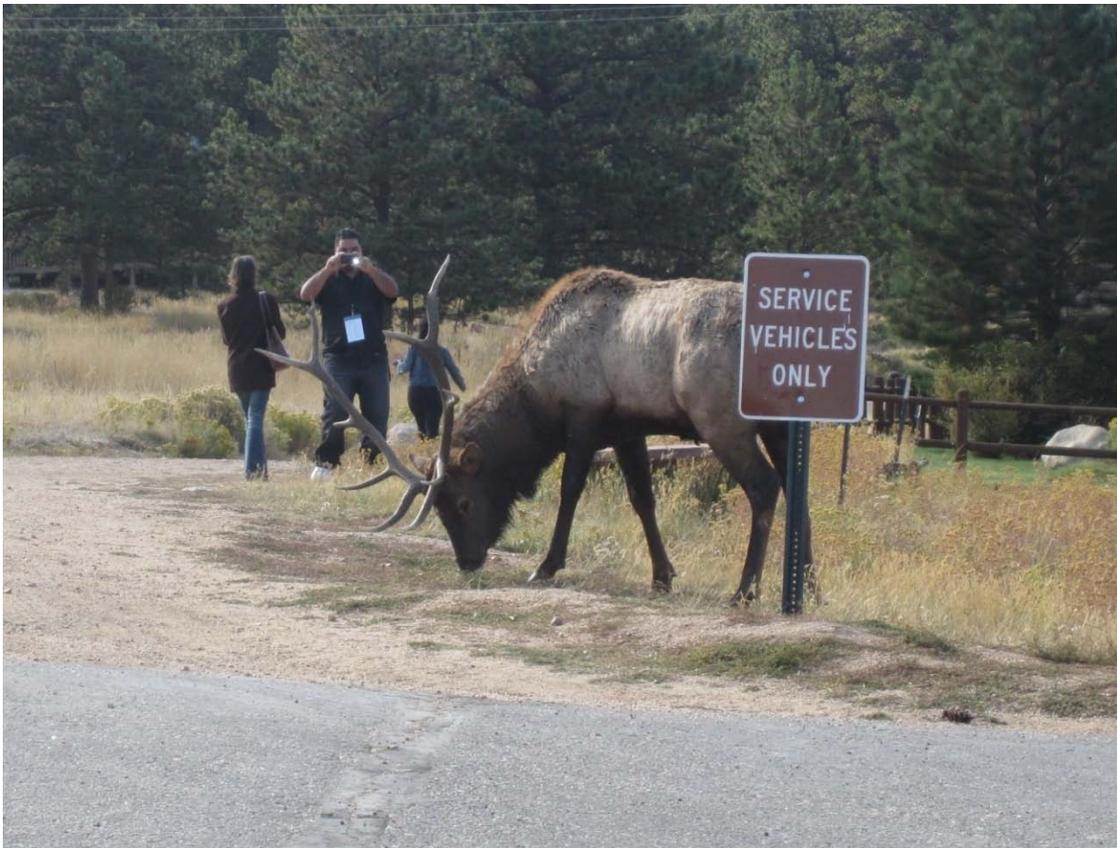




Perspectives on the Management of Human-Wildlife Habituation

Report from a workshop conducted at the George Wright Society Conference, Portland, OR, March 3, 2009

Natural Resource Report NPS/BRMD/NRR—2013/630



ON THE COVER

Photographer approaches elk near Rocky Mountain National Park
Photograph by: H. Wiczorek Hudenko

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February 2013

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

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Please cite this publication as:

Wieczorek Hudenko, H., and D. J. Decker. 2013. Perspectives on the management of human-wildlife habituation: Report from a workshop at the George Wright Society Conference, Portland, OR, March 3, 2009. Natural Resource Report NPS/BRMD/NRR—2013/630. National Park Service, Fort Collins, Colorado.

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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. As part of the inquiry, a habituation-themed workshop was conducted with park and protected area researchers, managers, and staff at the George Weight Society conference in 2009. The goal of the workshop was to advance understanding of habituation and identify and prioritize the most urgent management needs related to human-wildlife habituation in protected areas.

The workshop began with a presentation about habituation and the role it plays in human-wildlife interactions in national parks. This was followed by a panel discussion with audience participation. After a brief narrative from each panelist, a moderator presented a series of questions to guide the discussion. Audience members were encouraged to participate in the discussion and to offer input addressing habituation-related management issues.

The input from panelists and audience members emphasized the difficulty associated with distinguishing between habituation and food conditioning in an applied context. Nevertheless, participants expressed a desire to articulate these nuances in the hopes of shifting management of human-wildlife interactions in parks from a reactive, conflict-oriented perspective to a more proactive one. The consensus among participants was that coordination and collaboration among park divisions and other affected parties was of upmost importance when considering management and decision-making related to habituation. Participants identified the need for more research-based information related to habituation to facilitate such efforts.

Acknowledgments

We sincerely thank all of the NPS staff and other wildlife management professionals who participated in the workshop. We are especially grateful to the members of our panel: K. Brown, S. Chaney, B. Merkle, C. Young, and F. Young. We appreciate the assistance of 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) with the development of the workshop. 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).

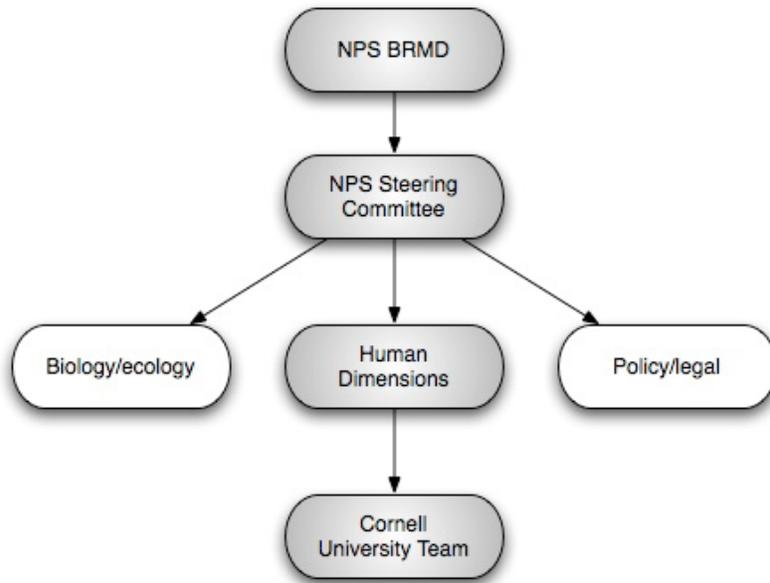


Figure 1. Organization of the NPS BRMD investigation of habituation. Shaded areas represent those related to the joint NPS and Cornell University human dimensions inquiry.

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 Workshop¹

The second habituation workshop took place on March 3rd, 2009 at the George Wright Society Conference, Portland, OR. 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 associated management needs. The workshop was structured as a panel discussion with audience participation. Participants included NPS staff from a variety of divisions, levels, and areas of expertise, university researchers and graduate students, employees of other federal agencies and NGO's, and many of the NPS habituation steering committee members. During the session participants received background information about: the NPS management and policy context related to habituation; and current theory and research related to human-wildlife habituation with summaries of management concerns related to habituation from parks across the country. The presentations were followed by a panel discussion. Earlier phases of the project and input from the NPS steering committee highlighted a need to integrate the perspectives and management tools of various disciplines to address the habituation phenomenon effectively. Consequently, invited panelists represented the various NPS divisions typically involved in managing human-wildlife habituation:

Kathy Brown, Park Ranger–Interpretation, East District Naturalist, Rocky Mountain National Park, Estes Park, CO.

Steve Chaney, Superintendent, Redwood National and State Parks, Crescent City, CA.

Bill Merkle, Wildlife Ecologist, Golden Gate National Recreation Area, San Francisco, CA.

Chuck Young, Chief Park Ranger, Mount Rainier National Park, Ashford, WA.

Frank Young, Chief of Maintenance, National Capital Parks–East, Washington, DC.

The moderator (Professor Dan Decker) introduced the panelists and each person provided a brief narrative that addressed two guiding questions from their disciplinary perspective:

1. *How does habituation affect your park or your job (with respect to your division's responsibilities)?*
2. *How does the way you carry out your division-specific work affect the development of habituation?*

¹ A report from the first habituation workshop at the Human Dimensions of Fisheries and Wildlife Management Conference in Estes Park, CO, is available as Natural Resource Report NPS/BRMD/NRR—2013/627.

Following the introductions, the moderator presented a series of questions to guide the panel discussion:

1. *How might collaboration among NPS divisions improve your park's capacity to address habituation?*
2. *What kind of institutional barriers or challenges prevent you from achieving this capacity?*
3. *Can you describe or provide examples of opportunities for various divisions to work together on habituation?*

After the panel discussion, audience members were invited to participate and offer input addressing habituation-related management issues.

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 391 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 (aka “gateway communities”) 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 overview 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

The graduate student on the project (Heather Wieczorek Hudenko) presented background information about habituation including theoretical frameworks, research, and case studies. Habituation is increasingly a topical issue for 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.

Habituation in wildlife can present both opportunities and challenges. Habituation 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 of wildlife to humans will occur if there is no significant negative consequence to the animal as a result of human presence. Human behaviors that cause 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: access to resources such as water, shelter, protection from predators, and breeding grounds; shifts in habitat use or species distributions; facilitation of research endeavors, and efforts to conserve populations; stress to individual animals; food conditioning; 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 of this phenomenon on wildlife habituation (Zinn et al., 2008). Such reciprocal human-wildlife habituation may have positive or negative impacts to people or wildlife, depending on context. Habituation in humans is likely influenced by: values, beliefs, attitudes, lack of perceived risk, acceptance capacity, and social norms. Key issues are how these concepts might relate to human behavior near wildlife and human expectations about wildlife in park settings. 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; and lead to property damage, disease transmission, or even the risk of injury or death.

In 2008 the NPS BRMD conducted a survey of park managers related to habituation issues and concerns. Managers responding to the survey identified a number of causes of habituation in parks: visitors' desire to be close to wildlife; visitors' lack of understanding or awareness of wildlife behavior; and elements of the park environment that foster human-wildlife interactions (e.g., trails near key food or habitat resources). Managers in the survey noted a number of effects of habituation particularly relevant to park management: negative impacts on wildlife such as physiological stress and changes in habitat use; increased visitor enjoyment but also increased risk to visitors; the fostering of food conditioning; and various management challenges such as limited resources to address habituation issues, the lack of service-wide management directives or legal interpretations, and wildlife management policies in surrounding communities. (For more information about the 2008 survey, please see Natural Resource Report NPS/BRMD/NRR—2013/629).

The theoretical distinction between food conditioning and habituation was emphasized in the presentation. Thinking about these processes as occurring through 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., 2005]). 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?

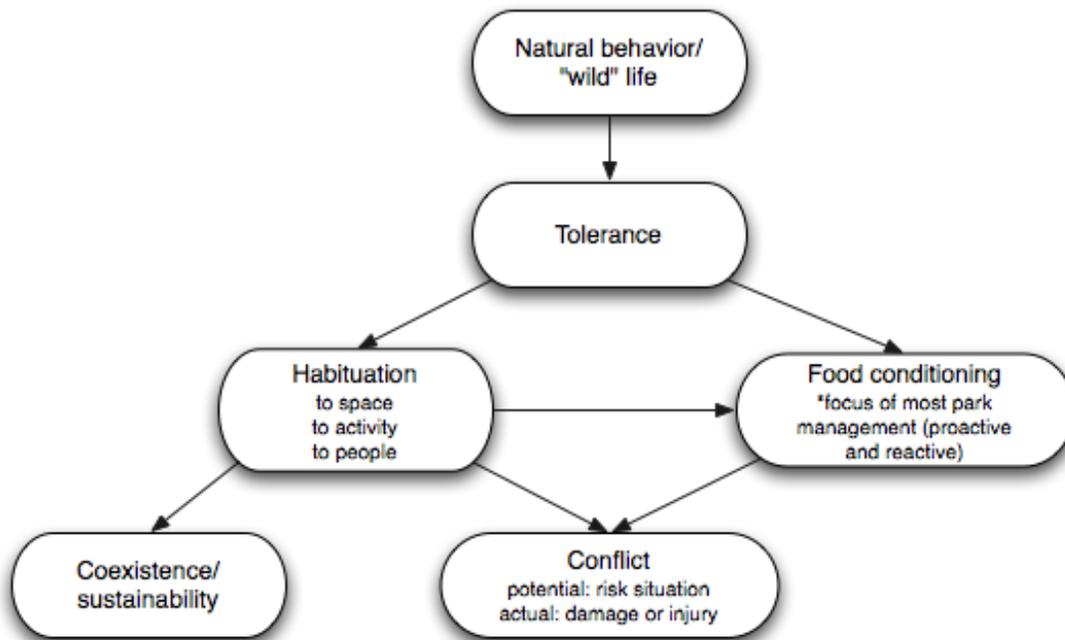


Figure 2. DRAFT framework depicting the relation between wildlife behavior and potential interaction with humans.

This habituation background presentation concluded by highlighting overarching themes from the first habituation workshop (see Natural Resource Report NPS/BRMD/NRR—2013/627), and by suggesting several questions relevant to the management of human-wildlife habituation.

- Should habituation be prevented or encouraged?
- Is there a balance?
- Should management efforts focus on people or wildlife?
- What resources will be required to manage habituation?
- How acceptable will management strategies be?
- How successful are current efforts to manage human-wildlife habituation?

Themes from Panel Responses and Audience Input

Panelist perspectives

Panelists began by offering a brief narrative that addressed the ways in which habituation affects parks and division-specific responsibilities and vice versa. Several themes emerged across panelists' perspectives. Panelists expressed the belief that management actions related to habituation typically are taken in response to human or animal injury. Many divisions that are called upon primarily when habituation has led to harm to wildlife or humans (e.g., law enforcement, Superintendent, maintenance) suggested they would like to find ways for their work to play a more preventative role. Several of the panelists noted that part of the reactive nature of habituation-related management responses is a consequence of the difficulty associated with separating habituation and food conditioning from a practical perspective. The nuances of human and wildlife behavior involved in the processes of habituation and food conditioning, and identifying and separating the two phenomena, can cause challenges in an applied setting and be difficult to address preemptively. Often, habituation behaviors are revealed only once an incident has occurred.

In contrast to the desire to manage to prevent habituation, panelists also recognized possible benefits to a certain degree of habituation, such as visitor satisfaction from viewing wildlife, and interpretation opportunities in which visitors can learn about wildlife in their natural setting. Much like the difficulty associated with separating habituation from food conditioning, however, panelists are unsure how to identify the "appropriate degree of habituation." They believe that some habituation may yield benefits to both visitors and wildlife, but were uncertain that an acceptable level of habituation could be identified or deliberately managed.

A number of panelists discussed the urbanization of spaces and people as an important cause of habituation in parks. They suggested that urban development along or near park boundaries was causing habituation outside the park of animals that use the park, and potentially causing conflict in parks. This boundary issue was also discussed as functioning in the reverse manner. Wildlife may become habituated in a park setting and then come to harm or create conflict when they venture into nearby developed areas. Panelists also identified social influences of urbanization as causes for habituation. They expressed the belief that with the growth of suburban spaces and culture, people's expectations about wildlife in parks have changed in recent decades. For instance, one panelist proffered that 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 arose from a combination of a lack of direct exposure to wildlife and expectations based on television programs in which people approach or touch wildlife.

Panelists emphasized the role that social norms can play in shaping visitor expectations and behavior near wildlife. It was suggested that many of today's park visitors came to the park and reflect norms that foster habituation such as approaching wildlife at close distances to capture a photo. The law enforcement representative also noted that some behavioral norms may be specific to park settings and passed down through generations. For instance, people may bring their children to a park with the expectation of feeding an animal (which fosters food conditioning rather than habituation) because this activity was something they experienced when young and now wish to share with their children. While this was previously acceptable behavior

in some park contexts several decades ago, visitors may not be aware of or understand changes in regulations and park policy. People may also mimic the behavior they see in others around them in a park, such as stopping cars next to elk on the side of the road, thereby establishing normative behavior in a particular context that may lead to habituation and that visitors may take with them to other situations. The opportunity to create norms that helped to manage habituation was also described. Panelists believed that norms about appropriate behavior around wildlife need to be present for both park staff as well as visitors. They cited the success of other changes in social norms, such as littering, as a positive sign that managing habituation problems in parks is possible.

All panelists agreed that a need exists to create common objectives and messages regarding habituation, for both visitors and park staff (including seasonal and volunteer staff). They believed that park staff are constrained in their ability to manage habituation and related issues because habituation in park settings is not well understood and therefore habituation-related goals and objectives are not identified for park staff. The lack of clear habituation management protocol for park staff prevents the development of regulations, policies, or communication messages to manage visitor behavior. It was agreed that participation from all park divisions was necessary to establish successful protocols to manage habituation. Cross-divisional strategies would permit parks to address habituation from multiple angles, leading to a more comprehensive and potentially more successful approach. The interpretation panelist noted that in addition to including staff from all park divisions, opportunities to involve volunteer staff and visitors in the management of habituation could enhance the effectiveness of strategies (e.g., elk crossing guards in Rocky Mountain National Park; the Meadow Stompers program in Mount Rainier National Park).

The perceived need for common objectives regarding habituation led panelists to conclude that habituation needs more research attention so that appropriate strategies can be developed. Furthermore, evidence of habituation-related causes and effects must first be identified before it is likely that habituation will receive focus from park management. Research is needed to evaluate both the costs and benefits of human-wildlife habituation for parks. Panelists identified several specific research questions they believed needed to be answered to help manage habituation.

- What kinds of interactions with wildlife do visitors need to have a positive park experience? How can that be provided while maintaining sustainable conditions for wildlife species?
- Which behaviors are humans exhibiting in parks that lead to habituation in wildlife?
- How can the research agenda move forward in a way that accommodates concerns from individual parks that their situation is unique and yet yields comprehensive and broadly applicable results?
- How are park contexts different from other areas where people encounter wildlife (i.e., near homes)?

- How does management of wildlife in communities surrounding parks affect park management of habituation? (e.g., habituated wildlife in parks may be more susceptible to hunting outside of parks).

Key comments from each panelist

Superintendent

Prioritization and resources play a role in the attention given to habituation-related issues. It is important to recognize the positive and negative impacts of habituation. Benefits include increased opportunities for wildlife viewing leading to visitor satisfaction and associated economic incentives. Increased human-wildlife conflict in parks and surrounding communities is a potential outcome, leading to visitor safety concerns, the loss of sensitive species, and increased costs (e.g., emergency services, law enforcement, litigation).

Wildlife Ecologist

We do not currently understand the causes and effects of habituation, particularly as it relates to the role that humans play. This type of knowledge is needed to inform management and decision-making. Also of interest is the manner in which wildlife research in the park may foster wildlife habituation (e.g., individual animals repeatedly exposed to researcher presence), and the reciprocal ways habituation can influence wildlife research (e.g., animals that do not show behaviors that are representative of the species; habituated animals that may be easier to observe).

Park Ranger—Interpretation

Interpretation and volunteer programs can be used to help people understand the delicate balance habituation creates. Human dimensions inquiry is needed to evaluate the effectiveness of programs designed to manage habituation.

Chief of Maintenance

Habituated animals can cause myriad impacts that require a response by facilities personnel. Habituated animals may affect visitor enjoyment (in positive and negative ways), visitor ability to use the park (e.g., goose scat may limit visitor use of lawns), and other park initiatives (e.g., beaver may build dams in high use areas and affect wetland restoration attempts).

Chief Ranger—Law Enforcement

A focus for law enforcement is responding to problems caused by habituation (e.g., injury to people or wildlife). We need to understand the human behaviors that lead to habituation-related problems and how they can be prevented. Can law enforcement divisions help establish appropriate behavioral norms by enforcing regulations?

Panel responses to questions and related audience comments

How might collaboration among NPS divisions improve your park's capacity to address habituation?

The panelists and audience members agreed that the key to more effective management of habituation issues is coordination and communication among the various park divisions. An example was provided and built upon by several participants. Habituation and food conditioning might be likely to occur in high use areas such as campsites. Natural resource specialists can help to reveal the biological aspects of the campground environment relevant to the development

of habituation. By clearly articulating these elements to both NPS staff and the public, everyone can understand and focus on a common goal. In the planning and design phases of the campground siting, a Superintendent can apply the information from natural resource staff to help anticipate and avoid problems associated with too much close contact between people and wildlife. Maintenance staff can assist by managing the elements of the natural or built environment identified by natural resource staff to help prevent the development of habituation. Interpretation can provide education programs and coordinate volunteer efforts to deter known causes of habituation and promote understanding of the wildlife resource. Finally, law enforcement can be provided the resources to be able to consistently and effectively enforce relevant regulations.

What kind of institutional barriers or challenges prevent you from achieving this capacity?

A fundamental concern expressed by both panelists and audience members was the lack of research available to help understand the causes and effects of habituation or the evaluation of related management strategies. These gaps were identified as a primary barrier to managing habituation issues within parks. Participants suggested that often other aspects of park management take priority over lesser-known topics such as habituation. It is a challenge for parks to allocate time and financial resources to an issue that is not well understood because it does not clearly relate to park goals and management priorities. Furthermore, enabling legislation and public opinion were also cited as critical influences on management priorities that might drive other management agendas over habituation. Yet, it was noted that habituation may cause some of the issues that do receive urgent, and often reactive, management attention. Conversely, habituation could potentially be used as a tool to promote safe, sustainable human-wildlife interactions. Panelists and audience members thus expressed the belief that allocating resources to explore habituation may help to facilitate more proactive management strategies that benefit both wildlife and visitors.

Participants identified communication as the other primary challenge to the management of habituation. The lack of communication across divisions within a park about practices that can help to manage habituation was most often cited. It appears that an opportunity exists for communication to illuminate how each division's strategies and actions can impact the collective management of habituation. Communication and information sharing across park units was also discussed. Participants believed that some parks have spent more time considering the habituation topic and had developed strategies that might benefit other parks. A desire for information sharing about these resources was expressed. Participants also highlighted challenges associated with the messages parks provide to the public. For instance, one panelist noted that education programs and signage indicate that visitors should not feed wildlife, yet bird feeders are prominently displayed outside many park buildings. This mixed message likely complicates attempts to foster "appropriate" human behavior around wildlife. Finally, participants also suggested that communication between parks and surrounding communities could be improved. Clearly, park wildlife management actions and actions taken by communities affect one another. Enhanced communication on this topic could lead to increased effectiveness of management strategies designed to impact habituation.

Can you describe or provide examples of opportunities for various divisions to work together on habituation?

Both panelists and audience members shared information about collaborations that they believed help to manage habituation in parks. One audience member described Denali National Park and Preserve's bear and wolf management plans as comprehensive documents that take a multi-faceted approach to management of these species. The Yosemite Bear Council was hailed as a model of effective collaboration. The Council consists of NPS staff from all divisions as well as representatives from other park partners such as concessions services. The Council works to maintain a naturally functioning population of bears while reducing human-bear conflict. Members of the council worked together to address human-bear conflict in a variety of ways: creating education materials for the public; providing bear resistant food storage containers and dumpsters; employing aversive conditioning when necessary; and initiating several research initiatives designed to understand human-bear interactions within the park. Finally, the natural resource specialist on the panel provided an example of collaborative management of habituation on Alcatraz Island. A bird conservation team that included natural resources staff, the chief of maintenance, concessioners, interpretation staff, and docents came together to discuss waterbird ecology and management on the island. The group designed ways to minimize disturbance to the birds while capitalizing on the education opportunity provided by the habituated birds nesting near visitor spaces on the island.

The prevailing theme throughout the examples that participants provided was communication and coordination among divisions to achieve a common, well-articulated goal. Several participants expressed a desire to collect examples of successful collaborative management documents that could serve as a resource for other parks. This interest in a document collection was noted by the habituation steering committee in earlier phases of the project as well.

Conclusions

Exploratory work prior to this workshop indicated that illuminating the distinctions between food conditioning and habituation would facilitate proactive management of wildlife and human behavior that could foster coexistence. The input from panelists and audience members in this session emphasized the difficulty associated with making such a distinction in an applied context. Nevertheless, participants expressed a desire to articulate these nuances in the hopes of shifting management of human-wildlife interactions in parks from a reactive, conflict-oriented perspective to a more proactive one.

The consensus among participants 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. The need for open dialogue to develop common goals and objectives, and communication about strategies and actions was emphasized. Participants identified the need for more research-based information related to habituation to facilitate such efforts. Associated with the calls for better communication and coordination was an interest in learning about successful strategies currently being used across the service. Some workshop participants believed a compilation of current management strategies related to human-wildlife habituation could serve as a resource for other NPS units and highlight areas for future inquiry.

Panelists and audience members had myriad experiences and viewpoints related to habituation. Participants shared knowledge about habituation through description of a recognition of context specificity needed to manage habituation, a desire to identify commonalities across experiences emerged. Understanding the human attitudes, and human and wildlife behaviors that drive the habituation phenomenon will assist the development of management strategies that promote a sustainable level of human-wildlife interactions within parks.

Literature Cited

- Bernstein, D. A., L. A. Penner, A. Clarke-Stewart, and E. J. Roy. 2006. *Psychology*, 7th ed. Houghton Mifflin Company, Boston, Massachusetts.
- Bornstein, M. H., and A. A. Benasich, 1986. Infant habituation assessments of individual differences and short-term reliability at five months. *Child development*, 57(1): 87-99.
- Herrero, S., T. Smith, T. D. DeBruyn, K. Gunther, C. A. Matt. 2005. From the field: Brown bear habituation to people – safety, risks, and benefits. *Wildlife Society Bulletin*, 33(1): 362-373.
- Jope, K. L. (1985). Implications of grizzly bear habituation to hikers. *Wildlife Society Bulletin*, 13: 32-37.
- Martin Soelch, C., M. Stoecklin, G. Dammann, K. Opwis, and E. Seifritz, 2006. Anxiety trait modulates psychophysiological reactions, but not habituation processes related to affective auditory stimuli. *International Journal of Psychophysiology*, 61(2): 87-97.
- Mazur, R., and V. Seher. 2008. Socially learned foraging behaviour in wild black bears, *Ursus americanus*. *Animal Behaviour*, 75(4): 1503-1508.
- McNay, M. E. 2002. Wolf-human interactions in Alaska and Canada: A review of the case history. *Wildlife Society Bulletin*, 30(3): 831-843.
- National Park Service. 2006. *Management Policies 2006*. Washington, DC: National Park Service.
- Phillips, A. T., and H. M. Wellman. 2005. Infants' understanding of object-directed action. *Cognition*, 98(2): 137-155.
- Turner, S. M., D. C. Beidel, R. Roberson Nay. 2005. Offspring of anxious parents: Reactivity, habituation, and anxiety-proneness. *Behaviour Research and Therapy*, 43(10): 1263-1279.
- Whittaker, D., and R. L. Knight. 1998. Understanding wildlife responses to humans. *Wildlife Society Bulletin*, 26(2): 312-317.
- Zinn, H. C., M. J. Manfredi, and D. J. Decker. 2008. Human conditioning to wildlife: Steps toward theory and research. *Human Dimensions of Wildlife* 13(6): 388-399.

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NPS 909/119806, February 2013

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