

Perceptions of Wildlife-associated Disease Risk: A Challenge or Opportunity for “One Health” in National Parks?

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Introduction

The “One Health” Initiative in the National Park Service (NPS), spearheaded collaboratively by the Wildlife Health Program and Public Health Program of NPS, is developing at a propitious time in the evolution of human-wildlife interactions in America. Some of us who study the human dimensions of wildlife conservation and management are concerned that many Americans may be showing signs of estrangement from wildlife. Disenchantment with human-wildlife interactions has grown during the last couple of decades, a period when experienced and perceived stresses in human-wildlife interactions have grown. We are uncertain how broadly and deeply the relationship has eroded, but disturbing symptoms of stress have been identified in what has been assumed by many in the wildlife conservation community to be essentially an indivisible relationship between Americans and wildlife. One wedge with potential to split this relationship is wildlife-associated disease and its management. To the degree a shift in attitude is occurring, all people interested in the future of wildlife conservation should be concerned.

In the context of wildlife disease/health management for protected areas such as national parks, if managers and communicators understood how people form their perceptions of wildlife-associated disease risk, One Health professionals could help curb public concern that might contribute to erosion of Americans’ affinity for wildlife. Conversely, if managers and communicators do not carefully handle the language, actions and communication of the One Health Initiative, they could inadvertently cause the gaps to widen. We first provide background and evidence for our concerns and cautionary perspective. We then comment on the state of relevant empirical data in the human dimensions knowledge base. We describe briefly the importance of risk perception and communication, tying it to wildlife-associated disease and wildlife health management.

Background

Many species of wildlife have been restored during the last 100 years. Current and projected abundance and distribution of several species have expanded markedly. This, combined with human population distribution, is contributing to a remarkable rise in human-wildlife interactions. People across the landscape, and perhaps especially those living in suburban and exurban areas, are experiencing personally novel interactions with wildlife. Even farm-

ers, ranchers, and other residents of rural areas are facing new situations with respect to wildlife.

While it is well documented that most people in the U.S. are interested in and value wildlife (USDI 2006), wildlife experts also contend that many people have concerns about co-existing with wildlife (Wobeser 2006). One can reasonably expect that these concerns temper enthusiasm for wildlife presence, whether people encounter wildlife as park visitors or neighbors of parks where wildlife are protected. Impacts of many types are demanding management attention, including disease risk (to people and domestic animals). As media coverage about diseases such as rabies, leptospirosis, Lyme disease, West Nile virus, “bird flu” (highly pathogenic avian influenza, HPAI) and chronic wasting disease (CWD) bombards the public, many wildlife species are characterized as threats to the health of livestock, companion animals, and humans. It is conceivable that over time such perceptions may contribute to wholesale change in public perspective about wildlife. We have already seen hints of this, as described briefly below.

Tracking people’s experiences with wildlife over the last three-plus decades, research of the Human Dimensions Research Unit at Cornell University suggests increases in three kinds of impacts arising from human-wildlife interactions: (a) *economic* loss, (b) *safety* of people and pets, and (c) *health* of people, pets and livestock. Taken individually, perhaps none of these alone would be sufficient to reverse the largely positive attitudes Americans have demonstrated toward wildlife. Taken together, however, these human-wildlife interactions that threaten basic human health, safety and security needs are contributing to development of negative perceptions of wildlife that may be creeping toward a tipping point, or a threshold of tolerance of wildlife on the landscape.

What evidence do we have on which to base our concern? Admittedly, the human dimensions research base is thin, but a few studies provide some reinforcement for our concerns. Using CWD as an example, Wisconsin studies revealed that people dropped out of deer hunting because of concerns about CWD. One-third of hunters were concerned about eating deer because of CWD (Vaske et al. 2004).

- A study of hunters in eight western states indicated that the hypothetical combination of high disease incidence and a connection to human health risk results in cessation of hunting interest in the area affected (Needham and Vaske 2008).
- In NY, a survey of hunters and non-hunters revealed approximately 75% and 50%, respectively, were concerned about CWD with 3 out of 5 concerned respondents worried about human health (Brown et al. 2005).

CWD is not the only source of concern and hunters aren’t the only people harboring concerns about disease associated with wildlife. For example, in Michigan, four out of five livestock producers, business owners and members of the general public expressed concern that deer had been found with bovine tuberculosis (TB) in northeast Michigan (Dorn and Mertig 2005).

Other studies that were not specifically designed to address wildlife-associated disease suggest a similar trend:

- In a 2007 study of suburban residents' experiences and attitudes associated with coyotes in Westchester County, New York, *every interviewee* mentioned the concern about disease associated with coyotes as a major issue for residents, even though the study focus was on encounters with coyotes that might present physical risk to people and pets and only one reported case of rabies in a coyote had been reported in the entire state in the previous 15 years (Hudenko, Siemer, and Decker 2008).
- Another recent study examined impacts from deer on community residents adjacent to the extensive open lands surrounding the Cornell University campus. Nearly 9 out of 10 residents had little or conditional tolerance of deer in their neighborhood. In addition, 59% agreed that deer in the area *create a serious safety risk* for people. Furthermore, and apropos to the One Health topic, half of the residents surveyed were *very* concerned about diseases carried by deer, with 38% believing deer present *a serious health risk*. This is in an area with no reported endemic deer-associated diseases that might normally be of concern to humans or their pets and livestock (e.g., Lyme, TB, or CWD) (Siemer et al. 2007).
- A longitudinal study of residents of the suburban community of Islip, New York, showed a marked increase in concern about Lyme disease and indicated a declining tolerance of white-tailed deer from 1984 to 1999. Concerns about Lyme disease increased strikingly, from 48% in 1984 to 96% in 1999. In 1984, over half of the Islip residents surveyed unconditionally enjoyed deer in their neighborhood, and 38% expressed some level of concern about deer. Fifteen years later, 78% expressed concerns about deer (Siemer et al. 2003; Decker and Gavin 1987).

Our cautionary perspective on the situation

We believe that the “One Health” initiative is coming at an opportune time because wildlife-associated disease is among an important set of impacts from human-wildlife interactions that may threaten basic human safety, health and security needs and cause a shift in attitudes about wildlife. Further, if predictions of wildlife-associated disease trends come to pass, the wildlife-associated disease component may soon lead the pack with respect to propelling an estrangement of humans and wildlife in many situations.

We believe this is a cause for concern, because looking forward, sustaining social support for conservation and management of wildlife, as a valued component of the environment, is uncertain, if we experience widespread reduction of public tolerance of wildlife. If we are heading toward a tipping point where the negative impacts of human-wildlife co-existence outweigh the positives, quite possibly the predicted increase in occurrence of wildlife-associated disease could accelerate an undesirable shift in Americans' attitudes about wildlife.

While none of us may want to think about the scenario we've painted, we nevertheless need to accept that it is plausible that the perception of disease-ridden wildlife could cause public sentiment about wildlife to devolve to pest status on a broad scale. This could have implications for visitation to parks where wildlife roam free and often close. Taken a step further, this scenario also suggests potential for decline in people's enthusiasm for being neighbors of parks and protected areas that could harbor wildlife that are free to roam into their

backyards and their children's play grounds. Fortunately, this scenario is not a certainty, and it may be avoided (as suggested below), but we clearly need more insight on the human dimensions of wildlife disease management to guide management.

Human dimensions of wildlife health management

Many human dimensions considerations in wildlife disease management were identified a few years ago by wildlife managers and wildlife health specialists, several employed by NPS, in the process of developing a “managers’ model” of the wildlife disease management system (Decker et al. 2006). They articulated the inherently anthropocentric or “human-based” motivation for wildlife disease management, emphasizing real or perceived effects of disease on some attribute of importance to *humans*. The salience of these effects, or risk perceptions, undoubtedly contributes to people’s overall consideration of the value of wildlife on the landscape. If the balance of this evaluation tips toward various concerns dominating society’s interest in wildlife, then the wildlife conservation community has a huge problem on its hands. Unfortunately, research provides little systematically-obtained insight about how people perceive wildlife-associated disease.

Risk perception and risk communication

The fields of risk perception and risk communication grew out of needs to manage human health hazards related to exposure to toxic wastes, nuclear power plants, or other potentially hazardous materials. Research over the last few decades has established that experts and the lay public perceive these types of risk differently (Morgan et al. 2002). Experts typically evaluate the need for management based on what is referred to as technical, objective or assessed risk that measures the probability and severity (likelihood of fatality) of a hazard. Assessed risk (our preferred term) is derived from scientific assessment, based on expert judgment, or a combination of both. Another kind of risk also plays heavily in management—perceived risk. Perceived risk is a layperson’s beliefs and attitudes. That is, perceived risk has two primary components (Slovic and Peters 2006):

- Cognitive component—what people believe about the risk (e.g., its probability of causing harm).
- Affective component—how people evaluate the risk (e.g., dreadful).

Keeping in mind that perception is reality, from management and communication standpoints, public beliefs about a situation, whether based on scientific assessment of probability or not, become the reality from which people express their opinions to protected-area managers (e.g., park superintendents), elected officials, and policy makers (e.g., about parks in or adjacent to their community or landholding). Individuals make their decisions about personal and familial behavior (e.g., wildlife viewing, visiting parks) based on such perceptions. Much of what leads to impacts perceived by people is not related to the probability of harm, but rather the assessment of the potential outcome. Human dimensions research is a scientific way to improve understanding of risk perceptions. Effective risk communication

addresses the target audience perceptions of risk, and focuses on what people need to know to make informed, independent judgments about risk, and improve their ability to control their exposure to risk (Morgan et al. 2002).

Risk communication and One Health

While risk communication developed out of public health concerns, it is being increasingly applied to wildlife management settings. In the context of NPS One Health, we are applying risk perception and risk communication theory to obtain insight about how people perceive wildlife-associated disease risks. By utilizing an established theoretical framework, we seek to avoid communication messages that inadvertently lead to over- or under-estimation of risk by the public. Instead, we aim to provide insight needed to develop messages that promote self-efficacy (a person's belief that he or she can take some adaptive response to reduce personal risk), societal efficacy (knowledge of actions that societal entities, such as NPS, can take to reduce exposure to risk), and response efficacy (a person's belief that an adaptive response will actually reduce a particular risk) (Evensen and Clark, forthcoming; Floyd, Prentice-Dunn, and Rogers 2000).

Concluding comments

First, do not take it for granted that the positive attitudes Americans have generally held toward wildlife are immutable. Second, we need to develop improved understanding of risk perception with respect to wildlife disease, through research into questions such as:

- What is the nature of perceived risk (cognitive and affective)?
- How do risk perceptions develop?
- To what extent are they cumulative?
- What can managers and communication specialists do to better inform people as their risk perceptions are developed?

If perceptions of risk associated with wildlife disease can be improved, perhaps the generally positive public opinion of wildlife can be sustained. We see two foci to the work ahead:

- Research-based human dimensions considerations should be integrated into comprehensive wildlife health and disease management.
- Wildlife disease management should be rapidly taking the lead as a conservation and social imperative.

We close by reiterating what may be at stake with respect to success of wildlife health and disease management. We think nothing less than the sustainability of wildlife as a valued component of the shared landscape for future generations lies in the balance. We hope in particular that the One Health Initiative in NPS contributes to ensuring that the clarion call "*No child left indoors*" is not answered by parents with the response "*No child will be allowed outdoors*" because of concerns about wildlife-associated disease.

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