New Society Publishers.
- Mearns, R. 1997. Livestock and environment: Potential for complementarity. *World Anim. Rev.* 88:2-14.
- Meinertzhagen, R. 1983. *Kenya diary (1902-1906)*. London: Eland Books.
- Merker, M. 1910. *The Maasai: Ethnographic monograph of an East African Semite People*. Berlin: Dietrich Reimer.
- Michailidou, M., D.J. Decker, and J.P. Lassoie. 2002. The interdependence of ecosystem and community viability: A theoretical framework to guide research and application. *Society Nat. Resources* 15:599-616.
- Mol, F. 1981. The Masai and Wildlife. *Swara* 4(2):24-27.
- Monroe, M. 2003. Two avenues for encouraging conservation behaviors. *Hum. Ecol. Rev.* 10(2):113-125.

- Mordi, R. 1987. *Public attitudes toward wildlife in Botswana*. Ph.D. dissertation, New Haven, CT: Yale University, School of Forestry and Environmental Studies.
- Moss, C. 1977. The Amboseli elephants. *Wildlife News* 12(2):9-12.
- Moss, C. 1988. *Elephant memories: Thirteen years in the life of an elephant family*. London: Elm Tree Books.
- Moss, C. 2001. The demography of an African elephant (*Loxodonta africana*) population in Amboseli, Kenya. *J. Zool.* 255:145-156.
- Mugisha, A. 2002. *Evaluation of community-based conservation approaches: Management of protected areas in Uganda*. Ph.D. dissertation, Gainesville, FL: University of Florida, Department of Wildlife Ecology and Conservation.
- Murray-Johnson, L., K. Witte, M. Boulay, M.E. Figueroa, D. Storey, and I. Tweedie. 2000-2001. Using health education theories to explain behavior change: A cross-country analysis. *International Quarterly of Community Health Education* 20(4):323-345.
- Muruthi, P. 2005. *Human-wildlife conflict: Lessons learned from AWF's African Heartlands*. AWF Working Papers. Nairobi, Kenya: African Wildlife Foundation.
- Mwangi, E. 2005. *The transformation of property rights in Kenya's Maasailand: Triggers and motivations*. CAPRI Working Paper 35. Washington DC: IFPRI.
[http:// www.capri.cgiar.org/pdf/capriwp35.pdf](http://www.capri.cgiar.org/pdf/capriwp35.pdf) . Last accessed July 20, 2010.
- Myers, D.G. 2002. *Social psychology* (7th Edition). New York: McGraw Hill.
- Myers, N. 1973. *The relationship of parks and other protected areas to their environs in Masailand, East Africa*. Ph.D. dissertation, Berkeley, CA: University of California..
- Nabane, N., and G. Matzke. 1997. A gender-sensitive analysis of a community-based wildlife utilization initiative in Zimbabwe's Zambezi Valley. *Society Nat. Resources* 10:519-535.
- Namara, A., M. Infield, and D. Sumba. 1998. *The influence of community conservation programme on farmers and pastoralist communities: Lake Mburo National Park, Uganda*. Report of a socio-economic survey carried out under the Community Conservation for Uganda Wildlife Authority Project. Kampala, Uganda: Uganda Wildlife Authority.
- Naughton-Treves, L. 1997. Farming the forest edge: Vulnerable places and people around Kibale National Park, Uganda. *Geogr. Rev.* 87(1):27-47.
- Naughton-Treves, L. 1998. Predicting patterns of crop damage by wildlife around Kibale National Park, Uganda. *Conserv. Biol.* 12:156-168.

- Naughton, L. R. Rose, and A. Treves. 1999. *The social dimensions of human-elephant conflict in Africa: A literature review and case studies from Uganda and Cameroon*. A report to the African Elephant Specialist Group, Human-Elephant Conflict Task Force. Gland: IUCN.
- Naughton-Treves, L. 2001. Farmers, wildlife and the forest fringe. In *African Rain Forest Ecology and Conservation*, eds. W. Weber, L.J.T. White, A. Vedder, and L. Naughton-Treves, 369-384. New Haven, CT: Yale University Press.
- Naughton-Treves, L. and A. Treves. 2005. Socioecological factors shaping local support for wildlife in Africa. In *People and wildlife, Conflict or Coexistence?*, eds. R. Woodroffe, S. Thirgood, & A. Rabinowits, 253-277. Cambridge, UK: Cambridge University Press.
- Ndaskoi, N. 2006. The root causes of Maasai predicament. *Fourth World J.* 7(1):28-61.
- Nelson, F. 2000. Sustainable development and wildlife conservation in Maasailand. *Environment, Development and Sustainability* 2:107-117.
- Newmark, W. D., and J.L. Hough. 2000. Conserving wildlife in Africa: Integrated conservation and development projects and beyond. *Bioscience* 50:585-592.
- Newmark, W.D., N.L. Leonard, H.I. Sariko, and D.M. Gamassa. 1993. Conservation attitudes of local people living adjacent to five protected areas in Tanzania. *Biol. Conserv.* 63:177-183.
- Ngure, N. 1992. Human-elephant interactions: Seeking remedies for conflicts. *Swara* 15:25-26.
- North American Association for Environmental Education. 1993. *Defining environmental education: The NAAEE perspective*. Washington, D.C.: North American Association for Environmental Education.
- Norton-Griffiths, M. 1998. The economics of wildlife conservation policy in Kenya. In *Conservation of Biological Resources*, eds. E. J. Milner-Gulland and R. Mace, 279-297. Oxford: Blackwell Science Ltd.
- Nunnally, J.C. and I.H. Bernstein. 1994. *Psychometric theory third edition*. New York: McGraw-Hill Series in Psychology.
- Ntiati, P. 2002. *Group ranch subdivision study in Loitokitok Division of Kajiado District, Kenya*. Land Use Change and Dynamics (LUCID) Project Working Paper Number 7. Nairobi, Kenya: International Livestock Research Institute.
- Nyhus, P.J., S.A. Osofsky, P. Ferraro, F. Madden, and H. Fischer. 2005. Bearing the costs of human-wildlife conflict: The challenges of compensation schemes. In *People and wildlife, Conflict or Coexistence?*, eds. R. Woodroffe, S. Thirgood, and A. Rabinowits, 107-121. Cambridge, UK: Cambridge University Press.

- O'Connell-Rodwell, C. E., T. Rodwell, M. Rice, and L. A. Hart. 2000. Living with the modern conservation paradigm: Can agricultural communities co-exist with elephants: A five-year case study in East Caprivi, Namibia. *Biol. Conserv.* 93:381-391.
- Ogra, M.V. 2008. Human-wildlife conflict and gender in protected area borderlands: A case study of costs, perceptions, and vulnerabilities from Uttarakhand (Uttaranchal), India. *Geoforum* 39:1408-1422.
- Okello, M.M., B.E.L. Wishitemi, and A.M. Mwinzi. 2001. Relative importance of conservation areas in Kenya based on diverse tourist attractions. *J. Tour. Studies* 12(1):39-49.
- Ole Dapash, M. 2002. Coexisting in Kenya: The human-elephant conflict. *Anim. Welfare Inst. Quart.* 51(1):10-12.
- Ole Parkipuny, M. S. and D. J. Berger. 1993. Maasai rangelands: Links between social justice and wildlife conservation. In *Voices from Africa: Local perspectives on conservation*, eds. E. D. Lewis and N. Carter, 113-131. Washington, D.C.: Word Wildlife Fund.
- O'Malley, E. 2000. *Cattle and cultivation: Changing land use and labor patterns in pastoral Maasai livelihoods, Loliondo Division, Ngorongoro District, Tanzania*. Ph.D. dissertation, Boulder, CO: University of Colorado.
- Omondi, P. 1994. *Wildlife-human conflict in Kenya: Integrating wildlife conservation with human needs in the Maasai Mara Region*. Ph.D. dissertation, McGill University, Montreal, Canada.
- Omondi, P., E. Bitok & J. Kagiri 2004. Managing human–elephant conflicts: the Kenyan experience. *Pachyderm* 36:80–86.
- Onetu, L. 1998. *The impacts of tourism on the socio-cultural and economic lifestyles of the Maasai*. B.A. Thesis, Nairobi, Kenya: Catholic University of East Africa.
- Organ, G.E. and H.A. Fosbrooke. 1963. *Ngorongoro's First Visitor*, Dar es Salaam, Tanzania: East African Literature Bureau.
- Orindi, V. and C. Huggins. 2005. The dynamic relationship between property rights, water resource management and poverty in the Lake Victoria Basin. International workshop on African Water Laws: Plural legislative frameworks for rural water management in Africa, 26-28 January 2005, Johannesburg, S.A.
- Orkin, M. 1998. The politics and problematic of survey research: Political attitude studies during the transition to democracy in South Africa. *Am. Behav. Sci.* 42(2):201-222.
- Osborn, F. and G. E. Parker. 2002. Community-based methods to reduce crop loss to elephants: Experiments in the communal lands of Zimbabwe. *Pachyderm* 33:32-38.
- Osborn, F.V. and G.E. Parker. 2003. Towards an integrated approach for reducing the conflict between elephants and people: A review of current research. *Oryx* 37(1):1-5.

- Osborn, F.V. and C.M. Hill. 2005. Techniques to reduce crop loss: Human and technical dimensions in Africa. In *People and wildlife: Conflict or coexistence?*, eds. R. Woodroffe, S. Thirgood, and A. Rabinowitz, 72-85. Cambridge: Cambridge University Press.
- Ostrom, E., J. Burger, C.B. Field, R. Norgaard, and D. Policansky. 1999. Revisiting the commons: Local lessons, global challenges. *Science* 284:278–282.
- Ouellette, J.A. and W. Wood. 1998. Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychol. Bull.* 124:54-74.
- Owen-Smith, R. N. 1988. Megaherbivores: The influence of very large body size on ecology. Cambridge University Press, Cambridge.
- Papageorgiou, K. 2001. A combined park management framework based on regulatory and behavioral strategies: Use of visitors' knowledge to assess effectiveness. *Environ. Manage.* 28(1):61-73.
- Parker, G.E., F.V. Osborn, R.E. Hoare, and L.S. Niskanen (Eds). 2007. *Human-elephant conflict mitigation: A training course for community-based approaches in Africa*. Participant's manual. Elephant Pepper Development Trust, Livingstone, Zambia and IUCN/SSC AfESG, Nairobi, Kenya.
- Parkipuny, M.S. 1989. So that the Serengeti shall never die. In *Nature management and sustainable development*, ed. W.D. Verwey, 256-264. Amsterdam/Springfield, VA/Tokyo: IOS.
- Parkipuny, M.S. 1997. Pastoralism, conservation, and development in the Greater Serengeti Region. In *Multiple land-use: The experience of the Ngorongoro Conservation Area, Tanzania*, ed. D.M. Thomson, 143-168. Gland, Switzerland and Cambridge, U.K.: IUCN.
- Parry, D. and B. Campbell. 1992. Attitudes of rural communities to animal wildlife and its utilization in Chobe Enclave and Mababe Depression, Botswana. *Environ. Conserv.* 19:245-252.
- Peil, M., D. Rimmer, and P.K. Mitchell. 1982. *Social science research methods: An African handbook*. London: Hodder & Stoughton.
- Peluso, N.L. 1993. Coercing conservation? The politics of state resource control. *Global Environ. Change* 3:199-217.
- Peña, E. D. 2007. Lost in translation: Methodological considerations in cross-cultural research. *Child Dev.* 78(4):1255-1264.
- Pennington, H. 1983. *A Living Trust: Tanzanian Attitudes towards Wildlife and Conservation*. M.Sc. Thesis, School of Forestry and Environmental Conservation. Yale University, New Haven, CT.

- Petrzelka, P. and P.F. Korsching. 1996. Farmers' attitudes and behaviors toward sustainable agriculture. *J. Environ. Educ.* 28(1):38-45.
- Petty, J. 2003. Social capital and the collective management of resources. *Science* 302:1912-1914.
- Pido, D.K. 1995. Donna Klump Pido Responds. *Afr. Art* 29(4):105.
- Pido, D.K. 1994. Review of the book *The art of the Maasai: 300 newly discovered objects and works of art*. *Afr. Arts* 27(2):15-19.
- Prins, H.H.T. 1992. The pastoral road to extinction: Competition between wildlife and traditional pastoralism in East Africa. *Environ. Conserv.* 19:117-123.
- Rainy, M. 1989. Samburu ritual symbolism: An adaptive interpretation of pastoralist traditions. *Soc. Sc. Inform.* 28(4):785-819.
- Rani, M., S. Bonu, and N. Diop-Sidibé. 2004. An empirical investigation of attitudes towards wife-beating among men and women in seven Sub-Saharan African countries. *Afr. J. Reprod. Health* 8(3):116-136.
- Rauwald, K.S. and C.F. Moore. 2002. Environmental attitudes as predictors of policy support across three countries. *Environ. Behav.* 34(6):709-739.
- Reading, R.P. and S.R. Kellert. 1993. Attitudes toward a proposed reintroduction of black-footed ferrets (*Mustela-nigripes*). *Conserv. Biol.* 7(3):569-580.
- Rebmann, J. 1850. Narrative of a journey to Madjame, in Jagga. *Church Missionary Intelligencer* 1(13):307-312.
- Reid, R.S., M. Rainy, J. Ogutu, R.L. Kruska, M. McCartney, M. Nyabenge, K. Kimani, M. Kshatriya, J. Worden, L. Ng'ang'a, J. Owuor, J. Kinoti, E. Njuguna, C.J. Wilson, and R. Lamprey. 2003. *People, Wildlife and Livestock in the Mara Ecosystem: The Mara Count 2002*. Report, Mara Count 2002. Nairobi, Kenya: International Livestock Research Institute.
- Rhodes, R.E. and K.S. Courneya. 2003. Self-efficacy, controllability and intention in the Theory of Planned Behavior: Measurement redundancy or casual independence? *Psychol. Health* 18(1):79-97.
- Richards, A. 1935. The village census in the study of culture contact. *Africa* 8:20-33.
- Riley, S.J. and D.J. Decker. 2000. Risk perception as a factor in wildlife stakeholder acceptance capacity for cougars in Montana. *Hum. Dim. Wildl.* 5:50-62.
- Rippetoe, P. and R. Rogers. 1987. Effects of components of protection-motivation theory on adaptive and maladaptive coping with a health threat. *J. Pers. Soc. Psychol.* 52:596-604.

- Ritsma, N. and S. Ongaro. 2002. The commoditization and commercialization of the Maasai culture: Will cultural manyattas withstand the 21st century? In *Cultural tourism in Africa: Strategies for the new millennium*, eds. J. Akama and P. Sterry, 127-135. Arnhem: Association for Tourism and Leisure Education.
- Rogler, L.H. 1999. Methodological sources of cultural insensitivity in mental health research. *Am. Psychol.* 54(6):424-433.
- Rokeach, M. 1968. *Beliefs, attitudes, and values: A theory of organization and change*. San Francisco, CA: Jossey-Bass.
- Rolston, H., III. 1985. Valuing wildlands. *Environ. Ethics* 7:23-48.
- Rolston, H., III. 1988a. *Environmental ethics*. Philadelphia: Temple University Press.
- Rolston, H., III. 1988b. Human values and natural systems. *Society Nat. Resources* 1:271-283.
- Ruttan, L.M. and M. Borgerhoff Mulder. 1999. Are East African pastoralists truly conservationists? *Curr. Anthropol.* 40(5):621-652.
- Saberwal, V.K., J.P. Gibbs, R. Chellam, and A.J.T. Johsingh. 1994. Lion-human conflict in the Gir Forest, India. *Conserv. Biol.* 8:501-507.
- Said, M. Y., R. N. Chunge, G. C. Craig, C. R. Thouless, R. F. W. Barnes, and H. T. Dublin. 1995. *African elephant database 1995*. Gland, Switzerland: IUCN.
- Saitoti, T. and C. Beckwith. 1993. *Maasai*. New York: Harry N. Abrams, Inc.
- Schildkrout, E. 1996. Bone picking. *Afr. Arts* 29(1):15-17.
- Schillings, C.G. 1906. *Flashlights in the jungle*. New York: Doubleday, Page, and Co.
- Schapera, I. 1935. Field methods in the study of modern culture contacts. *Africa* 8:315-326.
- Scheuch, E.K. 1968. The cross-cultural use of sample surveys: Problems of comparability. In *Comparative Research across cultures and nations*, ed. S. Rokkan, 176-209. Paris: Mouton.
- Scheuch, E.K. 1989. Theoretical implications of comparative survey research: Why the wheel of cross-cultural methodology keeps on being reinvented. *Int. Sociol.* 4:147-167.
- Schooler, C., C. Diakite, J. Vogel, P. Mounkoro, and L. Caplan. 1998. Conducting a complex sociological survey in rural Mali. *Am. Behav. Sci.* 42(2):276-284.
- Schultz, P.W. 2002. Knowledge, information, and household recycling: Examining the knowledge-deficit model of behavior change. In *New tools for environmental protection: Education, information, and voluntary measures*, eds. T. Dietz and P. Stern, 67-82. Washington, D.C.: National Academy Press.

- Schuman, H. and S. Presser. 1981. *Questions and answers in attitude surveys*. New York: Academic Press.
- Schwartz, S.H., G. Melech, A. Lehmann, S. Burgess, M. Harris, and V. Owens. 2007. Extending the cross-cultural validity of the Theory of Basic Human Values with a different method of measurement. *J. Cross Cult. Psychol.* 32:519-542
- Semali, L. and A. Stambach. 1997. Cultural identity in an African context: Indigenous education and curriculum in East Africa. *Folklore Forum* 28(1):3-27.
- Serneels, S., M. Herrero, S. BurnSilver, P. Chenevix Trench, K. Cochrane, K. Homewood, P. Kristjanson, F. Nelson, M. Radeny, D.M. Thompson, and M.Y. Said. 2009. Methods in the analysis of Maasai livelihoods. In *Staying Maasai? Livelihoods, conservation and development in East African rangelands*, eds. K. Homewood, P. Kristjanson, and P. Chenevix Trench, 43-68. New York: Springer.
- Sibanda, B.M.C. and A.K. Omwega. 1996. Some reflections on conservation, sustainable development and equitable sharing of benefits from wildlife in Africa: The case of Kenya and Zimbabwe. *South African J. Wildl. Res.* 26(4):175-181.
- Silva-Rodríguez, E.A., G.R. Ortega-Solís and E. Jiménez. 2007. Human attitudes toward wild felids in a human-dominated landscape of Southern Chile. *Cat News* 46:19-21.
- Simon, N. 1963. *Between the sunlight and the thunder: The wild life of Kenya*. Boston, MA: Houghton Mifflin Co.
- Sindinga, I. 1994. Employment and tourism training in Kenya. *J. Tourism Studies* 5(2):45-52.
- Sindiga, I. Wildlife-based tourism in Kenya: Land use conflict and government compensation policies over protected areas. *J. Tourism Studies* 6(2):45-55.
- Sitati, N.W. 2003. Human-elephant Conflict in the Masai Mara Dispersal Areas of Transmara District. PhD thesis, Kent, UK: University of Kent.
- Sitati, N.W., M.J. Walpole, R.J. Smith and N. Leader-Williams 2003. Predicting spatial aspects of human–elephant conflict. *J. Appl. Ecol.* 40:667–677.
- Sjöberg, L. 1998. Worry and risk perception. *Risk Anal.* 18(1):85-93.
- Slocum, R., L. Wichhart, D. Rocheleau, and B. Thomas-Slyter, eds. 1998. *Power, process and participation: Tools for change*. London: Intermediate Technology Publications.
- Slovic, P. 1987. Perception of risk. *Science* 236(17):280-285.
- Smith, E.A. and M. Wishnie. 2000. Conservation and subsistence in small-scale societies. *Annu. Rev. Anthropol.* 29:493-524.
- Smith, G.E. 1907. From the Victoria Nyanza to Kilimanjaro. *Geogr. J.* 29(3):249-269.

- Sokolowska, J. and T. Tyszka. 1995. Perception and acceptance of technological environmental risks: Why are poor countries less concerned? *Risk Anal.* 15(6):733-743.
- Songorwa, A.N. 1999. Community-based wildlife management (CWM) in Tanzania: Are the communities interested? *World Dev.* 27(12):2061-2079.
- Songorwa, A. Alexander, N. Buhr, and T. Hughley, F. 2000. Community based wildlife management in Africa: A critical Assessment of the Literature. *Nat. Resour. J.* 40(3):603-643.
- Spear T. and R. Waller. 1993. *Being Maasai: Ethnicity and identity in East Africa*. London: James Curry Ltd.
- Spencer, P. 2003. *Time, space, and the unknown: Maasai configurations of power and providence*. London: Routledge.
- Spencer, P. 2004. *The Maasai of Matapato: A study of rituals of rebellion*. London-New York: Routledge.
- Stankey, G.H. 1989. Linking parks to people: The key to effective management. *Society Nat. Resources* 2:245-250.
- Stephenson, P.J. 2005. *African elephant update No. 5*. Gland, Switzerland: WWF.
- Stephenson, P. J. 2007. WWF species action plan: African elephant, 2007-2011. Gland, Switzerland: WWF.
- Stout, R.J., R.C., Stedman, D.J. Decker, and B.A. Knuth. 1993. Perceptions of risk from deer-related accidents: Implications for public preferences for deer herd size. *Wildl. Soc. Bull.* 21:237-249.
- Sutton, J.E.G. 1993. Becoming Maasailand. In *Being Maasai*, eds. Spear and Waller, 38-60. London: James Currey Ltd.
- Sutton, S.R. 1994. The past predicts the future: Interpreting behaviour-behaviour relationships in social psychological models of health behaviors. In *Social psychology and health: European perspectives*, eds. D.R. Rutter and L. Quine, 71-88. Aldershot: Avebury.
- Talbot, L.M. 1972. Ecological consequences of rangeland development in Masailand, EastAfrica. In *The careless technology: Ecology and international development*, eds. Farvar, M.T. and J.P. Milton, 694-711. Garden City, NY: The Natural History Press.
- Tchamba, M. N. 1995. The problem elephants of Kaele: A challenge for elephant conservation in northern Cameroon. *Pachyderm* 19:26-32.
- Teel, T.L., M.J. Manfredo, and H.M. Stinchfield. 2007. The need and theoretical basis for exploring wildlife value orientations cross-culturally. *Hum. Dim. Wildl.* 12: 297-305.

- Terry, D.J., M.A. Hogg, and K.M. White. 2000. Attitude-behavior relations: Social identity and group membership. In *Attitudes, behavior, and social context: The role of norms and group membership*, eds. D. J. Terry and M. A. Hogg, 67–93. Mahwah, NJ: Lawrence Erlbaum Associates.
- Terry, D.J. and M.A. Hogg. 1996. Group norms and the attitude-behavior relationship: A role for group identification. *Pers. Soc. Psychol. B.* 22(8):776-793.
- Thomson, J. [1885] 2006. *Through Masai Land: A journey of exploration among the snowclad volcanic mountains and strange tribes of Eastern Equatorial Africa*. East Sussex, UK: Rediscovery Books Ltd.
- Thornton, C.T. and M.S. Quinn. 2009. Coexisting with cougars: Public perceptions, attitudes, and awareness of cougars on the urban-rural fringe of Calgary, Alberta, Canada. *Human-wildlife Conflicts* 3(2):282-295.
- Thornton, P.K., S.B. BurnSilver, R.B. Boone, and K.A. Galvin. 2006. Modelling the impacts of group ranch subdivision on agro-pastoral households in Kajiado, Kenya. *Agr. Syst.* 87:331-356.
- Thouless, C. 1993. *The Laikipia Elephant Project*. Final Report. Kenya Wildlife Service and Nairobi, Kenya: World Wide Fund for Nature Eastern Africa Regional Office.
- Thouless, C. 1999. *Review of African elephant conservation priorities*. 2nd edition. Nairobi, Kenya: IUCN/SSC African Elephant Specialist Group.
- Thouless, C.R., and J. Sakwa. 1995. Shocking elephants: Fences and crop raiders in Laikipia District, Kenya. *Biol. Conserv.* 72:99-107.
- Thouless, C., J. King, P. Omondi, P. Kahumbu, and I. Douglas-Hamilton. 2008. *The status of Kenya's elephants 1990-2002*. Report to Kenya Wildlife Service and Save the Elephants. Nairobi, Kenya.
- Trafimow, D. and K.A. Finlay. 1996. The importance of subjective norms for a minority of people: Between-subjects and within-subjects analyses. *Pers. Soc. Psychol. Bull.* 22:820-828.
- Treves, A., R.B. Wallace, L. Naughton-Treves, and A. Morales. 2006. Co-managing human-wildlife conflicts: A review. *Hum. Dim. Wildl.* 11:1-14.
- Turle, G. 1992. *The art of the Maasai: 300 newly discovered works of art*. New York: Alfred A. Knopf, Inc.
- UNEP. 1989. The African elephant. UNEP/GEMS Environment Library Number 3. Nairobi, Kenya: United Nations Environment Programme.
- UNEP-WCMC. 2008. State of the world's protected areas: An annual review of global conservation progress. Cambridge: UNEP-WCMC.

- Uzoka, F.M.E., A.P. Shemi, and G.G. Seleka. 2007. Behavioural influences on e-commerce adoption in a developing country context. *Electron. J. Inform. Syst. Develop. Countries* 31(4):1-15.
- Vaske, J. 2008. *Survey research and analysis: Applications in parks, recreation, and human dimensions*. State College, PA: Venture Publishing.
- Vaske, J.J. and M.P. Donnelly. 1999. A value-attitude-behavior model predicting wildland preservation voting intentions. *Society Nat. Resources* 12:523-537.
- Vaske, J.J., J.A. Gliner, G.A. Morgan. 2002. Communicating judgments about practical significance: Effect size, confidence intervals and odds ratios. *Hum. Dim. Wildl.* 7(4):287-300.
- Voeten, M.M. and H.H.T. Prins. 1999. Resource partitioning between sympatric wild and domestic herbivores in the Tarangire region of Tanzania. *Oecologia* 120:287-297.
- Von Höhnel, L. 1894. *Discovery of Lakes Rudolf and Stefanie*. vol. 1. London: Longmans, Green, and Co.
- Waithaka, J. 1993. The elephant menace. *Wildl. Conserv.* 96:62-63.
- Waller, R. 1976. The Maasai and the British 1895-1905: The origins of an alliance. *J. Afr. Hist.* 17(4):529-553.
- Wangui, E.E. 2008. Development interventions, changing livelihoods, and the making of female Maasai pastoralists. *Agric. Hum. Values* 25:365-378.
- Wasser, S.K., W.J. Clark, O. Drori, E.S. Kisamo, C. Mailand, B. Mutayoba, and M. Stephens. 2008. Combating the illegal trade in African elephant ivory with DNA Forensics. *Conserv. Biol.* 22(4):1065-1071.
- Webber, A.D., C.M. Hill, and V. Reynolds. 2007. Assessing the failure of a community-based human-wildlife conflict mitigation project in Budongo Forest Reserve, Uganda. *Oryx* 41(2):177-184.
- Weber, A.W. 1987. Socioecologic factors in the conservation of the Afromontane forest reserves. In *Primate conservation in the tropical rain forest*, eds. J.S. Gartlan, C.W. Marsh, and R.A. Mittermeier, 205-229. New York: Alan R. Liss.
- Weisburg, H.F., J.A. Krosnick, and B.D. Bowen. 1996. *An introduction to survey research, polling, and data analysis*. Thousand Oaks, CA: Sage Publications.
- Weladji, R.B., S.R. Moe, and P. Vedeld. 2003. Stakeholder attitudes towards wildlife policy and the Bénoué Wildlife Conservation Area, North Cameroon. *Environ. Conserv.* 30(4):334-343.

- Wells, M. and K. Brandon, with L. Hannah. 1992. *People and parks: Linking protected area management with local communities*. Washington DC: The World Bank.
- Western, D. 1973. *The structure, dynamics and changes of the Amboseli ecosystem*. Ph.D. thesis. Nairobi, Kenya: University of Nairobi.
- Western, D. 1975. Water availability and its influence on the structure and dynamics of a savannah large mammal community. *E. Afr. Wildl. J.* 13:265-288.
- Western, D. 1982a. Amboseli. *Swara* 5(4):8-14.
- Western, D. 1982b. Amboseli National Park: Enlisting landowners to conserve migratory wildlife. *Ambo* 11(5):302-308.
- Western, D. 1994. Ecosystem conservation and rural development: The case of Amboseli. In *Natural connections: Perspectives in community-based conservation*, eds. D. Western and R.M. Wright, 15-52. Washington, D.C.: Island Press.
- Western, D. 1997. *In the dust of Kilimanjaro*. Washington, D.C.: Island Press.
- Western, D. and W. K. Lindsay. 1984. Seasonal herd dynamics of a savanna population. *Afr. J. Ecol.* 22:229-244.
- Western, D. and D. Maitumo. 2004. Woodland loss and restoration in a savanna park: A 20-year experiment. *Afr. J. Ecol.* 42:111-121.
- Western, D. and D.M. Sindiyo. 1972. The status of the Amboseli rhino population. *E. Afr. Wildl. J.* 10:43-57.
- Western, D. and R.M. Wright, eds. 1994. *Natural connections: Perspectives in community-based conservation*. Washington, D.C.: Island Press.
- Western, D. and J. Waithaka. 2005. Policies for reducing human-wildlife conflict: A Kenya case study. In *People and wildlife: Conflict or coexistence?*, eds. R. Woodroffe, S. Thirgood, and A. Rabinowitz, 357-372. Cambridge University Press: Cambridge.
- Whittaker, D. 2000. *Evaluating urban wildlife management actions: An exploration of antecedent cognitive variables*. Ph.D. Dissertation, Department of Natural Resource Recreation and Tourism. Colorado State University, Fort Collins, CO.
- Whittaker, D., J.J. Vaske, and M.J. Manfredo. 2006. Specificity and the cognitive hierarchy: Value orientations and the acceptability of urban wildlife management actions. *Society Nat. Resources* 19:515-530.
- Whyte, A.V.T. 1977. *Guidelines for field studies in environmental perception*. Man and the biosphere program technical notes 5. Paris: United Nations Educational Scientific and Cultural Organization (UNESCO).

- Willgerodt, M.A. 2003. Using focus groups to develop culturally relevant instruments. *Western J. Nurs. Res.* 25(7):798-814.
- Wimmelbücker, L. 2002. *Kilimanjaro – a regional history. Volume one: Production and living conditions, c. 1800-1920.* Verlag: Münster.
- Wittman, K. and J.J. Vaske. 1998. *Using value orientations, normative beliefs, and attitudes to predict public support for wildlife management.* Paper presented at the 7th International Symposium on Society and Resource Management, 27-31 May. Columbia, MO.
- Wood, D.S. and D.W. Wood. 1990. *How to plan a conservation education program.* Washington, D.C.: Center for International Development and Environment of the World Resources Institute and U.S. Fish and Wildlife Service.
- World Health Organization (WHO). 2006. World health report 2006: Working together for health. Geneva: World Health Organization. http://www.who.int/whr/2006/whr06_en.pdf. Last accessed July 20, 2010.
- Wunder, 1996. Of elephants and men: Crop destruction in two CAMPFIRE communities in the Zambezi Valley, Zimbabwe. Ph.D. dissertation, Ann Arbor, MI: University of Michigan, School of Natural Resources and Environment.
- Young, M.D. and O.T. Solbrig, eds. 1993. *The world's savannas: Economic driving forces ecological constraints and policy options for sustainable land use.* Paris: Parthenon Press.
- Young, T.P., T.M. Palmer, and M.E. Gadd. 2005. Competition and compensation among cattle, zebras, and elephants in a semi-arid savanna in Laikipia, Kenya. *Biol. Conserv.* 122:351-359.
- Zinn, H.C., M.J. Manfredo, J.J. Vaske, and K. Wittmann. 1998. Using normative beliefs to determine the acceptability of wildlife management actions. *Society Nat. Resources* 11:649-662.
- Zinn, H.C. and C.L. Pierce. 2002. Values, gender, and concern about potentially dangerous wildlife. *Environ. Behav.* 34:239-256.

BIOGRAPHICAL SKETCH

Christine Browne-Nuñez is originally from the Greater Kansas City area of Missouri. She graduated from Blue Springs High School in 1986 and earned a B.A. in elementary education from the University of Missouri-Kansas City in 1990. The next five years were spent teaching at a science/math magnet school in the Kansas City, Missouri School District.

In 1995, Christine was selected to serve as a volunteer in Nairobi, Kenya, with the International Foundation for Education and Self-Help – Teachers for Africa Program (IFESH – TFA). She spent her first year in Nairobi working at Makini Primary School, where she taught English and math, and led two school clubs, the Environmental Action Club and the Wildlife Club. During this year, she also volunteered at the David Sheldrick Wildlife Trust's elephant orphanage in Nairobi National Park. She was later re-assigned to the Trust for her second year of tenure with IFESH – TFA, during which time she managed the volunteer program and assisted with general operations of the Trust.

Christine returned to the U.S. to pursue graduate studies in natural resource management. In 1998 she joined the master's program in Human Dimensions of Natural Resources at Colorado State University, where she earned her M.Sc. in 2001. That same year, she began her doctoral studies in the Department of Wildlife Ecology and Conservation at the University of Florida, continuing her focus on Human Dimensions. During her studies at the University of Florida, Christine was hired as a temporary instructor and developed and taught a course in Human Dimensions of Wildlife Management. Upon completion of her Ph.D. program, Christine will seek employment in the broad field of Human Dimensions. Christine has been married to her husband, Richard Nuñez, for 11 years. They have two children: Mara, age 4, and Kai, age 1.