UNDERSTANDING HUMAN-WILDLIFE INTERACTIONS IN U.S. NATIONAL PARKS: THE ROLE OF EMOTION IN HUMAN BEHAVIORS THAT FOSTER HABITUATION AND FOOD CONDITIONING IN WILDLIFE

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UNDERSTANDING HUMAN-WILDLIFE INTERACTIONS IN U.S. NATIONAL PARKS: THE ROLE OF EMOTION IN HUMAN BEHAVIORS THAT FOSTER HABITUATION AND FOOD CONDITIONING IN WILDLIFE

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Wildlife managers seek to influence human-wildlife interactions to maximize positive impacts for both wildlife and people. In many situations, in particular in protected areas such as national parks, wildlife may learn that people pose little threat and may be the source of a food reward, resulting in habituation or food conditioning. Managers are concerned about health and safety risks to people and wildlife associated with these phenomena. Communication often is a preferred management approach to address these issues, but it frequently fails to yield the desired effects on human behaviors. This ineffectiveness is in part due to a lack of information about human decision-making and behavior related to human-wildlife interactions that lead to habituation and food conditioning. I explored habituation and food conditioning in national parks using an iterative, multi-method approach that examined wildlife manager and park visitor perspectives about human-wildlife interactions. This included: workshops with wildlife researchers and managers; literature reviews; a content analysis of management documents; a survey of National Park Service staff; and visitor interviews at Acadia National Park in Maine. The collective efforts enabled me to identify key insights about human-wildlife interactions: (a) emotion is a critical catalyst of human decision-making and behavior in human-wildlife interactions; (b) it is difficult for wildlife managers to distinguish between habituation and food conditioning in a way that

optimizes management; (c) context specificity influences people's emotional and behavioral response to wildlife; (d) people rely on their prior experience when making decisions related to interactions with wildlife; (e) people enjoy wildlife and wish to avoid having negative impacts on wildlife, but often their behaviors do not correspond with management recommendations; and (f) communication is reported to be a preferred management strategy for addressing human-wildlife interactions, but frequently this approach is neither effective nor systematically evaluated. These insights suggest that the ability of managers to influence human behavior in these contexts may be improved through the application of decision-making models and communication messages that integrate emotional components. I also contend that utilizing a novel framework called "conservation recreation" in wildlife management may influence human-wildlife interactions in a way that positively impacts wildlife conservation.

BIOGRAPHICAL SKETCH

Heather Anne Wieczorek Hudenko grew up in a small community in mid-Michigan. For her undergraduate work, she attended the University of Michigan's School of Natural Resources and Environment. She received her Bachelor of Science degree in resource ecology and management with concentrations in behavioral ecology of carnivores and environmental education. After college, Heather worked as a naturalist at the International Wolf Center in Ely, MN, as an educator at the Adventure Science Center in Nashville, TN, and as a research technician at Dartmouth College where she assisted with studies on salmon restoration and ecotoxicology. Heather continued to explore her interest in carnivores and people through her masters research. As part of the Human Dimensions Research Unit at Cornell University, she studied the relationships between people and coyotes in suburban landscapes of New York State. In addition, she participated in the Emerging Wildlife Conservation Leaders program, where she worked to promote conservation initiatives for jaguars in Mexico and the southwestern United States. Finally, she was fortunate to be part of a collaboration with the National Park Service, and to conduct research related to human-wildlife interactions in national parks. This dissertation is a culmination of that work.

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This inquiry was a collaborative effort between Cornell University, the Biological Resource Management Division (BRMD) of the National Park Service (NPS), and Acadia National Park (ANP). Dr. Kirsten Leong facilitated the collaboration with the NPS and the implementation of the BRMD-based phases of inquiry. Her insight from both a human dimensions as well as a NPS perspective was vital to my work. My experience in ANP was a rewarding and fruitful endeavor in large part due to the contributions and assistance of Bruce Connery, Biologist, ANP. I would like to thank everyone on the NPS BRMD Habituation Steering Committee for their logistical and intellectual support. I am grateful to all of the wildlife professionals and NPS managers who offered their insights through the workshops and survey. The staff at ANP was infinitely helpful during my work at the park and I wish to thank all of the ANP campers who participated in the interview process.

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CHAPTER ONE
INTRODUCTION

The Problem

Human-Wildlife Interactions and Wildlife Management

Interactions between humans and wildlife are growing in the United States (US) as exurban development and suburban expansion increasingly place humans in wildlife habitat, some populations of wildlife expand into or adapt to living in human-dominated environments, and interest in wildlife viewing as a recreational activity increases (Knight, 2009; Kretser, Sullivan, & Knuth, 2008). Human-wildlife interactions occur in a variety of contexts, ranging from backyards to parks and protected areas. Encounters between people and wildlife can range from wildlife viewing at a distance to close contact. This diversity of potential human-wildlife experiences leads to equally diverse expectations for wildlife encounters and present significant challenges to management. For example, one meta-analysis during the late 20th century identified a decline in tolerance of wildlife (Butler, Shanahan, & Decker, 2003). More recently it has been suggested that the public's perceived risks associated with wildlife may negatively impact support for wildlife conservation (Decker et al., 2010). Wildlife managers grapple with these issues as they develop management strategies aimed at behavior of both wildlife and humans.

Habituation and Food Conditioning

One focus of wildlife management is to influence human-wildlife interactions to foster positive impacts while minimizing negative impacts for people and wildlife.

Impacts are wildlife-related effects recognized as important by citizens, communities, managers, or other stakeholder groups (Riley et al., 2002). A multitude of effects may result from the interaction of people, wildlife, and habitat characteristics, but an effect must be both perceived (i.e., recognized) and evaluated as important by a stakeholder to be an impact. Negative impacts may arise from human-wildlife interactions, particularly from those associated with habituation and food conditioning. Food conditioning is the process by which an animal associates humans or human spaces with food (Mazur & Seher, 2008; Whittaker & Knight, 1998). Often, food conditioning results when an animal obtains food that has been provisioned by people, either purposefully or inadvertently. Food conditioning is generally believed to have negative impacts for both people and wildlife (Conover, 2002; Larson, 1995; Orams, 2002). Food conditioning may lead to human-wildlife interactions when animals seek food in spaces occupied by people.

Habituation is the waning of a response following repeated exposure to a non-threatening stimulus (Alcock, 1998; Bernstein, Penner, Clarke-Stewart, & Roy, 2006). Typically, habituation in wildlife refers to an animal's lack of fear response to the presence of humans after repeated, non-consequential encounters (Herrero, Smith, DeBruyn, Gunther, & Matt, 2005; Jope, 1985; McNay, 2002; Whittaker & Knight, 1998). Like food conditioning, habituation can result from, or lead to, human-wildlife interactions. The process of habituation may also be reciprocal; in other words, people also may habituate to the presence or activities of wildlife (Zinn, Manfredo, & Decker, 2008). Debate exists regarding whether the positive impacts of habituation have the

potential to outweigh the negative impacts (Bejder, Samuels, Whitehead, Finn, & Allen, 2009; Wieczorek Hudenko, Siemer, & Decker, 2010a).

Human Decision-Making and Behavior

People's decision-making process and behavior play a key role in the outcomes of human-wildlife interactions. Certain aspects of encounters such as an individual's perceived risk, prior experience, or emotional state are particularly likely to influence their behaviors, both intended and performed, around wildlife. Emotion-related issues in wildlife management have received increased attention in recent years (e.g., Jacobs, 2009; Manfredo, 2008; Wilson, 2008), yet little is known about the roles risk and emotion play in human decisions associated with human–wildlife interactions, particularly those related to habituation and food conditioning. Despite this, wildlife managers are compelled to address these phenomena and the resulting human-wildlife interactions and impacts. Thus understanding the factors influencing human-decision making in the context of human-wildlife interactions may aid management objectives.

Communication

As the occurrence and outcomes of human-wildlife interactions, particularly those related to the development of habituation and food conditioning, depend largely upon the behavior of people, this is often the focus of management efforts. Wildlife professionals employ communication as one tool to address human behavior near wildlife. In many circumstances, this is a preferred management approach (Gore, Knuth, Curtis, & Shanahan, 2006; Wieczorek Hudenko & Connery, 2013). Communication campaigns to

influence human behavior typically address issues such as: recommended behaviors in response to wildlife; wildlife viewing protocols; food and trash storage; and wildlife feeding. Theories in communication and message design suggest various ways to foster behavior change (e.g., elaboration likelihood model [Petty & Cacioppo, 1986]; integrated model of behavioral prediction [Fishbein & Yzer, 2003], fear appeals [Witte, 1992]). The challenge with application of these theories is the difficulty achieving significant changes in wildlife-related behavior through communication interventions (Baruch-Mordo, Breck, Wilson, & Broderick, 2011).

The Research Need

Wildlife researchers, conservationists, and managers allocate substantial resources to understanding and addressing human-wildlife interactions. Little is known about how interactions between people and wildlife may influence human or wildlife behavior, and how encounters between people and wildlife in one setting may translate to another. Human activity plays a central role in wildlife habituation and food conditioning, yet little research-based knowledge about the human dimensions of these phenomena (e.g., the relevant motivations, emotions, and behaviors of people), particularly habituation, is available (Hudenko, Siemer, & Decker, 2010b). Factors such as an individual's emotional state, expectations, perceived risk, and experience are likely to influence human decision-making, and therefore behavior, related to habituation and food conditioning. Researchers and managers have identified a possible relation between habituation in wildlife and habituation in people, suggesting that a feedback loop between the two is an important component of the growing incidence of problematic human-

wildlife interactions. Yet, the influence of these elements, and the response of humans to wildlife, has largely been assumed or neglected by previous studies. Symposia and workshops on wildlife habituation were held at the 2005 annual meeting of The Wildlife Society, and at the 2007 George Wright Society meeting; feedback from participants overwhelmingly indicated a need for greater attention to this topic, especially to the human dimensions**.** Although a preference exists for the use of communication interventions to address human-wildlife interactions, such efforts are infrequently evaluated and often are met with varying success (Gore, Knuth, Curtis, & Shanahan, 2006).

Despite, or perhaps because of, the lack of data, wildlife professionals continue to seek better understanding of how people react to encounters with wildlife to promote positive and reduce negative interactions. An understanding of human perceptions and behavior in the context of human-wildlife interactions related to habituation and food conditioning could help to address this wildlife management challenge more effectively.

Research Context

Parks, protected areas, and natural areas may represent unique settings in which to conduct inquiry to improve understanding of human-wildlife interactions. Previous work has shown that people view such spaces as unique areas for wildlife relative to human-dominated landscapes, and that people may have different attitudes about the presence of wildlife, or human activities directed toward wildlife, in natural areas (Wieczorek Hudenko, Decker, & Siemer, 2008; Zimmermann, Wabaken, & Dotterer, 2001). Additionally, in the symposia mentioned previously, wildlife managers identified the

need to attend to issues associated with human-wildlife interactions specifically in and around protected areas. This was in part due to concerns about differential management regimes inside and outside of park boundaries and the potential impacts of this on both human and wildlife behavior.

In the US, national parks often are spaces designed to promote wildlife viewing opportunities. At the same time, managers also are charged with protecting the wildlife in parks, a mandate that may be challenging to reconcile with some of the effects from human-wildlife interactions.

> The National Park Service's (NPS) mission is
> to promote and regulate the use of the... national parks...
> which purpose is to conserve the scenery and the
> natural and historic objects and the wild life therein
> and to provide for the enjoyment of the same in such
> manner and by such means as will leave them unimpaired
> for the enjoyment of future generations. (16 U.S.C. § 1)

The national park system consists of 401 individual units of almost 30 different designations, ranging from urban National Historic Sites and Monuments, to National Parks with remote wilderness. Management of the national parks occurs in a variety of contexts. Parks often are thought of as islands of habitat, distinct from their surroundings, and isolated from regular human activities. Human activity, however, is widespread in a variety of park contexts. Nearly 274 million recreationists visited parks within the national park system in 2013 (National Park Service, 2014). Many individual parks receive millions of visitors annually, communities at the entrances to many parks have experienced burgeoning development in recent decades, and other parks are embedded in urban areas. The commonality among these parks, regardless of their context, is that they

have a core area where resources are to be conserved unimpaired for the enjoyment of current and future generations.

The NPS prohibits the feeding, touching, teasing, frightening or intentional disturbing of wildlife nesting, breeding, or other activities (36 C.F.R. 1 § 2.2 a 2). In addition, many parks have food storage regulations and guidelines for wildlife viewing. The NPS laws and policies for wildlife feeding are fairly consistent throughout the units, but visitor compliance and enforcement vary widely and opportunities for food conditioning to develop are widespread. Unlike food conditioning, no service-wide policy guidance exists related to wildlife habituation. Given the high number of recreationists in parks, and the ample opportunities for human-wildlife interactions related to habituation, clear implications exist for key aspects of the NPS mandate including wildlife health and conservation, and visitor enjoyment and safety. Many parks struggle with food conditioning-related issues, therefore managing habituation to promote positive impacts yet prevent food conditioning is a significant challenge. This issue is particularly relevant for parks with developed zones (e.g., campgrounds, picnic areas), where animals may be attracted by food and people are concentrated. The implications of negative human-wildlife interactions also have potentially broader implications such as economic or legal costs, and negative impacts on visitor attitudes toward wildlife conservation or support for the parks.

Research Purpose and Objectives

To address the need for knowledge about human-wildlife interactions that lead to habituation and food conditioning, the Biological Resource Management Division

(BRMD) of the NPS supported a multi-phase inquiry. The BRMD was interested in this issue because of concerns about the behavior of park visitors around wildlife and of the conservation implications of human-wildlife interactions in parks. As indicated above, understanding of human-wildlife habituation is still largely undeveloped. Much work is needed to explore the potentially reciprocal relationship between human behavior and wildlife behavior, the drivers of such behavior, and the implications of this phenomenon for management of human-wildlife interactions. Conversely, many studies have examined food conditioning and its implications for wildlife behavior and conservation, as well as for human-wildlife interactions. Despite this, initiatives to influence human behaviors related to food conditioning of wildlife (e.g., feeding of wildlife, improper food storage) still appear unable to meet desired management objectives. More information is needed to understand the relevant human behaviors and cognitions that influence the outcomes of human-wildlife interactions and to explore factors relevant to communication interventions.

The investigation I conducted with the BRMD began with an examination of the human dimensions of human-wildlife habituation[1]. The goal of our inquiry was to improve scientific understanding of the human cognitive processes and resulting behaviors that contribute to human wildlife habituation. The knowledge gained during this project was expected to improve the capacity of land management agencies, local stakeholders, and local municipalities and communities to develop shared communication messages, policies, and management strategies to address human-wildlife habituation and to promote coexistence of humans and wildlife. Objectives of our inquiry were:

[1] While the investigation was designed to explore habituation specifically, it quickly became apparent to the study team that food conditioning issues were linked with habitation from a management perspective, thus both phenomena were examined in the study.

1. To determine and examine the diversity of experiences with, beliefs about, and management priorities related to wildlife habituation in parks and surrounding communities across the national park system.
2. To identify and prioritize the most urgent management needs related to the human dimensions of human-wildlife habituation in and around protected areas in the US.
3. To synthesize existing literature related to human-wildlife habituation in and around protected areas and identify knowledge gaps.
4. To develop a recommended strategy for initiatives to aid managers addressing stakeholder beliefs, attitudes, and behaviors that contribute to human-wildlife habituation.

These objectives were addressed through several phases of inquiry with NPS natural resource staff and other wildlife professionals, a review of the published literature, and a management document analysis[2]. Findings suggested that a visitor's prior experience with wildlife, expectations created by that experience, and emotions related to wildlife are primary drivers of visitor behavior leading to wildlife habituation and food conditioning in parks. Our inquiry indicated further investigation was needed to understand these issues to enhance the management of human-wildlife interactions and wildlife-related communication in parks. Thus the next phase of inquiry was an exploratory analysis of these themes using data collected directly from park visitors. Objectives of the visitor-focused phase of inquiry were:

[2] NPS Natural Resource Reports were produced for each activity associated with these phases of inquiry. Reports are available at: http://www.nature.nps.gov/publications/nrpm/nrr.cfm.

1. Explore visitors' prior experience with wildlife, including the emotions (intensity [i.e., strength] and valance [e.g., positive, neutral, negative]) and behaviors associated those interactions.
2. Examine visitors' expectations for interactions with wildlife including the associated emotions and intended behaviors.
3. Determine visitor behaviors (intended and performed) related to wildlife encounters and habituation and food conditioning.
4. Identify visitor exposure and response to communication and education materials in parks.

Overview of methods

I conducted this inquiry under the premise that a multi-method approach to information gathering and characterization of the factors that most influence human-wildlife interactions will improve insight for management efforts. To this end, I used an iterative, mixed-method approach to examine human-wildlife interactions related to habituation and food conditioning in parks.

The NPS BRMD formed the Habituation Steering Committee with representatives from each NPS region, and I worked with them to launch an inquiry into the topic. Several methods were used to achieve the objectives, including: workshops with wildlife researchers and managers; literature reviews; a survey of NPS natural resource staff; and a content analysis of management documents. The workshops took place at two professional conferences; one conference was wildlife-focused, and the other was park-focused. The goals of the workshops were to explore habituation-related research and

management needs, respectively. Input from the steering committee and findings from the workshops directed the focus of two literature reviews. The reviews included the theoretical and empirical literature in two areas: human decision-making, attitudes, and behaviors associated with human-wildlife interactions; and interventions designed to address human-wildlife interactions in parks. Using the theoretical frameworks and concepts identified through the literature reviews and emergent themes from the workshops, we designed a qualitative, open-ended survey to address four topics: (a) extent and nature of habituation in parks; (b) causes and effects of habituation; (c) habituation-related management strategies, actions, priorities, and needs; and (d) visitor attitudes and behaviors associated with habituation. A convenience sample approach was used and the survey was distributed to natural resource staff in parks throughout the US. The final phase of the initial BRMD habituation inquiry included a content analysis of park management, planning, and policy documents that provide guidance for management strategies or actions related to habituation. We created a coding scheme to identify characteristics of human-wildlife interactions and related management issues in parks. The coding categories were developed using information from previous phases of inquiry and input from the Habituation Steering Committee and BRMD staff.

Review of the findings from these phases of inquiry and consultation with the Habituation Steering Committee and BRMD staff led us to conclude that additional inquiry was needed directly with park visitors. I[3] worked together with these NPS representatives to define the additional objectives for the visitor inquiry and to identify an appropriate study area. Acadia National Park (ANP) in Bar Harbor, ME was selected as

[3] For the purposes of this dissertation, I use singular personal pronouns when referring to the dissertation or to work conducted with visitors in ANP. When referencing my work associated with the NPS BRMD inquiry, I use plural pronouns as I worked with a team of individuals.

the study location due to historic high levels human-wildlife interaction in campgrounds. ANP managers were concerned about the potential for food conditioning or habituation of raccoons at Blackwoods Campground, and about the resulting human-raccoon interactions. It is believed that habituation and food conditioning of raccoons in Blackwoods Campground is influenced directly by human behaviors.

I conducted semi-structured, in-depth interviews with campers in Blackwoods Campground, using an interview guide to direct the conversation. The guide consisted of a series of questions based on the concepts identified a priori (e.g., behaviors and emotions associated with campers' prior experience with wildlife; expectations for future interactions with wildlife; and visitors' exposure and reaction to wildlife-related communications), and also had probes to encourage in-depth responses. A random start, systematic sample was used to conduct interviews. Visitors provided verbal consent, and all interviews were recorded with a digital voice recorder[4]. I coded interviewee responses and used inductive analysis to identify emergent themes (Lincoln, 1985). Interviews were partially transcribed to record rich text examples, provide context for responses, and capture details in the interviewees' descriptions. To complement the self-reported behavior of interviewees, I conducted behavioral observations at campsites. I made observations to assess food and trash storage practices that would be relevant to wildlife food conditioning.

The multiple methods and sources that were used to gather information for this inquiry helped to create a thorough understanding of human-wildlife interactions

[4] The interview protocol and guide were approved by Cornell University's Institutional Review Board for Human Participants, Protocol #1006001472. We verified with the National Park Service that Office of Management and Budget approval was not required; and we received a research permit from Acadia National Park.

associated with habituation and food conditioning. Due to the limited data available about our topic, the nature of the inquiry was exploratory. It is important to recognize the potentially unique characteristics of our study including: the national park focus; habituation as the original construct of interest; and cultural influences (e.g., the NPS as a federal agency; ANP for site specific work). Nevertheless, I believe our approach generated results that can be extrapolated to human-wildlife interactions in other contexts, albeit with caution. In this dissertation I have attempted to describe the specifics of the inquiry with enough detail to facilitate reader assessment of transferability of the findings to other contexts (Lincoln & Guba, 1985; Patton, 2002). The NPS's involvement throughout the work has ensured applicability of the results for park wildlife management.

Definitions

A number of terms are used throughout the dissertation. While each is defined and discussed within specific chapters, below is a brief overview of important terms and concepts.

Affect: Affect is defined as a generalized feeling state. It may be conscious or unconscious, and may manifest as a positive or negative reaction to a stimulus (Finucane, Peters, & Slovic, 2003).

Approach: Approach behaviors describe action towards an object or activity, or engagement with one's environment. Individuals will demonstrate approach behaviors when the action leads them to a positive affective state (Fredrickson, 2001).

Avoidance: Avoidance behaviors encompass movement away from an object, activity, or disengagement with one's environment. Individuals demonstrate avoidance behaviors when an action helps them to avoid a negative internal state (Fredrickson, 2001).

Behavioral intention: Behavioral intentions are indicative of an individual's readiness to perform a certain behavior. Theories suggest that attitudes, subjective norms, perceived behavioral control, and a number of other variables lead people to develop intentions to perform a behavior and that those intentions can in part, predict the performance of the behavior (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Yzer, 2003).

Emotion: Emotion is experienced as a discrete and specific state. Emotion is usually created through a definite causal mechanism and has defined cognitive content (Forgas, 1992). Emotion theorists believe emotion is a major determinant in action (Ekman, 1999), particularly in risk-based situations (Loewenstein, Weber, Hsee, & Welch, 2001).

Experience: Experience with a wildlife species can take two general forms. Experience may be direct, such as when an individual has a one-on-one encounter with an animal. It may also be indirect, where information about or familiarity with, wildlife is transferred to the person from social networks or the media. Experience may be related to impacts, attitudes, risk perceptions, tolerance, and a variety of other concepts relevant to wildlife management. As such, it is a crucial variable for managers to consider, but its influences are not well understood.

Food conditioning: Food conditioning is the process by which an animal associates humans or human spaces with food (Mazur & Seher, 2008; Whittaker & Knight, 1998). Often, food conditioning results when an animal obtains food that has been provisioned by people, either purposefully or inadvertently. Food conditioning is generally believed to have negative impacts for both people and wildlife (Conover, 2002).

Habituation: Habituation is the waning of a response following repeated exposure to a non-threatening stimulus (Alcock, 1998; Bernstein et al., 2006, pp. 195-196). Typically, habituation in wildlife refers to an animal's lack of fear response to the presence of humans after repeated, non-consequential encounters (e.g., Herrero et al., 2005; Jope, 1985; McNay, 2002; Whittaker & Knight, 1998). The process of habituation may also be reciprocal; in other words, people also may habituate to the presence or activities of wildlife (Zinn et al., 2008).

Human-wildlife conflict: Human–wildlife conflict is a term frequently used in the wildlife literature to describe a subset of human–wildlife interactions that lead to negative outcomes for either wildlife or people (Conover, 2002).

Human-wildlife interaction: Human-wildlife interaction is a term used ubiquitously and diversely throughout the wildlife literature. It applies to an array of encounters from wildlife viewing at a distance to close contact (e.g., people trying to feed or touch animals).

Risk perception: Slovic (1987) described risk perception as intuitive risk judgments made by citizens, as opposed to the technical assessments made by experts. Risk perceptions are influenced by many interrelated characteristics, such as whether the

risk is familiar, certain, controllable, equitable, known, voluntary, observable, immediate, and manageable (Slovic, 1987). People perceive risk with context specificity and such perceptions can shape decisions and behaviors.

Wildlife management: The definition of wildlife management has evolved over many decades to emphasize or clarify various aspects of the process. For the purposes of the dissertation, the definition proposed by Riley et al. (2002, p. 586) is most apt: "Wildlife management is the guidance of decision-making processes and implementation of practices to purposefully influence interactions among and between people, wildlife, and habitats to achieve impacts valued by stakeholders."

Assumptions

I am a female American academic and entered this research with the perspective that wildlife conservation is important. It is my opinion that more knowledge is needed about human-wildlife relationships and that improved understanding of this topic is salient and topical for both conservation and management. Furthermore, I believe both qualitative and quantitative scientific inquiry into this issue can provide useful insight for wildlife managers, policy makers, educators and communicators. These underlying assumptions may have influenced my thinking throughout the research process; however, I worked with a team of researchers and managers, many of whom had different orientations than I. Input from various parties at each phase of inquiry helped to minimize the influence of individual biases on the development of study objectives or data collection and interpretation.

Operating Assumptions

It is important to acknowledge that several assumptions underlie my research and approach.

Manager survey: In conducting an online survey, many assumptions are made about respondents and their participation. In administering a questionnaire, I assume that respondents understand the questions and provide accurate responses to the best of their ability. To address this potential concern, I worked with NPS managers (e.g., Habituation Steering Committee members and BRMD staff) to create both the questionnaire and the accompanying note of introduction. I also must acknowledge the possibility of social desirability (Gregory, 2004) or expectancy effects (Rosenthal & Jacobson, 1968). I conducted analyses of survey responses in collaboration with a NPS natural resource manager and Habituation Steering Committee member, Bruce Connery, Biologist, ANP, to increase accuracy of interpretation.

Content analysis of guidance documents: I assume that the multiple methods for document collection that we employed garnered the majority of available relevant documents. Thus I further assume that the sample of documents was representative of the set of management guidance documents NPS managers rely upon. I assume that we accurately interpreted the content of the documents during the course of our analysis and that our codes and categories accurately captured the constructs we sought to examine. Input from the Habituation Steering Committee and BRMD staff helped to ensure that the assumptions were appropriate for the context.

Interviews: I assume that in conducting interviews, I am gleaning reliable and valid information about the research questions. Every effort was made to present questions in an objective way, to keep interview questions and probes similar across interviews, and to allow informants to speak freely without the interviewer offering her opinion or providing cues. It should be recognized, however, that researcher bias may play a part in the interview process as well as analysis and interpretation of responses (Patton, 2002; Seidman, 2006). Review of draft analyses and interpretations by other study team members helped reduce such bias.

Sampling: I assume that by systematically and randomly sampling campsites I generated a sample that accurately reflects the population of campers using my study site. Thus, I believe I have a representative sample. Furthermore, in drawing conclusions from the data for management purposes, I assume a certain degree of generalizability. I also recognize the potential limitations to extrapolating the findings to other parks or contexts, but attempt to ameliorate these problems by sufficiently describing the research approach and context (Lincoln, 1985; Patton, 2002).

Assessment and analysis: By formulating the interview and survey questions based on input from NPS natural resource staff, wildlife professionals, wildlife researchers, and theoretical and empirical literature, I assume I am assessing the intended concepts. I presume that the data were entered accurately into the database without significant human error and that no pertinent information was lost in the coding of responses or when performing and interpreting statistical analyses. A subset of cases were reviewed to verify the accuracy of data entry, coding consistency, and statistical analyses.

Organization of Dissertation

This dissertation is organized into six chapters, beginning with this introduction to the research. Chapters Two through Five make up the body of the dissertation and function as separate papers, therefore some minor redundancies occur between chapters. The final chapter includes a synthesis of observations from the previous chapters and a discussion of implications of the work overall.

Chapter One has introduced the topics addressed in the dissertation and presented a justification for the work. It includes an overview of the inquiry including purpose, objectives, and methods. Key definitions and assumptions of the work are outlined and applicability of the results discussed.

Chapter Two was published in the journal *Human Dimensions of Wildlife* (Wieczorek Hudenko, 2012). It applies theories and frameworks from the risk and decision-making literature to understand human decisions related to human-wildlife conflicts. A review of cognitive and affective theories of decision-making is used to explore ways in which emotions and cognitions influence decision-making related to negative human-wildlife interactions. I assert that models that integrate emotion are most relevant for understanding decision-making in human-wildlife conflict. Further, I suggest that the ability of managers to predict human behavior in these contexts may be improved through the application of integrated models of decision-making. An explanation of how this knowledge could help us to evaluate wildlife management regulations and inform communication efforts is included.

The third chapter summarizes all phases of inquiry associated with the initial NPS BRMD project. Broadly, it includes a discussion of the human dimensions of habituation, and its relevance to human-wildlife interactions and park management. In this chapter I outline the NPS BRMD Habituation Project and describe its objectives to explore the extent and nature of habituation across the national park system and to identify related management priorities and knowledge gaps. The chapter provides an overview of the methods employed: workshops with wildlife researchers and managers; literature reviews; a survey of NPS managers; and a content analysis of management documents. Findings are discussed collectively across activities and are organized into key themes: the challenges of distinguishing habituation and food conditioning; visitor-related issues (knowledge level, visitor prior experience and expectations, social influences, and emotion); management of human-wildlife interactions in parks (food issues, human-wildlife conflict, preference for communication as a solution, lack of consistency and necessary information). Finally, implications for parks and other wildlife management authorities are discussed, and research needs are highlighted.

Chapter Four focuses on results and implications from semi-structured interviews conducted with campers in ANP during August 2011. Interviewees responded to questions about: prior experiences with wildlife; expectations for future interactions with wildlife; emotions associated with experiences; past and intended behaviors around wildlife; and exposure and reaction to wildlife-related communications. Findings from the interviews are used to extend, examine, and challenge various ideas identified during the course of the NPS BRMD habituation project. Specific attention is paid to: habituation and food conditioning issues; visitor knowledge; visitor expectations for

interactions with wildlife; visitor emotions associated with interactions with wildlife; visitor exposure to wildlife-related communication. I explore the implications for wildlife-related communication and management.

Chapter Five proposes a new framework, conservation recreation, and applies it to human-wildlife interactions. It describes conservation recreation as a type of nature-based recreation that can contribute to positive conservation outcomes. Using data from the interviews in ANP, an examination of park visitors' prior experience, emotions, and expectations explores how and why nature-based recreationists interact with wildlife. Consideration is given to how empathy for wildlife may play a role in fostering what is termed unintentional conservation recreation. The link between wildlife-related communication and conservation recreation is discussed. This examination has implications for the potential to promote sustainable recreation that positively impacts natural resources.

The final chapter summarizes the various phases of the research and synthesizes findings. It evaluates what the individual papers suggest about the relation between human-wildlife interactions, emotion, and communication initiatives in parks, and looks at the broader implications for human-wildlife interactions in other contexts. The chapter describes the contributions of this work to theory, policy, and practice and highlights areas in need of further inquiry.

Finally, the appendices contain the manager survey, the interview guide, and a summary of management priorities and research needs from our NPS BRMD inquiry.

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CHAPTER TWO

EXPLORING THE INFLUENCE OF EMOTION ON HUMAN DECISION-MAKING IN HUMAN-WILDLIFE CONFLICT[1]

Introduction

Wildlife researchers, conservationists, and managers allocate substantial resources to understanding and addressing human-wildlife interactions. Wildlife professionals are interested in a range of interactions, from bird watching to bear attacks. While interactions may be perceived as positive or negative, those that instantiate conflicts are most often the focus of research and practice.

Ample evidence exists to indicate that human-wildlife conflicts have drawn increasing attention over the last decade. Human-wildlife conflict is a term frequently used in the wildlife literature to describe a subset of human-wildlife interactions that lead to negative outcomes for either wildlife or people. A proliferation of articles in the scientific literature demonstrates this increased interest. A search of the Web of Science database for the topic "human-wildlife conflict" yielded six articles published between 1990 and 1999, and 98 articles published between 2000 and 2009. The inception of the journal *Human-Wildlife Conflicts* in 2007 (re-named *Human-Wildlife Interactions* as of spring 2010) and the establishment of the Human-Wildlife Conflict Collaboration (a global partnership of organizations that aims to prevent and mitigate human-wildlife conflict) are further evidence of a focus on human-wildlife conflict.

[1] Wieczorek Hudenko, H. (2012). Exploring the influence of emotion on human decision making in human–wildlife conflict. *Human Dimensions of Wildlife, 17*(1), 16-28. doi: 10.1080/10871209.2012.623262

Human-wildlife conflict is considered on both a socio-cultural level as well as an individual level. Conflict at the socio-cultural level can include issues such as cultural norms or practices, land use planning, and conflicts between user groups. This paper, however, focuses on conflict between individual people and wildlife species. Management attention is often directed toward addressing individual human-wildlife interactions that lead to conflict situations. For example, many state agencies keep report logs about human-wildlife interactions to track incidents of conflict and determine where intervention is needed. Similarly, park officials engage in education and communication activities to reduce the potential for negative visitor-wildlife interactions. Managers seek to understand how people react to encounters with wildlife to promote positive and reduce negative interactions. Individual human-wildlife interactions are inherently uncertain events as they rely on the behavioral response of both a human and an animal. Context-specific cues (e.g., number of people present; proximity of a food source or offspring), including those that may be unknown or unobserved by a human, may influence an animal's response to human presence, leading it to react in what is perceived as an atypical fashion. Interactions between people and wildlife also may create risky situations (e.g., injury to person or animal; disease transmission). These events, when an animal reacts in an unexpected fashion, under potentially risky circumstances, often are the ones that lead to conflict.

Habituation and food conditioning of wildlife can create the risky and uncertain situations that lead to negative human-wildlife interactions, and therefore are important causes of human-wildlife conflict (Conover, 2002). Habituation is the waning of a behavioral response following repeated exposure to a nonthreatening

stimulus (Bernstein, Penner, Clarke-Stewart, & Roy, 2006, p. 195-196). Typically, habituation of wildlife refers to an animal's lack of behavioral fear response to the presence of humans after repeated, nonconsequential encounters (Herrero, Smith, DeBruyn, Gunther, & Matt, 2005; McNay, 2002). Habituated wildlife may use human spaces with regularity and may forage or travel within close range of people. The process of habituation may also be reciprocal; in other words, people also may habituate to the presence or activities of wildlife (Zinn, Manfredo, & Decker, 2008). Food conditioning denotes the process by which an animal associates humans or human spaces with food and may occur either through an operant or classical conditioning mechanism. Under operant conditioning, a behavior that is followed by pleasurable or satisfying stimulus (i.e., reinforcement) will be more likely to occur again (Bernstein et al., 2006) (e.g., a coyote that finds food near a house is more likely to approach the house again). Classical, or respondent, conditioning refers specifically to an association that develops between a conditioned stimulus and a conditioned response (e.g., bears in some parks appear to associate coolers with food). Food conditioning also may arise if an animal habituated to humans is rewarded (i.e., acquires a human food source) for approaching human spaces or people. In most cases, food conditioning leads to negative outcomes for both wildlife (e.g., sub-optimal diet or habitat) and people (e.g., injury from an encounter).

Human decision-making plays a key role in both wildlife habituation (e.g., approaching an elk for a photograph) and food conditioning (e.g., curbing trash overnight can attract bears) processes. These processes in turn may have impacts on the ways in which humans interact with wildlife, often leading to conflict. Particular

variables such as perceived risk and an individual's emotional state are likely to influence human decision-making, and therefore behavior, related to habituation and food conditioning. The goal of this paper is to evaluate theories and frameworks from the risk and decision-making literature related to individual human decisions, with emphasis on emotional components in the context of human-wildlife conflicts caused by habituation and food conditioning. While emotion-related issues in wildlife management have received increased attention in recent years (e.g., Jacobs, 2009; Manfredo, 2008; Wilson, 2008), little is known about the roles risk and emotion play in human-decisions leading to human-wildlife conflict, particularly habituation and food conditioning. Yet, managers are compelled to address human-wildlife conflict and therefore understanding the emotional factors of human decision-making in this context may aid management of human-wildlife conflict.

The Importance of Risk and Emotion

Human-wildlife interactions are typically emotionally charged events; individuals may experience worry, excitement, fear, pleasure, or a variety of other highly-valenced emotions. These emotions may drive both an individual's behavior during an interaction and his or her interpretation of the event. For instance, a person excited about viewing a bear may approach a bear, and use food to draw the bear near. The individual may perceive the resulting close encounter as a thrilling experience. Yet for another person, being in close proximity to a bear could provoke fear and anxiety. In response, she or he might run away. Despite these differences in human behavior and interpretation, the emotions associated with the interaction may drive the

individual to engage in behaviors that precipitate negative events and lead to human-wildlife conflict.

The varying levels of risk associated with a human-wildlife interaction also may affect the behavioral response of both people and wildlife and have implications for conservation. For example, an encounter with a bear poses a greater risk to human safety if cubs are present as a bear is likely to be protective of its offspring. The risk an individual perceives during an encounter is also important. A person who perceives high risk from an interaction with a raccoon in a campground is likely to engage in behaviors to prevent such an occurrence, whereas an individual with low perceived risk may not (e.g., leave garbage around a campsite), increasing the chance of a negative interaction. In addition to consequences for individual human behavior, it has been suggested that the public's perceived risks associated with wildlife may negatively impact support for wildlife conservation (Decker et al., 2010).

Within the wildlife and human dimensions literature, human decisions and behavior near wildlife are typically evaluated using a number of different concepts such as: satisfaction and use (e.g., Brunke & Hunt, 2008; Driver, Tinsley, & Manfredo, 1991), value orientations (e.g., Fulton, Manfredo, & Lipscomb, 1996; Teel & Manfredo, 2010; Whittaker, Vaske, & Manfredo, 2006), wildlife acceptance capacity (Decker & Purdy, 1988; Riley & Decker, 2000), attitudes (e.g., Gusset et al., 2008; Kellert 1985), norms (e.g., Jonker, Organ, Muth, Zwick, & Siemer, 2009; Wittmann, Vaske, Manfredo, & Zinn, 1998), and impacts (e.g., Decker, Jacobson, & Brown, 2006; Riley et al., 2003). However, decision-making and risk-related frameworks have increasingly received attention in the context of human-wildlife

conflict (e.g., Gore, Knuth, Curtis, & Shanahan, 2006; Wilson & Bruskotter, 2009). Additionally, recent discourse about human-wildlife interactions suggests that emotional factors, like those discussed above, are particularly influential in such encounters (Dayer, Stinchfield, & Manfredo, 2007; Jacobs, 2009; Manfredo, 2008).

Theories on Judgment and Decision-Making

Research on judgment and decision-making is applied to a wide variety of contexts (e.g., economics, criminal justice, human development, health care), generating a vast and continuously evolving literature. Cognitive theories of decision-making and behavior suggest that the process is deliberative and rational. These theories purport that people use logic and reasoning to weigh inputs and generate a rational decision. In contrast, emotional and affective theories of behavior suggest that decision-making is primarily, or at least significantly, driven by an individual's emotional state or emotional response to an event or stimulus. The dichotomy that separates theories of decision-making into those that are strictly cognitive and those that purposefully incorporate emotions is to an extent artificial. Extensive conceptual overlap between the two groups exists and empirical evidence related to this intersection abounds. As a result, a number of integrative theories and models have been developed that incorporate both cognitive and affective, or emotional components. I will first review separate cognitive and affective theories of decision-making, with attention to those that are relevant to human-wildlife conflict. Next, I will examine integrative theories that include both cognitive and affective elements.

Due to their inclusion of emotional components, it is the integrative theories that may be most applicable to understanding human-wildlife conflict.

Shortcomings of Cognitive Theories

Prominent cognitive theories of behavior include the theory of reasoned action (TRA) and its extension, the theory of planned behavior (TPB). TRA suggests that attitudes and subjective norms lead people to develop intentions to perform a behavior and that those intentions predict the performance of the behavior (Ajzen & Fishbein, 1980). TBP added the element of perceived behavioral control to the model to address people's perception of their ability to perform a specified behavior (Ajzen, 1991). Such rational approaches to decision making are intuitively appealing, but many other factors not addressed by strictly cognitive approaches also play a role in decision-making. For example, the unconscious[2] use of heuristics and biases can influence decision-making, as can the mental accessibility of information, or the way in which ideas are presented, or framed. It is important to consider how these may affect decision-making in the context of situations that can lead to human-wildlife conflict.

When making decisions, humans tend to employ, often automatically, strategies that promote a reduction in cognitive load, thereby decreasing the amount of mental energy required for decision-making (Simon, 1990; Wilson, 2008). Both heuristics and biases help to reduce cognitive load during decision-making tasks. The literature describes various heuristics and biases and many of these are particularly

[2] The accepted terminology for mental processing that does not occur within conscious awareness varies in the field of psychology. "Unconscious" and "nonconscious" are the two terms most often used. In this paper I use "unconscious" as it is most consistent with use in the field of cognitive psychology, from which I draw most heavily.

salient to human-wildlife conflict. First, the availability heuristic suggests that the greater the relative ease with which content comes to mind, the more likely we are to judge it to be true (Gilovich, Griffin, & Kahneman, 2002; Tversky & Kahneman, 1973). Wildlife stories often appear in the media when a significant negative event occurs. The relative availability of such information about wildlife may influence how people think about a particular species or the risk it poses. For example, when one hears about a single mountain lion attack in the news, one may believe the attacks are more common than they really are because the information is readily available in the mind. Under the anchor and adjustment heuristic people are exposed to a reference point and then additional evaluations are biased toward this point (Tversky & Kahneman, 1974). Though this concept is typically used when referring to numerical evaluations, much literature exists on the idea that one can anchor on intuition (Kahneman, 2003). Many ideas and beliefs about wildlife are instilled in people through cultural mechanisms and may lead individuals to have an intuition that leads them to think about particular species in a certain way. North American and European fairy tales often portray the wolf as a scary or bad animal, leading many to have a negative association with wolves. This orientation may serve as an anchor point such that new knowledge of or experiences with wolves tend to be interpreted as bad.

The representativeness heuristic describes the way in which evaluations are made about an object or event relative to a similar known group. If characteristics are representative of a category, people will automatically subsume the object or event in question in that category and attribute other aspects of the category to the object being evaluated (Tversky & Kahneman, 1974). For example, while people may not be

familiar with the behavior or traits of an individual wildlife species, such as a bear, they may be generally familiar with the concept of predatory animals. If one then knows that a bear is a predator, using the representativeness heuristic, one may think that a bear has all the characteristics of a predator.

Confirmation bias describes information processing that occurs in a manner that is consistent with, or confirms, previous conceptions (Bernstein et al., 2006). Many people may have preconceived ideas about wildlife based on their upbringing, cultural influences, or prior experience. For instance, a sheep rancher may believe that coyotes are pests, and would therefore be likely to think that everything a coyote does is a problem. Optimism bias, or the inclination to overestimate positive outcomes and underestimate negative ones (Gilovich et al., 2002) seems particularly relevant to human-wildlife conflict situations. Many people encounter wildlife while recreating in a park or natural area. At such times, people often actively seek interactions with wildlife, and may feel that they are prepared for an encounter such that a bad experience could happen to others, but would not happen to them personally. They also may believe that because they simply want to observe wildlife, the animal will not respond negatively. For instance, while a person may be fully aware that an elk during the rutting season is likely to be aggressive and charge, she or he may believe that it is safe to approach the animal because he or she will not experience a negative event.

Another shortcut to reduce cognitive load that is likely to be employed during decision-making under risk is accessibility, or the degree to which mental content is available. Accessibility is determined by both the cognitive mechanism that produces the content and by the characteristics of the stimulus (Kahneman, 2003). For instance,

content related to similarity (i.e., how closely the stimulus resembles another object or idea) is generally more accessible than content associated with probability (i.e., the likelihood that something will occur). In a human-wildlife interaction, the similarity of a situation to what one has seen on television is more likely to come to mind during the decision-making process than is the objective probability of injury associated with an interaction. A stimulus also can activate, or prime, unconscious mental content, such that when a second stimulus is presented, concepts, attitudes, and values related to the first stimulus are employed during evaluation of the second (Gilovich et al., 2002). Priming may be particularly relevant to encounters with wildlife that have an emotional component. For example, if one learns about poisonous snakes at a nature center program and subsequently feels fear or anxiety, and one then encounters a snake on a trail, one might be afraid regardless of whether the snake is poisonous. Lastly, the frame, or manner in which information about a stimulus is presented, will influence the subsequent evaluation of the stimulus (Tversky & Kahneman, 1981). The framing of wildlife communication materials likely will affect whether people perceive certain interactions as conflict. For instance, a park sign that indicates 5% of campers have trouble with bear in a campground versus one that reports 95% of campers do not have problems with bears will make a person more concerned about bear and more likely to evaluate an encounter with a bear as indicative of problems.

While cognitive theories such as TRA and TPB help us to understand the more conscious, reasoned elements of decision-making such as attitudes, norms, and control, the various heuristics and biases described above suggest that many processes beyond those that are purely cognitive influence decision-making. Many of these

unconscious strategies that people rely upon when encountering wildlife indicate that emotions may be an important factor. Emotionally laden thoughts are highly salient and more readily encoded than non-emotional thoughts (Bernstein et al., 2006) and therefore are more likely to be accessible when people encounter wildlife. Similarly, emotions associated with wildlife are likely to influence what concepts people anchor on or seek to confirm when interacting with wildlife. Emotions may make one more likely to be optimistic about approaching wildlife, or could influence how one is primed to interpret new information. As unconscious mental strategies (e.g., heuristics and biases) are expected to be relied upon in human-wildlife interactions and emotional components of such interactions may prevail in these instances, theories of emotion and affect should be addressed when considering decision-making in the context of human-wildlife conflict.

Theories of Emotion and Affect

Emotion, affect, and mood all may influence an individual's behavior and decision-making. Each of these motivational states is thought to be a separate construct (Wilson, 2008); however, the precise distinction and implications are debated in the published literature. For applied purposes, the resulting impact of any of these three phenomena on behavior and decision-making may be similar. Additionally, recent discussion about the application of affect, emotion, and mood theory to human-wildlife interactions suggests that the separation of these concepts might not be practical, and in general emotion is the focus of current dialogue (Manfredo, 2008). In accordance with the current discourse, I primarily use the term emotion unless

explicitly referring to research on affect or mood. Below, I review the definition of each motivational state and related empirical work in each of these three arenas and explore how they relate to human-wildlife conflict.

Affect is defined as a generalized feeling state. It may be conscious or unconscious, and may manifest as a positive or negative reaction to a stimulus (Finucane, Peters, & Slovic, 2003). Emotion is experienced as a more discrete and specific state. Emotion is usually created through a definite causal mechanism and has defined cognitive content (Forgas, 1992). Emotion theorists believe emotion is a major determinant in action (Ekman, 1999), particularly in risk-based situations (Lowenstein, Weber, Hsee, & Welch, 2001). Traditional theories of emotion suggest three primary mechanisms for the generation of emotions (Bernstein et al., 2006):

1. The James-Lange theory of physiology: a stimulus generates a physiological response that leads to a specific emotion.
2. The Cannon-Bard theory of simultaneous processing: an individual simultaneously has a physiological response to a stimulus and cognitive processing about the stimulus leading to an emotion.
3. The Schacter-Singer two-factor theory: an individual experiences a stimulus and associated physiological arousal, then conducts a cognitive appraisal to interpret the arousal and this generates a specific emotion.

More recently, emotion theorists suggest that cognitive and emotional processing occurs via separate systems in the brain, but that these systems interact concurrently to generate a reaction to stimuli (LeDoux, 2000). Current ideas about emotion suggest that emotions are more complex than traditional theories indicated. It is likely that a

variety of mechanisms for emotion generation play a role in decision-making related to the occurrence of human-wildlife conflict.

Mood is a low intensity feeling that typically does not have an identified cause or specified content (Finucane, Peters, & Slovic, 2003). Mood can influence risk-taking; an individual in a happy mood is more likely to engage in risky activities (Weber & Johnson, 2009). For instance, an individual may be in a happy mood because she or he is on vacation in a national park, and this could make the individual more likely to approach an animal (i.e., engage in risky behavior).

Affect, emotion, and mood can all vary along a spectrum of valence and intensity and influence decision-making and behavior. Experience can lead to a link between an affective state and memory of an event. If the affective state was positive at the time of an experience, an individual will seek situations that may replicate the state (Epstein, 1994). A person who fed ducks at a park as a child may remember enjoying the event and thus be more inclined to feed wildlife as an adult. Experiences may be marked by positive or negative feelings and such markers can facilitate (or bias) decision-making as described by the somatic marker hypothesis (Damasio, 1996). Under this hypothesis, prior experience feeling upset while watching deer consume landscaping plants may lead one to chase deer as soon as they enter the backyard. The "feelings-as-information" hypothesis states that people will use their feelings as information when judging an event or object. The mood states induced by the subject of a judgment or by the process of judging can influence the decision outcome (e.g., if one is in a positive mood, one will evaluate the subject more positively) (Peters & Slovic, 2000; Schwarz & Clore, 1983). The affect heuristic

suggests that affect can skew evaluation of risks and benefits of an event, aiding and/or biasing decision-making (Keller, Siegrist, & Gutscher, 2006; Slovic, Finucane, Peters, & MacGregor, 2004). Together, these ideas about emotion and mood are all strong support for the idea that one's feelings (whether defined as affect, emotion, or mood) are likely to influence one's behavior in situations that could lead to food conditioned or habituated wildlife.

Integrative Theories

While it is important to understand the origins of individual cognitive and affective theories of decision-making, the substantial overlap of the two schools of thought with respect to risk suggests that a more cohesive integration will be most useful to understand human-wildlife relationships. Below, several theories are reviewed that address the way that emotions and cognitions interact during decision-making. Such an integration was suggested in the literature several decades ago when Simon (1983) proposed the intuitive model of rational decision-making. This model emphasized the importance of prior experience in decision-making, and the role of emotion in moderating attention during decision-making. More recently, several theories and models that incorporate experience and emotion have emerged.

The integrative model of behavioral prediction (IMBP) continues the evolution of TRA and TPB by adding affective variables as antecedents to the development of beliefs (Fishbein & Yzer, 2003). The model also includes environmental constraints as a variable that can potentially disrupt the manifestation of behavioral intentions as behaviors. Presumably, environmental constraints could induce emotional states that

play a more direct role than antecedent affective variables in facilitating or disrupting planned behavior. The IMBP incorporates emotions in two ways that directly apply to human-wildlife conflict. First, suppose a person has a prior human-wildlife interaction that is highly emotionally valenced. That experience is likely to influence the person's beliefs about an interaction with the species in the future, thus functioning as a background variable that influences behavioral, normative, and efficacy beliefs in the model. If, however, the next time a person encounters the animal, it behaves differently than it did during the initial experience, the associated emotional state generated in the human will likely override prior beliefs (e.g., behavioral, normative, and efficacy) and influence the individual's behavioral response as an environmental constraint (i.e., context-specific variable that disrupts intentions from manifesting as actual behavior).

Dual process models identify two types of processing that occur when a decision is made (Kahneman, 2003; Sloman, 1996). System 1 is automatic, unconscious, based upon affect, and an immediate impression of the stimulus. In contrast, system 2 is controlled, reasoned, and conscious. The processing that occurs through system 1 is moderated by system 2 to produce what is presumed to be the "best" decision. While on a hike, a person might see a bear cub. The system 1 response may be excitement and empathy for what appears to be a baby animal alone in the forest. The behavioral response could be to approach the animal to see it more closely. System 2 might then activate and the person may recall that he or she learned mother bears are likely to be nearby and will protect their cubs fiercely. Therefore, the person may decide to avoid the bear and continue hiking with caution.

Similar to the dual process model, fuzzy trace theory suggests a reasoned route and a reactive route (Reyna & Brainerd, 1995; Reyna & Farley, 2006). Decision-making can occur either through a precisely evaluative path relying on verbatim memory of knowledge, or through a gist-based route that relies on fuzzy mental representations that capture the general meaning of information or experiences. These two routes are encoded separately and use of one or the other may be context specific and vary over the lifespan. The theory suggests that the reliance on gist-based thinking increases as an individual accumulates experience over time. Under fuzzy trace theory a person may have a number of benign or even positive encounters with a coyote that passes through her or his backyard. The gist this person extrapolates about the experiences is that coyotes moving through the yard are interesting to view and do not cause trouble. The behavioral response a person may have to this gist is to allow coyotes to move freely through the yard despite knowing they may cause problems. Conflicts arise, however, when coyotes are allowed to linger in suburban spaces and become habituated to these areas. The gist-based behavioral response that caused this to occur could explain what managers presume to be lack of knowledge or vigilance on the part of suburban residents who report problems with coyotes. The resident's processing that occurred based on previous interactions may have been reasonable and therefore during future encounters, overrode other information (e.g., coyotes can habituate and cause problems) to the contrary.

The integrative theories describe the relation between cognitive and affective components of decision-making and purport that both are relevant. They suggest that the roles of each component vary relative to context-specific variables. In general,

when emotional arousal is high, and/or an individual has prior experience to draw from, affective processing will dominate decision-making. Since emotions are likely to be intense during interactions with wildlife, models that incorporate emotion as a significant variable that influences decision-making seem most appropriate to understand human behavior with respect to human-wildlife conflict.

Using Integrative Decision Models to Understand Human-Wildlife Conflict

With respect to the theories reviewed and the empirical support available, a few key concepts emerge as most applicable to human-wildlife conflict. In a human-wildlife encounter that might lead to conflict, certain factors (e.g., species type; geographic setting; number and behavior of people in the area) may limit the use of rational decision-making processes. Such limitations favor the incorporation of emotional components and thus the use of integrative models to understand decision-making. For instance, under increased stress people will rely on their immediate appraisal of a situation and associated emotional cues, allowing system 1 to dominate decision-making. When individuals are under time pressure they are likely to employ cognitive shortcuts (e.g., heuristics) and emotions in decision-making. The uncertainty of a situation will increase the influence of emotions on decision-making. Finally, in circumstances of high motivation to engage with a stimulus, individuals are likely to apply a cognitive appraisal (i.e., reasoned, deliberate evaluation) of the situation. The contexts of human-wildlife interactions that may lead people to engage in behaviors that foster food conditioning or habituation often meet all of the above criteria: high stress, time urgency, uncertainty, and high motivation. Most of these factors imply the

use of an affective-based, or system 1 decision process, although high motivation will encourage some degree of cognitive moderation.

Humans often do not make rational decisions, particularly in highly emotionally valenced circumstances such as those surrounding human-wildlife interactions that lead to habituation and food conditioning. Consequently, various theories of judgment and decision-making under risk can improve our understanding of these situations. The integrative models described in this paper (e.g., IMBP, dual-process, fuzzy trace) incorporate highly relevant emotional variables to varying degrees and should be considered for use when evaluating human-wildlife conflict situations. In particular, those that address the role of intuition (dual process as described in Kahneman [2003] and fuzzy trace [Reyna & Brainerd, 1995]) should be applied. Intuition in dual process is primarily system 1, however intuition lies between perception and cognition and utilizes content elements of system 2 (i.e., reasoned, conscious processing) such as information from prior experience. This conceptualization of intuition is similar to fuzzy trace's gist-based processing. These models and associated empirical research suggest that behavior is driven primarily by intuition, particularly in risky, emotionally charged, and uncertain situations (Haidt, 2001; Klein, 1998; Leiserowitz, 2006; Slovic et al., 2004; Weber & Johnson, 2009), like those encountered in a human-wildlife interaction. Intuition allows individuals to make an immediate evaluation of a situation as good (leading to approach behaviors) or bad (leading to avoidance) (Kahneman, 2003).

Problems between people and wildlife may occur when a series of neutral or positive interactions leads to a negative encounter. For example, after a series of non-

consequential encounters, wildlife and humans may experience a waning of an initial fear response to one another. This habituation process may be understood in the context of the decision-making literature. Reliance on gist, or intuition-based decision-making is known to increase with age as an individual accumulates experience from which to formulate the gist of situations. Typically, this leads to risk-avoidant behaviors. On the other hand, if one were to have multiple neutral experiences with a wildlife species (i.e., close encounters with no negative consequences), one might extrapolate the gist that it is acceptable behavior to be near animals (i.e., a person becomes habituated to wildlife presence and engages in behaviors that facilitate wildlife habituation). This intuition likely will be drawn upon in future encounters. As Reyna and Farley (2006) note, "Failures to experience bad outcomes may instill complacency in real life" (p. 23). Empirical studies demonstrate that when people rely on prior experience to make future judgments, they underestimate the likelihood of rare events (Hertwig, Barron, Weber, & Erev, 2004) (i.e., if one has not had a negative encounter with a bear, one might act without considering the objective probability of the occurrence). Such decision-making could be detrimental or beneficial depending upon the context. Negative impacts of "complacency" may include wildlife utilizing space close to homes, leading to food conditioning or potential interactions that result in injury to humans or wildlife. Benefits, however, of reciprocal human-wildlife habituation may include increased opportunities for wildlife viewing and less physiological stress for individual animals.

Implications for Management

As previously discussed, human-wildlife interactions, and a certain (as of yet undefined or identified) degree of human-wildlife habituation may have positive conservation impacts. People who enjoy wildlife may seek out encounters, increasing their appreciation for wildlife and thereby support for conservation initiatives (Kretser, Curtis, Francis, Pendall, & Knuth, 2009). On the other hand, human-wildlife interactions are risky situations that can result in harm to people or wildlife. Furthermore, habituation may lead to food conditioning, which in general causes conflict between people and wildlife. Finding a balance between learned approach and avoidance behaviors in both people and animals will be key to successful management of human-wildlife interactions.

One of the inherent difficulties associated with finding an appropriate level of habituation from a behavioral decision-making perspective is understanding how to encourage "good" decision-making in people. The definition of a good decision is debated in the decision-making literature. Decisions may have coherence, or internal consistency (i.e., are logical and rational according to the individual decision-maker's goals), and/or they may have correspondence with external reality (i.e., is consistent with the reality of the situation) (Reyna & Farley, 2006; Tape, 2009). Finding a balance between coherence and correspondence is not limited to the decision-making literature, but is in fact a very real problem for wildlife managers. It may be the case that a person who approaches an animal is acting consistently with his or her beliefs and goals to be close to wildlife, or to thrill seek, thereby exhibiting coherence. Such

behaviors, however, may not constitute a good decision from a manager's perspective; a close encounter with wildlife is a risk-laden situation.

Exploring elements of people's decision-making processes when they encounter wildlife may help to illuminate some of the issues associated with individuals' decision-making in the context of human-wildlife conflict. If researchers and managers can work toward identifying a sustainable level of human-wildlife habituation that prevents negative outcomes, and fosters positive encounters, an opportunity exists for human-wildlife interactions to help further conservation goals.

Implications for Future Inquiry

Inquiry is needed to understand the emotional components of decision-making in the context of human-wildlife conflict. Theoretically, an individual's emotions will be a significant driver in her or his behavior during a human-wildlife interaction. To understand how emotions might influence human-wildlife interactions a number of issues need to be explored. It is important to characterize the emotional components that influence an interaction. The relation between an individual's cognitive evaluation of his or her emotional expectation for an interaction (e.g., it will be scary; it will be exciting) and his or her behavior when encountering an animal needs to be examined. We must explore whether these expectations hold any predictive power with respect to an individual's approach or avoidance behavior and if these expectations for emotional response are realized during an interaction. One may assume understanding the latter issue would be dependent upon the animal's response to the interaction. If an animal's

behavior deviates from the expectation, how might this influence a person's emotions and subsequent behavior?

Context is expected to be highly relevant to human-wildlife interactions. Examples in this manuscript draw from a variety of situations, from backyard encounters with wildlife, to wildlife viewing in national parks. Understanding the influence of contextual cues on expectations for interactions, and the lability of emotion in these circumstances is crucial. A logical assumption is that an individual is likely to be in a different affective state at home than she or he would be when visiting a park. It would be helpful to understand how this might influence expectations for interactions and behavior during an interaction. We also should explore whether intuition that draws on previous experience developed in one context will transfer to the other?

Finally, if the literature suggests that the emotional component of decision-making is relevant to behavior, we should explore whether communication efforts focused on this aspect can influence observed behaviors. For instance, if one employed emotionally-valenced communication strategies, would these be more likely to be relied upon during the actual encounter between human and wildlife? Managers and communicators would benefit from knowing if communication can induce the use of a heuristic that leads to the desired (from a management perspective) behavior or if emotionally-charged communications could serve as "emotion markers" that influence behavior.

The integration of emotion and intuition into our understanding of human-wildlife interactions that foster food conditioning and habituation appears to be a very

promising pursuit. Future inquiry will help to refine its application and may have implications for addressing human-wildlife conflicts and promoting human-wildlife coexistence.

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CHAPTER THREE
HUMAN-WILDLIFE HABITUATION IN NATIONAL PARKS

Introduction

Interactions between humans and wildlife are growing in the US as: exurban development and suburban expansion increasingly place humans in wildlife habitat; some populations of wildlife expand into or adapt to living in human-dominated environments; and interest in wildlife viewing as a recreational activity increases (Knight, 2009; Kretser, Sullivan, & Knuth, 2008). Human-wildlife interactions occur in a variety of contexts, ranging from backyards to parks and protected areas. In recent decades, the changing dynamics between people and wildlife have taken on greater management significance. According to the 2010 U.S. Census, approximately 81% of Americans live in urban areas. Studies have found that urbanization is changing public perceptions of wildlife, and that people from urban backgrounds may seek out and value encounters with wildlife (Nelson, 2008). As people change the way they interact with animals, wildlife learn from these experiences and may modify their behavior accordingly. In protected areas such as national parks, wildlife quickly may learn that people pose little threat and may be the source of a food reward, resulting in habituation and food conditioning. Managers frequently are concerned about potential health and safety risks to both people and wildlife associated with these changes in wildlife behavior. This project was developed to examine these issues and associated management actions in parks and to identify potential management needs.

Differentiating Habituation and Food Conditioning

Often in wildlife management literature and practice, a blurred distinction between habituation and food conditioning complicates our understanding of habituation (Bogan, 2012; Hopkins et al., 2010). Habituation is the waning of a response following repeated exposure to a stimulus with neutral consequences (Alcock, 1998; Bernstein, Penner, Clarke-Stewart, & Roy, 2006, p. 195-96). Typically, managers become concerned about habituation in wildlife when an animal loses its fear response to the presence of humans after repeated, non-consequential encounters (e.g., Herrero, Smith, DeBruyn, Gunther, & Matt, 2005; Jope, 1985; McNay, 2002; Whittaker & Knight, 1998). With respect to human-wildlife interactions in parks, humans also may demonstrate habituation and lose their fear of interactions with wildlife (Zinn, Manfredo, & Decker, 2008). Knowledge of habituation in humans comes mostly from psychology studies using controlled laboratory settings (e.g., Bornstein & Benasich, 1986; Martin-Soelch et al., 2006; Phillips & Wellman, 2005; Turner, Beidel, & Roberson-Nay, 2005). Habituation in humans is likely influenced by: values, beliefs, attitudes, lack of perceived risk, acceptance capacity, previous experience, and social norms (Zinn, Manfredo, & Decker, 2008). Little is known about how these concepts might relate to specific human behaviors near wildlife.

Conditioning occurs when an animal learns to associate a stimulus with a positive or negative consequence (e.g., reward or punishment) and the response to the stimulus intensifies over repeated exposures. Food conditioning is the process by

which an animal associates humans or human spaces with food. In general, food conditioning leads to negative outcomes for both wildlife (e.g., sub-optimal diet or habitat, translocation, lethal removal) and people (e.g., potential injury from an encounter, disease threats). In the wildlife literature, food conditioning is most often described as a process of classical conditioning through which animals learn to associate food with the presence of humans or human activity (e.g., Mazur & Seher, 2008; Whittaker & Knight, 1998). Food conditioning also may arise if an animal habituated to humans is rewarded (i.e., acquires a human food source) for approaching human spaces or people. The conditioned stimulus (i.e., food), however, is *not* present in a habituation-only context. Food conditioning and habituation develop through distinctly different learning mechanisms (i.e., habituation: learning to ignore a stimulus vs. food conditioning: learning to pay greater attention to a stimulus). Understanding the nuanced differences in the type of learning may have implications for the management of both human behavior and wildlife.

Why Study Habituation in Parks?

Parks, protected areas, and natural areas represent unique settings in which to explore human-wildlife interactions that result in changes in wildlife behavior. Previous work has shown that people view such spaces as unique areas for wildlife relative to human-dominated landscapes, and that people may have different attitudes about the presence of wildlife, or human activities directed toward wildlife, in natural areas (Wieczorek Hudenko, Decker, & Siemer, 2008; Zimmermann, Wabakken, & Dötterer, 2001). Additionally, exploratory symposia and workshops on wildlife

habituation held at the 2005 annual meeting of The Wildlife Society and the 2007 George Wright Society meeting overwhelmingly indicated a need for greater attention to this topic, especially to the human dimensions**.**

The U.S. National Park Service (NPS) administers 401 individual units of almost 30 different designations, ranging from urban National Historic Sites and Monuments, to National Parks with remote wilderness. The commonality among these parks, regardless of their context, is that they have a core area where resources are to be conserved unimpaired for the enjoyment of current and future generations (16 U.S.C. § 1).

Nearly 274 million recreationists visited parks within the national park system in 2013 (National Park Service, 2014), creating ample opportunities for human-wildlife interactions. Understanding and management of human-wildlife interactions in parks has evolved over the last century. In the early twentieth century, parks encouraged feeding and close viewing of animals that likely led to habituated and food-conditioned wildlife. Managers recognized that these situations led to many human injuries each year from wildlife due to a change in animal behavior as a result of interactions with humans. This, in turn, led to the removal of many animals. By the 1970s, parks secured open pit garbage dumps, initiated education programs and regulations to prevent feeding of wildlife, and began to establish regulations that addressed how closely visitors could approach wildlife, in an attempt to improve visitor and wildlife health and safety.

Presently, the NPS prohibits the feeding, touching, teasing, frightening or intentional disturbing of wildlife nesting, breeding or other activities (36 C.F.R. 1 §

2.2 a 2). In addition, many parks have food storage regulations and guidelines for wildlife viewing. The NPS laws and policies for wildlife feeding are fairly consistent throughout the units, but visitor compliance and enforcement vary widely and opportunities for food conditioning to develop are widespread. While the NPS aims to "maintain native plants and animals by preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations" (National Park Service, 2006, p.42), no service-wide regulations or policies exist related to wildlife habituation. Yet, given the high number of recreationists in parks, and the ample opportunities for human-wildlife interactions related to habituation, clear implications exist for key aspects of the NPS mandate including wildlife health and conservation, and visitor enjoyment and safety. Habituation can create opportunities such as access for wildlife to important food resources and increased wildlife viewing for visitors. However, challenges exist such as potential physiological stress for wildlife, and safety concerns for people. In addition, the relationship between habituation and food conditioning is of particular concern for parks. Many parks struggle with food conditioning-related issues, and managing habituation to promote positive impacts while preventing food conditioning is a significant challenge. This is particularly relevant in park developed zones, especially around picnic areas or campgrounds. In addition, animals habituated or food conditioned inside a park may be more likely to interact with humans or use human spaces outside of the park. Due to the differences in management regimes inside and outside of parks, this could put wildlife and/or humans at risk. The implications of negative interactions include all of these concerns, and also have potentially broader

implications such as economic or legal costs, and negative impacts on visitor attitudes toward wildlife conservation or support for the parks.

Description of the Project

To address the need for knowledge about changes in wildlife behavior resulting from human-wildlife interactions in parks, the Biological Resource Management Division (BRMD) of the NPS formed a Habituation Steering Committee with representatives from each NPS region and launched an inquiry into the topic. The investigation began with an examination of the human dimensions of human-wildlife habituation. The objectives of the project were to explore the extent and nature of habituation across the national park system, and to identify related management priorities and knowledge gaps. Several methods were used to achieve these objectives including: workshops with wildlife researchers and managers; literature reviews; a survey of NPS managers; and a content analysis of management documents.[1] Results from each activity were reported as separate Natural Resource Reports (Wieczorek Hudenko & Connery, 2013; Wieczorek Hudenko & Decker, 2013a, 2013b, Wieczorek Hudenko, Siemer, & Decker, 2013; Wieczorek Hudenko & Seimer, 2013). In this paper, we summarize collective learnings from all portions of the project. Below, a description of each approach is provided. The findings are discussed collectively as each activity provided a broad range of insights into habituation-related issues in the national parks. Findings are organized into key themes that emerged.

[1] This research was conducted with approval from Cornell University's Institutional Review Board (Protocol ID 0910000976).

Workshops

Two workshops were conducted with wildlife researchers and managers at professional conferences. The first two-hour workshop took place at the Pathways to Success: Integrating Human Dimensions into Fisheries and Wildlife Management Conference in Estes Park, Colorado, in October of 2008. Workshop participants included twenty-six wildlife researchers and managers from state and federal government, universities, and non-governmental organizations. The goal of the workshop was to explore research needs related to habituation. A series of brief presentations provided background information about the NPS context and human-wildlife habituation. Participants worked in break-out groups to identify and prioritize research-related needs associated with human-wildlife habituation. The groups then synthesized their lists and collectively generated a single set of prioritized issues.

The second workshop was conducted at the George Wright Society Conference in Portland, OR, in March of 2009. Like the first workshop, this two-hour session began with brief background presentations. A panel discussion then occurred with representatives from different divisions of the NPS, including: natural resources; interpretation; law enforcement; maintenance; and superintendent. Twenty-eight wildlife researchers and managers, most with the NPS, participated in discussions with the panel. The focus of the workshop was the identification and prioritization of management-related needs associated with human-wildlife habituation in the parks.

Literature Reviews

Based on input from the Habituation Steering Committee and initial inquiry associated with the workshops, literature reviews in two topic areas were conducted. One review specifically focused on theory and empirical research related to human-wildlife interactions that may lead to habituation (for details see Wieczorek Hudenko, 2012). This included studies about: human-wildlife interactions; individual human decision-making and behavior; and risk perception, attitudes, values, and beliefs related to interactions with wildlife. The second review focused on interventions designed to address human-wildlife interactions in parks. This included a broad range of studies examining the use of wildlife-directed techniques, as well as human-directed strategies such as regulations, education and communication campaigns, and law enforcement. Peer-reviewed literature was searched and article selection was guided by findings from the first stages of inquiry.

Manager Survey

A survey of managers was designed to be exploratory in nature and to cover a diversity of topics related to the management of habituation in parks. To examine the extent and nature of human-wildlife habituation in parks, NPS managers were queried about current management protocols and park management priorities related to habituation as well as their perceptions of visitor expectations, attitudes, and behaviors with respect to wildlife encounters in the parks.

The survey instrument included eight qualitative, open-ended questions addressing the following themes: extent and nature of habituation in parks; causes and

effects of habituation; habituation-related management strategies, actions, priorities, and needs; and visitor attitudes and behaviors associated with habituation. The survey was conducted July-September, 2008. A convenience sample was used and the questionnaire was distributed via email to natural resource managers in parks across the NPS system. Each NPS Habituation Steering Committee member utilized a variety of formal and informal communication channels to encourage participation in his or her region. The survey included a letter of introduction explaining the survey and its intent. The introductory note also pointedly distinguished between habituation and food conditioning and asked respondents to separate issues associated with each phenomenon. Seventy-eight managers responded to the survey from 76 individual NPS units, representing all seven NPS regions. They identified 87 different species for which habituation potentially was an issue (Figure 3.1).

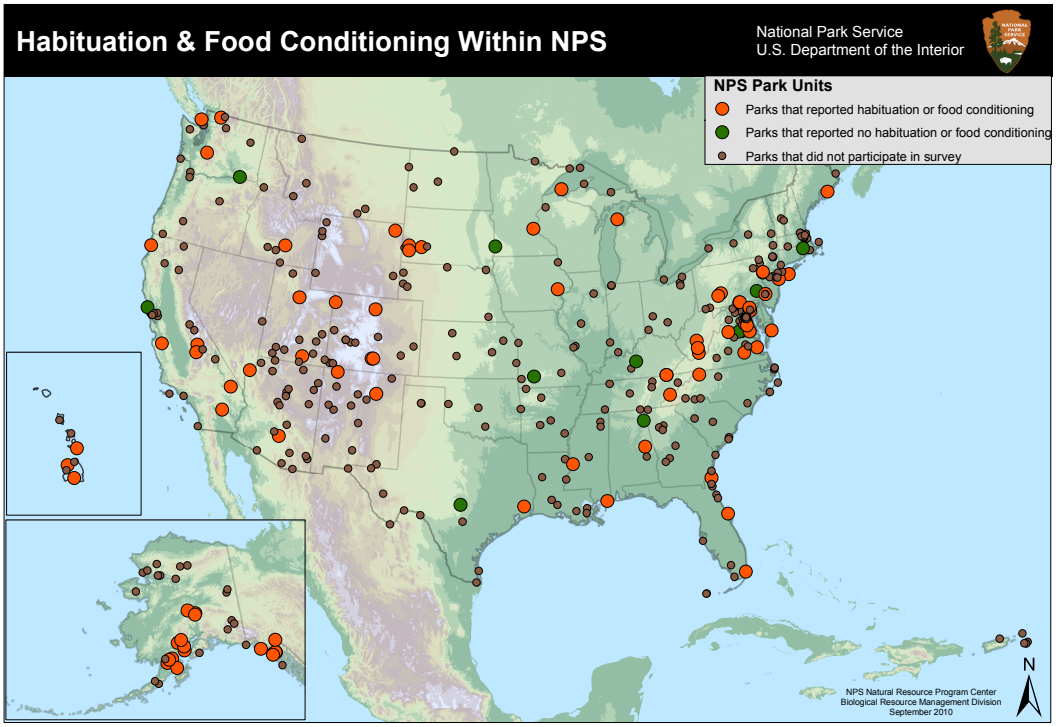

Figure 3.1. Map of National Park Service units and their responses to habituation survey[2].

Content Analysis

To examine the current focus and scope of issues and management activities related to habituation in park units, management, planning, and policy documents that provide guidance for management strategies or actions related to habituation (i.e., NPS guidance documents) were collected from June-October of 2009. A call for guidance documents was issued by BRMD and distributed via memo to regional Natural Resource Chiefs, and then passed on to contacts at individual parks. Additional solicitation for documents occurred through several NPS-wide announcements as well

[2] This map was created by Lauren Barish, BRMD student employee and Antioch Univ. New England MS student.

as individual contacts from Habituation Steering Committee members. Documents also were collected from internal and external NPS websites.

A coding scheme was created to identify characteristics of human-wildlife interactions and related management issues in parks. The coding categories were developed using information from previous stages of inquiry and input from the Habituation Steering Committee and BRMD staff. All items in the coding scheme were written as presence/absence questions and coded as binary variables. The categories included: descriptive information; problem-focused information (e.g., types of negative interactions or impacts; action thresholds); solution-focused information (e.g., wildlife-directed actions; visitor management strategies); use of habituation and food conditioning terminology (e.g., specific or implied); and management activities (e.g., level of focus; scope; divisions included).

The coding scheme was directly applied to all plans that included a significant focus on native wildlife management. Variables were coded as present or absent and entered into a database. The remaining documents (i.e., plans that mentioned native wildlife management but did not focus on it) were reviewed with the coding scheme as a guide. These documents included: broader management plans that included wildlife components; Superintendent's Compendiums; and guidelines and protocols. A total of 68 documents were coded: 22 with strict application of the coding scheme, and 46 using a qualitative application of the coding scheme.

Findings

A number of themes and subthemes emerged across the activities we conducted in this inquiry (Table 3.1).

Table 3.1 Summary of themes emerging from multiple methods of inquiry into human-wildlife habituation in US National Parks.

Habituation and Food Conditioning

- Difficult to separate in an applied setting.
- Food conditioning creates risk for people and wildlife
- Continuum of behavior (habituation and food conditioning can be considered behaviors along a continuum).

Visitor-Related Themes

- Perceived lack of knowledge about and respect for wildlife behavior and park management.
- Problematic overlap between visitor areas and wildlife habitat.
- Attitudinal and behavioral consequences of expectations regarding wildlife behavior and park management influence habituation and food conditioning.
- Prior experience, especially with suburban wildlife, and popular culture influences visitor behaviors around wildlife.
- Visitor emotions influence decision-making and behavior.
    - Affects both intended and performed behavior.
    - Models integrating emotion may be helpful to understand and influence visitor decision-making and behavior.

Management-Related Themes

- Food conditioning considered more significant management issue than habituation.
- Visitor inadvertent and purposeful provisioning of food is a significant problem and difficult to manage.
- Management strategies focus on aversive conditioning for wildlife, and communication, education, and regulation for visitors.
- Preference for communication and education but evaluation is lacking.

Desire for Consistency

- Standard protocols to address habituation are lacking.
- Need for coordination and collaboration within the NPS and other agencies and organizations.
- Communication to NPS staff and visitors regarding habituation needs improvement.

Information Needs

- Basic information regarding causes and effects of habituation.
- Identification of points along the continuum of habituation and food conditioning behaviors.
- Role of human attitudes and behavior in the development of habituation.
- Evaluation and information sharing regarding management interventions for people and wildlife to address habituation and food conditioning.

Habituation or Food Conditioning?

A theme that repeatedly emerged across activities in this inquiry was the challenge of separating habituation and food conditioning in an applied setting. While this inquiry was intended to explore habituation, and habituation and food conditioning are different theoretically, distinguishing between the two is exceptionally difficult. Phrases such as "negative human-wildlife interactions," "problem interactions," and "human-wildlife conflict" often were used as umbrella terms for both habituation and food conditioning. This appeared to be the case in particular for animals such as bears or coyotes that are apt to become both habituated and food conditioned.

The majority of responses to questions about habituation in the workshops and survey were dominated by food-related issues (e.g., visitors feeding wildlife, management of trash in parks, the availability of anthropogenic food in high use areas), indicating either confusion in terminology, inability to distinguish between the two in practice, or both. For example, many parks in the survey identified a lack of proper waste management and food storage as practices that fostered habituation in wildlife. They also suggested hazing or aversive conditioning techniques[3], such as noisemakers or rubber bullets, as the solution to habituation. Yet, as described, the causes and solutions were more related to food conditioning in wildlife than to habituation. Similarly, many management documents referred to both processes

[3] Aversive conditioning is a process used by managers to deter animals. Hazing is a term used for techniques that rely on the repeated use of fear stimuli (e.g., hand clapping, pyrotechnics). However, there appears to be ambiguity in the application of these terms and they often are used interchangeably. We present our findings to reflect the various usages of the terms across activities in the project.

together, or interchangeably. In a few cases, recent documents identified and employed specific definitions of each phenomenon.

Consistently in the published literature, management documents, and input from managers, food conditioning was addressed to a greater extent than was habituation. This focus on food-related issues often was acknowledged overtly and it was explained that the aggressiveness of animal behavior, and therefore potential danger to both wildlife and people, was greatest when animals become food conditioned. Food conditioning was described as a threat to wildlife both because of potential negative health impacts associated with diet, but also because of the danger of human-caused injury or death. Visitor-related problems associated with food-conditioned animals included visitor safety as well as property damage.

Habituation and food conditioning often were discussed as a continuum of behaviors along which habituation was considered less likely to lead to serious human-wildlife interactions than was food conditioning. It was acknowledged that habituation could predispose animals to become food conditioned, however, and lead to more severe problems and the need for more significant management interventions. Despite this risk, the possible benefits of habituation (e.g., reduced stress to wildlife; opportunities for visitors to view wildlife leading to visitor enjoyment) and strategies for managing habituation at levels to achieve benefits and avoid problems often were discussed.

Visitor-Related Themes

Throughout the inquiry managers discussed the link between human-wildlife interactions and a variety of issues related to park visitors. Visitors' knowledge, experience, expectations, and emotions, as well as park management of visitors, were identified as influencing human-wildlife interactions.

Natural resource managers in our inquiry were concerned about visitors' perceived lack of knowledge about wildlife behavior and ecology, and inadequate respect for wildlife in parks. They also expressed concerns about visitors' attitudes about the wildlife management objectives of the NPS. They believed that many of the problematic behaviors exhibited by visitors are the result of this lack of knowledge about wildlife and park management. Participants in our workshops and survey perceived that visitors misunderstand the park context and have expectations that wildlife will be "tame" or "like zoo animals." Consequently, visitors are more likely to approach animals (which are likely to be habituated to some degree already if they are near people or developed areas), leading to further habituation and increased risk to both people and the animal. Regardless of the visitors' motivations, whether it is a close photo or the thrill of approaching wildlife, the results are the same and the chances for negative outcomes exist. Managers suggested that these visitors lack a basic understanding of wildlife behavior and that this limits their ability to judge the risks that their actions pose, either to themselves, to other visitors, or to wildlife. Of particular concern are situations in which visitors want to feed animals, thereby fostering food conditioning. In addition to these more deliberate visitor behaviors,

managers also highlighted inadvertent behaviors that may foster habituation and food conditioning such as poor camping, hiking, or picnicking practices.

Managers also perceived that high visitation and high use areas in key wildlife habitat encourage humans and wildlife to interact in close proximity, and consequently to habituate to one another. This is viewed as primarily a park management issue. Managers believed that these problems could be avoided via regulations to address seasonal flux in visitation and corresponding visitor and wildlife needs. They also identified the location of buildings and other park infrastructure in important wildlife habitat as contributors to habituation.

We repeatedly found throughout our investigation that managers believed a visitor's prior experience with wildlife, expectations created by that experience, and emotions related to wildlife, are primary drivers of visitor behavior leading to wildlife habituation and food conditioning in parks.

Expectations were described as people's beliefs about what wildlife would or should do in a park, and what managers did to foster or limit particular wildlife and human behaviors. Two primary aspects of expectations with respect to human-wildlife interactions were emphasized: (1) the origins of expectations, and (2) the attitudinal and behavioral consequences of expectations with respect to future interactions. Participants in the first workshop and the survey expressed the belief that together these two elements largely drove the habituation phenomenon and likely led to other related issues such as food conditioning. Additionally, it was recognized that visitor expectations have the potential to be influenced by all divisions within a team of protected area managers (e.g., interpretation, natural resources, management, law

enforcement, and facilities and maintenance). Expectations of interest were of three types: (1) expectations people brought with them when they visited a park (formed prior to park visit, based on beliefs and attitudes derived from prior direct experience, social norms, mass media, or specific marketing); (2) expectations visitors developed while in a park (based on observing others' behavior around them); and (3) expectations influenced by park communication or management actions either before or during a visit (which may encourage or discourage behaviors leading to habituation).

The panel of NPS managers at the second workshop identified social influences of urbanization as causes for habituation and other changes in human and wildlife behavior. They expressed the belief that with the growth of suburban landscapes and culture, people's prior experience and expectations about wildlife in parks have changed in recent decades. For instance, one panelist proffered that experience with the habituated behavior of many suburban-dwelling deer might lead park visitors to expect that all ungulates would behave in such a fashion. Another panelist described a similar expectation for close wildlife viewing among urbanized visitors that may arise from a combination of a lack of direct experience with wildlife, and from exposure to television programs in which people approach or touch wildlife. Respondents to the online survey echoed this belief and stated that when visitors experience repeated instances of non-threatening wildlife encounters, those visitors are likely to be bolder in future interactions – contributing to habituation of people as well as wildlife. Many managers expressed concern regarding the way in which visitor experiences in one park may or may not translate to another park. For instance, one

park might be more likely to enforce anti-feeding or approach distance regulations than another, or messages might not be consistent across parks. The issue of concern was how such experiences might affect visitor behavior toward wildlife.

Finally, interest in the role of emotions in visitor decision-making and behavior associated with wildlife was identified in each phase of our inquiry. While emotions were identified consistently, many managers suggested that this received little management attention and often was not considered a valid concern in wildlife management issues. This interest in emotions on the part of participants in our inquiry mirrors trends in communication and social psychological theory. Our literature review exploring human decision-making and behavior in human-wildlife interactions revealed several models with empirical support that suggest emotions play a significant mediating role in people's decision-making.

The theory of planned behavior (TPB) is one of the models most commonly used in the development of wildlife-related communication messages. A recent iteration of this model, the Integrated Model of Behavioral Prediction (IMBP) explicitly incorporates affective variables (i.e., mood, emotion) as antecedents to behavior (Fishbein & Yzer, 2003) (Figure 3.2). The IMBP also includes a variable termed "environmental constraints." Environmental constraints may be a variety of factors in one's surroundings such as structural elements, available resources, or the presence of other individuals. It is believed that this variable can disrupt the performance of an intended behavior. Presumably, environmental constraints also could induce emotional states (e.g., a person does not intend to feed a squirrel but upon seeing that it looks hungry, the individual feels sad and compelled to feed it).

These emotional states arising from cues in the environment will play a more direct role in behavior than antecedent affective variables (i.e., mood and emotion in the model). The IMBP incorporates emotions in a way that directly applies to human-wildlife interactions. Suppose a person has a prior human-wildlife interaction that has a significant emotional impact. That experience is likely to influence the person's beliefs about an interaction with the species in the future. If, however, the animal behaves differently during the next interaction, the emotional state generated in the person (e.g., interest instead of fear), likely could override prior beliefs and influence the individual's behavioral response.

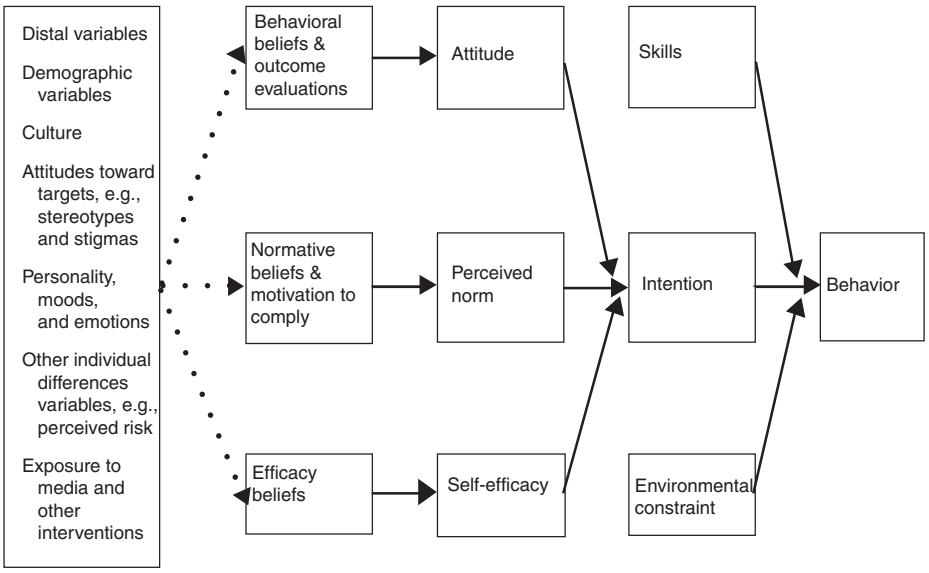

Figure 3.2. Integrative model of behavioral prediction (Fishbein & Yzer, 2003).

Management-Related Themes

The topic most often addressed in the various phases of the inquiry was negative interactions between people and wildlife associated with food, and the

management implications of those interactions. Both wildlife- and visitor-directed management strategies were discussed, with a focus on aversive conditioning and education efforts.

Interactions that occurred around food sources were typically considered "conflict," and often described as leading to human injury, negative health impacts to wildlife, and/or damage to property. In general, the workshops, survey, and management plans discussed food conditioning more extensively than habituation, and most management techniques described were designed to address problematic wildlife-visitor interactions that arise from food conditioning. The potential negative impacts of these interactions to wildlife conservation and to visitor safety likely are the reason that food conditioning receives more management attention than does habituation.

When addressing the relation between habituation and food conditioning, managers suggested that habituation may lead to food conditioning, and that this could foster reliance on humans, consequently causing animals to alter their natural behavior or character. Park staff expressed concern that food conditioned animals may be considered nuisance or pest species, or may model "bad" behaviors to other animals in the population. Respondents in the survey most often identified visitor feeding of wildlife as the visitor behavior leading to habituation[4]. Both purposeful feeding and inadvertent feeding (i.e., careless camping and picnicking) were identified as prolific

[4] This response again emphasizes the challenges associated with distinguishing between habituation and food conditioning in an applied setting and the significant overlap in managers' use of the terms. Many responses to our survey questions about habituation addressed both habituation and food conditioning issues. For instance, this information was provided in response to a question about "human behaviors leading to habituation."

in parks throughout all regions. Park managers in both workshops also discussed human behaviors associated with food, such as improper camping and picnicking, and purposeful feeding, as the most difficult human behaviors to manage. They believed that visitor misunderstanding of regulations, and of basic wildlife behavior, are the root of the problem and difficult issues to address. In addition to such lack of knowledge, managers were concerned about visitors who disregarded regulations, even if they understood them.

Most of the management strategies identified included both wildlife and visitor components. The wildlife-focused approach most commonly discussed in the inquiry was aversive conditioning. Aversive conditioning techniques (primarily fear- and/or pain-based stimuli) varied with respect to the nature and severity of wildlife behavior and the resulting human-wildlife encounters. Managers' perception of the effectiveness of these techniques also was varied. Other wildlife-directed actions included removing access to human food (e.g., waste collection, animal-proof storage and trash cans), hazing, and removal of individual animals. Even wildlife-directed protocols typically had a "visitor education" component. In fact, the findings from several of the activities suggest that the use of visitor-directed education and communication campaigns is the most common strategy used by wildlife managers to address negative human-wildlife interactions. Such strategies included one-on-one interactions between staff and visitors during the permitting process, as well as "teachable moments" when natural resource specialists engaged visitors while conducting aversive conditioning. In addition to interpersonal interactions, signage also was a commonly-used approach to park information and communication efforts.

The other visitor-directed strategy that appeared in a significant proportion of the documents and survey responses was restrictions to visitor activities in parks (e.g., trail or campsite closures; food storage and wildlife feeding regulations; and wildlife viewing requirements such as approach distance [i.e., a distance beyond which people are not to approach particular wildlife species]).

Although examples of specific education and communication programs were identified in the workshops and survey, it was largely recognized that the effectiveness of these efforts rarely had been systematically evaluated, and the literature review substantiated this belief. Participants in the inquiry agreed that it would be beneficial for parks to be more knowledgeable about, and effective with, communication efforts designed to change visitor behavior related to habituation and food conditioning. Such evaluation would be critical given the strong preference for visitor communication and education over other methods of visitor-directed strategies (e.g., regulation, enforcement) identified in the inquiry.

Desire for Consistency

There was consensus among participants in the inquiry that standard protocols for addressing changes in human and wildlife behavior are lacking. A common theme was the desire to see consistency with parks' policies and approach to these issues, as well as coordination with and among other agencies and organizations. The guidance document review verified this lack of consistency. A theme across the activities was that coordination and collaboration among park divisions and other affected parties (e.g., communities near parks) was of utmost importance when considering

management and decision-making related to habituation. In fact, more than half of the management plans reviewed for the content analysis included at least five different NPS divisions in management activities. However, direct contact with managers via the workshops and survey suggest that lack of communication and inconsistency in interpreting and applying policy inhibits effective collaborations.

The need for open dialogue to develop common system-wide goals and objectives, and communication about strategies and actions was emphasized. Related to this issue was the identification of the need for consistency in messaging about habituation, both to NPS staff and to visitors. Participants expressed that evaluation and information sharing about successful strategies currently being used across the service was critical. They also believed a compilation of current management strategies related to behavior change in wildlife could serve as a resource for NPS units and highlight areas for future inquiry. While a recognition of the context specificity associated with habituation existed, nonetheless a desire to identify commonalities across experiences emerged, as well as a desire for a more well-articulated and unified approach to habituation-related issues. There appears to be a need for overarching consistent guidance that still preserves flexibility to adapt to the specific context and to maintain managerial discretion at the park level.

Information Needs

Managers who responded to the survey identified the lack of information about human-wildlife habituation as a key challenge to managing human-wildlife interactions in parks. Workshop participants and survey respondents suggested that

more descriptive information about the causes and effects of habituation is needed. In particular, finding a way to distinguish specific points along the continuum of habituation and food conditioning also would be beneficial. Thresholds along the continuum that yield positive and negative effects are likely to vary with context and species specificity. The threshold of habituation leading to coexistence that is appropriate for one species may not be for another, or the threshold for the same species may vary seasonally and by individual animal. Managers believe that studies that explore these differences will aid management and decision-making.

The role that human attitudes and behaviors play in the development of habituation was another key information need identified in the inquiry. While managers believed that visitors' prior experience, expectations, and emotions are relevant to human behavior near wildlife, they suggested that little is known about these factors that would enhance management strategies for visitors. The literature review identified theoretical frameworks like the IMBP that can be used to examine how these factors might influence individual visitor decision-making and behavior near wildlife, but studies in this particular context are lacking.

With the exception of management interventions focused on bears and elk, few systematic evaluations of management interventions implemented for the explicit purpose of managing wildlife habituation or food conditioning in national parks exist. Studies to document the relative effectiveness of commonly-used management actions are needed. Managers believe that most parks monitor human-wildlife interactions within their boundaries, but that many lack adequate resources for more comprehensive evaluations of interventions. Additionally, it may be the case that when

systematic monitoring or evaluation occurs, it is not published in the formal academic literature, and therefore not available to a wide audience. This appeared particularly to be the case for interventions designed to influence human behavior in the context of human-wildlife interactions. Responses to the survey suggested that information regarding design and techniques for developing education and communication programs, and support for implementing them, are two key needs. The inquiry found that researchers and managers have created a comparatively robust biological and human dimensions information base to rely on for grizzly and black bear management decisions and actions in national parks. This body of information may serve as a model for the types of work that can be done for a variety of other species and contexts of interest to wildlife managers.

Conclusions

Insight from this collection of activities suggests that identifying the nuances of human and wildlife behavior involved in the processes of habituation and food conditioning, and separating the two phenomena, can be challenging in an applied setting. Within the NPS context, habituation and food conditioning often are not distinguished from one another from a management perspective, and actions tend to focus on the human-wildlife interactions that have clear legal and policy guidance and are more likely to result in negative effects and impact human safety and wildlife conservation (i.e., result from food conditioning). Guidance that clarifies the distinctions between the two phenomena, coupled with examples from parks, could

help managers better evaluate their specific management context and develop more targeted management actions.

For example, this research demonstrates that shifting management of human-wildlife interactions from a reactive, conflict-oriented perspective to a more proactive one is a stated priority for parks. Yet, for a variety of reasons managers often do not attend to wildlife behavior until it becomes "problematic" (i.e., until an animal demonstrates food conditioned behavior), at which point it is very difficult to apply management actions that will effectively "unlearn" that behavior. A contributing factor is the potential suite of benefits associated with habituation, which managers often want to preserve, as well as the allocation of limited resources. To shift to a consistently proactive approach, managers will need to identify a priori the areas in which habituated but not food conditioned behavior might be tolerated, and for which species. Hazing techniques or aversive conditioning may need to be applied *before* animals demonstrate "bad behavior" (i.e., when they are simply exploring a campground or picnic area for the first time), to ensure that they do not accidentally receive food rewards for their exploratory behavior. This approach would take considerable pre-planning, attention from staff, and allocation of scarce resources.

Managers also believe that education and communication efforts designed to prevent food conditioning and maximize the potential benefits of habituation is a preferred strategy for the NPS, and that such an approach could create the potential for habituation to help foster a more general "conservation ethic" among park visitors. However, the effectiveness of these efforts is rarely systematically evaluated. Testing the success of visitor-directed programs in effecting human behavior change (e.g.,

fostering proper food storage, preventing intentional feeding), and making results of these experiments available to other managers will be essential. In addition, managers need more information about how emotions and prior experience with wildlife influence people's actions and reactions towards wildlife in parks to better inform the development of messages, incentives, and provision of alternatives. This information is especially pertinent given the plethora of studies corroborating that information alone rarely results in human behavior change (Cialdini, 2003; Covello & Sandman, 2001; Obermiller, 1995). Such information would allow the national park system to create common objectives, protocols, and communication messages for visitors and staff regarding human-wildlife interactions.

This exploration of human-wildlife habituation has implications beyond the management of parks and protected areas. If most habituated wildlife eventually become food conditioned, or if wildlife managers are unable to practically distinguish between the two behaviors, then habituation may indeed be a negative or downward-spiraling process that increases the risks to all involved, no matter the context. However, by helping managers identify the difference between the two behaviors, benefits of habituation may become the focus of management of human-wildlife interactions in a variety of environments, from parks to urban areas. Such information may improve the capacity of federal and state land management agencies, communities, and other stakeholders to develop shared communication messages, policies, and management strategies to address human-wildlife habituation and more broadly, to promote coexistence of humans and wildlife. Examples of the potential benefits of habituation can be seen in wildlife-based tourism, where populations have

been protected because of opportunities to view wildlife closely. Furthermore, people who enjoy wildlife and are able to seek encounters may increase their appreciation of wildlife and therefore support conservation initiatives (Kretser, Curtis, Francis, Pendall, and Knuth, 2009). If researchers and managers can work toward identifying a sustainable level of human-wildlife habituation that prevents negative outcomes, and fosters positive encounters, an opportunity exists for human-wildlife interaction to help further conservation goals.

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CHAPTER FOUR

HOW VISITORS' PRIOR EXPERIENCES AND EMOTIONS MAY AFFECT HUMAN-WILDLIFE INTERACTION IN PARKS

Introduction

Wildlife management occurs across myriad landscapes, from parks and preserves to residential and urban areas. Wildlife management policies and practices differ across these environments and often are impacted by varying expectations for human-wildlife interactions. This context-specific approach contributes to the complexity of wildlife management, made even more so because both wildlife and people readily traverse the boundaries between one management regime and another. Currently unknown is the degree to which the behavior of people or wildlife, or human expectations for interactions, are context specific. Not knowing whether and how humans alter their behaviors and expectations between contexts presents challenges for the management of human-wildlife interactions. For example, some people may find it enjoyable to observe a bear closely in a park setting (leading them to approach a bear or tolerate it being near to them), but feel differently about a bear in their backyard. The extent to which context-specific differences exist has implications for wildlife management, leading managers to ask questions such as: what do people expect from human-wildlife interactions in different situations and how does their behavior change or remain constant between them? Moreover, how might human behavior impact wildlife behavior? For example, in a park, an animal habituated to the presence of humans may forage in close proximity to humans, or not flee as humans

approach it. When a similar situation arises in a residential area, the animal may be hazed or removed. This diversity of potential human-wildlife experiences leads to equally diverse expectations for wildlife encounters and presents challenges to management. Wildlife managers grapple with this issue as they develop management strategies aimed at behavior of both wildlife and humans. An understanding of human-wildlife interactions in various contexts could help to address wildlife management more holistically.

Human-wildlife interactions span a continuum from wildlife viewing at a distance to close contact (e.g., hand feeding a wild animal). These interactions can have positive and negative impacts for both people and wildlife. Commonly cited causes and consequences of human-wildlife interactions are habituation and food conditioning (Whittaker & Knight, 1998). Food conditioning is the process by which an animal associates humans or human spaces with food (Mazur & Seher, 2008; Whittaker & Knight, 1998). Often, food conditioning occurs when an animal obtains food that has been provisioned by people, either purposefully or inadvertently. Food conditioning is generally believed to have negative impacts for both people and wildlife (Conover, 2002; Larson, 1995; Orams, 2002) (e.g., detrimental physiological impacts for animals; property damage or injury to people). Food conditioning may lead to human-wildlife interactions when animals seek food in spaces occupied by people.

Habituation is the waning of a response following repeated exposure to a non-threatening stimulus (Alcock, 1998; Bernstein, Penner, Clarke-Stewart, & Roy, 2006, pp. 195-196). Typically, habituation in wildlife refers to an animal's lack of fear

response to the presence of humans after repeated, non-consequential encounters (Herrero, Smith, DeBruyn, Gunther, & Matt, 2005; Jope, 1985; McNay, 2002; Whittaker & Knight, 1998). Like food conditioning, habituation can result from, or lead to, human-wildlife interactions. The process of habituation may also be reciprocal; in other words, people also may habituate to the presence or activities of wildlife (Zinn, Manfredo, & Decker, 2008). Debate exists regarding whether the positive impacts of habituation have the potential to outweigh the negative impacts (Bejder, Samuels, Whitehead, Finn, & Allen, 2009; Wieczorek Hudenko, Siemer, & Decker, 2010a).

Background: Human-Wildlife Interactions in Parks

To address the need for knowledge about human-wildlife interactions that lead to habituation and food conditioning, I worked with the Biological Resource Management Division (BRMD) of the National Park Service (NPS) to conduct a multi-phase inquiry. The BRMD was interested in this issue because of concerns about the behavior of park visitors around wildlife and of the conservation implications of human-wildlife interactions in parks. National parks often are spaces designed to promote nature-based recreation and wildlife viewing opportunities. At the same time, however, managers are charged with protecting wildlife in parks and park visitors, a dual mandate that may be challenging to reconcile with some of the effects from human-wildlife interactions. Because food conditioning and habituation are of great concern as the proximal causes for many negative human-wildlife interactions, many parks have food storage regulations, and guidelines for wildlife viewing, but visitor

compliance and enforcement are reported to vary widely. Human-wildlife interactions leading to habituation and food conditioning have clear implications for key aspects of the NPS mandate including wildlife health and conservation, and visitor enjoyment and safety. These issues are particularly relevant for parks with developed zones (e.g., campgrounds, picnic areas), where animals may be drawn by food, and people are concentrated. Furthermore, wildlife management policy and practice vary inside and outside of parks and the differences are likely to have an effect on both wildlife and human behavior across these boundaries.

Our NPS BRMD investigation began with an examination of the human dimensions of human-wildlife habituation[1]. The objectives of the inquiry were to explore the extent and nature of habituation across the national park system, and to identify related management priorities and knowledge gaps. Several methods were used to achieve these objectives including: workshops with wildlife researchers and managers; literature reviews; a survey of NPS natural resource staff; and a content analysis of management documents. These phases of inquiry confirmed that habituation and food conditioning are common challenges for parks and are the focus of significant management effort. Input from NPS managers, as well as the reviews of theoretical and empirical literature, suggest that a visitor's prior experience with wildlife, expectations created by that experience, and emotions related to wildlife, are

[1] While the investigation was designed to explore habituation specifically, it quickly became apparent to the study team that food conditioning issues were linked with habitation from a management perspective, thus both phenomena were examined in the study.

primary drivers of visitor behavior leading to wildlife habituation and food conditioning in parks[2].

Experience, expectations, and emotion

NPS managers believed that most visitors came to a park with prior wildlife experience that influenced the development of expectations about wildlife in a park. The diversity of such prior experience would lead to equally diverse expectations of wildlife behavior at the parks as well as expectations for interactions. Prior experience might include direct contact with wildlife via close interactions, or indirect means such as media, friends, or communication and educational materials. Prior experience and related expectations were of interest due to their potential influence on visitor behavior in situations where a person might encounter wildlife (e.g., camping, hiking), and during close human-wildlife interactions. Managers in initial phases of the inquiry expressed concern that prior experience might lead visitors to have inaccurate knowledge about wildlife behavior and wildlife management, and to lack appropriate "respect" for wildlife (e.g., lack of caution resulting in risky situations, lack of appreciation for the risks to wildlife health from anthropogenically provisioned food). They perceived that this lack of knowledge and respect were drivers of problematic visitor behaviors that foster habituation and food conditioning (e.g., feeding or approaching wildlife, non-compliance with food or trash storage regulations). NPS managers believed that emotions associated with prior experience and

[2] Further details of the rationale for the study, phases of inquiry, and findings can be found in Wieczorek Hudenko & Connery, 2013; Wieczorek Hudenko & Decker, 2013a, 2013b, Wieczorek Hudenko, Siemer, & Decker, 2013; Wieczorek Hudenko & Siemer, 2013.

expectations were highly relevant to managing human-wildlife interactions in parks. In addition, a literature review exploring human decision-making and behavior in human-wildlife interactions (Wieczorek Hudenko, 2012) revealed several models with empirical support that suggest emotions play a significant mediating role in people's decision-making (e.g., integrated model of behavioral prediction [Fishbein & Yzer, 2003]; dual-process [Kahneman, 2003; Sloman, 1996]; fuzzy trace [Reyna & Brainerd, 1995; Reyna & Farley, 2006]). These models suggest that emotions arising from prior experience, as well as those experienced at the time of an encounter, moderate behavior. In fact, the emotions experienced when an interaction occurs, in response to contextual factors (e.g., species, location, presence of other people), can limit the use of rational decision processes, thus disrupting planned behaviors. In such circumstances, intuition, utilizing emotional response and abstracted information from prior experience (i.e., the gist or general sense), may be relied upon (Kahneman, 2003; Reyna & Brainerd, 1995). When this occurs, specific information (e.g., recommended behaviors) that an individual has learned is less likely to guide behavior. Given the impact of emotion on behavior, however, it is possible that recommendations that are linked with emotion might be more likely to influence behavior in these situations (Wieczorek Hudenko, 2012).

Managing interactions with communication and education

As the development of habituation and food conditioning depends largely upon the behavior of people, this is often the focus of management efforts. Communication and education campaigns are commonly relied on to address human behavior around

wildlife. These campaigns address issues such as wildlife feeding, food and trash storage, wildlife viewing, and recommended behavioral responses to wildlife. Findings from several phases of our NPS BRMD inquiry suggest that visitor-directed education and communication campaigns are the approach most frequently used by wildlife managers to address human-wildlife interactions in parks (Wieczorek Hudenko & Connery, 2013; Wieczorek Hudenko & Siemer, 2013; Wieczorek Hudenko, Siemer, & Decker, 2010b). Participants in the inquiry agreed that it would be beneficial for parks to be more knowledgeable about, and effective with, communication efforts designed to change visitor behavior. We found that such efforts are infrequently evaluated and often are met with varying success. Finally, NPS managers expressed a desire to see consistency with parks' policies and approach to the management of human-wildlife interactions, as well as coordination with and among other agencies and organizations.

Inquiry with Park Visitors

Findings from our NPS BRMD inquiry indicate that a number of issues are relevant to human behaviors near wildlife, particularly as it relates to human behaviors that foster habituation and food conditioning. These include: (a) prior experience, expectations, and emotions associated with wildlife, (b) behaviors related to habituation and food conditioning, and (c) exposure and response to communication and education materials in parks. The importance of these issues was evident in our review of published literature, management document analysis, and work with NPS Natural Resource staff and other wildlife professionals. Further investigation is

needed, however, to understand these topics to enhance the management of human-wildlife interactions and wildlife-related communication in parks. Thus we conducted an exploratory analysis of these ideas directly with park visitors. This study focused on myriad questions related to the issues identified above.

Visitors' prior experience, expectations, and emotions

I sought to understand three questions that emerged repeatedly throughout the phases of our NPS BRMD inquiry: (a) what types of prior close wildlife encounters do people visiting a park report (e.g., species and context); (b) how do people respond to encounters with wildlife; and (c) did visitor behaviors match stated intended behaviors? Questions one and two are descriptive in nature, whereas my prior work allowed me to make predictions about question three. The previous work and decision-making models suggest that situational variables can affect planned behaviors. I speculated that contextual cues (e.g., species, location, presence of others) affect both intended behaviors as well as actual response to wildlife. I addressed the question, how do people believe their prior experiences affect their expectations and intended behaviors during future encounters? I also explored the questions: What are individuals' emotional responses to close encounters with wildlife? Do people report that their emotional response played a role in their behavior during an encounter or that it would alter their intended behavior in future encounters?

Theory would suggest that emotionally significant experiences are the ones most likely to be reported (Bernstein et al., 2006). Based on theory and the previous inquiry, I speculated that emotion-linked experiences influence past and future

behavior around wildlife. Specifically, encounters eliciting a significant emotional reaction in individuals will lead them to respond based on intuition at the time of an encounter, and likely will alter future intended behaviors.

Behaviors related to habituation and food conditioning

Our NPS BRMD inquiry provided many perspectives about visitor behavior in parks that might affect habituation or food conditioning of wildlife. The sources for this information were NPS staff, wildlife professionals, and management documents, but not systematically obtained input about visitors' experiences and behaviors. This includes visitor perspectives regarding their behavior and observational data of visitor actions or practices regarding: feeding or approaching wildlife; actions visitors report they engage in either to encourage or discourage close encounters with wildlife; and visitors' awareness of recommended behaviors and their compliance with such recommendations. Most parks have regulations or recommendations regarding food and trash storage; wildlife viewing; and prohibitions on wildlife feeding, but systematically collected evidence regarding compliance is not available.

Exposure and response to communication and education materials

Parks rely on communication and education materials to convey information about recommendations for visitor behavior related to wildlife. Although communication and education has long been an emphasis in most parks, data to inform such efforts is needed. Some information needs are basic, such as knowing: where visitors get information about wildlife; the types of wildlife-related communication or

education materials people report seeing (in parks or other contexts); messages visitors tend to recall; the sources of these materials, and particular aspects of materials or messages visitors find most helpful. Based on previous phases of inquiry, I speculated that emotionally-based communication will be most influential to visitor behavior.

In summary, inquiry with NPS natural resource staff and other wildlife professionals, a literature review, and a management document analysis, yielded several themes to explore with park visitors. These themes included: the relation between visitors' previous experience, expectations for future encounters, and emotional responses; visitor behaviors related to wildlife habituation and food conditioning; and visitors' exposure and response to communication and education materials. As described above, I wished to examine several aspects of these themes that are theoretically and practically significant. In addition, based on the initial inquiry, I believed three concepts within these themes were particularly important to explore with park visitors: the influence of contextual cues on visitor responses to wildlife and intended future behaviors; the relevance of emotions to visitor responses to wildlife and intended behaviors; and the potential influence of emotionally-salient communication and education materials.

Methods

Study Site

Acadia National Park (ANP) in Bar Harbor, ME was selected as the study location due to historic high levels human-wildlife interaction in campgrounds. I

worked with park staff to determine the specific campground for the study (Blackwoods Campground). Park managers were concerned about the potential for food conditioning or habituation of raccoons at Blackwoods Campground, and about the resulting human-raccoon interactions. Raccoons often acquire food from visitors in Blackwoods Campground and actively forage in the area. This increases the chances for a close encounter between raccoons and visitors, and visitors may be scratched or bitten. Of particular concern is the risk of rabies transmission during such an interaction. It is believed that habituation and food conditioning of raccoons in Blackwoods Campground is influenced directly by human behaviors. All of the 306 campsites in the Blackwoods Campground are generally booked during the summer season, creating ample opportunities for human-wildlife interactions.

Data Collection

Semi-structured interviews were conducted with campers in Blackwoods Campground during August 2011. An interview guide was used to structure conversations between visitors and the interviewer. The interview guide explored the key themes identified through previous phases of the overall inquiry: behaviors and emotions associated with campers' prior experience with wildlife; expectations for future interactions with wildlife; and visitors' exposure and reaction to wildlife-related communications. Additionally, due to its relevance to the study site, the interview guide addressed people's interactions with raccoons.

This phase of inquiry was intended to be exploratory in nature, to inform future experiment-based work on these topics. Thus, the interviews were structured as open-

ended questions with follow-up probes. While every question was asked as systematically as possible across interviews, each interviewee did not respond directly to every question. Furthermore, when asked if they had ever had a close encounter with wildlife, some people identified only one close encounter with wildlife, while others described a number of different encounters. Similarly, for follow-up questions some interviewees answered for each encounter they described, while others gave a general answer that they applied to multiple encounters. There were many occasions when interviewees did not respond to a particular question, but instead took their narrative in a different direction.

A random start, systematic sample was used to conduct interviews. Visitors were queried at every third campsite in a progression through the campground. The campground consists of two loops of campsites and I began at a randomly generated campsite number. Every five days I switched loops in the campground and began at a new randomly generated campsite number. When a campsite was vacant, or the visitors were absent or declined to be interviewed, I continued inquiring at every third campsite to maintain a systematic sample. Visitors provided verbal consent, and all interviews were recorded with a digital voice recorder[3].

[3] The interview protocol and guide were approved by Cornell University's Institutional Review Board for Human Participants, Protocol #1006001472. We verified with the National Park Service that Office of Management and Budget approval was not required; and we received a research permit from Acadia National Park.

Data Analysis

The interviewer listened to recorded interviews and reviewed notes using an inductive, iterative approach (Lincoln, 1985) to create codes for each question. All responses were coded and entered into Microsoft Excel v14.3.5 (Microsoft; Redmond, WA). Conceptually similar responses were combined into categories and a code was generated to represent each category. This approach allowed us to identify emergent themes within and across interviews. Differential Emotions Theory states that emotions can be characterized as discrete states that are amenable to categorization (Izard, 1991). Consequently, I examined the emotional response of visitors within the framework of discrete emotional states that are likely to influence visitor behavior. Interviews were partially transcribed to record rich text examples, provide context for responses, and capture details in the interviewees' descriptions.

Due to the data-collection method, I report findings using descriptive statistics, statements about trends in the data related to emergent themes, and rich text examples. Although the open-ended nature of the questions meant that specific details were not consistent across interviews, I was able to categorize responses according to relevant themes and generate frequency data for those questions where a substantial proportion of interviewees responded. When calculating frequencies for most questions, I counted all responses an interviewee provided, generating percentages based on the number of people who responded to that particular question. Frequencies therefore represent how many times each code was reported for a particular question or follow-up, regardless of whether the same person provided one or multiple responses.

When I compared individuals' responses across questions, I employed a different approach. Using SPSS v.22 (IBM; Armonk, NY), I examined the relation between people's prior experience, behavioral and emotional responses, and intended future behaviors across the population of interviewees. When so doing, I wished to avoid problems related to pseudo-replication by using more than one close encounter per individual. Including all encounters reported when comparing across interviews may have skewed the data based on the perception and experience of individuals who described multiple encounters (e.g., for variables such as behavioral and emotional responses). To address this, I developed a decision rule based on my hypothesis that emotion-linked experiences were most salient to the concepts I was exploring. For comparison between questions (e.g., behavioral response and species encountered), only the first close encounter with a reported associated emotion was included for analysis. If no emotion was reported for any encounters an individual described, I used the first encounter an interviewee reported.

For some analyses between different encounter-related questions, such as the relation between species, context, behavioral response, and emotion, the categories were diverse and sample sizes were quite small at that level of analysis. Consequently, when I discuss these findings I focus on observed trends in the data and individual examples and do not report percentages.

Behavioral Observations

To complement the self-reported behavior of interviewees, I conducted behavioral observations at campsites using a random start, systematic sample.

Observations were conducted on six days during August, 2011, and on each occasion I began at a new randomly generated campsite number. I made observations at every 5th campsite to assess food and trash storage practices that would be relevant to wildlife food conditioning. ANP regulations specify that all food items be stored in vehicles or odor-proof, hard sided lockers and that trash be disposed of in dumpsters or stored in a vehicle. I made observations during non-interview hours to maximize the potential number of sites occupied, but without their occupants present. I did not collect data for campsites with campers present because often they were utilizing food or trash in such a way that I could not accurately assess where or how these items were typically stored. Of the 169 campsite observations I conducted, 79 sites were occupied without campers present and therefore eligible for observation.

Findings

Prior Experience, Expectations, and Emotions

Previous encounter descriptive statistics

I approached 105 campsites for interviews, and at nine sites people declined to be interviewed. The reasons they cited were: eating, leaving the campsite, setting up the campsite, or non-English speaking. Interviews averaged 13:06 minutes in duration (range 4:13-46:02). Ninety-three of the 96 people interviewed reported a close encounter with wildlife at some point in their lives. When asked if they had ever had a close encounter with wildlife, 80% of campers reported multiple encounters. Of the

212 total number of encounters described, the vast majority of people (84.7%) suggested that their encounters with wildlife were unintended or accidental.

The most frequently reported species encountered were: black bear (45.2%), deer (40.9%), moose (38.7%), and raccoons[4] (30.1%). Interactions most often occurred on trails or roads in state or local parks (46.2%), individuals' backyards (44.1%), and campsites in state or local parks (32.3%) (Table 4.1). Twenty percent of interviewees reported an encounter in a national park and 10.8% reported interactions specifically in ANP. Thirty-six percent of interviewees reported at least one interaction in a campsite or campground and 5.4% identified Blackwoods Campground specifically. Reports of encounters associated with trash or compost were mentioned by 12.9% of people. Twenty-two percent of interviewees reported an encounter that occurred while they were driving, and 12.9% reported an encounter while they were hiking.

[4] This number reflects those people who listed raccoons when asked about close encounters with wildlife generally. When asked specifically about close encounters with raccoons, most people said yes, even if they had not mentioned it previously.

Table 4.1 Acadia National Park campers' prior experience with wildlife. Most frequently mentioned species by context.

	Trail or Road in State or Local Parks	Backyards	Campsites in State or Local Parks	National Parks	Acadia National Park
Black Bear (n = 49)	46.9%	14.3%	12.2%	14.3%	0.0%
Moose (n = 38)	57.9%	2.6%	10.5%	2.6%	0.0%
Deer (n = 40)	15.0%	47.5%	0.0%	0.0%	10.0%
Raccoon (n = 30)	10.0%	40.0%	30.0%	3.3%	3.3%

Interviewees were asked specifically about "close encounters," but I did not define the term "close," leaving it to the interpretation of interviewees. For the 52 individuals identifying a specific distance for one or more encounters, 86.5% reported an encounter less than 15 feet away, 46.4% an interaction 5-25 yards away, 21.2% an encounter 25-100 yards away, and 17.3% an encounter 100 or more yards away.

Behavioral and emotional response to prior experience

To examine responses to encounters, as described previously, I used only the first encounter with a linked emotion, or the first encounter reported if no emotions were described. Once again, this resulted in a total of 93 campers who reported a close encounter. Under these parameters, species and locations reported most frequently were similar to those of all reported encounters: black bear (25.8%), moose (15.1%), raccoons (12.9%), and deer (11.8%); and trails or roads in state or local parks (26.2%),

individual's backyards (23.8%), national parks (20.3%), and campsites in state or local parks (17.9%). The most common response to encounters was to observe the animal and to refrain from interfering with it (Table 4.2). Many people explained that they would observe the animal from what they felt was a "safe" distance, although the definition of "safe" varied by interviewee, context, and species.

> 113[5] Keeping a healthy distance, not trying to touch it or anything.
> 123 My philosophy with wildlife is always if you get close to have a look that's ok, but not to get too close.
> 154 I try not to get too close to them [bear]. I'm not going to chase them, it's their home, I just watch them.
> 170 You find where the bears are and keep a safe distance. … 100ft, I wouldn't go any closer than that to keep them safe.

The next most common response was to deter the animal by making noise or scaring the animal away. Other responses described by fewer than 10% of interviewees included: seeking shelter in a tent, house, or car; moving away; taking a photo; or walking past the animal. Responses varied by species; no one reported deterring commonly reported ungulate species such as moose or deer, but rather the majority of people observed them. Responses to bear were mixed, varying between observing, deterring, and seeking shelter/removing oneself from the situation. Finally, people were more likely to report deterring raccoons than any other response to that species. Context did not play a particularly distinguishing role in reported responses to various species.

[5] Numbers indicate interview identification.

Table 4.2 Acadia National Park campers' reported behavioral response to prior wildlife encounters.

Behavioral response to encounter* (*n* = 93)	
Observe	51.6%
Observe at safe distance	31.2%
Deter or Scare	11.8%
Seek shelter in tent, house, or car	9.7%
Move away	4.3%
Take photo	4.3%
Walk past	3.2%
Performed planned behavior? (*n* = 32)	
Yes	65.6%
No	9.4%
Don't know	12.5%
Instinct	9.4%

* These data come from the first encounter with a linked emotion each interviewee reported, or the first encounter reported if no emotion was described.

Most people (60.3%) reported that there were no other individuals beyond their group nearby at the time of the encounter they described. Encounters were described overwhelmingly (94.2%) as unintentional or accidental. Two-thirds of people who responded to a question about whether or not their reaction to the close encounter was how they would have planned to behave answered in the affirmative (Table 4.2). The remaining people were relatively evenly split among responses including "no," "don't know," and "instinctual reactions." Instinctual reactions often were reported even when people had planned to behave in a different manner, but felt that an emotional response in the moment overrode their intended behavior. 113 "You always hear freeze and drop, and I thought about that for a second and I said 'there is no way.' I was too afraid to do it." Nine respondents reported similarly unplanned reactions.

Emotional responses to encounter varied by species (Table 4.3). People generally reported that the emotions they experienced during interactions with ungulates (e.g., moose and deer) were excitement and enjoyment. Emotional reactions to bear were more mixed, slightly less than one-third of individuals reported that they were scared or concerned, while the rest expressed excitement and enjoyment. Reactions to raccoons were similarly diverse, with half of respondents reporting excitement and enjoyment, while one-third were scared, and some individuals expressed indifference. Of the individuals reporting fear or concern associated with their encounters (n = 14), almost all (85.7%) were in a park or campground context rather than a backyard. Two people with raccoon encounters on their porch reported feeling fearful. Campers reporting encounters with moose and bear generally reported slightly stronger feelings on a 1-10 scale, for both fear and excitement, than did those reporting encounters with raccoons or deer. A number of individuals suggested that with experience over time, their emotional response to certain wildlife attenuated.

> 146 The bear was higher [enjoyment] than the deer because we see deer all the time.
> 149 We're close to deer all the time where we live. We did [enjoy] when we first moved there but now we're like ‘oh they're going to come and they're going to eat our rhododendron bushes.’ They're more of a pest.
> 195 It was really scary at first, when we first moved there. Like the first time you went out and there was a bear there, in the parking lot. But by the end it was like, they were like squirrels, they're not scary anymore.

Table 4.3 Acadia National Park campers' reported emotional response to prior wildlife experience by species.

	Excited	Enjoy	Scared	Concerned	Indifferent
Black bear (*n* = 24)	45.8%	16.7%	20.8%	8.3%	0.0%
Moose (*n* = 14)	57.1%	28.6%	7.1%	0.0%	0.0%
Deer (*n* = 11)	45.5%	54.5%	0.0%	0.0%	0.0%
Raccoon (*n* = 12)	25.0%	25.0%	33.3%	0.0%	16.7%

Many interviewees expressed a perspective that appeared linked both to their behavioral as well as emotional response to wildlife encounters. A substantial number (34.4%) of all interviewees provided an unprompted response that if they "respect" wildlife (e.g., give them space, don't aggravate them) then the wildlife will not respond negatively toward them.

> 110 We respect their area and hopefully they respect ours.
> 121 Just ignore it. They're just like people, be nice to them and they'll be nice to you.
> 148 They don't bother me and I don't bother them. I just watch them. Don't try and get too close, that's the deal.
> 195 The bears there [Yosemite National Park] are used to people, so they're pretty chill. They won't hurt you; they're looking for food.

A little over two-thirds (69.8%) of all interviewees responded to a question about how they believed their close encounters might affect future ones. About one-third of these people (32.8%) responded that there would be no effect, 20.9% suggested that they would be more careful during future encounters, 20.9% reported that their encounter made them feel more respectful or connected to nature, and 13.4%

reported that they would feel more comfortable. The proportion of people reporting they would be more careful in future encounters was higher for moose than for other species. Narrative excerpts support this diversity of responses.

> 107 We keep our food in coolers, but we're not going crazy either because we haven't had any problems.
> 123 Maybe we're more likely to keep a respectful distance and be vigilant. I might start backing off a little sooner when I see an animal [moose] coming toward me. I wouldn't wait for them to get that close; I'd be a little quicker to back away.
> 195 You can think more rationally and remember what you're supposed to do instead of just freaking out.

People also described a habituation-type response with respect to the relation between their prior experience and future encounters.

> 135 More confidence because I'm used to them now… try to take a picture, I would be excited, not scared.
> 187 I camped all growing up. There were always deer around and stuff, and each one you kind of just get more comfortable with the wildlife around.

Raccoon interactions

While 30.1% of all people interviewed included raccoons in their description of close encounters with wildlife, 82.1% reported having had a close interaction with a raccoon when asked directly (Table 4.4). Interviewees most often reported having these encounters at campsites in state or local parks, in their backyards, or near their house, garage, porch, or barn. Ten percent reported previous interactions specifically in Blackwoods Campground. Twenty-six percent of campers reported that the raccoon interaction was associated with their trash or compost, either at home or in a campsite,

and 13% said a raccoon had taken food from them. Behavioral responses to encounters included: observing, deterring, or removing the animal using pest control or humane traps. Around a house or yard (n = 33), people were most likely to observe or to try to remove raccoons (63.6%). In a campground or park setting (n = 31) the greatest number of people reported trying to deter or scare away raccoons (48.4%), although about a quarter (25.8%) of people said they would observe in this context. Three people reported feeding raccoons; two did so in a park campground setting and one at home.

Table 4.4 Acadia National Park campers' context description and reported responses to interactions with raccoons.

Had a raccoon encounter (*n* = 95)	82.1%
Context (*n* = 77)	
State or local campsite	32.5%
Backyard	19.5%
House, garage, porch, barn	19.5%
Blackwoods campground	10.4%
Trash or compost	26.0%
Stole food	13.0%
Behavioral response (*n* = 64)	
Observe	32.8%
Deter	28.1%
Remove	10.9%
Feed	4.7%
Emotional Response (*n* = 49)	
Excited	33.0%
Scared	20.4%
Annoyed/frustrated	20.4%
Nonchalant	10.2%
Cautious	12.0%
Intended Future Response (*n* = 87)	
Deter or scare	44.0%
Observe	36.8%
Leave or back away	17.2%
Seek shelter	13.8%
Report to authorities	10.3%
Take photo	3.4%

Emotional responses to raccoon encounters were varied (Table 4.4). Of the people who expressed emotional reactions, nearly one-third were excited by the close encounter; whereas a smaller percentage were scared, were annoyed or frustrated, or were nonchalant. Some interviewees felt that they had made a bad decision that led to the interaction and that the interaction made them feel more cautious. People who reported feeling scared or annoyed by raccoons more frequently deterred them while

those that were excited more often observed. I did not find notable context-specific variation in emotional response.

Intended behaviors around raccoons during future encounters at a campsite were mixed (Table 4.4). Of campers responding to this question, the greatest number said they would deter or try to scare away raccoons, and a substantial proportion reported that they would observe the raccoon. Some people planned to leave or back away, to seek shelter in a vehicle or tent, to report the raccoon to park authorities, or to take a photo. A few interviewees distinguished their responses temporally, suggesting they would report an encounter if it were during the day but would observe it or stay in their tent or vehicle if a raccoon entered the campsite at night.

All interviewees (n = 95) were queried about the behaviors they engaged in to discourage raccoons from entering their campsites. The most commonly reported behavior was storing food in a vehicle (73.7%). Campers also stated that they removed trash from their campsite as a method of deterring raccoons (35.8%). Some people described doing this regularly, multiple times throughout the day (40.0%), while others said that they emptied trash once a day (30.5%). Sixteen percent of interviewees told us that they made certain to empty their trash whenever they left their campsite. Other behaviors to discourage raccoon presence reported by campers included: storing food in containers (30.5%); keeping trash in a vehicle (11.6%); keeping food in a cooler (6.3%); hanging trash at the campsite (3.2%).

Expectations for interactions

A considerable proportion of all interviewees (35.8%) reported that they did not have any expectations for interactions with wildlife during their visit to ANP. This may be an artifact of ANP, which is known more for its scenic shoreline and hiking and biking trails than for wildlife viewing compared to some other national parks such as Yellowstone National Park.

> 115 I was not aware that there was a whole lot of active wildlife management in this park in particular. I would expect it in a park like Yosemite, there would be more active management, but I didn't even know that there were active actions here, things that the park service would do to limit or encourage interactions.
> 168 Acadia is different than a lot of other national parks because you don't have the wildlife that you just walk up to here.

A substantial proportion (34.7%) of all campers in our sample expected to see very little wildlife during their visit. A quarter of people (25.3%) reported that they hoped to see more wildlife, or had hoped to see specific species during their trip. Seventy-seven people offered explanation for their expectations. Many people (50.6%) explained that their expectations were formed based on their previous experience. Others suggested their expectations arose from prior knowledge such as reading, preparations for their trip, or knowledge of the habitat type (22.1%). Finally, a number of interviewees identified the relative density of visitors as the reason for their expectations for seeing little wildlife (20.8%).

Behavioral intention during encounter

We asked interviewees (n = 85) how they intended to behave when they encountered wildlife, and most (70.6%), responded that they would observe the animal and not interfere with what it was doing. Over one-third of individuals (37.6%) stated that their reaction would be species dependent. Species dependence was influenced by a variety of contextual variables such as a person's prior experience, the presence of other individuals, location, and appearance of the animal (e.g., disease, aggression).

> 128 It depends on what kind of wildlife it was, and would probably depend on whether I was with the kids or by myself.
> 142 If it was something scary I would try not to move and not to make noise, but otherwise we would try to see them.
> 164 It depends on what the wildlife is and whether we thought it was rabid or not.
> 185 It depends on what it was, but so long as it wasn't a buck in mating season, we'd approach it closer.

A smaller proportion of campers (17.6%) planned to back away or leave the area upon encountering certain species of wildlife, although 15.3% suggested they would take a photo. Five people (5.9%) responded that they would approach an animal.

Behaviors Related to Habituation and Food Conditioning

Feeding wildlife

Responses to a question about wildlife feeding demonstrated interesting species and context specificity, as seen below in the mutually exclusive categories (Table 4.5). When asked if they fed wildlife, the greatest proportion of campers said they did not feed any type of wildlife A smaller proportion said they did not feed

wildlife but that they did feed backyard birds; others said they did feed wildlife, but only backyard birds. A proportion of interviewees reported that they did feed wildlife such as birds, small mammals, and deer, but only in their backyards. Finally, a few interviewees reported that they fed birds or other small mammals in public places such as parks, or reported that they did not feed animals, but that they did feed ducks at a park.

When asked about intended behaviors near wildlife, no interviewees reported an intention to feed wildlife. In response to a specific question about whether they would feed wildlife in a future encounter, one individual answered yes.

Table 4.5 Acadia National Park campers' reported and intended behaviors related to feeding and approaching wildlife.

Do you feed wildlife? (n = 95)	
No	42.9%
No, yes backyard birds	16.0%
Yes, only backyard birds	20.4%
Yes, backyard birds, small mammals, and deer	13.3%
Yes, birds and small mammals in parks	5.4%
No, yes birds in park	2.0%
Would you approach wildlife? (n = 52)	
Yes	21.2%
No	71.7%
Species dependent	7.7%

Approaching wildlife

Only five people reported they would approach wildlife when asked about intended future behaviors. However, when asked in a separate question specifically whether they would approach wildlife, a considerable proportion answered in the

affirmative and many said their decision to approach would be species dependent (Table 4.5). The remainder of people reported they would not approach. Once again, interviewees appeared to feel that there was a distance at which it was acceptable to approach animals.

> 141 I like to take photos and that may lead me to approach it more closely. I do have zoom on my camera, so you don't get too close.
> 149 I would approach a bear in order to see it... at a safe distance... not get closer than 100 yards.
> 190 I would say I'd probably attempt to get a little bit closer. But not that you would go to feed it or too close that the animal would bite me or something.

Behavioral observations

Of the 79 campsite observations I conducted, nearly one-third had coolers stored out in the open, either on the ground or on picnic tables (Table 4.6). Twenty-two percent had trash stored in an open plastic bag or box at the campsite. Food was stored in plastic bins with lids or sealed bags at 31.6% of sites; 5% of sites also had open plastic bags or bins. Food was kept on the picnic table or the ground in 30.4% of sites. Thirteen percent of sites had left some type of open food item or food scrap sitting out and 7.6% had dirty dishes.

Table 4.6 Comparison of campers' reported and observed behaviors in Blackwoods Campground in Acadia National Park.

Behavior	Reported (*n* = 95)*	Observed (*n* = 79)
Storing Food in Vehicle**	73.7%	67.1%
Trash Removal	35.8%	78.5%
Food in Containers	30.5%	31.6%
Food in Cooler	6.3%	31.6%
Hanging Trash	3.2%	0.3%

* Reported behaviors were in response to a question about what people did around the campsite to deter raccoons. It could be that people engaged in other camping practices that minimized the potential for wildlife food conditioning but did not identify it in response to this question.
** I observed campsites when campers were not present so I could not confirm that food was in the vehicle, only that it was not present at a campsite.

Exposure and Response to Communication and Education Materials

Learning about wildlife

All interviewees (*n* = 95) were questioned about how they learned about wildlife. The most common mechanisms for learning about wildlife were: wildlife-related television (66.0%,); previous experience (45.7%); reading print materials (35.1%); zoos, wildlife parks, or nature centers (35.1%); and reading online (15.0%). Prior experiences with wildlife appeared to inform people's understanding of wildlife in diverse ways.

> 115 I didn't seek any information about how to behave in the campsite, or how to interact with wildlife. It's kind of an assumption that we understand that from our life experience.
> 130 As I've had more experiences, it kind of gives me a set to draw from like choosing the reaction. I think it [experience] helps me make a better decision in the future.

> 141 It [experience] shows you what works and what doesn't. It shows you the right way and the wrong way because when you go too close and they get scared and run away then you realize next time I shouldn't do that because then we won't get to actually watch it. It'll be scared and run away.

Effect of wildlife management activities on interactions

I queried campers (n = 76) about how they thought park wildlife management activities might influence their interactions with wildlife. The most often mentioned topic was the benefit of educational and ranger programs (31.6%). One-quarter of respondents identified park regulations, and 18.4% signage, as helpful to people and wildlife.

> 101 We used to feed wildlife … geese, ducks, but then they started following us, we thought it was nice, that we were doing them a favor. But then we learned it was counterproductive in terms of their migration and health.
> 118 I wouldn't have known about the bears [how to respond] unless I read something about it.
> 131 That experience [camping in Yellowstone National Park with strict food and trash regulations in campsite] has made us more conscious.

Twenty-four percent of campers said they either did not know, or did not have an opinion, about the effect wildlife management activities had on human-wildlife interactions.

Wildlife-related communication materials

Almost all (91 of 95) interviewees reported that they had seen materials from a park or wildlife agency about appropriate behavior in the presence of wildlife. The most commonly noticed types of communication were signage and brochures. This

was the case for signage (40.9%) and brochures (15.1%) in other parks, as well as in ANP (rabies sign in Blackwoods Campground [39.8%]; signs other places in ANP [21.5%]; brochure and newsletter at check-in to Blackwoods Campground [22.6%]). Fewer than 10% mentioned ranger interactions, educational programs, or the picnic table signs at each campsite in Blackwoods Campground.

A number of messages were said to be included in the materials campers had seen. The greatest proportion of people described messages around the theme of "don't' feed wildlife" (53.8%). Many individuals also suggested that materials addressed recommended behavioral responses to wildlife (47.3%) and food (45.2%) or trash (23.7%) storage recommendations. Eight-five percent of people report that they already knew about the recommended behaviors before seeing the materials, and 15.1% report that they did not. With respect to following recommendations, 16.3% of respondents stated that they did follow recommendations, and 67.4% report that they already performed the recommended behavior. An additional 17.4% already engaged in the behavior but felt that it was a good reminder, or that they learned additional specifics that helped them to modify their behavior. Finally, 9.3% suggested that they started the behavior after seeing the materials. A number of campers explained that it was important to understand *why* one ought to engage in a particular wildlife-related behavior.

> 101 As far as feeding animals, we grew up doing that, we didn't know. Now I know why. Sometimes people tell you not to do things and you don't know why. If they tell us not to do something it's a good idea for us to know why.
> 130 I think adding the reason why it's important for a regulation, not just 'you have to do this,' but why it's important that if you leave food scraps it attracts raccoons and they make a mess.

Campers were asked about the information they sought when planning their trip to ANP (n = 86). About 12% of respondents purposefully sought out wildlife-related information. People mainly looked for information about activities (48.8%) and camping reservations (39.5%). Interviewees primarily sought information from the ANP website (71.8%) or other websites (20.5%). The other two most commonly used sources were guidebooks (25.6%), and friends and family (23.1%). For those seeking wildlife-related information specifically, most cited the ANP website as their source, although a few people also mentioned guidebooks, other websites, and friends and family as well.

Discussion

Results from this study were rich in detail and informative about human-wildlife interactions. To organize the data obtained, I highlight key themes from the findings that address topics identified as salient from earlier phases of the inquiry. These themes center around: individuals' experiences, expectations, and emotional responses to encounters with wildlife; behaviors relevant to food conditioning and habituation; and wildlife-related communication.

Prior Experience, Expectations, and Emotions

Almost all of the interviewees experienced close encounters with wildlife and most reported that they did not do so intentionally. People reported a wide range of species and contexts for these interactions. The most commonly reported species--

bear, moose, deer, and raccoons--present the opportunity for a diverse set of encounters, from wildlife viewing to potentially dangerous interactions. Most interactions occurred in state or local parks, individuals' backyards, and in campgrounds. People suggested that their intended reaction to a wildlife encounter would be species specific. Evidence of this also was seen through prior experience; people reported observing ungulate species but were more likely to deter or avoid bears or raccoons.

Effect of prior experience and context specificity

A substantial proportion of wildlife encounters occurred outside of national park contexts, often in people's backyards or in state and local parks. We heard concerns from managers during earlier phases of inquiry about the ways in which visitors may or may not apply information learned from prior experience in other contexts to a national park setting. I speculated that contextual cues would affect both intended behaviors as well as actual response to wildlife. Campers in the study substantiated these ideas and concerns about the transfer of knowledge or understanding from one context to another. The interviewees often expressed that they viewed park wildlife, and associated wildlife behavior, as different from one park or context to another. For instance, many people claimed that they had not come to ANP to see wildlife or that ANP is not known for its wildlife and therefore wildlife management issues are not relevant in this particular context. Furthermore, many interviewees suggested that they had not seen any wildlife-related materials from ANP (even though every camper received materials upon check-in to their campsite, the

lavatories had signage about wildlife, and picnic tables at each campsite had signage), and therefore concluded that there were not specific regulations or recommendations regarding wildlife. As a result, some campers reported being less rigorous with their camping practices than they would be in other parks or campgrounds. Yet, ANP has similar wildlife concerns and regulations to other national parks.

Species-specific differences in visitor behavior and intention were observed in addition to the location-based context specificity. The variation in people's behavioral and emotional responses to encounters with different species of wildlife in different contexts has implications for the NPS and its interest in influencing people's behavior toward wildlife in national parks. Nearly half of the interviewees reported that prior experiences were a significant mechanism through which they learn about wildlife. These individuals are consciously using their set of prior encounters to inform their decision-making during future interactions. Thus, if we know that: people behave differently in park and non-park contexts; a substantial proportion of interactions occur in backyards or local natural areas; and people are using these experiences as a way to learn about wildlife, then it is likely that they are bringing certain expectations to parks about their interactions with wildlife that may not apply in a national park setting. These circumstances are likely to influence individuals' behavior when they encounter wildlife as well as their attention to communication messages about wildlife.

Many people reported that they already knew about recommended behaviors around wildlife, but if recommendations are not consistent with the previous experience that informs their decision-making, it is uncertain which input would most

influence their behavior (i.e., their prior experience in a non-park setting, or the recommendations they received at the park). Decision-making theories examined in earlier phases of the inquiry would categorize both of these as background variables, both potentially overridden by contextual or situational factors, including emotional responses (Fishbein & Yzer, 2003).

Some people suggested that their previous encounters would make them more careful. This type of prior experience often was reported when someone had experienced a conflict with an animal. The notion that a camper would be more careful after such an encounter implies a learning that could serve to reduce food conditioning (e.g., lead to improved food storage practices) and some possible negative effects of habituation (e.g., people getting close enough to be injured in an encounter). In this case, previous experience likely would serve to reinforce communication messages consistent with what the NPS desires. While most interviewees reported behavioral intentions in line with wildlife recommendations, people often made qualifying statements regarding these planned behaviors. Once again, much of it had to do with species and context specificity. For instance, people might plan to follow recommendations, but because approaching an animal did not cause problems during their past encounters, they may be inclined to do so again. Thirteen percent of interviewees suggested that their prior experiences would make them more comfortable during future encounters.

An "agreement" with wildlife

An intriguing idea expressed by many interviewees was the notion of an agreement that existed between people and wildlife during an encounter such that if a person "respects" an animal then it will not respond negatively. Often the idea of respect had to do with keeping a certain distance from the animal, however this distance varied widely among interviewees. This notion was linked to both interviewees' behavioral and emotional responses to interactions. The problem with this concept of an agreement between people and wildlife is that it hinges on two erroneous assumptions. The first is an anthropomorphic assumption about the cognitions and capacity for reasoning of wildlife vis-à-vis human behaviors and intentions. The second is an assumption regarding behavioral homogeneity and predictability across individuals of a species. A belief in this agreement could lead people to engage in behaviors, such as approaching wildlife, or allowing wildlife to approach a campsite, that facilitate negative encounters. Not only might an animal injure people, but it also might increase the chance that an animal would become food conditioned. Furthermore, if the animal does not behave as expected, individuals may have a negative emotional response (e.g., feeling betrayed by violation of the agreement because the person did not intend to harm the animal). Some interviewees confirmed this negative emotional response to violation of the "agreement" and suggested that it affected their behavior. These people reported being so perturbed by this violation that they responded based on fear or surprise, and did not perform intended behaviors. A number of individuals reported learning from the experience

(e.g., “I approached too closely,” “we were in their space”) and expressed an intention to change their behavior during future encounters.

Emotions in response to wildlife

Emotions can serve as powerful motivators of behavior. I speculated that emotion-linked experiences would be influential to past and future behavior around wildlife. The influence of emotions either could lead to an increase or decrease in the likelihood of human-wildlife interactions through approach or avoidance mechanisms. My data revealed trends indicating both influences on behavior, which in turn varied considerably based on species and context. Interviewees expressed mixed emotions about bear and raccoons, animals that are likely to raid campsites, trash bins, or to become food conditioned. Whereas they generally expressed enjoyment and excitement associated with ungulate species. In addition, people more often expressed fear when they encountered animals in a park or campground setting than they did when they encountered the same species in their backyards. Many individuals indicated that when they encounter animals in their backyards, they have a greater sense of control, safety, or familiarity associated with the animal or space.

For those species and contexts where people experienced mixed emotions or fear, their behavioral response typically was to deter or avoid the animals. In contrast, feelings of enjoyment or excitement were associated with species that people were more likely to approach, and comfort (or nonchalance) experienced in backyard contexts was associated with observation of animals. These emotion-behavior connections were associative given the nature of my study; nevertheless they

substantiate the notion that emotions are drivers in human behavior around wildlife. The type of emotion experienced appears to have differential effects on behavior (i.e., approach or avoidance), moderated further by context specificity, but greater understanding of these influences is needed and would have important implications for wildlife management and communication.

Despite intentions, a substantial proportion of interviewees reported that they did not behave as they had planned during previous encounters, but rather that their behavioral reaction was emotion–driven or instinctual. These findings lend support to my theory that emotions experienced at the time of the encounter can override planned behaviors and lead people to respond based on intuition. Intuition is comprised of a combination of emotional response and abstracted knowledge from prior experience, but does not include specific knowledge (e.g., behavioral recommendations from communication materials) (Kahneman, 2003). An example of this may be the number of interviewees who had close encounters with moose and reported approaching based on feelings of excitement and enjoyment. Many of these individuals were aware of recommendations not to approach wildlife, and stated that they did not "intend" to do so. A number of these people then experienced some aggression from the moose during the encounter (e.g., charging, snorting), and some people reported fear associated with this. Interestingly, people with past moose encounters also were most likely to say that they would be more careful during future encounters due to the outcome of those interactions. This supports the idea that emotions not only alter behaviors during an encounter, but also have the potential to alter intended future behaviors.

Behaviors Related to Habituation and Food Conditioning

One-third of people reported close encounters with wildlife in campsites, often in relation to food. This suggests that many of the animals people interacted with likely were food conditioned. In fact, many people noted that it seemed clear to them that the animal they encountered was "used to human food." This confirms findings from earlier work wherein managers expressed significant concern about camping practices fostering food conditioning of various wildlife species in national parks. Certainly these circumstances increase the opportunity for negative interactions, particularly given that so many people also reported an inclination to observe wildlife that came into their campsite.

The majority of people reported observing wildlife during close encounters, rather than deterring them, even in a campsite setting. This occurred even though most people reported seeing communication materials advising them to deter wildlife at campsites. This is of concern to managers because such behavior could lead to habituation of wildlife to campgrounds, which in turn could lead to food conditioning if a food reward is obtained by a habituated animal. I did see trends indicating that campers were more likely to deter species that are more apt to become food conditioned around campsites such as bear and raccoons.

What constitutes wildlife?

It is interesting to note that park visitors rarely mentioned close encounters with songbirds or small mammals – despite the fact that people likely interact with

these species on a far more regular basis than they do with the more-often-identified bear or moose. This may suggest that people are likely to be habituated to these species because they encounter them regularly in a non-threatening manner. Further support for this notion comes from the findings related to wildlife feeding. Numerous people reported that they did not feed wildlife, but somewhat incongruously that they fed backyard birds. Some people also mentioned feeding small mammals and deer in their backyard, yet the idea that this "didn't count" as wildlife feeding was conveyed through interviewee responses. If people are habituated to the presence of these animals, one can assume that they are more likely to be complacent about regulations or recommended behaviors. This is evidenced by those individuals who do not think of backyard feeding of these animals as "wildlife feeding." Such a conceptualization has implications not only for the wildlife in and around people's homes but also for what people are likely to do in a park setting. One can imagine that people who do not think of birds or squirrels as wildlife might think it is acceptable to feed them at a campground or beach, even if they know they ought not feed wildlife. This could lead to negative impacts for the health and wellbeing of the animals as well as for other recreationists who interact with these animals.

When asked about close encounters, species that might often be found near people's homes, such as raccoons or deer, were more commonly identified than songbirds or small mammals. Interviewees were likely to identify emotional responses to these species as well. It may be the case that individuals simply were reporting encounters that were most interesting and/or more emotionally significant. This would lend credence to the theory that emotion-linked interactions are more relevant to

people. Thus it may be the case that such emotion-linked encounters have more relevance for future interactions and therefore implications for influencing behavior. This notion resonates with ideas identified during earlier phases of the inquiry.

How close is too close?

Interviewees were asked whether they had experienced close encounters with wildlife, but a definition of "close" was not specified in the question. In fact, the type of interaction that constituted a "close" encounter for interviewees ranged widely. Some people described nearly touching animals, or animals raiding campsites while they were present. Others talked about wildlife viewing at a distance of 100 yards or more. How individuals conceptualize a close encounter has implications for their behavioral response. Nearly one-third of interviewees responded to wildlife encounters based on their perception of not getting "too close" to wildlife. Many campers also indicated that their definition of too close or what some called a" respectful distance" was dictated by previous experience. In other words, people would judge how close they should get to an animal based on prior experiences. This perspective is problematic because experiences may not generalize across contexts. For example, a person's previous experience may have been with habituated wildlife that were less likely to have an overt reaction, leading the person to think approaching to distance X is not a problem for an animal because it did not show a response. However, the next animal encountered may not be habituated to people and instead may have an aggressive reaction to being approached, or a negative physiological response. Alternatively, the approach of a visitor may contribute to habituation of the

individual animal, leading to positive (e.g., wildlife viewing opportunity) or negative (e.g., forages near a road or campground) effects. Finally, humans also may habituate to these types of approach-based encounters. If an individual approaches an animal and there is no obvious negative consequence, this could lead the person to disregard regulations or behavioral recommendations. The interviews provided evidence that non-threatening repeated exposures like this attenuate an individual's emotional response, likely influencing future behavior.

Exposure and Response to Communication and Education Materials

Awareness of messaging

A theme that emerged from earlier phases of the inquiry was NPS managers' concerns about the consistency of messages across NPS units. Findings from this study verified the potential issues associated with lack of consistency. I heard numerous comments from interviewees about communication materials they had seen at other national parks and their uncertainty about the applicability to ANP. Furthermore, a substantial proportion of people learned about wildlife-related recommendations from state and local parks, or wildlife agencies. It appears that people often are unsure whether these same rules and regulations apply in a national park campground. Some people even expressed that they did not think the information they had previously seen would be relevant because ANP was different (e.g., not a park where people focus on wildlife). Interestingly, some individuals discussed materials from other entities in relation to their assertion that they already knew how to behave around wildlife, and therefore did not need to attend to new materials. In

contrast, other people emphasized their confusion about whether the same messages applied in national parks, or in ANP specifically. A particularly interesting finding related to this issue was the number of people who used infrastructure cues (e.g., presence or absence of bear-proof dumpsters or food lockers) as information about the importance, or lack thereof, of wildlife issues such as food conditioning. This evidence reiterates the importance of recognizing where people are gaining their experience and information about wildlife and how it translates from one setting to another. These findings imply that not only is consistency across the NPS system important, but agreement between messaging among state or local park settings and wildlife agencies would be useful. Increased emphasis on the generalizability of wildlife recommendations from one context to another may contribute to increased compliance.

Of interest are the different types of communication materials identified by interviewees. For instance, less than one-quarter of interviewees mentioned seeing the materials that each camper receives upon their check in to Blackwoods Campground. Some individuals even specifically said they did not receive anything, or that there was not anything in these materials about wildlife. In contrast, nearly 40% of people noted the sign on the campground lavatory that talked about rabies. This evidence might lend support to theories about the salience of emotion-linked communications. The lavatory sign not only talked about disease issues, which many people expressed concern or fear about, but it also used the phrase "A fed raccoon is a dead raccoon." A number of respondents noted that the "fed is dead" message elicited in them empathy for wildlife and suggested that this motivated them to alter their behavior. An

alternative explanation could be that the frequency with which this sign was mentioned was due to its relative proximity to campers at the time of interviews, yet interestingly, there were also signs about not feeding animals on the picnic tables at every campsite, yet remarkably these were only mentioned by a few people in the entire interview sample. These findings substantiate ideas developed out of earlier phases of this work and concepts advanced at the onset of this phase. Specifically, the results suggest that emotion-linked communication has the potential to be more influential on behavior than other types of communication, such as information-based.

Compliance with messaging

Almost all interviewees had seen wildlife-related communication materials. People most often reported that the messages focused on not feeding wildlife, how to respond to wildlife, and food storage recommendations. Furthermore, nearly all interviewees reported that they followed recommended behaviors. Yet in the behavioral observations I identified that a third of campers had coolers and food in containers or bags around their campsites. These behaviors have the potential to cause food conditioning in wildlife around the campground. The fact that campers report that they are engaging in the recommended behaviors, contrary to the evidence I found in the behavioral observations could be explained in two ways. This could result from social desirability (people wanting to please the interviewer or not admit that they are disobeying regulations). Alternately, it may be that people believe they are engaging in the proper behaviors, but in fact they lack accurate knowledge or understanding. Many interviewees who professed to engage in correct behaviors used storing food in

coolers or containers out around the campsite as evidence of their compliance. It is interesting to note that 17% of people did report that while they already knew about and engaged in recommended behaviors, they felt that the materials they saw helped them to further refine their behaviors. These findings appear to have implications for message design; information in communication materials may need to be more explicit.

A number of interviewees suggested that when they understood *why* communication materials encouraged them to engage in certain behaviors they were more likely to comply. Communication theories such as the elaboration likelihood model (Petty & Cacioppo, 1986) assert that some audiences are more influenced by messages that have this type of detailed explanation. To utilize this type of theory requires significant knowledge about individual audience characteristics and could be difficult to apply to an audience as broad as transient recreationists in a park. In particular, given the other findings in this study related to the transfer of wildlife-related knowledge and understanding across contexts, targeting a number of specific audience segments seems unrealistic with respect to wildlife-related communication. This leaves one to wonder if there is a more common baseline characteristic that could be addressed across audience segments, while still satisfying the people who might want further explanation about why a behavior is important. Many people in the study noted that after they learned that a behavior was bad for wildlife, they altered their practices. In fact, many people believed they were helping wildlife when in fact they were engaging in behaviors such as wildlife feeding that would lead to problems. This drive to help wildlife, or to be respectful of wildlife, was expressed in a variety of

ways throughout the study across the majority of interviews. Perhaps this empathetic connection to wildlife, a common element across interviewees, could be tapped to increase compliance with recommendations and attention to details about suggested behaviors. The potential effectiveness of such emotion-linked messaging has theoretical support from earlier work in this inquiry, and empirical confirmation from this phase of study.

Implications for Management and Future Research

Emotions

This study, together with theory and findings from the NPS BRMD inquiry, suggests that people's emotions are relevant to human behavior related to human-wildlife interactions. With respect to decision-making models, emotions may be relevant at two points in the decision-making process. Emotions from prior encounters likely serve as informational inputs and will be relied upon to plan behaviors for future interactions. Emotions experienced during an encounter may interfere with planned behaviors and lead individuals to react to wildlife based on intuition or instinct. Finding ways to influence or manage emotional responses to wildlife, and therefore behavior, is a challenging undertaking. For instance, managers may wish for people to be sufficiently wary or afraid of an animal such that they do not approach it. However, as demonstrated in the present study, if people are too fearful this emotion may disrupt planned behaviors such as following recommended responses to wildlife. Furthermore, fear about a particular species could change individuals' perspectives about the species such that they might no longer support conservation efforts. Thus, identifying types of

emotions that are salient to individuals and can achieve desired outcomes while minimizing negative effects will be crucial. This is a difficult balance to strike, but perhaps attention to other emotions such as empathy for wildlife could help to alleviate some of these potential problems. Findings suggest that this emotion is common across the park visitor population.

This study revealed some interesting trends related to emotion; however, little is known about how emotions in response to wildlife affect decision-making processes and additional inquiry is needed on several fronts. To begin, we need to understand how the various emotional factors that appear relevant to decision-making differentially input into individuals' decision processes. People in the study suggested that they relied heavily on prior experience to make decisions about their behavior near wildlife. More information is needed about whether emotionally significant experiences have greater weight in the decision-making process and if this is related to the type of emotion experienced. Work is needed to assess in which direction different emotions shift behavior (e.g., does fear lead to avoidance and excitement to approach behaviors?). An important consideration will be how people reconcile prior experience with behavioral recommendations they learn from communication or education materials. The role contextual variation plays in how people utilize prior experience (i.e., determining that a prior experience is or is not relevant to current circumstances) also is relevant. These issues focus on emotion that inputs into decision-making in a conscious manner. The study revealed that unconscious emotional responses during an encounter also might have significant impacts on behavior. Given the exploratory nature of the study, however, further inquiry is needed specifically to examine the way

in which emotions experienced at the time of an encounter alter planned behaviors and how the input of prior experience may be moderated by emotions.

Prior Experience and Context Specificity

This study revealed a host of issues related to the manner in which people utilize wildlife-related information from prior experience. Consistent with theories about decision-making and behavior, people in the study relied heavily on their prior experience to inform future interactions with wildlife. This reliance on prior experience had both benefits and drawbacks, particularly with respect to what might be desirable in a NPS campground. People had species- and context-dependent reactions to wildlife and significant experience in backyard and state and local park settings. They also expressed varying definitions of acceptable approach distances from wildlife. People used these prior experiences as informational inputs when making decisions about how to behave around wildlife. However, due to context specificity, this prior experience was not always relevant to future encounters with wildlife. For instance, an individual might have encountered a habituated deer in a neighborhood, leading him or her to believe that it is acceptable to approach ungulates. When this person then encounters a moose in a park, he or she may rely on this experience and approach the animal, disregarding regulations and recommended behaviors to the contrary. Context specificity also influenced the manner in which people interpreted wildlife-related communication messages. While most people in the study were familiar with wildlife-related recommendations related to prohibitions against feeding or approaching wildlife, many individuals reported that their potential

engagement in these behaviors would depend on the species or context. People often deviated from what they knew was recommended because they had contradictory experience, or because they did not believe it was relevant for a particular context. People frequently reported using other cues, such as what they knew about a specific park, to inform behavioral decision-making.

The context specificity revealed in this study has a number of implications for management and future inquiry. It appears that many people fail to understand the risks (either to themselves or to wildlife) associated with particular species or contexts. It may be helpful to explore ways to convey that seemingly benign species, including those in non-park contexts, can still be food conditioned or habituated. Such circumstances can lead to problematic interactions or harm wildlife. Information is needed about the way in which people evaluate different contexts and species and how such characterizations influence their behavior around wildlife and during interactions. This study indicated that many individuals gain experience with wildlife and exposure to wildlife-related communication near their homes or in state and local parks. It would be useful to conduct an inquiry into how communication messages differ between various contexts and how people utilize the information across contexts. It may be the case that more coordination and collaboration between various parks and wildlife agencies with respect to messages would be useful.

Communication

A variety of communication challenges exist in relation to influencing human-wildlife interactions in national parks. The work with campers revealed that people

appear to receive substantial wildlife-related communication from sources other than national parks. It may be that national park communication efforts could be considered in association with other parks and wildlife agencies. People report they are more likely not to attend to messages in parks because they already have been exposed to basic messaging in these other contexts. It appears, however, that people often receive mixed messages between different contexts in which they interact with wildlife and are unsure what recommendations are most relevant in these various situations.

It is encouraging to note that people generally desire to engage in behaviors that are beneficial for wildlife. It seems, however, that people often mistakenly engage in problematic behaviors because they do not think what they have learned is applicable for a particular context or species, or because they misunderstand the specifics of recommendations. I saw evidence of these problematic behaviors in the way people stored food around campsites, or approached wildlife, while keeping what they felt was a "safe" distance. Although parks discourage these behaviors, visitors still expressed the belief that their actions were in accordance with recommendations. This situation has implications for messaging related to food storage, camping practices, and wildlife viewing. More information is needed to inform the design of such messaging. We need to understand the relevant factors in circumstances where people believe that they are engaging in the correct behavior when in fact they are not. Is it due to a misunderstanding of messages; lack of consistency in messages; context specificity; reliance on prior experience; or emotional mediation? Even with increased compliance it may be the case that the rate of noncompliance will be sufficiently high to cause problems such as food conditioning. It is entirely likely that other types of

management intervention will be needed regardless. However, given that we know communication materials are a favored strategy, it would make sense to explore ways to improve the effectiveness of these efforts. Based on this research, it appears that emotion-based communication messages could be more influential than information-based approaches, but experimental work is required to examine this idea. An interesting related question is whether emotion-based messages might be more effective even in circumstances where situational emotions might otherwise override planned behaviors and reliance on knowledge of recommended behaviors. With respect to emotion-based messaging, we need to identify emotions that are both salient and pervasive among anticipated audiences. Most interviewees in this study endorsed feelings of empathy and a desire to help wildlife. This may provide a promising avenue for future inquiry and possibly more effective communication strategies.

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CHAPTER FIVE
A PROPOSED FRAMEWORK FOR THE RELATION BETWEEN HUMAN-WILDLIFE INTERACTIONS IN PARKS AND POSITIVE CONSERVATION OUTCOMES

Introduction

Conservation Recreation

Conservation of land for the purpose of nature-based recreation is a long-standing tradition (Sellars, 1997). Nature-based recreation includes a variety of activities such as hiking, wildlife viewing, camping, boating, and hunting. While providing myriad benefits for recreationists and protecting lands from intense development, areas that are set aside for recreation often suffer significant degradation from overuse and misuse (George & Crooks, 2006; Monz, Pickering, & Hadwen, 2013; Reed & Merenlender, 2008). Conversely, some nature-based recreational activities may have direct or indirect positive conservation effects, such as user fees that support conservation programs, or prescribed hunts that reduce overpopulation of species on a landscape (USFWS, 2012). Natural resource professionals in a variety of management regimes find themselves wrestling with the challenge of encouraging nature-based recreation while protecting the land and its associated habitats and wildlife.

Traditional nature-based recreation (e.g., hiking, camping, hunting) may have positive or negative conservation impacts; however, other nature-based activities, created specifically to advance conservation goals, exist as well. These activities often are designed to help protect or restore a component of the environment or ecological

service. For instance, opportunities are available for individuals to help with wetland restoration, invasive species removal, or prescribed burns. Moreover, this type of activity also may provide recreation benefits for the participant. Such practices may be thought of as an additional type of nature-based recreation – one intended to have a positive conservation impact.

Recreation activities in nature that have a positive conservation effect and conservation-oriented outdoor activities can be linked conceptually by their shared potential for positive conservation outcomes. This idea is termed conservation recreation (Figure 5.1). Conservation recreation includes two categories of activity: 1) nature-based recreation that has an *unintended* positive conservation outcome (e.g., wildlife viewing, hunting, camping); and 2) nature-based activities *intended* to have a positive conservation outcome (e.g., environmental workdays, trail maintenance outings). As previously discussed, nature-based recreation can have positive or negative conservation effects; however, only recreation leading to positive effects would be considered part of conservation recreation. We can describe behaviors in the two categories of activity that constitute conservation recreation as pro-conservation behaviors. Pro-conservation behavior would include all actions that lead to a positive conservation outcome, whether they arise from a recreation or conservation-based activity.

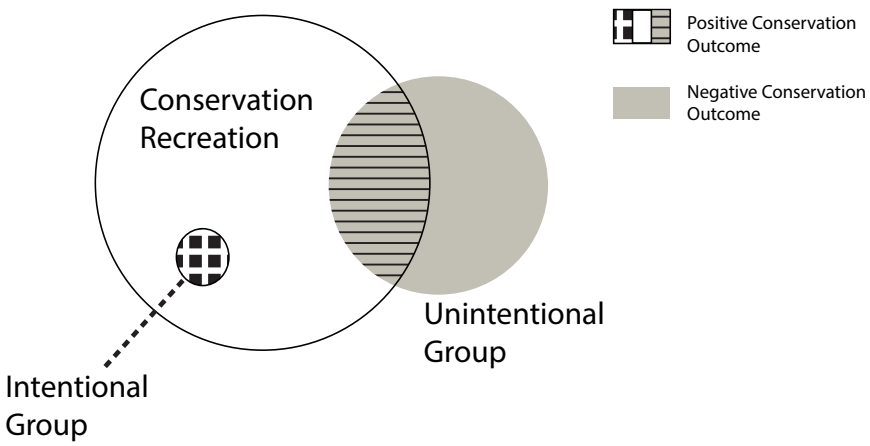
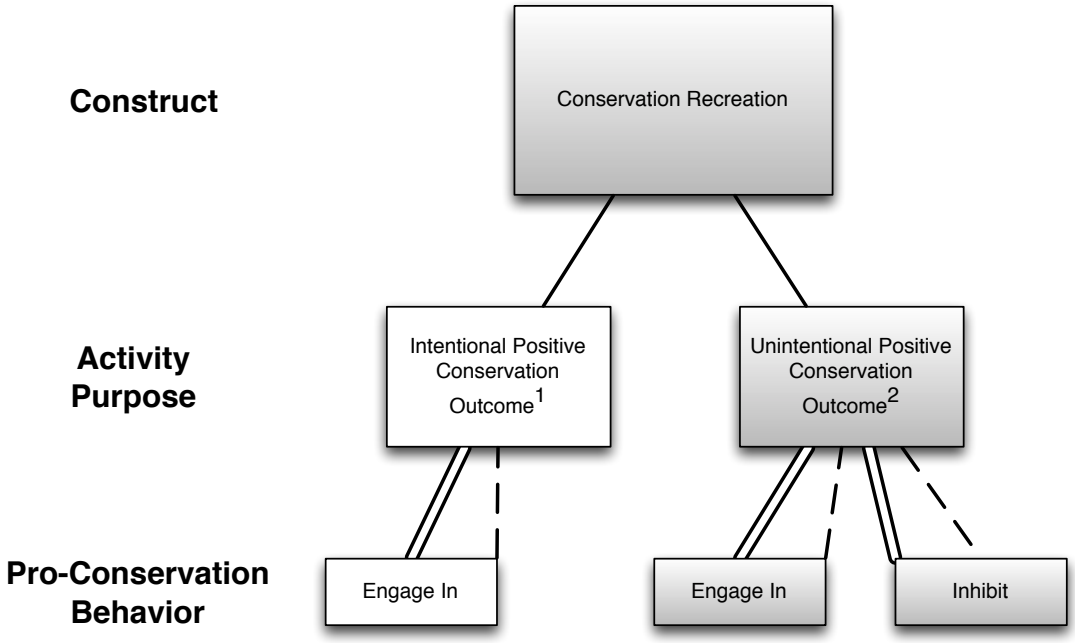


Figure 5.1. Individuals can be classified into groups that contribute to positive conservation outcomes, intentional or unintentional; both are included under the conservation recreation framework.

Unintentional Conservation Recreation

Under the conservation recreation framework, there exist individuals who engage in recreation-focused activities that yield unintentional positive conservation outcomes. Individuals within this category may be aware of the potential effects of their activity, but it is not necessarily their purpose. Unintentional positive conservation outcomes may arise from behavior that a person actively engages in, or from behavior that a person inhibits himself or herself from doing. For instance, a person might hang food in a "bear bag" while camping. By engaging in this behavior, the camper is minimizing problems with wildlife near the campsite. A recreationist also may contribute positively toward conservation outcomes by inhibiting an action. For example, a hiker who refrains from wandering off trail helps to prevent erosion or

harm to sensitive species. In this case, an individual contributes to conservation by *not* engaging in a behavior that causes negative conservation outcomes. Thus people are participating in an activity for recreational purposes and that activity unintentionally yields positive conservation outcomes via their engagement or inhibition of certain behaviors. Once again, we would refer to these specific behaviors as pro-conservation; in fact, the motivation for the behavior may indeed be pro-conservation although the primary activity is recreational. Different pathways of *unintentional* conservation recreation occur either via engagement or inhibition of certain behaviors (Figure 5.2).



[1] E.g., environmental workday. [2] E.g., camping, hiking, hunting.

Figure 5.2. Gray boxes denote the pathway of unintentional conservation recreation. Individuals may engage in or inhibit behaviors based on approach (double lines) or avoidance (dashed lines) motivations.

Wildlife and Unintentional Conservation Recreation

Much like its effect on conservation outcomes generally, nature-based recreation can yield both positive and negative outcomes for wildlife. Recreationists not intending to have any impact on wildlife conservation may in fact create both positive and negative outcomes. Examples of positive outcomes include user fees that help support wildlife conservation programs, and lands protected for recreation that also include key wildlife habitat (USFWS, 2012). When recreating, however, people often engage in behaviors that foster problems with wildlife. For instance, wildlife viewing at close distances can lead to habituation (Knight, 2009); and improper food or trash storage by campers may lead to wildlife becoming food conditioned (Larson, 1995; Orams, 2002). Habituation and food conditioning of wildlife is of concern to managers because it can lead to health and safety risks for both people and wildlife. Furthermore, the possibility that these processes create negative human-wildlife interactions also has the potential to influence recreationists' attitudes toward conservation of wildlife and natural areas (Buttke, Decker, & Wild, 2014). Despite the negative effects of food conditioning and habituation, habituation can lead to positive outcomes as well. Habituated wildlife can afford recreationists greater viewing opportunities and may reduce the stress experienced by individual animals when humans are near (Knight, 2009; Whittaker & Knight, 1998). The difficulty associated with realizing these positive effects is the tendency for people to approach habituated wildlife too closely, leading to negative interactions. Additionally, habituated wildlife may become food conditioned (Bejder, Samuels, Whitehead, Finn, & Allen, 2009).

Due to the fact that food conditioning can have significant negative impacts, its prevention is an important positive conservation outcome.

Nature-based recreation that affects wildlife offers ample opportunity to explore the potential impact of unintentional conservation recreation. Under the *unintentional* pathway in the conservation recreation framework, the intention of the user group is not related to conservation. Individuals in this group may care about conservation outcomes, but it typically is not the primary motivation behind their actions. Recreationists may contribute to positive outcomes either by *engaging in* activities that prevent problems with wildlife (e.g., properly storing food and disposing of trash, following signage) or by *inhibiting* actions that could cause problems (e.g., not approaching wildlife, refraining from feeding wildlife). Wildlife professionals may find it useful to understand the motivations and attitudes of individuals engaged in nature-based recreation activities and the extent to which these activities are or may lead to unintentional conservation recreation.

The dual route of engagement or inhibition that leads to positive outcomes can be examined via motivations. People are motivated to act by either approach or avoidance drives associated with an affective state. An affective state is a generalized reaction to a stimulus that may be positive or negative, and conscious or unconscious (Finucane, Peters, & Slovic, 2003). Approach motivations or behaviors describe a drive or action towards an object or activity, or engagement with one's environment. Avoidance is the opposite, a motivation or behavior that encompasses movement away from an object, activity, or disengagement with one's environment (Fredrickson, 2001). Individuals will demonstrate approach behaviors when the action leads them to

a positive affective state, or avoidance behaviors when the action helps them to avoid a negative internal state. Individuals may have approach or avoidance motivations leading to either engagement or inhibition in the conservation recreation framework (Figure 5.2). A person might store his or her food carefully while camping because he or she cares about wildlife and feels good when he or she contributes to keeping wildlife healthy (i.e., engagement via approach motivation). An avoidance motivation for the same engagement behavior might be fear of getting rabies from a raccoon that raids one's campsite (i.e., storing food to avoid anxiety). Inhibition similarly may arise out of an approach or avoidance motivation. One might refrain from getting close to wildlife on a trail because one wishes to be respectful of an animal (i.e., approach motivation) or because one is fearful about a dangerous encounter (i.e., avoidance motivation). Understanding these different motivational routes that might lead people to act in certain ways around wildlife has implications for the design of communication messages.

Communication and Unintentional Conservation Recreation

It is impractical, if not impossible, to understand and incorporate into communication messages all of the myriad motivations individuals have for their behaviors around wildlife. Theories in communication and message design suggest various ways to address different audience motivations to foster behavior change (e.g., elaboration likelihood model [Petty & Cacioppo, 1986]; integrated model of behavioral prediction [Fishbein & Yzer, 2003], fear appeals [Witte, 1992]). The challenge with application of these theories is the difficulty achieving significant

changes in wildlife-related behavior through communication interventions (Baruch-Mordo, Breck, Wilson, & Broderick, 2011). Furthermore, some approaches, such as fear appeals, may lead to "boomerang effects" (Hovland, Janis, & Kelly, 1953), creating negative attitudes toward wildlife, and even more generally for parks and conservation. Nevertheless, wildlife professionals rely heavily on communication as a tool for managing human behavior near wildlife (Gore, Knuth, Curtis, & Shanahan, 2006; Wieczorek Hudenko & Connery, 2013). Contribution of the unintentional pathway of the conservation recreation framework is the identification and classification of target audiences who already are engaged in behaviors that lead to positive wildlife conservation outcomes. While these individuals may not be recreating intentionally for the purpose of conserving wildlife, many may be pleased to learn that their actions also benefit wildlife. In fact, some specific behaviors may be motivated by pro-wildlife conservation goals although the activity is not wildlife-related. Given the fact that the primary focus of an individual's recreation may not be wildlife-related, their behaviors may not be consistently positive for wildlife, or precisely what managers desire. The communication opportunity exists within the reinforcement and refinement of these existing behaviors, rather than major behavior shifts. Understanding the motivations and underlying emotions associated with these behaviors will help wildlife professionals to tailor messages that maximize success.

An Inquiry with Park Recreationists

This project examined the perspective of recreationists in a park campground about their experiences with wildlife. We sought information about campers' previous

interactions with wildlife, behavior around wildlife, and response to communication messages about wildlife. Specifically we explored campers' prior experience, emotions, and expectations related to human-wildlife interactions. Understanding how and why these nature-based recreationists interact with wildlife provided information about potential impacts on wildlife health and behavior. We examined whether the behaviors of campers contributed to, or prevented, negative impacts to wildlife. We considered the associated attitudes and motivations within the conservation recreation framework. Through this effort, we gained insight that could be applied to the design of a communication intervention to encourage and refine nature-based recreationists' behaviors that promote positive conservation outcomes on multiple scales.

Methods

Study Site

Acadia National Park (ANP) in Bar Harbor, ME was selected as the study location due to historic high levels human-wildlife interaction in campgrounds. We worked with park staff to determine the specific campground in which to conduct the study (Blackwoods Campground). Park managers were concerned about the potential for food conditioning or habituation of raccoons at the campground, and about the resulting human-raccoon interactions. Raccoons often acquire food from visitors in Blackwoods Campground and actively forage in the area. This increases the chances for a close encounter between raccoons and visitors, and visitors may be scratched or bitten. Of particular concern is the risk of rabies transmission during such an interaction. It is believed that habituation and food conditioning of raccoons in

Blackwoods Campground is influenced directly by human behaviors. All of the 306 campsites in the Blackwoods Campground are generally booked during the summer season, creating ample opportunities for human-wildlife interactions.

Data Collection

Semi-structured interviews were conducted with campers in Blackwoods Campground, ANP during August 2011. An interview guide was used to structure conversations between visitors and the interviewer. The interview guide explored the behaviors and emotions associated with campers': prior experience with wildlife; expectations for future interactions with wildlife; and interactions with raccoons. Additionally, the interview guide was designed to identify the types of communication that visitors received regarding wildlife.

A random start, systematic sample was used to conduct interviews. Visitors were queried at every third campsite in a progression through the campground. When a campsite was vacant, or the visitors were absent or declined to be interviewed, we continued inquiring at every third campsite to maintain a systematic sample. Visitors provided verbal consent, and all interviews were recorded with a digital voice recorder.[1]

[1] The interview protocol and guide were approved by Cornell University's Institutional Review Board for Human Participants, Protocol #1006001472. We verified with the National Park Service that Office of Management and Budget approval was not required; and we received a research permit from Acadia National Park.

Data Analysis

The interviewer listened to recorded interviews and reviewed notes using an inductive, iterative approach (Lincoln, 1985) to create codes for each question. All responses were coded and entered into Microsoft Excel v.14.3.5 (Microsoft; Redmond, WA). Conceptually similar responses were combined into categories and a code generated to represent each category. This approach allowed us to identify emergent themes within and across interviews. Differential Emotions Theory states that emotions can be characterized as discrete states that are amenable to categorization (Izard, 1991). Consequently, we examined the emotional response of visitors within the framework of discrete emotional states that are likely to influence visitor behavior. Interviews were partially transcribed to record rich text examples, provide context for responses, and capture details in the interviewees' descriptions. We used the data to examine visitors' intended behaviors in situations that might lead to wildlife habituation or food conditioning within the conservation recreation framework.

The application of the conservation recreation framework was post hoc as a result of the emergence of relevant themes during the inductive coding process. As such, we do not report statistics related to our findings because the concepts were not explicitly explored systematically across all interviews. Rather, we discovered themes related to conservation recreation in most interviewee responses during the course of our analyses; and we report on those findings below.

Findings

Descriptive Information

One hundred and five campsites were approached for interviews, and at nine sites people declined to be interviewed. The reasons they cited were: eating, leaving the campsite, setting up the campsite, or non-English speaking. Duration of interviews averaged 13:06 minutes in duration (range 4:13-46:02).

Pro-Conservation Behaviors that Constitute Unintentional Conservation Recreation

Our interview guide included questions for visitors about a number of their behaviors that might affect wildlife, including visitor reactions to wildlife during encounters and their camping practices. Most campers reported undertaking pro-conservation behaviors that could be considered unintentional conservation recreation practices. The most often reported behavior was not feeding wildlife.

> 128[2] We just watched it [coyote]. I'm not one to feed wildlife.
> 131 We'd say ooh, cool, and stay where we were. We wouldn't try to feed it.
> 136 I don't like to feed wildlife. I don't think that's appropriate.

By limiting wildlife exposure to human food, campers help to minimize food conditioning. Many visitors expressed that even if they wanted to feed wildlife, they refrained from doing so.

> 113 If I hadn't seen the sign I might have thrown a piece of bread to them or something. I might have known it was a good idea [not to feed] and yet...[laughs] as a parent you want to give the kids a cool little moment, so having the sign is good.

[2] Numbers indicate interview identification.

> 137 [Child's name] really likes to feed animals, but if we know we're somewhere where they ask you not to, we don't do it.
> 161 The bear I saw was lame, I still didn't give him any food.

Abstaining from camping practices that can negatively affect wildlife, and lead to food conditioning, was another commonly reported behavior. Campers frequently identified food storage and trash disposal as practices used to minimize wildlife problems. For instance, they ensured food was properly stored around the campsite at night or when the campsite was vacant.

> 122 We put our food in the car, trash in the dumpster. We're trying to make it the least appealing campsite around.
> 129 We just make sure to keep our food up and do our part, and know they won't bother us.
> 152 I made us put away all of our food in the car, even though it was all closed up.

In addition, interviewees made sure to properly dispose of trash around the campsite, particularly food wrappers or scraps.

> 130 We're emptying it [trash] after every meal because we know that's part of keeping little animals away.
> 134 We're careful not to put any drippings or anything in the fire pit.

When people maintain distance from wildlife, it helps to reduce habituation of wildlife and limits the opportunity for problematic encounters. Not approaching wildlife is a key component toward the reduction of habituation; and this was an important behavior that many interviewees reported.

> 134 We just want to see them [wildlife], be a witness of that. I don't need to be closer.

149 We would try to go as far around them as possible.
186 I gather if you approach them they'll try and get away. So it's better just to leave them where they are and stay on the trail anyway.

Other campers indicated that they did not stay near wildlife if an unintended encounter suddenly found them close.

121 We kept backing away and keeping eye contact with the bear.
123 We just kind of backed off and gave her [mother moose with calf] the space. We knew what to do.
169 I just back off, you don't want to get too close.

A number of campers indicated that they actively discourage wildlife if they accidentally find themselves in close proximity or if an animal approaches them or their campsite.

126 We were hiking and there was a moose with her baby from here to the car [10ft] and I freaked out, well I didn't, we just went behind a tree and started clapping.
130 I got up [out of tent] and grabbed my pots and pans and started banging.
155 I would just kind of shoo them away if I could.
195 They tell you to try to scare them away, to yell at them to get out of here, and that usually worked.

Motivations for Engaging in Pro-Conservation Behaviors

Interviewees identified a host of reasons for their actions, either engagement or inhibition, that led to positive conservation outcomes for wildlife (i.e., participation in pro-conservation behaviors). Quite often, campers inhibited behaviors such as feeding or approaching wildlife because they understood that it would have negative effects on individual animals or wildlife populations.

> 101 We used to feed wildlife, but then we learned it was counterproductive in terms of their migration and health.
> 134 We're not meant to have encounters with them. If we have encounters it's because we've encroached on their area … and we're forcing encounters; and those are not good for people or animals. We don't look for encounters.
> 157 You'll domesticate them and then they'll starve and die.
> 168 We turned it into an educational thing that said 'this is why you're not supposed to feed the wildlife because now this deer can't take care of itself.'

Interviewees frequently expressed a desire to avoid negative conservation impacts. Many cited the desire to preserve the "wild" or "natural" characteristics of wildlife or parks as their reason to avoid feeding or approaching wildlife.

> 127 I don't like feeding the animals because then they don't stay wild.
> 129 I would like to keep the nature part and not disturb it.
> 161 They're wild animals, they have their place, stay away from them.

Additionally, many campground recreationists do not feed or approach wildlife because they have been instructed not to do so through communication or educational materials provided by parks or wildlife professionals.

> 111 A little duck … when you were a kid … you used to always feed them stuff. But now mostly they say don't feed them, and so I stay away from them.
> 124 They [Blackwoods Campground] always give a number of warnings about not feeding the wildlife, in fact that's how we first became aware.
> 137 That's always one of the most helpful things. It comes to my attention what I should be doing, if there are any specific instructions about what to do or not to do.
> 196 If you read the rules you realize that food storage is an issue with attracting animals. So if you're concerned you'll follow the rules.

A number of interviewees also identified that understanding why they ought not engage in a particular behavior was especially relevant to their decision not to do so.

> 101 As far as feeding animals, we grew up doing that, we didn't know. Now I know why. … If they tell us not to do something it's a good idea for us to know why.
> 130 I think adding the reason why it's important for a regulation, not just 'you have to do this,' but why it's important that if you leave food scraps it attracts raccoons and they make a mess.
> 134 It's fine that they do that [close trail for nesting falcons]. I don't have a problem with it; the rangers explain it very well.

Preventing problems with wildlife was another commonly identified reason for engaging in pro-conservation behaviors. Visitors described previous experiences wherein their behaviors led to problematic encounters. They suggested that they had learned from these prior experiences and had consequently changed their behavior in the future.

> 123 Maybe we're more likely [after close encounter with a moose] to keep a respectful distance and be vigilant. I might start backing off a little sooner when I see an animal coming toward me.
> 133 When the kids were little and we first camped here, we'd have the cooler out. And they [raccoons] learned how to open coolers, and the eggs and everything would be right down in the woods. … We learned that real fast, you want your food, you keep it under cover.
> 152 There's Canada geese in every park and people feed them. And so there's goose [feces] in every park, and it's not that nice. So I think because of that experience I'm a big believer in not feeding wildlife, which is kind of funny because it's a very selfish reason, but that's ok.

Similarly, people did not wish to experience nuisance issues that might arise when wildlife are fed, obtain food, or are approached.

> 112 We've been in campgrounds where there's been garbage … where raccoons have been a serious nuisance problem … you could just tell there was a lot of negligence on the side of campers.

> 125 I think it's a good idea how they post not to feed the animals because then they would all be attracted to everybody, and bothering everybody, and could become dangerous or a hassle.
> 191 I bungee cord all of the coolers because I know what a mess they can make. … My thoughts always go to how much food are they going to ruin and what's it going to cost me.

Some individuals suggested that their motivation was concerns about the implications for the experience of future recreationists in the same place.

> 143 I'd be more afraid of feeding an animal in a park only because they get so used to being fed and they get attracted in here and there's more occurrence of problems with people in the future.
> 181 If we feed them they're going to start expecting it from other people. Somebody might get bit.

Many campers cited concerns about safety as the motivation for not engaging in behaviors that might cause wildlife to become food conditioned or habituated.

> 131 In Yellowstone where bears have killed people and you think maybe I'll put my food away. I think it [signage] made us a little more conscious.
> 161 Chasing any kind of wild animals, you don't know how they're going to react. You don't know if there are diseases. You don't need anything to happen that will put you or the animals in a bad situation.
> 192 No [approach], you never know, something could be rabid. … Raccoons can be really nasty. I'd go the other way as quickly as possible.

Safety appeared to be particularly relevant to campers with children.

> 109 Number one concern is the safety of kids and wife [in response to how to respond to encounter].
> 124 We just stayed in the tent, we knew better because they could be rabid and we had the kids. It was more of a protective kind of thing, parental. Stay away from the wildlife, if they're too friendly, that's a bad thing.
> 158 Well we didn’t want it to bite the kids.

Attitudes and Emotions Associated with Unintentional Conservation Recreation

Our data suggest that campers participating in unintentional conservation recreation behaviors often do so because they do not want to hurt wildlife. Many report feeling troubled about wildlife that become food conditioned or habituated. They suggest that these animals are "no longer able to care for themselves," or "become unhealthy."

> 119 You feel like it's probably worse for the animals if they cross into where people are camping because they're probably getting potato chips and food that's left behind and then become dependent on that.
> 124 I feel … more concern for the animals, having closer interaction. … It's hard to ignore the concerns for wildlife if you get educated.
> 168 Because people aren't going to always be here to feed these animals, they need to fend for themselves.

A number of campers were concerned about the potential need to remove animals that become food conditioned.

> 150 If you feed the animals it's the same as killing them. Because if they lose their fear they become a problem and they have to be dealt with by the park.
> 161 What upsets me when I see people do things that causes a wild animal to react badly against an individual. And then people want the wild animal destroyed or hurt or something.
> 169 Well of course with the raccoons don't feed them, because they end up having to kill them. They'll become tame and a nuisance and they end up having to do away with them and that's not what you want.

The communication message "A fed animal is a dead animal" was often quoted by campers in reference to a variety of species such as bears or raccoons. Visitors felt that this messaging was particularly poignant and made them feel badly for the wildlife. Many visitors reported that feeling bad or sad for wildlife influenced their behavior.

> 110 It’s sad to me when wildlife get so habituated by encounters. … It’s when they get comfortable seeing people that it’s a problem. But we try to respect them.
> 112 It goes back to what we had learned, a fed bear is a dead bear, so I wasn't trying to kill them of course, but seriously dissuade them.
> 155 I feel sad for animals a lot because I think we're taking over a lot of their natural space and it's forcing them to interact more with us … A fed raccoon is a dead raccoon, that catchy phrase I think is good, it draws people’s attention to it more.
> 194 Later we saw him in the dumpster. So we worried about bear hunting season thinking he's not going to last very long.

Feeling respect for wildlife and wildlife habitat was another commonly reported emotional reaction to wildlife encounters.

> 108 We try to keep a respectful distance. We know that this is where they live and we try to respect their home as much as we can.
> 123 My inclination would be to just observe the animal without getting too close. To try and have a healthy respect for the distance and obviously not to interfere or to feed them or anything.
> 161 They're wild animals and they need to be respected, but it's great to see them.
> 169 I have more respect probably as I'm older to stay at more of a distance and watch them in their natural habitat. Whereas when I was younger, I'd want to run up to them.

Interviewees reported that the “naturalness” or “wildness” of wildlife and parks were emotionally significant to them and to their experience as campers. Additionally, many people expressed that they would feel badly were their behaviors to contribute to a reduction in this state.

> 104 The upkeep of the pristine environment is specifically important in how I would like to see it [wildlife].
> 161 They're wild animals. They're wild for a reason. They're nice to look at but approaching I think is the wrong thing to do.

> 180 If we happen to come across them when we're hiking, in a natural way, that's really exciting. But we don't find it as exciting if we see it somewhere like a campground because we know it's not healthy for them. … It's really exciting that we don't [need to be close to them] because they're wild animals.
> 194 We've always rooted for animals and enjoyed seeing them in a wild state.

Campers frequently expressed irritation or frustration with other visitors who engaged in behaviors the led to food conditioning or habituation. These emotions were generally rooted in concern for wildlife health and annoyance about the potential nuisance issues.

> 103 It irritates me when I see people feeding wildlife.
> 134 I can't stand it when I see people throwing bread at seagulls...it's bad, they get used to it and they forget how to hunt and you're making them lazy and then they come closer and are more dangerous.
> 154 I've seen a lot of people do a lot of crazy things, especially down in the Smokies. They're terrible down there about those things – they touch the bears. You'll have a little granny leading a three-year-old kid, and a bear down the road, and they're dragging the kid running after it. And it's like 'you know folks if that bear was in your backyard you'd be calling the cops to come get it.' They get in a national park and they think it's ok to chase them.

Discussion

Analysis of interviews with campers in ANP revealed a number of themes that suggest the conservation recreation framework is applicable to human-wildlife interactions in parks. The concept of *unintentional* conservation recreation appears especially pertinent. Individuals typically come to the park campground for recreation purposes; ANP is known for its scenic views and enchanting hiking and biking trails. Despite the recreational nature of the activity, campers have the potential to create positive, or to prevent negative, wildlife outcomes. In many cases, interviewees were

participating in unintentional conservation recreation. An important consideration in this analysis is that the study was not designed to investigate the idea of conservation recreation, yet our interviewee responses fit that framework well, and suggest intriguing opportunities for communication and education.

Emotions, motivations, and behaviors that might yield negative conservation outcomes also existed within our sample. Our analysis for this paper, however, focused on consideration of the conservation recreation framework. The goal of application of the framework was to examine visitor behaviors and the related emotions and motivations that might yield positive conservation outcomes.

Campers reported engaging in a variety of actions that minimize problems with wildlife such as food storage, trash disposal, leaving an area where wildlife are present in close proximity, and actively discouraging wildlife from campsites and other human-dominated spaces. Interviewees also described inhibiting other actions such as feeding or approaching wildlife, which can lead to food conditioning or habituation. Many interviewees stated that even when they desired to feed wildlife, they refrained from doing so. Collectively, these actions constitute pro-conservation behaviors, or behaviors that lead to positive outcomes for wildlife. These pro-conservation behaviors are achieved either through engagement in, or inhibition of particular actions (Table 5.1).

Interviewees described myriad motivations for their pro-conservation behaviors. The motivations identified can be categorized generally as either approach (i.e., leading to a positive affective state), or avoidance (i.e., avoiding a negative affective state [Fredrickson, 2001]). Approach motivations included the desire: to

Table 5.1 A typology of proposed communication strategies associated with unintentional conservation recreation behaviors.

Approach or Avoidance Behavior*	Motivation/Desired Outcome	Example Behavior	Behavioral Category	Associated Emotion	Communication Strategy
Approach	Help keep wildlife healthy	Do not move towards wildlife	Inhibition	Feel respect for wildlife	Reinforce respect and highlight existing contribution to conservation
Approach	Preserve wildness/naturalness of wildlife	Leave area when wildlife are close	Engagement	Happiness about helping wildlife	Participate in wildlife conservation with little effort
Approach	Help future recreationists to have a positive experience	Do not feed	Inhibition	Happiness related to altruism	Not doing something (e.g., feeding) can help wildlife during your visit and positively impact experience of future recreationists
Approach	Desire to follow rules	Food storage	Engagement	Happiness related to compliance	Message about positive outcome achieved when adhering to regulations
Avoidance	Avoid negative effect to health/well-being of wildlife	Do not feed	Inhibition	Would feel sad because "fed is dead"	Empathy-based appeal, anthropomorphize wildlife w/ cartoon animal; emphasize helping animal through inaction/restraint
Avoidance	Avoid causing food conditioning or habituation	Deter wildlife	Engagement	Anxiety/concern about safety	Emphasize pro-conservation outcome of safety measures and latent concern/respect for wildlife
Avoidance	Avoid nuisance	Trash disposal	Engagement	Irritated/frustrated with noncompliant visitors	Foster social norms of encouraging people to do more/better; reward behavior with park incentives (e.g., cleanest campsite receives free day pass)
Avoidance	Don't contribute to problematic wildlife behavior	Food storage	Engagement	Upset because animals are unhealthy	Slight modifications to normal camping routine can prevent harm to wildlife

*Approach/avoidance framework adapted from Fredrickson (2001)

preserve the "wild" or "natural" character of the animals and/or the park experience; and to adhere to recommendations provided by communication materials and wildlife professionals. Descriptions of avoidance motivations were dominated by: previous experience that lead to problems with wildlife; a desire to prevent nuisance issues; and concerns for safety, particularly that of children. Two motivational themes that were described by interviewees from both an avoidance and approach perspective were the health of wildlife and the experience of future recreationists. Some campers suggested that they performed pro-conservation behaviors because they felt positively about contributing to the health of wildlife individuals or populations. Other individuals stated that they were motivated to engage or inhibit certain behaviors because they would experience negative emotions (e.g., feel sad or bad) associated with potentially harming wildlife. Similarly, some campers reported that they wanted to ensure that their actions did not contribute to a negative experience for future recreationists, while others were motivated by the thought of helping future recreationists to have a positive experience.

Approach and avoidance motivations applied to behaviors that people both engaged in and inhibited themselves from performing. For some behaviors, both types of motivations were relevant and varied by interviewee. For example, an inhibition behavior, such as not approaching wildlife, could be motivated by a person's desire to avoid anxiety associated with safety concerns, or by a wish to feel positively about contributing to the animal's health and well-being. The decision-making and behavior of campers in a park will affect wildlife conservation outcomes, whether the individuals performing the actions are cognizant of this fact, and regardless of the

motivations driving their behavior. It is within this variety of motivations and the associated nuanced emotions that potential communication and education opportunities exist. While a communication campaign may not be able to address the array of motivations described by campers, understanding the emotional drivers within the two broad categories of approach and avoidance may illuminate potential avenues for messaging. Once again, it is important to bear in mind that the community of recreationists that constitutes the target audience in this case are individuals whose primary activity focus likely is not wildlife, but may nevertheless be interested in the impact of their actions vis-á-vis wildlife for a variety of reasons.

The emotions reported by interviewees can be associated with positive or negative affective states and thus related to approach or avoidance motivations. Many individuals described feeling bothered or upset by the notion that animals might not be able to care for themselves, or could become unhealthy as a result of campers' behavior. In particular, they described feeling sad or bad about wildlife that might need to be removed because of problems, or that might die from the effects of food conditioning (e.g., fed is dead). Another negatively-valenced emotional category identified by campers was feelings of irritation or frustration with other people's actions that might contribute to food conditioning or habituation. This led interviewees to be concerned for wildlife health and nuisance issues. Emotions associated with positive affective states included feeling respect for wildlife and the value of experiencing wildlife in a "wild" or "natural" state.

Despite the fact that our interviewees generally did not have a wildlife-related primary focus to their activities, most reported engaging in what can be considered

pro-conservation behaviors. Many also described wildlife-related motivations for their actions. The emotions associated with these behaviors and motivations have implications for communication efforts.

Implications

Conservation Recreation Framework

The conservation recreation framework provides a unique contribution to our understanding of how to manage nature-based recreation to promote sustainable recreation that positively impacts natural resources. In our application of the framework, we considered how campers' behaviors could contribute to the avoidance of negative impacts to wildlife as a consequence of recreation, thereby yielding a positive outcome. We considered their actions to be unintentional conservation recreation as the primary focus of their activities was recreation-based and did not have deliberate conservation intent. We categorized their specific behaviors as pro-conservation as they could lead to positive conservation outcomes on multiple levels including: individual level outcomes for recreationists' health and well-being; community impacts as the behavior of one camper could affect the experience of future campers by influencing wildlife behavior; and impacts to wildlife health and behavior.

Unintentional Conservation Recreation and Communication

The conservation recreation framework can be helpful as the context for campers' actions is not one of intentional conservation impacts, but rather of

recreation in which their actions will have a conservation impact regardless. Despite this recreational activity purpose, we found that people are likely to have significant emotional drivers to want to help wildlife, but opportunities for active conservation recreation practices that can be seen to have a direct impact on wildlife may be limited. For example, visitors to parks or protected areas vacationing for a few days may not have the option of participating in a wildlife-related conservation activity, or they may be unlikely to spend their time in that way. The unintentional conservation recreation concept reframes the issue, however, and suddenly *not* doing something (e.g., not feeding wildlife) becomes a way that people can help wildlife simply while visiting the park and engaging in their planned activities. Similarly, engaging in a behavior that is part of an individual's normal camping routine, such as food storage, also can be considered a pro-conservation behavior. These behaviors may be ones that many individuals already practice, but perhaps not with the diligence necessary to prevent problems with wildlife consistently. If a primary motivation for inhibiting from or engaging in such behaviors is respect for wildlife, or preventing harm to wildlife, viewing these as pro-conservation behaviors may provide a new avenue for communication materials directed at behavior change. Instead of messages focused on "don't do X," ones that suggest to visitors that they can help wildlife, and participate in wildlife conservation efforts, all by *not* doing something, or by continuing something they already intend to do, may have promise.

Many campers reported that safety concerns, avoiding a nuisance, or a desire to follow rules and regulations, were their primary behavioral motivations. A large proportion of interviewees who cited these reasons for their actions also expressed

concern or respect for wildlife. Messaging could utilize such emotional components to influence visitors' behavioral decision-making. Framing communication in a way that highlights the positive conservation outcomes of behaviors people may engage in for non-wildlife-related reasons could be effective. The goal would be to shape or mold existing behavior, creating behavioral shifts or refinements, rather than absolute change. It may be that this could be achieved by engaging the more prevalent emotions we identified, such as concern for wildlife, irrespective of individuals' motivations.

The vast majority of our interviewees expressed an emotion that we might label as empathy for wildlife. People describing this emotion reported feelings such as: respect for wildlife; not wanting to hurt wildlife; feeling sad for wildlife; and concern for the death or removal of wildlife. Some campers identified that these feelings were significant drivers in their behavioral decision-making related to not feeding or approaching wildlife, and to food storage and trash disposal around campsites. Even campers reporting other motivations for their behavior, such as safety or nuisance concerns, often described feelings of empathy for wildlife. Collectively these individuals are driven by an avoidance motivation, they do not wish for their actions to lead them to experience a negative affective state. Considering this group of people experiencing empathy for wildlife and avoidance motivations suggests a large target audience that could be reached by the same type of communication message.

It has been suggested that utilizing emotion in communication may be more effective for influencing behavior than other strategies (Obermiller, 1995). In fact, targeting negative emotion, or the desire to avoid negative affective states, may be

most advantageous (Lang & Yegiyan, 2008). A commonly employed strategy along these lines is fear appeals. Fear appeals are strategic communications designed to convey a threat that motivates individuals to engage in recommended behaviors (Witte, 1992). This approach can be challenging however, as it only reaches a subset of the population with a particular motivation (e.g., safety concerns) and can create boomerang effects (e.g., fear of wildlife that leads to behaviors with negative conservation impacts). The understanding that a considerable proportion of the population of interest experiences empathy for wildlife and avoidance motivations, suggests an alternate approach. Empathy-based communication could capitalize on a negative emotional incentive for behavior change, but also avoid the negative collateral impacts of boomerang effects. In fact, if empathy for wildlife is reinforced, and the idea of pro-conservation behaviors can be conveyed, it may encourage people to think about other contexts outside of parks where their behaviors might influence conservation issues.

Another negative emotion that emerged among our interview results was irritation or frustration with people who approached or fed wildlife, or engaged in camping practices that negatively affected wildlife or created nuisance problems. Many campers were frustrated with the potential impacts such behaviors had not only for wildlife, but also for other recreationists. The results suggest an idea of a community of campers or recreationists that are affected by individuals' behavior. If this conceptualization exists, and the associated emotions are strong, the elements may be present to foster social norms for pro-conservation behaviors. It is worth noting again, that many people appear to engage in the correct core behaviors, but do not do

so precisely in the proper fashion, or perhaps are not diligent about consistently performing the behavior (e.g., food storage, refraining from feeding wildlife). The conservation recreation framework could aid the development of a social norm to encourage the appropriate behaviors. The framework allows people to consider the positive outcomes of behaviors they already engage in or inhibit from. Campers experiencing irritation or frustration may find these emotions sufficiently motivating such that they are willing to address the issue with fellow recreationists. The reframe of focusing on existing behaviors that yield positive conservation outcomes but that need refinement, potentially would provide a non-confrontational way for campers to influence the behaviors of others. Communication efforts could encourage this social norm for frustrated campers to intervene with those who need to modify their behavior and provide them with the tools to do so with a positive angle related to conservation outcomes.

It appears that the conservation recreation framework holds promise for avenues of communication that focus on encouraging and refining existing pro-conservation behaviors by engaging individuals' emotions. Those recreationists that experience empathy for wildlife may be inspired by messages that inform them that their practices have the potential to contribute to positive conservation outcomes. Those that have other emotions and motivations still may be encouraged to learn that while a behavior they perform or inhibit might achieve their intended purpose, they also are contributing to positive wildlife impacts. It is worth considering whether this framework could have broader implications as well.

Future research

The proposed communication typology (Table 5.1) is untested. These avenues for communication are an effort to link behaviors and emotional motivations through the framework of conservation recreation. While we believe the types of messages and approaches mentioned could yield success, research is needed regarding implementation and evaluation. If people learn to recognize that by *not* engaging in a behavior, or by doing something they already practice, they can have positive wildlife impacts, this orientation may even transfer to other conservation issues as well, but inquiry is needed to test this notion. It would be helpful to examine whether communication messages could make recreationists believe that existing or slightly modified behaviors are significant or rewarding. If so, we could study if this leads to increased compliance in a variety of park contexts. Lastly, we wonder if it could be possible that such behaviors might transfer beyond parks to people's homes, backyards, or other natural areas? We hope that the conservation recreation framework and the notion of pro-conservation behaviors, particularly for the population of unintentional conservation recreations, suggest that inquiry into these topics could yield promising results.

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CHAPTER SIX
CONCLUSIONS

A Brief Summary

Wildlife managers in parks seek to influence human-wildlife interactions to maximize positive impacts for both wildlife and people. Human-wildlife interactions constitute a broad range of encounters between people and wildlife, from close contact to distant observation. Encounters occur in a variety of contexts, from individual's backyards to wilderness expanses in national parks. In many of these situations, and in particular in protected areas such as national parks, wildlife may learn that people pose little threat and may be the source of a food reward, resulting in habituation and food conditioning. Managers frequently are concerned about potential health and safety risks to both people and wildlife associated with these changes in wildlife behavior. Communication often is a preferred management approach to address human-wildlife interactions, but it frequently fails to yield the desired effects on human behaviors that facilitate habituation and food conditioning. A contributing factor to the limited effectiveness is the lack of information available about human decision-making and behavior in the context of human-wildlife interactions, specifically those leading to habituation and food conditioning. I explored human decision-making and behavior through a multi-method approach that examined wildlife manager and park visitor perspectives about human-wildlife interactions. Taken together, the collective efforts described in this dissertation enabled me to identify the following key insights about human-wildlife interactions that are likely to be relevant to wildlife management:

1. Emotion is a critical catalyst of human decision-making and behavior in the context of human-wildlife interactions.
2. It is difficult for wildlife managers to distinguish between habituation and food conditioning in a way that optimizes the management of each behavior.
3. Context specificity influences people's emotional and behavioral (intended and actual) response to wildlife.
4. People rely heavily on their prior experience when making decisions related to human-wildlife interactions.
5. People enjoy wildlife and wish to avoid having negative impacts on wildlife, but often their behaviors do not correspond with management recommendations designed to avoid negative outcomes.
6. Communication is reported to be a preferred management strategy for addressing human-wildlife interactions, but frequently this approach is neither effective nor systematically evaluated.

In this chapter I expand on these key insights from the inquiry and discuss implications for wildlife management theory, policy, and practice. I conclude by suggesting directions for future research that build on these ideas.

Key Insights from the Inquiry: Human-Wildlife Interactions

Emotion is Critical to Human-Wildlife Interactions

My work revealed that emotions are influential to human decision-making and behavior related to wildlife. Theory suggests that emotion-linked prior experience will be salient to an individual's decision-making through its effect on the formation of behavioral intentions (Fishbein & Yzer, 2003). In this way, emotional response to previous wildlife encounters is an informational input into an individual's decision-making. Emotions experienced at the time of an encounter also may act to disrupt intended behaviors, leading to behavioral responses guided by intuition. The influence of emotions at either of these stages could lead to an increase or decrease in the

likelihood of human-wildlife interactions through approach or avoidance mechanisms. Data from interviewees revealed both influences on behavior, which varied based on species and context. In other words, the type of emotion experienced appears to have differential effects on behavior (i.e., approach or avoidance), moderated further by context specificity. NPS managers also reported that emotions are critical to human-wildlife interactions. While emotions were identified repeatedly through various phases of inquiry, managers suggested that this topic received little management attention and often was not considered a valid concern.

Of particular interest was an emotional category I labeled empathy. The vast majority of interviewees expressed emotions that could be included in this category, such as: respect for wildlife; wanting to help wildlife; not wanting to hurt wildlife; feeling sad for wildlife; and concern for the death or removal of wildlife. Some campers identified that these feelings were significant drivers in their behavioral decision-making related to not feeding or approaching wildlife, and to food storage and trash disposal around campsites. Even campers reporting other motivations for their behavior, such as safety or nuisance concerns, often described feelings of empathy for wildlife. Depending upon how they expressed this emotion, these individuals were driven by either approach or avoidance motivations. While they may have had differing motivations, this group was united in their expression of empathy, which may constitute a way to reach them collectively with the same communication message.

Challenges of Understanding and Addressing Habituation and Food Conditioning

Insight from this inquiry suggests that identifying the nuances of human and wildlife behavior involved in the processes of habituation and food conditioning, and separating the two phenomena can be challenging in an applied setting. The majority of people I interviewed reported observing wildlife during close encounters, rather than deterring them, even in a campsite setting. This occurred even though most people reported seeing communication materials advising them to deter wildlife at campsites. This is of concern to managers because such behavior could lead to habituation of wildlife to campgrounds, which in turn could lead to food conditioning if a food reward is obtained by a habituated animal. Within the NPS context, habituation and food conditioning often are not distinguished from one another from a management perspective, and actions tend to focus on food conditioning because it has clear legal and policy guidance and is more likely to result in negative effects and impact human safety and wildlife conservation. Yet managers also expressed the belief that habituation is inevitable. This creates an exceptionally complex situation wherein managers are compelled to address habituation, attempting to identify the point at which the benefits of habituation (e.g. wildlife viewing opportunities, less stress to animals) are optimized while food conditioning is prevented.

Prior Experience Influences Human-Wildlife Interactions

Consistent with theories about decision-making and behavior, and with manager perspectives, interviewees reported that they relied heavily on their prior experience to inform future interactions with wildlife. This reliance on prior

experience in decision-making had both benefits and drawbacks, particularly with respect to what might be desirable in a NPS campground. Both emotional and behavioral aspects of prior experience are relevant and can influence people's response to wildlife, including their attention to or processing of communication messages.

A substantial proportion of the wildlife encounters reported by interviewees occurred outside of national parks, often in people's backyards or in state and local parks. Earlier phases of the inquiry indicated managers were concerned about the ways in which visitors may or may not apply information learned and behaviors from prior experience in other contexts to a national park setting. Campers in the study substantiated these ideas and concerns about generalization of knowledge or understanding of ramifications of human-wildlife interactions from one context to another. The interviewees often expressed that they viewed park wildlife as different from one park or context to another, and that they altered their expectations and behavioral response according to this notion. An example of this was the manner in which people who fed backyard wildlife did not conceptualize this as "wildlife feeding" because of the context.

Reports of prior experience with wildlife demonstrate a diverse set of encounters, from wildlife viewing to potentially dangerous close interactions. Most people in my study had experienced close encounters with wildlife and these interactions included a wide range of species and contexts. Most interactions occurred in state or local parks, and in individuals' backyards. Furthermore, by and large they reported species-specific reactions. People used these prior experiences as

informational inputs when making decisions about how to behave around wildlife. However, due to context specificity, this prior experience may not be relevant to future encounters with wildlife. For instance, an individual might have encountered a red fox in his or her yard that was not habituated, thus it fled to avoid humans. In a park, however, a fox might be habituated (or food conditioned), and therefore not run, thereby potentially leading to a negative encounter if the person's expectation is violated.

People Care about Wildlife

A high proportion of interviewees expressed enjoyment or excitement about wildlife, a desire to help wildlife, or a wish to be respectful of wildlife. In fact, many people engaged in behaviors such as wildlife feeding that would lead to problems, mistakenly believing that they were helping wildlife. Many people in the study noted that after they learned that a particular behavior they performed was bad for wildlife, they altered their practices.

It is encouraging to note that people generally care for wildlife and desire to engage in behaviors that are beneficial for wildlife. It seems, however, that people often mistakenly engage in problematic behaviors because they do not think what they have learned is applicable for a particular context or species, or because they misunderstand the specifics of recommendations.

Communication is Important to Management but Needs Refinement

Insight from NPS managers, the management document analysis, and the review of literature indicated that communication strategies are a preferred strategy for addressing human-wildlife interactions, but often this approach is neither effective, nor systematically evaluated. Almost all interviewees reported that they had seen wildlife-related communication materials and recalled specific messages. Of particular interest from a communication perspective are the different types of materials identified by interviewees. Emotion-based messages were reported to be more memorable and influential with respect to behaviors.

Findings from inquiry with NPS natural resource staff and interviewees suggest one significant issue associated with communication efforts is the lack of consistency of messaging regarding behaviors around wildlife. Many people expressed uncertainty about the applicability of communication materials between parks. Additionally, a substantial proportion of people learned about wildlife-related recommendations from state and local parks, or wildlife agencies. It appears, however, that people often receive mixed messages between different contexts in which they interact with wildlife and are unsure what recommendations are most relevant in these various situations. For instance, one park might have messages instructing visitors not to harass wildlife, while another suggests that if visitors encounter certain species they ought to make loud noises and wave their arms. Other people expressed that they deliberately did not attend to new messages because they had seen materials elsewhere and felt they knew all of the pertinent information.

Finally, many individuals explained that they made judgments about what types of information were relevant in a given park. A particularly interesting finding related to this issue was the number of people who used infrastructure cues (e.g., presence or absence of bear-proof dumpsters or food lockers) as information about the importance, or lack thereof, of wildlife issues such as food conditioning. This evidence reiterates the significance of recognizing where people gain their experience and information about wildlife and how it translates from one setting to another. These findings imply that not only is consistency across the NPS system important, but message agreement between NPS, state and local parks, and wildlife agencies would be useful.

Contribution to Theoretical Frameworks

Emotion Theory

In Chapter Two of this dissertation, I applied theories and frameworks from the risk and decision-making literature to understand human decisions related to human–wildlife interactions associated with habituation and food conditioning. I examined the influence of emotions and cognitions in these contexts through a review of cognitive and affective theories of decision-making. Based on this review, I purported that models that integrate emotion are most relevant for understanding decision making in human–wildlife interactions. I focused on three models [integrated model of behavioral prediction (Fishbein & Yzer, 2003), dual-process (Kahneman, 2003; Sloman, 1996), fuzzy trace (Reyna & Brainerd, 1995; Reyna & Farley, 2006)] that incorporate highly relevant emotional variables.

When considering the context of human-wildlife interactions, I assert that emotions are most relevant at two points in the decision-making process. Emotions from prior encounters likely serve as informational inputs and will be relied upon to plan behaviors for future interactions. Emotions experienced during an encounter may interfere with planned behaviors and lead individuals to react to wildlife based on intuition or instinct. The IMBP incorporates both prior experience and emotions (which presumably could also function as a part of prior experience) as background variables that contribute to the formation of intended behaviors. It also allows for the interruption of the performance of intended behaviors by "environmental constraints" which I argue could include emotional response to wildlife and/or other context specific cues associated with a wildlife encounter.

In situations where emotions may override planned behaviors, models that address the role of intuition [dual process as described in (Kahneman, 2003) and fuzzy trace (Reyna & Brainerd, 1995)] should be applied. Intuition in dual process is primarily system 1 (i.e., automatic, unconscious, based on affect, and an immediate impression of the stimulus), however intuition lies between perception and cognition and utilizes content elements of system 2 (i.e., reasoned, conscious processing) such as information from prior experience. This conceptualization of intuition is similar to fuzzy trace's gist-based processing (i.e., mental representations that capture the general meaning of information or experiences). These models and associated empirical research suggest that behavior is driven primarily by intuition, particularly in risky, emotionally charged, and uncertain situations (Haidt, 2001; Klein, 1998; Leiserowitz, 2006; Slovic, Finucane, Peters, & MacGregor, 2004; E. U. Weber &

Johnson, 2009), like those encountered in a human–wildlife interaction. Intuition allows individuals to make an immediate evaluation of a situation as good (leading to approach behaviors) or bad (leading to avoidance) (Kahneman, 2003). Thus these models account for "in the moment," emotion-driven decisions that lead people to behave in ways that they did not intend, while also incorporating the potential influence of prior experience.

Findings from both the manager and visitor inquires supported these ideas about the relevance and influence of emotions in human-wildlife interactions. Despite reporting behavioral intentions that modeled recommended behaviors around wildlife, a considerable proportion of interviewees reported that they did not behave as they had planned during previous encounters, but rather that their behavioral reaction was emotion–driven or instinctual. These substantiate my proposition that emotions experienced at the time of the encounter can override planned behaviors and lead people to respond based on intuition. An example of this may be the number of interviewees who had close encounters with moose and reported approaching these large animals based on feelings of excitement and enjoyment. Many of these individuals were aware of recommendations not to approach wildlife, and stated that they did not "intend" to do so. A number of these people then experienced some aggression from the moose during the encounter (e.g., charging, snorting), and some people reported fear associated with this. Interestingly, people with past moose encounters also were most likely to say that they would be more careful during future encounters due to the outcome of those interactions. This supports the idea that

emotions not only alter behaviors during an encounter, but also become part of one's experience and have the potential to alter intended future behaviors.

Conservation Recreation

In Chapter 5 I illustrate a framework termed *conservation recreation* that describes nature-based recreation activities that have a positive conservation outcome. I focus on the particular concept of *unintentional* conservation recreation that appears especially pertinent to human-wildlife interactions in parks. Individuals within this category have a primarily recreation-based agenda and do not have deliberate conservation intent. However, these people engage in recreation-focused activities that yield unintentional positive conservation outcomes. Individuals within this category may be aware of the potential effects of their activity, but it is not necessarily their purpose. Unintentional positive conservation outcomes may arise from behavior that a person actively engages in, or from behavior that a person inhibits himself or herself from doing. Within the framework, these specific behaviors are referred to as pro-conservation; the motivation for the behavior may indeed be pro-conservation although the primary activity is recreational. Such pro-conservation behaviors can lead to positive conservation outcomes on multiple levels including: individual level outcomes for recreationists' health and well-being; community impacts as the behavior of one camper could affect the experience of future campers by influencing wildlife behavior; and impacts to wildlife health and behavior.

Within the conservation-recreation framework, people's behaviors that prevent negative impacts to wildlife as a consequence of recreation are reframed as actions

that promote positive conservation outcomes. In my study, campers reported engaging in a variety of actions that minimize problems with wildlife such as food storage, trash disposal, leaving an area where wildlife are present in close proximity, and actively discouraging wildlife from campsites and other human-dominated spaces. Interviewees also described inhibiting other actions such as feeding or approaching wildlife, which can lead to food conditioning or habituation. Many interviewees stated that even when they desired to feed wildlife, they refrained from doing so. Collectively, these actions constitute pro-conservation behaviors, or behaviors that lead to positive outcomes for wildlife. These pro-conservation behaviors are achieved either through engagement in, or inhibition of particular actions.

The conservation recreation framework also helps to illustrate emotion-behavior connections relevant to human-wildlife interactions. This connection can be understood through approach and avoidance motivations. Interviewees described myriad motivations for their pro-conservation behaviors (e.g., not feeding or approaching animals). The motivations identified can be categorized generally as either approach (i.e., leading to a positive affective state), or avoidance (i.e., avoiding a negative affective state [Fredrickson, 2001]). Approach motivations included the desire: to preserve the "wild" or "natural" character of the animals and/or the park experience; and to adhere to recommendations provided by communication materials and wildlife professionals. Descriptions of avoidance motivations were dominated by: previous experience that lead to problems with wildlife; a desire to prevent nuisance issues; and concerns for safety, particularly that of children. The utility of the conservation recreation framework comes from considering actions people would

perform while recreating, and perhaps for non-wildlife related motivations, as pro-conservation behaviors.

The conservation recreation framework provides a unique contribution to our understanding of how to manage nature-based recreation to promote sustainable recreation that positively impacts natural resources. The framework offers a way to incorporate emotion-behavior connections into our understanding of human behavior around wildlife. It also acknowledges people's expressed desire to help wildlife or to engage in the "correct" behaviors even when their activity purpose is not conservation oriented.

Reframing people's behaviors that prevent negative impacts to wildlife as actions that promote positive conservation outcomes may be a way to increase compliance with management recommendations. The conservation recreation framework provides a mechanism to accomplish this and has promising implications for communication approaches. For instance, managers could focus on using communication to encourage and refine existing pro-conservation behaviors rather than striving to completely alter problematic visitor behaviors.

Implications for Policy and Practice

Continuum of Tolerance

A concept emerged in early phases of the inquiry (e.g., workshops, manager survey) that suggested habituation and food conditioning are behaviors along a continuum of tolerance between people and wildlife. Wildlife that become tolerant of people through repeated non-consequential encounters may then become habituated,

and if food is introduced into these encounters, food conditioned. Work with park visitors provided evidence of humans' role in the wildlife habituation process and confirmed notions of human habituation to wildlife. People described feeling more comfortable with, and more likely to observe, certain species after repeated encounters with no significant negative impacts. They also report being less vigilant or careful with food if they did not experience problems in past experience with a species or context.

Survey responses and manager input provided convergent evidence that food conditioning typically produces negative impacts (e.g., sub-optimal wildlife diet or habitat, potential human injury or disease risk from an encounter), whereas habituation may lead either to positive (e.g., increased viewing opportunities, less physiological stress to animals) or negative impacts (e.g., shifts in habitat use, risk of injury to people or wildlife from close encounters). Many survey respondents suggested that habituation is inevitable. If this is true, rather than focusing efforts on trying to prevent habituation, parks could instead consider ways to foster a level of habituation on the continuum that produces positive impacts and minimizes negative impacts, provided this is practically feasible.

Managers recognized the cost-benefit tradeoff between the increased wildlife viewing opportunities associated with habituation and the potential for food conditioned animals or other problems that may increase risks to wildlife or visitors. This type of tradeoff is commonly recognized between what has been described as potentially contradictory parts of the NPS mission: visitor enjoyment without impairment of natural or cultural resources. Results suggest that the situation leaves

many managers in a "no action is a good action" dilemma and leads them to take a passive approach to managing habituation. This is compounded by the fact that often managers do not have the science to establish benchmarks from which they can measure the situation or evaluate their actions.

Those parks with programs in place to manage problem animals, but with resource constraints (i.e., staff, funding), may be less likely to place emphasis on something with ambiguous effects such as those associated with habituation. Despite this potential hurdle, my research demonstrates that shifting management of human-wildlife interactions from a reactive, conflict-oriented perspective to a more proactive one is a stated priority for parks. Yet, the tendency for parks to attend to wildlife behavior only after it becomes "problematic" (i.e., until an animal demonstrates food conditioned behavior) makes it very difficult to apply management actions that will effectively "unlearn" the problem behavior. In addition to resource constraints, a contributing factor to managers' apathy related to addressing habituation, is the potential suite of benefits associated with it, which managers often want to preserve. To shift to a consistently proactive approach, managers will need to identify a priori the areas in which habituated but not food conditioned behavior might be tolerated, and for which species. Hazing techniques, or other strategies may need to be applied *before* animals demonstrate "bad behavior" (i.e., when they are simply exploring a campground or picnic area for the first time), to ensure that they do not accidentally receive food rewards for their exploratory behavior. This approach would take considerable pre-planning, attention from staff, and allocation of scarce resources.

This exploration of human-wildlife habituation has implications beyond the management of parks and protected areas. If most habituated wildlife eventually become food conditioned, or if wildlife managers are unable to practically distinguish between the two behaviors, then habituation may indeed be a negative or downward-spiraling process that increases the risks to all involved, no matter the context. However, by helping managers identify the difference between the two behaviors, benefits of habituation may become the focus of management of human-wildlife interactions in a variety of environments, from remote parks to urban backyards. Such information may improve the capacity of federal and state land management agencies, communities, and other stakeholders to develop shared communication messages, policies, and management strategies to address human-wildlife habituation and more broadly, to promote coexistence of humans and wildlife. Examples of the potential benefits of habituation can be seen in wildlife-based tourism, where populations have been protected because of opportunities to view wildlife closely (Weber & Vedder, 2001). Furthermore, people who enjoy wildlife and are able to seek encounters may increase their appreciation of wildlife and therefore support conservation initiatives. (Kretser. Curtis, Francis, Pendall, & Knuth, 2009).

If researchers and managers can work toward identifying and achieving a sustainable level of human-wildlife habituation that prevents negative outcomes, and fosters positive encounters, an opportunity exists for human-wildlife interaction to help further conservation goals.

Contract with Wildlife

As discussed in Chapter 4, the data revealed that many people believed in the existence of an agreement, or contract, between people and wildlife. The terms of this contract are that if a person behaves in a "respectful" way during an encounter with wildlife, then the animal will not respond in a way that leads to negative impacts. People in the inquiry made it clear that they care about and have respect for wildlife. They also indicated that these feelings significantly influenced their decision-making and behavior related to wildlife. This meant that people were willing to approach wildlife but explained that they kept a "respectful distance", or did not approach "too closely." The precise definitions of "respectful distance" and "too close" ranged widely among interviewees.

A perplexing aspect of the "contract" was that many people believed that the imagined contract would influence wildlife behavior (as though wildlife might know that people meant no harm). Unfortunately, this concept hinges on two erroneous assumptions. The first is an anthropomorphic assumption about the cognitions and capacity for reasoning of wildlife vis-à-vis human behaviors and intentions. The second is an assumption regarding behavioral homogeneity and predictability across individuals of a species or across contexts.

A belief in this contract could lead people to engage in behaviors, such as approaching wildlife, or allowing wildlife to approach a campsite, that facilitate negative encounters. Such circumstances could result in injury to people or wildlife; and close encounters could facilitate food conditioning. If an animal responds to one of these encounters with aggression, or in a way that is contrary to the individual's

expectations, a person might feel betrayed by the animal's violation of the agreement. In response, the person may have a negative emotional reaction or may not perform intended behaviors. In a close encounter, this could lead to a risky and problematic situation. It also may erode empathy or positive emotions a person may have about wildlife. Data from the visitor interviews supported all of these possibilities.

Given what this overall inquiry suggests about emotion-behavior relationships with respect to wildlife encounters, a belief in a contract will be very difficult to address from a management standpoint. The contract is an inherently emotion-linked conceptualization with associated behavioral responses. A possible solution would be to encourage visitors to develop "contracts" that are in line with both wildlife and management interests through engaging the desire of visitors to assist wildlife. A number of individuals reported learning from negative experiences (e.g., "I approached too closely," "we were in their space") and expressed an intention to change their behavior during future encounters. Emotional appeals with messages to correct errant behaviors may engage the feelings of caring, respect, or empathy that most of these visitors expressed.

Communication

The inquiry revealed that most people believe they are aware of recommended behaviors related to wildlife and many report that they follow recommendations. Despite this, direct observation of campsites revealed significant noncompliance with recommended behaviors. There are several factors that contribute to this result. Individuals reported that their potential engagement in prohibited behaviors such as

feeding or approaching wildlife would depend on the species and context of an encounter. People often deviated from what they knew were recommended behaviors because recommendations were not consistent with their previous wildlife experience, which they relied upon as an informational input into their decision-making. People frequently reported that they did not believe recommendations were relevant for a particular context, and thus they used other cues, such as what they knew about a specific park, to inform behavioral decision-making. Finally, even when an individual intended to follow recommended behaviors, it was possible that an emotional response to an encounter could disrupt the performance of that behavior. Managers confirmed a preference for communication strategies as a method of addressing human-wildlife interactions, but also expressed concern over lack of effectiveness. The results from this inquiry suggest two promising paths that might improve communication for management of human-wildlife interactions: emotion-based messaging and a focus on unintentional conservation recreationists.

Empathy-based approaches

Evidence from our study indicates that emotion-based communication has the potential to be more influential on behavior than other types of communication, such as information-based. The potential effectiveness of such emotion-linked messaging has theoretical support from earlier work in this inquiry, and empirical confirmation from the interview phase of study. A high proportion of interviewees described the saliency of emotion-based messaging such as the "fed is dead" phrase, and many noted that such messages elicited in them feelings of empathy for wildlife and

motivated their behavior. Despite the abundance of wildlife-related communications presented to campers in the study at ANP, a sign that likely induced an emotional response was the only material mentioned by a substantial proportion of interviewees. The majority of people expressed concern or respect for wildlife, including those that cited other reasons or motivations (e.g., safety or nuisance concerns) for their intended or performed behaviors. Many people expressed a desire to help wildlife, and intentions to inhibit behaviors that harm wildlife. Taken together, these findings indicate that a considerable proportion of the population of interest experiences empathy for wildlife in some fashion. This suggests fertile ground for messaging that utilizes emotional components to influence visitors' behavioral decision-making. Perhaps this empathetic connection to wildlife could be tapped to increase compliance with recommendations and attention to details about suggested behaviors. This could create behavioral shifts or refinements, possibly easier to achieve than complete alterations of existing behavioral patterns.

Conservation recreation applications

It appears that the conservation recreation framework holds promise for avenues of communication that focus on encouraging and refining existing pro-conservation behaviors by engaging individuals' emotions. Those recreationists who experience empathy for wildlife may be inspired by messages that inform them that their practices have the potential to contribute to positive conservation outcomes. Those who have non-wildlife-related emotions and motivations still may be

encouraged to learn that while a behavior they perform or inhibit might achieve their intended purpose, they also are contributing to positive wildlife impacts.

The unintentional conservation recreation framework can be helpful as the context for campers' actions is not necessarily one of intentional conservation impacts, but rather of recreation in which their actions will have a conservation impact regardless. This concept reframes the issue, and suddenly *not* doing something (e.g., not feeding wildlife) becomes a way that people can help wildlife simply while visiting the park and engaging in their planned activities. These behaviors may be ones that many individuals already practice, but perhaps not with the diligence necessary to prevent problems with wildlife consistently. If a primary motivation for inhibiting or engaging in such behaviors is respect for wildlife, or preventing harm to wildlife, reframing these as pro-conservation behaviors may provide a new avenue for communication materials directed at behavior change. Instead of messages focused on "don't do X," communications that suggest to visitors that they can help wildlife, and participate in wildlife conservation efforts, all by *not* doing something, or by continuing something they already intend to do, may have promise. It is worth considering whether this framework could have broader implications as well. If people learn to recognize that by *not* engaging in a behavior, or by doing something they already practice, they can have positive wildlife impacts, this orientation could transfer to other conservation issues as well.

Limiting Noncompliance

Wildlife management within the national park system attempts to address a tension between balancing visitor enjoyment, visitor safety, and wildlife health and well-being. Management tends to address most intensely those circumstances where the conservation need is great (e.g., endangered or sensitive species), or where risk to visitors is significant. This is in no small part because even if a communication effort is highly effective at changing most people's behavior, it may only take a few instances of noncompliance to foster problems with or for wildlife. For instance, an animal may rapidly become food conditioned, therefore requiring major wildlife-related intervention. As discussed previously, however, wildlife managers (particularly in a park setting) often are encouraged to use communication and education activities to change human behavior rather than relying on regulations and enforcement. This is believed to be a less "heavy handed" approach that allows for greater enjoyment of wildlife and therefore presumably more support for conservation and for the managing agency (Wieczorek Hudenko & Connery, 2010). The suggestions described above for improving the success of communication efforts will be most applicable in situations where risk to wildlife and people is minimal. Identifying the most effective means, whether communication or regulatory-based (or a combination), to address human behavior around wildlife will help wildlife managers to allocate resources to the most fruitful efforts.

Culture of Caring

Taken together, data from this inquiry suggest that a broad cultural shift related

to human-wildlife interactions in the national park setting could maximize the benefit to visitors, park managers, and wildlife alike. This shift could be expressed as a "culture of caring," and would encapsulate a number of concepts that appear to guide wildlife management and visitor behavior in national parks. Concepts central to this ideology would include: 1) intentionally anthropomorphizing wildlife with communication materials to build a connection with visitors, 2) maximizing empathy for wildlife, 3) providing recommendations that manage food conditioning and habituation at desired levels, and 4) reinforcing park visitors for unintentional pro-conservation activities. This new culture could promote enhanced empathy for wildlife in ways that engage both visitors and park staff instead of utilizing traditional and less effective communication strategies. New and effective communication techniques could harness the power of targeted social marketing and emotional appeals that are engaging to park visitors. For example, in 1944 the "Smokey the Bear" campaign was devised to increase awareness of fire safety hazards in park settings. This campaign was touted as highly successful at altering human behavior related to forest fires (now wildfires) because of emotional connection with Smokey (Paveglio, Carroll, Absher, & Norton, 2009). Similarly, a newly imagined "Rocky the Raccoon" who becomes ill when eating human food, or "Samantha the Squirrel" who carelessly stores her acorns in a visitor's cooler, could help to usher in a new culture of "caring conservation" that places wildlife and park management interests at the center of the visitor experience.

Future Research

Emotion, Prior Experience, and Expectations

Throughout this dissertation the role of emotion in human-wildlife interactions has been emphasized. Despite this emphasis, additional inquiry is needed on several fronts to better understand how emotions directly impact decision-making processes. People in the study suggested that they relied heavily on prior experience to make decisions about their behavior near wildlife. Do more emotionally significant experiences have greater weight in the decision-making process? Is this related to the type of emotion experienced? The type of emotion experienced appears to have differential effects on behavior (i.e., approach or avoidance), moderated further by context specificity, but greater understanding of these influences is needed and would have important implications for wildlife management and communication. For instance, work is needed to assess in which direction different emotions shift behavior (e.g., does fear reliably lead to avoidance and excitement to approach behaviors?). It also is important to understand how people reconcile prior experience with behavioral recommendations they learn from communication or education materials and what role contextual variation plays in how people utilize prior experience (i.e., determining that a prior experience is or is not relevant to current circumstances).

Most of the above questions focus on emotion that consciously influences decision-making. My dissertation revealed that unconscious emotional responses during an encounter also might have significant impacts on behavior. In fact, I asserted that unconscious emotional experiences are likely to override the influence of prior experience and intended behaviors. Given the exploratory nature of the study,

however, further inquiry is needed specifically to examine the way in which emotions experienced at the time of an encounter alter planned behaviors and how the input of prior experience may be moderated by emotions. The role of wildlife behavioral response also is relevant, in particular whether and how wildlife response that deviates from an individual's expectation influences emotions and subsequent human behavior. We also should explore whether intuition that draws on previous experience developed in one context will transfer to the other.

Habituation and Food Conditioning: The Continuum of Tolerance

Managers need information about the role that emotions, prior wildlife experience, and behaviors play in the development of habituation and food conditioning. Insight about the threshold where habituation becomes food conditioning could help managers separate the two processes and potentially allow for management activities that foster the possible benefits of habituation while preventing the negative effects of food conditioning. Points along the habituation continuum that yield positive and negative effects are likely to vary with context and species specificity. A sustainable threshold of habituation that is appropriate for one species may not be for another, or the threshold for the same species may vary seasonally or by location (resource availability). For instance, a bear may be more tolerant of people when ample food is available (e.g., during the salmon run). On the other hand, it could be more or less tolerant of humans when food is limited and it is forced to forage over a wider portion of its home range that might include areas of high human activity. Variability in an animal's tolerance of humans can also relate to reproductive behavior

of the animal (e.g., territoriality, aggression, protection of young, etc., which can vary by season and resource availability). Information about these types of circumstances may help managers and other park staff to address habituation and develop more targeted management actions.

Communication Efforts

It appears that emotion-based communication messages will be more influential than information-based approaches with respect to behavior change associated with human-wildlife interactions, but experimental work is required to examine this idea. With respect to emotion-based messaging, we need to identify emotions that are both salient and pervasive among anticipated audiences. My work suggests that emotion-based messages, particularly those relying on empathy, could be crafted to appeal to both approach (i.e., leading to positive affect) and avoidance (i.e., avoiding negative affect) motivations, thereby resonating with a broad swath of park visitors.

An interesting question is whether emotion-based messages could be effective even in circumstances where situational emotions might otherwise dominate decision-making by overriding planned behaviors and reliance on knowledge of recommended behaviors. The use of imagery is a potential avenue for effective emotion-based communication that could prove influential in such circumstances. Aspects of message structure (i.e., how a message is presented) and content (i.e., what is conveyed in the message) determine the extent of cognitive load required to process a message and how the receiver allocates automatic processing resources to do so (Lang, 2000).

When people have low ability to process, a circumstance that is likely to arise during a human-wildlife interactions, they are more likely to process the "easiest" elements of a message such as visual cues (Lang, 1995). The manner in which a receiver responds to a message is highly relevant to the associated thoughts and memories that simultaneously are activated (Byrne & Hart, 2009). An individual's prior experience will affect what thoughts or memories are most accessible and therefore may be activated by exposure to the message (Bernstein, Penner, Clarke-Stewart, & Roy, 2006). Emotion-based imagery could help to ensure that recommendations are processed by visitors on conscious and unconscious levels. While an approach of this nature has theoretical and empirical support, its effectiveness in this context needs to be evaluated. Furthermore, specific images and messages need to be tested to ensure the communication materials do not cause boomerang effects (Hovland, Janis, & Kelly, 1953). Imagery might be helpful to elicit emotional responses and to increase reliance on recommendations, however, images will need to be carefully selected so as not to activate unintended constructs about the target species (e.g., x animal is cute) that might motivate people to want to draw the animals close, resulting in the opposite behavior that the message intends.

Many individuals in the study believed they engaged in wildlife-friendly behaviors but often their actions fell short of precise recommendations. This situation has implications for messaging related to food storage, camping practices, and wildlife viewing. We need to understand the relevant factors in circumstances where people believe that they are engaging in the correct behavior when in fact they are not. Is it due to a misunderstanding of messages, lack of consistency in messages, context

specificity, reliance on prior experience, or emotional mediation?

This study indicated that many visitors gain experience with wildlife and exposure to wildlife-related communication near their homes or in state and local parks. It would be useful to conduct an examination of how communication messages differ between various contexts and how people utilize the information across contexts. It may be the case that more coordination and collaboration between various parks and wildlife agencies with respect to messages would be useful.

Ideas related to the conservation recreation framework, pro-conservation behaviors, and communication approaches need more robust examination. We should explore whether communication messages could lead recreationists to believe that their existing or slightly modified behaviors are significant and rewarding. If this could be achieved, would this lead to increased compliance in a variety of other contexts?

As discussed previously, NPS managers believe that education and communication efforts designed to prevent food conditioning and maximize the potential benefits of habituation is a preferred strategy for the NPS, and that such an approach could create the potential for habituation to help foster a more general "conservation ethic" among park visitors. However, the effectiveness of these efforts is rarely systematically evaluated. Testing the success of visitor-directed programs in effecting human behavior change (e.g., fostering proper food storage, preventing intentional feeding), and making results of these experiments available to other managers, will be essential. Such information would allow the national park system to

create common objectives, protocols, and communication messages regarding human-wildlife interactions that are more effective for visitors and staff.

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APPENDIX A

Survey of NPS Managers: Human-Wildlife Habituation in Parks

The Biological Resource Management Division of the National Park Service (NPS) and the Human Dimensions Research Unit at Cornell University are studying human dimensions of human-wildlife habituation in and around NPS units. A national steering committee has been formed to provide guidance for this study. Bill Stiver from Great Smoky Mountains National Park is the committee representative from the Southeast Region. The first step for Bill and the other steering committee members is to identify the extent and general nature of human-wildlife habituation issues.

Many park service units have, to varying degrees, considered or pursued actions to address impacts associated with habituation. We are requesting your help in determining how human- wildlife habituation affects your park, if at all. (Note: even if you have not had and do not anticipate attention to human-wildlife habituation, we'd like your input). Your responses to 8 key questions will help us gain an initial understanding of NPS management perspectives on human-wildlife habituation issues. This survey is being distributed natural resource managers in parks throughout the U.S.

Please fill out the survey electronically on Sharepoint via the following link. You do not need to complete all questions in one session, instructions and an overview are provided:

http://nrpcsharepoint/brmd/humdim/Lists/Wildlife%20Habituation%20Survey/overview.aspx

As you respond to the questions, please distinguish between habituation and food conditioning as follows: wildlife habituation is the reduction of an animal's response to a repeated, inconsequential stimulus (usually resulting in loss of fear response to people). Food conditioning is when an animal learns to associate food with the presence of people, due to positive experiences of acquiring food easily.

Please respond by August 8, 2008. These are the key questions presented in the survey:

1. To what extent does habituation occur at your park? Please include species, description of behavior, and evidence to support your response (e.g., studies, professional judgment)?

2. What is being done in your park that fosters or prevents habituation?

3. How important is managing habituation at your park to you, resource managers, other park staff, or the public? Why?

4. What effects from habituation are of interest or concern regarding:

    a. Wildlife?

    b. People (NPS managers, park visitors, park neighbors)?

5. Which human behaviors leading to habituation are most common in your park (e.g., approaching wildlife for different reasons, other recreational activities)?

    a. Which of the above human behaviors are most difficult to manage?

    b. Do you feel any of these are unique to your park?

6. How has habituation changed over time (e.g., change in causes/effects, intensity, frequency, species)?

7. How does habituation reflect people's attitudes about wildlife? Please explain.

8. What kind of support would best help your park address habituation (e.g., technical support for specific problems, general training on habituation, assistance in interpretation/communication)?

Results will be synthesized and made available on the Sharepoint site. They also will provide the context for a workshop on human-wildlife habituation in protected areas at the upcoming Human Dimensions of Fish and Wildlife Management conference in September/October http://welcome.warnercnr.colostate.edu/nrrt/hdfw/ Workshop outcomes also will be made available via Sharepoint.

Thank you for your input!

APPENDIX B

Interview guide for visitor interviews in Blackwoods Campground August, 2011

Thank you for taking the time to speak with me today, I appreciate your willingness to participate in our study. I would like to use this digital voice recorder to record our interview, but if you prefer, I can take notes instead. I would also like to reiterate that your participation in this interview is voluntary and you may chose to end the interview at any point.

Questions to explore prior experience (Research Objective 1)

1. Have you ever had a close encounter with wildlife?
    a) Species and context?
    b) When this encounter occurred, were you trying to have a wildlife experience or was this a surprise?
    c) How did you respond to the encounter?
    d) Was this how you planned to behave?
    e) What were other people in the area doing?
    f) How did this encounter make you feel?
    g) Could you rate this feeling on a scale of 1-10?
    h) How do you think this experience has affected or will affect your future interactions with wildlife?

2. Would you tell me about other ways in which you are familiar with or learn about wildlife? (Researcher note: let interviewee respond, can prompt with the following options if needed.)
    - Wildlife viewing (e.g., backyard, travel).
    - Watch wildlife-related television programming.
    - Read about wildlife in print or online.
    - Talk about wildlife with friends and family.
    - Visit zoos or parks.

3. Do you feed wildlife? (Researcher note: elicit what species and context; how often)
    a) What motivates you to do this? (Researcher note: explore the emotions associated with wildlife feeding through this question.)

Questions to explore expectations (Research Objective 2)

4. When you came to the park what did you expect your interactions with wildlife to be like? (Researcher note: encourage description of species, context, and frequency.)

a) How did you feel about potential interactions with wildlife? (Researcher note: encourage interviewee to describe both type of emotions as well as strength.)
b) Can you explain why you expected the interaction to be like this?
c) Has this expectation changed since your arrival at the park? If yes, why?

5. Did you have any activities planned to help you have an interaction with wildlife?
   a) Will you feed wildlife? Approach wildlife?

6. How do you intend to behave if/when you encounter wildlife? (Researcher note: if encounter occurred – make sure it was covered under prior experience.)

7. How do you think park wildlife management activities might influence your interactions with wildlife? (Researcher note: let interviewees respond to open-ended question to assess general impression of "wildlife management." Follow up with examples including: interpretive programs, regulation, fencing, signage.)

Raccoon-specific questions

8. (If raccoons weren't mentioned in prior experience) Have you ever had a close encounter with a raccoon? (*Research Objective 1*)

9. What actions are you taking to prevent or encourage raccoons in your campsite? (*Research Objective 3*)

10. How do you expect to react if a raccoon came close to your campsite? (*Research Objectives 2 & 3*)

11. How often do you remove trash from your campsite?
    a) At what time of day do you typically do this?

Communication questions (Research Objective 4)

12. Have you ever seen any materials from a park, your state wildlife agency, or from this park about what to do around wildlife? (Researcher note: what types of info?)
    a) Did you know about the recommended behaviors ahead of time?
    b) Did you perform the behavior before/after seeing the material?

13. What types of information did you seek when planning your trip to Acadia?
    a) Where did you get this information?

APPENDIX C

Management priorities and information needs related to human-wildlife habituation in national parks. Data based on inquiry conducted in collaboration with National Park Service Biological Resource Management Division.

General management priorities	• More specific approach and understanding to distinguish between habituation and food conditioning to aid management decision-making and development of strategies. • Shift management of human-wildlife interactions in parks from a reactive, conflict-oriented perspective to a more proactive one. • Coordination and collaboration among park divisions and other agencies and organizations (e.g., communities near parks, state wildlife agencies) with respect to the management of human-wildlife interactions. • Consistency with the NPS's policy, regulations, and approach to managing habituation. • Education for staff regarding habituation issues. • Improved internal support for addressing habituation.
Management priorities related to wildlife	• Maintaining wildlife conservation goals. • Addressing human wildlife interactions that may harm wildlife. • Human-wildlife interactions that lead to food conditioning.
Management priorities related to visitors	• Human-wildlife interactions that cause negative health or safety impacts for visitors. • Addressing human behaviors that cause food conditioning. • Providing opportunities for wildlife viewing that do not lead to negative human-wildlife interactions. • Management options that focus on communication rather than regulation and enforcement.
General information needs	• Integrated human dimensions and biological habituation research agendas. • Identification of positive and negative impacts of habituation for wildlife and visitors. • Synthesis and communication of existing studies related to human-wildlife interactions, food conditioning, and habituation in parks. • Comparison and critical evaluation of findings from existing studies with current recommendations and strategies utilized in parks.
Information needs related to wildlife	• Document the relative effectiveness of commonly-used actions to manage food conditioning and habituation such as aversive conditioning. • Identify a level of habituation that will not lead to food conditioning and may maximize potential benefits of habituation. • Understand of points along a continuum of wildlife behavior that include habituation and food conditioning.

Information needs related to visitors	• Understand the role that human attitudes and behaviors play in the development of habituation. • Identify effective means of modifying human behavior to reduce food conditioning of wildlife in parks. • Systematic evaluation of communication and education interventions designed to alter visitor behavior around wildlife that influences the development of habituation or food conditioning. • Learn about successful strategies currently being used across the service (e.g., communication and education, restrictions to visitor activities). • Information regarding design and technique for visitor-directed management efforts that address habituation and food conditioning.