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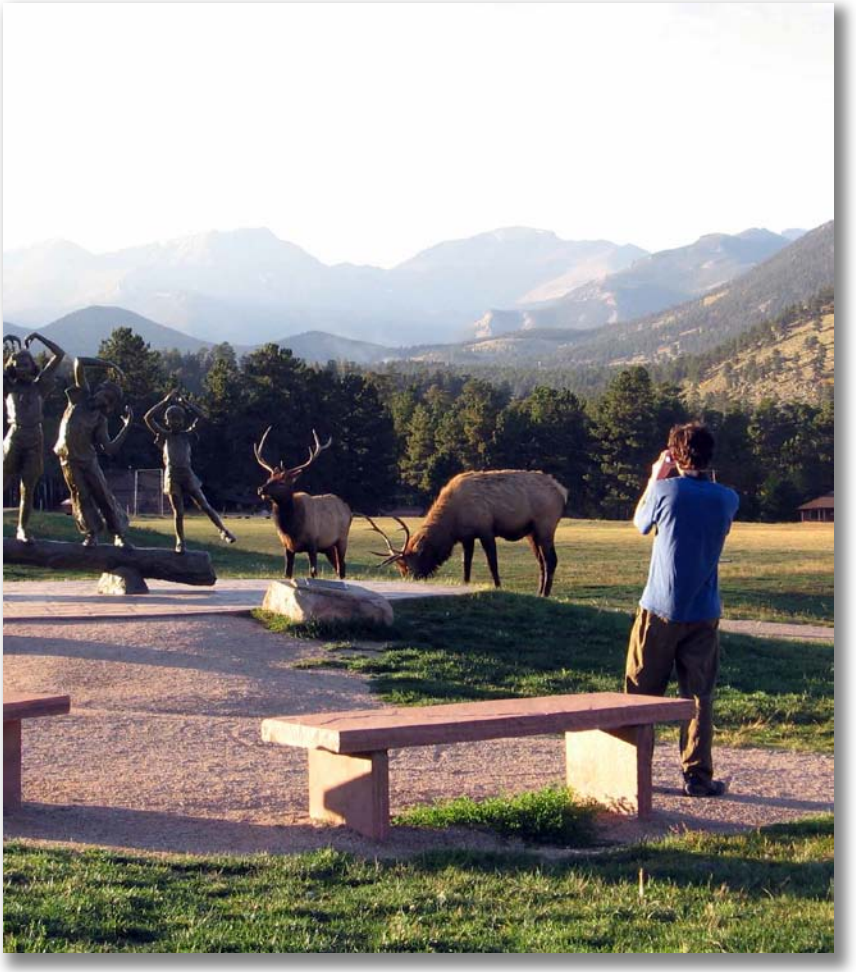
Natural Resource Stewardship and Science

Perspectives on Human Dimensions of Wildlife Habituation

Report from a workshop conducted at the Human Dimensions of Fish and Wildlife Management Conference, Estes Park, CO, October 1, 2008

Natural Resource Report NPS/BRMD/NRR—2013/627



ON THE COVER
Photographer approaches elk near Rocky Mountain National Park
Photograph by: H. Wieczorek Hudenko

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Abstract

In 2008 the Biological Resource Management Division of the National Park Service (NPS) launched a multi-faceted inquiry to inform management of human-wildlife habituation across the National Park system. The NPS created a Task Agreement with Cornell University to complete several parts of the inquiry. To begin the inquiry, a habituation-themed workshop was conducted with wildlife and human dimensions researchers and practitioners at a professional conference. The goal of the workshop was to advance understanding of habituation and identify and prioritize the most urgent research needs related to human-wildlife habituation in protected areas.

The workshop included a series of presentations about habituation and the role it plays in human-wildlife interactions in national parks. Workshop participants broke into small groups for facilitated discussions. Groups prioritized the aspects of human-wildlife habituation they felt were most urgent and needed attention to improve management of human-wildlife interactions in protected areas. Session participants then reconvened to summarize and synthesize input from the break-out groups and to discuss potential implications for policy, education/training, and management interventions.

Wildlife managers and human dimensions researchers and practitioners emphasized their desire to better understand human-wildlife habituation and the positive and negative consequences for park resources and visitor experiences. Workshop participants highlighted the need for integrated human dimensions and biological habituation research agendas. There was consensus among participants that standard protocol for addressing habituation issues is lacking across the NPS. Workshop participants indicated that improved understanding of human expectations was critical to managing habituation issues in protected areas.

Acknowledgments

We sincerely thank all of the researchers and wildlife management professionals who participated in the workshop. We are grateful to the National Park Service Habituation Steering Committee members (S. Bates, B. Connery, D. Foster, R. Gubler, B. Merkle, C. Ogden, P. Owen, J. Schaberl, D. Schirokauer, B. Stiver, and F. Turina) for their assistance developing the workshop. We appreciate the presentation delivered by B. Connery and J. Schaberl. K. Leong, the technical advisor for the project, provided important guidance and support throughout the workshop planning and implementation.

This project was completed as part of Task Agreement J2340100030 of the Great Lakes-Northern Forest Cooperative Ecosystem Studies Unit under Cooperative Agreement H6000082000 between the National Park Service and the University of Minnesota.

Our research was conducted with approval from Cornell University's Institutional Review Board (Protocol ID 0910000976). Daniel J. Decker, Professor and Director, Human Dimensions Research Unit, was the Principal Investigator of this project.

Introduction

Wildlife habituation from the human perspective

Interactions between humans and wildlife are growing in the United States (U.S.) as: (a) exurban development and suburban expansion increasingly place humans in wildlife habitat and (b) some populations of wildlife expand into or adapt to living in human-dominated environments. Human-wildlife interactions occur in a variety of contexts, ranging from backyards to parks and protected areas. While many interactions may have benefits for both wildlife and humans, those that lead to conflict are a pressing issue for wildlife managers at the local, state, and federal level. A key factor believed to lead to human-wildlife conflict is habituation. Human activity plays a central role in habituation of wildlife, yet little is known about the way in which human beliefs, attitudes, and behaviors may influence this phenomenon. Furthermore, the development of human tolerance for wildlife, and the potential impact of such tolerance on wildlife habituation, has not been explored. Researchers and managers nevertheless have identified the possible relationship between habituation or tolerance in both humans and wildlife as an important component of the growing incidence of problematic human-wildlife interactions in developed landscapes.

Symposia on wildlife habituation were held at the 2005 annual meeting of The Wildlife Society and at the 2007 George Wright Society meeting. Feedback from conference attendees overwhelmingly indicated a need for greater attention to this topic, *especially to the human dimensions.* The conference sessions and a preliminary review of literature indicate that most attention to habituation has been directed at the causes and consequences for wildlife; the response of humans to habituated wildlife has largely been assumed or neglected by previous studies. In these symposia, National Park Service (NPS) managers specifically identified the need to attend to human-wildlife habituation issues in and around protected areas.

A collaborative project between the National Park Service and Cornell University

In recent decades, the changing dynamics between people and wildlife have taken on greater management significance. According to the 2000 U.S. Census, approximately 80% 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. Encounters may range from wildlife viewing to attempts to get close to wildlife, thereby contributing to habituation. Little is known about how people will respond to habituated wildlife in these contexts and how encounters between people and wildlife in one setting may translate to another. This diversity of potential human-wildlife experiences leads to equally diverse expectations for wildlife encounters in parks and protected areas. Such expectations present challenges to management and will require novel approaches to enforcement and interpretation.

Given the pressing need for knowledge on the subject, in 2008 the Biological Resource Management Division (BRMD) of the NPS launched an inquiry into human-wildlife habituation. This investigation explores the issue of habituation from three perspectives: (1) wildlife biology and ecology; (2) human dimensions; and (3) policy and legal considerations. A steering committee of NPS natural resource specialists was formed in spring of 2008 to guide the

exploration of this topic. The steering committee advised on projects related to these three aspects of the NPS habituation investigation. To begin the research agenda, a Task Agreement between the NPS and Cornell University was established to explore the human dimensions component of human-wildlife habituation (Figure 1).

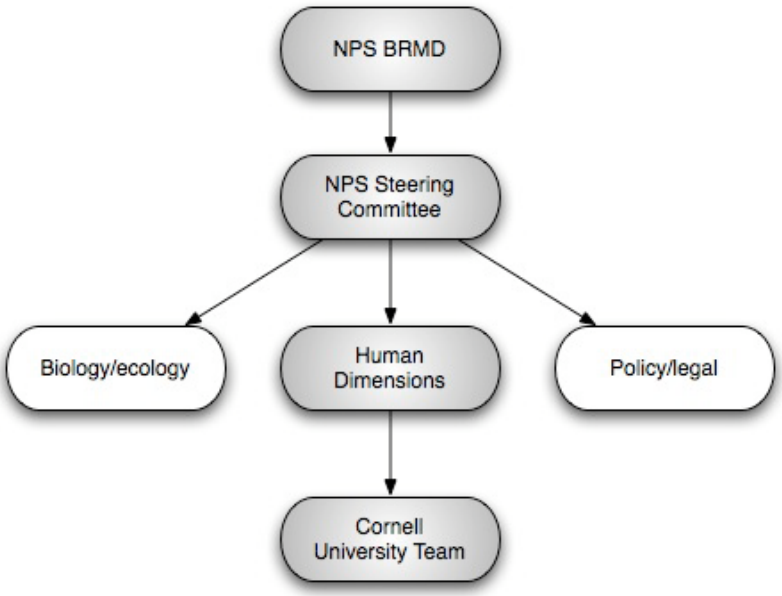

Figure 1. Organization of the NPS BRMD investigation of habituation. Shaded areas represent those related to the joint NPS and Cornell University human dimensions inquiry.

The human dimensions inquiry seeks to improve scientific understanding of the human cognitive processes and resulting behaviors that contribute to human wildlife habituation. The knowledge gained during this project will provide benefit to parks and communities by exploring the causes and effects of human-wildlife habituation. Such information will improve the capacity of federal and state 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 promote coexistence of humans and wildlife. Objectives of the human dimensions investigation were to:

1. 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. 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. Synthesize existing literature related to human-wildlife habituation in and around protected areas and identify knowledge gaps.

4. Develop a recommended strategy for initiatives to aid managers addressing stakeholder beliefs, attitudes, and behavior that contribute to human-wildlife habituation.

5. Share these findings with other federal and state wildlife management agencies, universities, private land managers, conservation groups, and local municipalities.

To achieve these objectives, the Cornell University researchers and the NPS Habituation Steering Committee research team completed the following activities (and products).

1. A workshop with NPS steering committee and human dimensions of wildlife researchers and practitioners to advance understanding of habituation and identify and prioritize the most urgent *research* needs related to human-wildlife habituation in and around protected areas.

2. A workshop with NPS steering committee and park and protected area researchers, managers, and staff to advance understanding of habituation and identify and prioritize the most urgent *management* needs related to human-wildlife habituation in and around protected areas.

3. A situation analysis and preliminary needs assessment based on: the co-tolerance workshops, site visits to parks, web- or telephone-based inquiry with NPS staff, and coordination with NPS steering committee.

4. A comprehensive, literature-based background report that: examines key aspects of the human dimensions of human-wildlife habituation identified in a preliminary needs assessment (likely including topics such as: tolerance, acceptance, and risk); identifies knowledge gaps; and provides recommendations for management actions and public outreach to disseminate information.

5. A system for classifying parks and park contexts based on human wildlife interaction characteristics (identify possible management approaches to managing interactions).

6. A catalog of parks and issues using the classification system.

7. Recommendations for prioritization of further inquiry based on synthesis of catalog.

Description of Habituation Workshop

The first of the two habituation workshops took place on October 1st, 2008 at the Pathways to Success: Integrating Human Dimensions into Fisheries and Wildlife Management Conference in Estes Park, CO. The purpose of the workshop was to advance understanding of the human dimensions that contribute to human-wildlife habituation in and around protected areas, and to identify and prioritize human dimensions research needs. Workshop participants included human dimensions researchers and practitioners, the NPS habituation steering committee members, resource managers, biologists/ecologists, program managers, educators, and environmental consultants. During the workshop participants received background information about: the NPS management and policy context; current theory and research related to human-wildlife habituation; and summaries of management concerns related to habituation from parks across the country. A series of brief presentations by the research team and a steering committee subgroup covered these topics. Participants then broke into small groups for facilitated discussions. Individuals shared experiences and identified gaps in knowledge needed to address the human dimensions aspects of human-wildlife habituation. Small groups prioritized the aspects they felt were most urgent and needed attention to improve management of human-wildlife habituation in and around protected areas. Finally, the session participants reconvened to summarize and synthesize progress made in the break-out groups and to discuss potential implications for policy, education/training, and management interventions.

Summary of presentations

Background on NPS context

The human dimensions program manager with BRMD (Dr. Kirsten Leong) presented background information on the NPS context. 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. Managers recognized that this led to many human injuries each year from wildlife and by the 1970s many parks had initiated education programs and regulations to prevent feeding of wildlife. Discussion among researchers and managers in recent years has highlighted the need to distinguish between habituation and food conditioning. The common issue associated with either of these phenomena is a change in animal behavior due to interactions with humans.

The 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 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 USC § 1). The NPS system consists of 392 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 are often thought of as islands of habitat, distinct from their surroundings, and isolated from regular human activities. Nevertheless, communities at the entrances to many parks have seen 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 CFR 1 § 2.2 a 2). In addition, many parks have food storage regulations and guidelines for wildlife viewing. 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 policy guidance exists related to wildlife habituation.

This presentation concluded with several key observations relevant to the workshop: human-wildlife habituation occurs in many different contexts within the National Park System; while NPS has consistent laws and policies for wildlife feeding, there is no similar policy for wildlife habituation; a variety of definitions have been used for wildlife habituation; issues related to habituation in parks parallel those in other protected area and wildlife management contexts.

Background on habituation

Habituation is increasingly on the radar screen of wildlife managers for a variety of reasons. Suburban and exurban development and the expansion and overabundance of some wildlife species bring wildlife and humans in close proximity to one another, creating ample opportunity for habituation. Interest in wildlife viewing and concerns about wildlife-associated disease also have elevated managers' interest in habituation issues.

A textbook definition of habituation is the waning of a behavioral response following exposure to a repeated stimulus (Bernstein et al., 2006, p.195-196). Typically, habituation in wildlife refers to an animal's loss of fear response to the presence of humans after repeated, non-consequential encounters (e.g., Herrero et al., 2005; McNay, 2002). Issues complicating understanding about habituation include: animal habituation to non-neutral stimuli if the negative valance is not great; a blurred distinction between habituation and conditioning; lack of information about human's role in encouraging or discouraging habituation.

Habitation in wildlife can present both opportunities and challenges. It is primarily discussed with respect to physiological and behavioral responses of wildlife species to humans (e.g., Whittaker & Knight, 1998; Herrero et al., 2005) and documentation of incidents of human-wildlife conflict (e.g., McNay, 2002; Jope, 1985). Habituation in wildlife will occur if there is no significant negative consequence to the animal as a result of human presence. Causes for habituation in wildlife may be intentional (e.g., humans approaching wildlife) and unintentional (e.g., overlap between human activity and core wildlife habitat/resources). Habituation in wildlife may have myriad effects: providing access to resources such as water, shelter, protection from predators, breeding grounds; shifts in habitat use or species distributions; facilitate research endeavors, and efforts to conserve populations; stress to the animals, may lead to food conditioning and conflict with humans, and the potential need for more significant interventions by managers.

Knowledge of habituation in humans comes mostly from studies of infant cognition (e.g., Bornstein & Benasich, 1986; Phillips & Wellman, 2005) and psychophysiological experiments evaluating human reaction time and other sensory responses in controlled laboratory settings (e.g., Martin Soelch et al., 2006; Turner et al., 2005). In an applied wildlife setting, concepts related to habituation include familiarity, tolerance, acceptance and experience over time. A recent paper described the possibility of human habituation to wildlife, and the potential impact

on wildlife habituation (Zinn et al., 2008). Habituation in humans is likely influenced by: values, beliefs, attitudes, lack of perceived risk, acceptance capacity, and social norms. The key question is how these concepts might relate to human behavior near wildlife. Habituation in humans may: increase wildlife viewing opportunities, and chances to learn about wildlife and their habits; foster positive attitudes toward wildlife and conservation initiatives; change expectations about wildlife; lead to property damage, disease transmission, or even the risk of injury or death.

The distinction between food conditioning and habituation was emphasized. Thinking about these as distinct learning mechanisms may help tailor management strategies. In the wildlife literature, food conditioning is most often described as a process of classical conditioning (e.g., Mazur & Seher, 2008; Whittaker & Knight, 1998). This is a specific kind of learning through which animals learn to associate food with the presence of humans or human activity (e.g., Pavlov's experiments on classical conditioning [for a description see Bernstein et al., 2006]). The conditioned stimulus (i.e., food) is not present in a habituation scenario. A potential framework for considering the relation between "wild" life, tolerance, habituation, food conditioning, coexistence, and conflict was presented in a figure (Figure 2). Wildlife managers may consider a variety of issues related to habituation: should they focus on prevention, intervention, or encouragement; should actions target people or wildlife; what resources are required; how acceptable are various strategies?

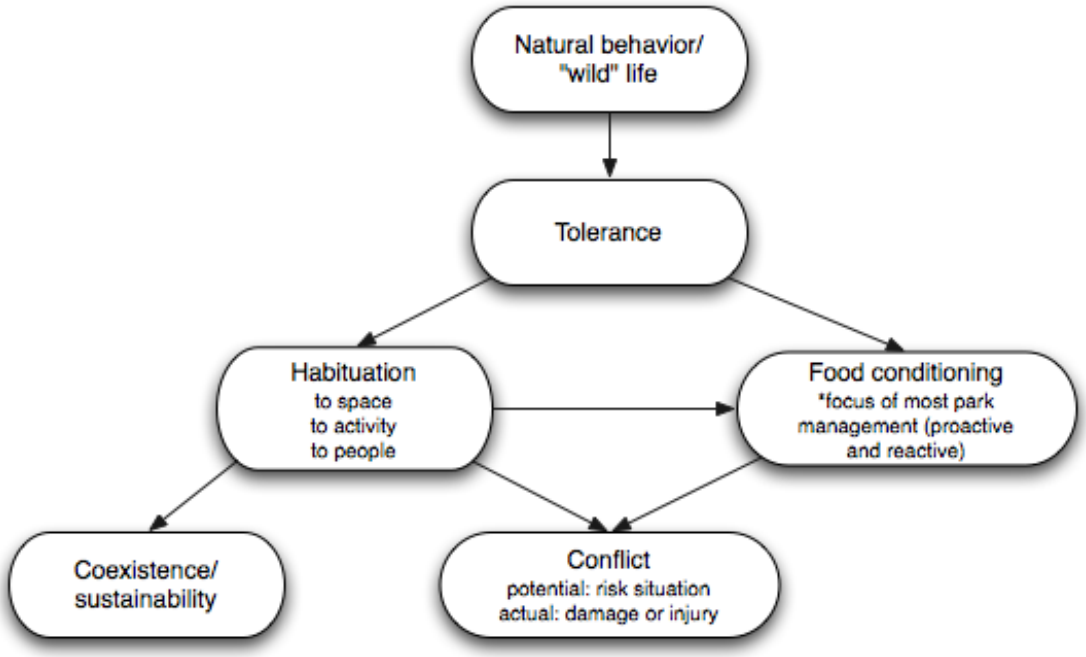

Figure 2. DRAFT framework depicting the relation between wildlife behavior and potential interaction with humans.

This habituation background presentation concluded by highlighting overarching themes to organize concepts related to human-wildlife habituation:

- What approaches are best?
    - for different contexts?
    - for different species?
- Why does habituation occur?
    - causes?
    - effects?
- What are consequences of habituation?
    - for wildlife management generally?
    - for parks and protected areas specifically?

Park perspectives on habituation

Bruce Connery, biologist with Acadia National Park, and Jim Schaberl, ecologist formerly with Mount Rainier National Park (currently at Shenandoah National Park) presented preliminary findings from a habituation survey conducted with park managers during summer 2008. The purpose of their presentation was to contextualize habituation theory and research with practical examples from parks. Mr. Connery and Mr. Schaberl are also both members of the habituation steering committee.

Habituation in the parks varies as widely as the types and number of NPS units, species, and habitats. Awareness and concerns about habituation also range widely among resource managers across the Service. Most parks focus management on food conditioning, rather than habituation. Habituation in parks is primarily documented in mammals, with a few examples of birds. Little research has evaluated the way in which humans are involved in habituation.

Some specific examples highlighted by park managers include: coyotes adapting to use park and urban spaces around Santa Monica Mountains National Recreation Area; a variety of ungulate issues, particularly related to use of roads, across the US; horses and birds on beaches; chipmunks in picnic areas; and alligators near boardwalks.

Causes of habituation related to wildlife behaviors may include: population and range expansions, high quality habitat in human use areas, animals seeking protection or shelter (predator avoidance strategies) in areas of high human activity, or the location of development in key wildlife areas in or near parks. Human causes of habituation frequently mentioned by park managers included: a natural human desire to be close to wildlife; the challenge of getting close to perceived "wild" animals; seeking opportunities to photograph wildlife; the adrenaline rush because of the risk of approaching wildlife; lack of appreciation for or misunderstanding of wildness, or the effects on wildlife such as stress. Managers also noted concerns that visitors and staff may be unaware of habituation and believe that viewable wildlife implies tameness. Such beliefs may lead to dangerous or unacceptable human behaviors. From a management

perspective, many survey respondents believed that wildlife needs are seen as secondary to management or operations focused on traditional visitor activities, cultural activities, cultural resources, economics, or safety, and that these priorities might encourage the circumstances identified above.

Expected wildlife-specific effects of habituation include: animal stress; ecological shifts; attraction of certain "adaptable" species to some park areas; problems with sensitive or rare species; an easy transition to food conditioning. Human specific effects were identified as: increases in wildlife viewing and visitor enjoyment; "tame" or approachable wildlife; risk taking; viewing wildlife as pests; questioning park management; less support for "natural" conservation programs; increased fear of wildlife; lack of understanding of "wildness" in natural areas. A number of managers were concerned that visitors interacting with habituated wildlife may ruin experiences of others with different expectations of natural areas.

Managers described particular management issues related to habituation. The misunderstanding of the differences between habituation and food conditioning, and the management focus in most parks on food conditioning were seen as barriers to dealing with habituation. The focus of many park's management is on species of greatest threat, rather than some more common ones that may be habituated. Policy and legal considerations also were raised, such as the lack of management's willingness to change visitor use and dearth of strong legal interpretation or management directives. Another complicating factor for park managers is the way that wildlife are managed outside of parks.

Habituation occurs in protected areas and managers may benefit from actions to manage the phenomenon more directly. The NPS may consider: developing legal and management guidance; intervening at habituation thresholds (e.g., regulate distances between people and wildlife) instead of focusing on food conditioning; considering approaches to both communication and direct behavior management (e.g., "do not approach wildlife"); engaging in human dimensions and wildlife research on habituation.

Based on the initial inquiry with managers, it appears that habituation is not well understood, and consequently is not widely recognized as a focus for management attention. Wildlife management values related to human-wildlife interactions have changed over time (e.g., feeding wildlife was once viewed as "good," but is now understood to lead to problems), and continue to evolve. It appears that the context and appearance of habituation in protected areas are changing. We must generate scientific information about human cognitions and behaviors related to interactions with wildlife to manage habituation.

Guiding questions for small group discussions

- What do you think are the most important human factors related to human-wildlife habituation in and around protected areas?

- Of the topics discussed in your group, which do we need to learn the most about

Themes from Synthesis Discussion Augmented with Notes from Break-out Groups

The predominant theme arising from the human-wildlife habituation workshop break-out groups focused on people's expectations for interactions with wildlife in or near parks and protected areas. The workshop participants identified a need to better understand two primary aspects of expectations with respect to human-wildlife interactions: (1) the origins of expectations, and (2) the attitudinal and behavioral consequences of expectations with respect to future interactions. Participants expressed the belief that together these two elements largely drove the habituation phenomenon.

Expectations of interest were of three types (Figure 3):

1. expectations people brought with them when they visited a park (formed prior to park visit, based on beliefs and attitudes derived from direct experience, social norms, mass media, or specific marketing);

2. expectations visitors develop while in a park (based on observing others' behavior around them); and

3. expectations influenced by park communication or management actions (which may encourage or discourage behaviors leading to habituation).

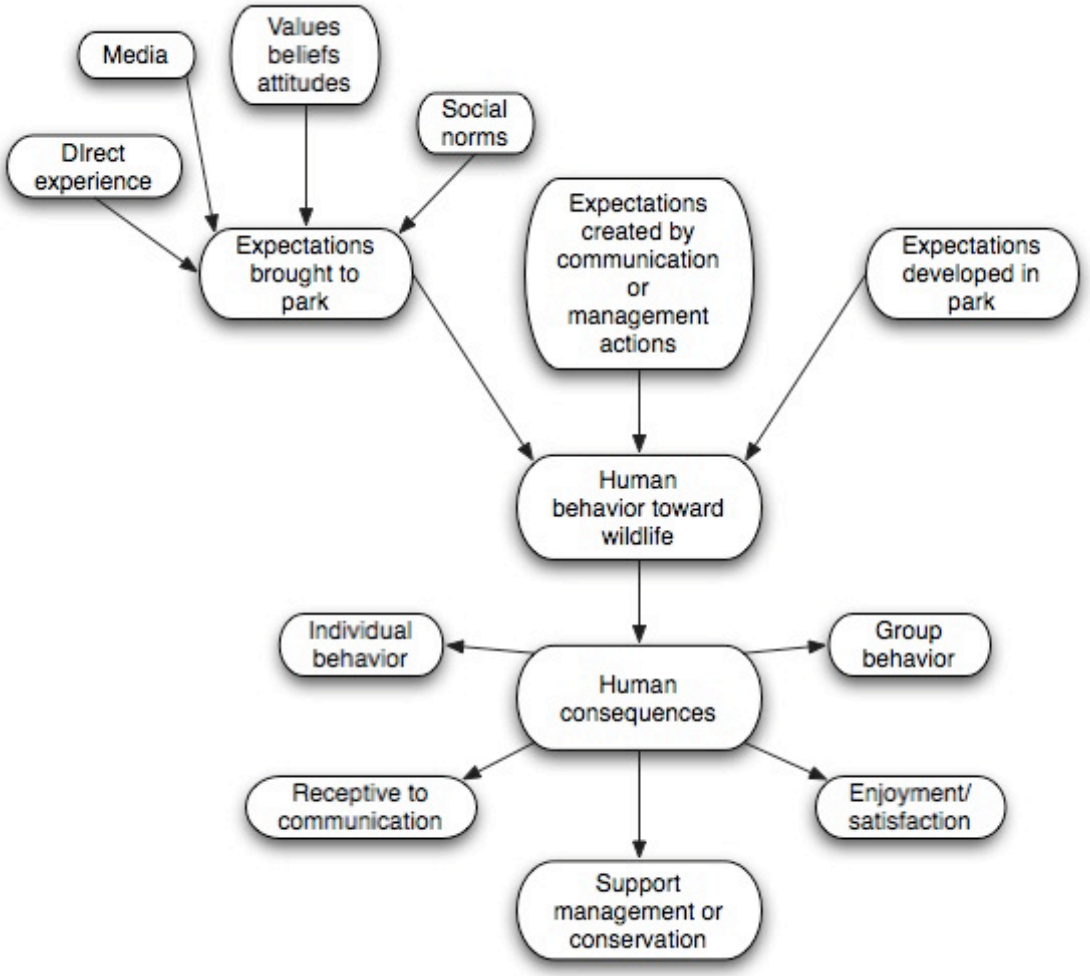

Figure 3. Conceptualization of human expectations about wildlife as described by workshop participants. Note: Another pathway from "Human behavior toward wildlife" would be "Wildlife consequences," however this was not the workshop focus, so those ideas are not depicted here.

Of greatest concern were habituation scenarios that led people to feed wildlife (resulting in food conditioning) or that led people to be intolerant of wildlife. Despite these potential problems associated with human-wildlife habituation, participants also recognized that some degree of habituation may provide beneficial opportunities for wildlife and people. For instance, under certain circumstances, habituation may lead to tolerance of human presence by wildlife and wildlife presence by humans in mutually beneficial ways (e.g., provides wildlife with access to resources and humans with wildlife viewing opportunities). The potential for habituation to help foster a more general "conservation ethic" was also discussed.

Interventions that influence the development or modification of expectations were of interest. Although intervention examples were identified, it was largely recognized that the effectiveness of these efforts rarely had been systematically evaluated.

Items from break-out groups

- expectations – origins and effects on behavior
    - external factors (marketing)
    - personal norms (what people bring to the table)
    - experiential (one's direct experience with wildlife)
    - observation of the behavior of others (social norms)
    - are unnatural – too individualized/based on personal experience, what is a natural human-wildlife interaction?
- poor behavioral norms
    - how people are "managed" in parks
- values/beliefs/attitudes
    - people want to be close to wildlife
    - people want to nurture/care for/feed wildlife
    - desire to have a "special" experience
    - possible influence of broad cultural changes
    - Animal Planet/Disney-type shows
    - childhood learning
    - natural desire to connect with wildlife
- messages from authorities – need to evaluate and adapt to current challenges – consistency within the NPS
- possible benefits of habituation – to promote conservation

Categories of human dimensions interest identified by workshop break-out groups

Workshop participants identified a variety of interests associated with the human dimensions of habituation. These interests can be clustered into three general categories. The categories are not mutually exclusive, but provide an organizational aid for describing workshop output. Categories of interest include: risk issues related to habituation, context for habituation, and management issues associated with habituation.

Risk issues

- risk assessment difficult – species are unpredictable (or at least individuals within a species may be more or less prone to aggression or habituation) – may be habituated and passive, or aggressive
- how much risk are parks/individuals willing to accept?
- people don't understand the risks
- lack of fear/risk perception is motivating poor behavior ("that can't happen to me!")

Context: Park specific issues

- lack of consistency – in management approach, message, regulations
- no way to systematically reach visitors in many parks
- "zoo mentality"
- visitors believe "I should get what I want because I paid to be here" – ownership of experience – locals also feel this, but in a different way
- poor communication among managers intra and inter park

Management issues

<u>Education related</u>

- education on habituation is lacking
- difficulties associated with reaching visitors
- wide variety of target audiences
- people don't know how to act
- need social marketing
- paradigm shift for how people view wildlife is needed
- lack of awareness
- inconsistency of message across parks/contexts
- message is more important than regulation
- agency limits message content
- people don't understand what is good/bad for wildlife - misconceptions

Wildlife management related

- food conditioning occurs
- not disturbing wildlife – parks let them go where they need to, but then they may use areas close to people
- artificial overpopulation of some species because of management of park setting
- creating physical barriers between wildlife and people?
- aversive conditioning not publicly acceptable
- management activities create repetition leading to habituation (visitors always funneled to same parking lot)
- behavioral ecology vs. population biology, species vs. landscape level management

Enforcement related

- behavioral norms – acceptable to approach?
- people don't listen even if aware of regulations
- fines not high enough
- unlikely to get caught/fined

Questions raised by participants potentially relevant to future inquiry

Attitudes and expectations

- If visitors are having good interactions with wildlife will they then assume "tameness" in other animals?
- Why do they have those expectations?
    - Are parks giving people false impressions?
    - Are we the origins of these expectations?
- Where do people get their ideas of wildlife?
- How do we get them to care as much about ecosystems [as they do about individual animals]?

Issues associated with human behavior

- If people become desensitized will they practice less appropriate behavior in the future (in regards to other animals)?

- What kind of behavior does that [expectations] drive?

- NPS needs to understand those expectations, how expectations are developed, how visitor expectations drive visitor behavior in parks.

Modifying or regulating human behavior

- What kind(s) of behavior we are looking for?

- What percentage of the visitors are aware of the regulations?

- What would really work in terms of affecting human behavior? (We could benefit from a synthesis of previous research in this area).

- How do we create a more effective docent system so that we turn viewing opportunities into education?

- Parks may intervene in many ways to address habituation. Parks could use good information on acceptability of various management actions.

- What then is the best method of education?

Effects of habituation on humans and wildlife

- We need to understand the human impact on wildlife and wildlife impacts on humans [related to habituation].

- What emotions do we have from habituation, good or bad?

- Is there a connection between [animal] behavior and visitation levels?

- Would wildlife become habituated just because we have too many people in an area? Could we reduce habituation by reducing human numbers?

- What is the relationship between levels of human contact and wildlife habituation (what relative contribution does that make to habituation)?

- Does habituation select for more tolerant individuals at a population level?

Conclusions

The steering committee and research team anticipated that understanding and managing habituation in or near protected areas is a highly complex issue. The workshop validated this assumption. Wildlife managers and human dimensions researchers and practitioners emphasized their desire to better understand this phenomenon and the positive and negative consequences for park resources and visitor experiences. Workshop participants highlighted the need for integrated human dimensions and biological habituation research agendas.

There was consensus among participants that standard protocol for addressing habituation issues is lacking. A common theme was the desire to see consistency with the NPS's policy and approach to habituation, as well as coordination with and among other agencies and organizations. Participants agree that it would be beneficial for parks to be more knowledgeable about and effective with these issues. Many expressed the belief that they had a professional responsibility to deal with habituation, but felt constrained by limited information and approaches.

The primary conclusion we drew from discussions among workshop participants was that improved understanding of human expectations was critical to managing habituation issues in protected areas. It was recognized that many aspects of expectations were relevant; expectations have the potential to be influenced by all divisions within a protected area management team (e.g., interpretation, natural resources, management, law enforcement, and facilities and maintenance).

Understanding and managing the human dimensions of habituation in and around protected areas will require more than a parochial approach. Rather, a collaborative approach among all divisions of park management as well as the various entities in surrounding communities and landscapes will be needed.

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