

Communicating about Wildlife-associated Disease Risks in National Parks

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Introduction

OUR WORLD IS FILLED WITH RISKS. The spate of natural and human-made disasters occurring across the globe that has captured our attention over the last decade has brought this point home for even those least affected. The way people perceive and come to understand risks of many kinds is having consequences at multiple levels, some of which are relevant to US national parks.

Political theorists, sociologists, and anthropologists have argued that people are increasingly focusing on risks and hazards when they make decisions and contemplate governmental and societal actions (Giddens 1990; Douglas 1992; Beck 1999). One type of risk in the public and scientific consciousness that many parks need to pay more attention to is that posed by wildlife-associated diseases (Gortázar et al. 2007). Informing people about avoiding or minimizing exposure to these and other risks associated with park visits may become an imperative for park managers intent on keeping outdoor experiences attractive for citizens.

Concern about wildlife disease is increasing because outbreaks are occurring more often than ever before in modern times (Jones et al. 2008; Keesing et al. 2010). A growing human population, global movement of people and exotic animals, and encroachment on wildlife habitat for agricultural and urban development are drivers in the expansion of wildlife-associated diseases (Baretto 2003; Wobeser 2006). Additionally, scientists expect global climate change to aggravate the spread of wildlife-associated disease by increasing vulnerability of potential host populations to infection through intensifying environmental stress, lengthening the pathogen transmission season, reducing biodiversity, and expanding the geographic ranges of pathogens and vectors (IAFWA 2005; Keesing et al. 2010; Kutz et al. 2008). The bottom line: we can expect an increase in the incidence and prevalence of wildlife-associated disease.

Wildlife-associated diseases may be potential hazards of management importance in any park, but this is especially true for those parks where visitors and wildlife interact regularly. Knowledge of how people perceive and react to such hazards can help managers develop effective responses, including tailoring risk communication messages to specific audiences

The George Wright Forum, vol. 29, no. 2, pp. 227–235 (2012).

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(visitors, neighbors, concession staff, etc.). Identifying people's perceptions of risks can also alert park managers to actions that the public views as important for risk management. In this article, we highlight three lessons for effective risk communication drawn from a study of risk perceptions and reactions to wildlife-associated diseases in National Park Service (NPS) units.

The study

In collaboration with wildlife health professionals from the NPS Biological Resources Management Division, we used a multi-case approach to study risk perceptions and reactions with respect to wildlife-associated diseases (Stake 2006). We interviewed people living and working in and around four NPS units that have experienced wildlife-associated disease issues; three of these sites are discussed in this paper: (a) Sleeping Bear Dunes National Lakeshore, MI, (b) Fire Island National Seashore, NY, and (c) Golden Gate National Recreation Area, CA. We first created profiles of the case areas, which included (a) demographic data about the population surrounding the NPS unit, (b) analysis of local newspaper articles on diseases of interest, and (c) information about the activities of organizations and agencies involved in managing the risks associated with the disease. We conducted semi-structured interviews and oral history interviews with NPS employees and community members, respectively, during two-week visits at each site between April and September 2009. We collected 106 interviews (60 with NPS employees and 46 with community members) that described how the public experienced, perceived, and responded to a disease of local concern. We interviewed NPS park administrators, natural resource managers, law enforcement rangers, maintenance workers, interpretative rangers, visitor use assistants, cultural resource managers, safety officers, and public affairs specialists. Interviews with community members included conversations with local residents, journalists, nongovernmental organization (NGO) members, NPS volunteers, and officials in other governmental agencies.

Lesson #1: Know the context

Context played a powerful role in conditioning risk perceptions and responses to the diseases. At each study site, four dimensions of context (epidemiological, environmental/geographic, social, and cultural) were important influences on how people characterized the types and magnitude of their concerns. If people perceive and respond to the same disease differently across NPS units due to variations in context, it is questionable whether risk communication messages and modes considered successful at one park are directly transferable to another location without verification (e.g., a pilot program). Perceptions of and reactions to Lyme disease at Fire Island National Seashore (FINS) and Golden Gate National Recreation Area (GGNRA) exemplify this point.

At GGNRA, the public was minimally concerned about Lyme disease. To the extent that some local residents were concerned, they attributed risks primarily to the inability of the medical establishment to diagnose and treat the disease. A local resident reflected this perspective:

I don't think that I can blame the Park Service if I get bit by a tick in the park. In that movie [by a local filmmaker] I told you about, 'Under Our Skin', it is really against the medical estab -

lishment. . . . A lot of people have [Lyme disease] and are not diagnosed, are not diagnosed correctly, or are not treated.

Local newspapers provided abundant efficacy information, advising readers of actions they could take to limit exposure to ticks and Lyme disease. While people could be bitten by ticks on NPS lands, GGNRA is surrounded by many other public open space lands that also serve as tick habitat, so one's exposure to ticks is not limited to visiting the park. Trust in the NPS is high in communities adjacent to GGNRA and no interviewee indicated personal or community blame toward the NPS for the presence of Lyme disease locally.

At FINS, several local residents were very concerned about Lyme disease and angry that the national seashore would not do more to manage ticks. The incidence of Lyme disease from 2005 to 2009 was 96 times greater in New York compared with California (CDC 2010). The higher presence of ticks and incidence of Lyme disease at FINS compared with GGNRA certainly fostered differences in risk perceptions and reactions to the hazard, but it was not the only factor.

Local residents at FINS live within the national seashore; thus, many people tend to identify ticks they pick up in their own backyards as having "come from" FINS. Similar to the situation in or around many other parks, there is a history of tensions between local residents and FINS that fosters mistrust among some residents which may or may not relate to the issue being discussed (i.e., disease). An official from a community within FINS reflected:

There is a perception amongst residents that the Seashore does not prioritize the health of human residents on the Island as they should. . . . This sentiment is strong in some segments of the community; it is reflected in the response to the mosquito and tick control policies of the Seashore. There is definitely a lack of trust.

While several permanent residents were angered by what they perceived as a long-standing unwillingness of FINS to manage ticks, some seasonal residents viewed Lyme disease as a problem because it simply did not fit with their idea of what Fire Island should be—a place for care-free outdoor recreation. A community leader reflected:

People here come from Manhattan, or wherever, and they just think about it as coming to their beach house on Fire Island. It is a place to sun, surf, and enjoy the summers.

Compare this sentiment with the GGNRA interviewees' contention that most people exposed to Lyme disease at GGNRA were local residents engaging in various outdoor activities. Multiple interviewees told us that these California residents viewed Lyme disease as a "natural" component of the ecosystem.

The differences in prevailing perceptions of Lyme disease at FINS and GGNRA demonstrate the relevance of four types of context in affecting risk perceptions and reactions to the hazard: cultural/historical (trust, blame, "naturalness" of Lyme disease), social (media coverage, efficacy information), epidemiological (incidence rates, vector prevalence), and

environmental/geographic (living inside vs. outside the park, presence of other public lands that present similar risk exposure). When evaluating whether to transfer a risk communication tactic about a wildlife-associated disease that worked well in one park to another park, differences that might exist in each of these contexts should be considered. A disease may have similar epidemiological characteristics at both sites, and the environment and geography may even be comparable, but variations in just one dimension of context could substantially alter the magnitude or types of public risk perceptions. Tailoring risk communication to the specifics of the context can help your audience to understand the hazard.

Lesson #2: People's risk focus can shift over time

Many social and cultural influences can cause concern about risks to grow or shrink (Kasperson et al. 2003). Consequently, risk perceptions and reactions to hazards can change over time. We found not only that magnitude of risk perceptions can change with time exposed to a hazard, but the types of perceived risks also can shift substantially. The possibility of influencing audience segments to shift risk perceptions can be important in some situations. An example from Sleeping Bear Dunes National Lakeshore (SBDNL) illustrates how progression from one type of concern to another can occur.

SBDNL and the surrounding communities in the northwest corner of Michigan's Lower Peninsula experienced an outbreak of type E botulism in autumn 2006. While this disease had been present in Lake Michigan and in other Great Lakes for decades, SBDNL had never experienced the scale of impact experienced in 2006, when 2,900 dead birds (including gulls, cormorants, horned grebes, and common loons) washed up along 14 miles of its shoreline. When NPS employees discovered the dead birds, they immediately sent specimens to state laboratories for testing. Meanwhile, local residents started asking questions. What's killing the birds? Does it pose a risk to my health or that of my kids and grandkids who swim in the lake? How about risks to the health of my dog if it picks up a dead bird on the beach? Beach walking is a popular pastime in this area of Michigan, so many people were exposed to the dead birds.

The education director at a local NGO that focuses on water issues recalled that initially local residents were concerned predominantly with human health. Many residents contacted her to ask for information about the dead birds and to express their concern:

I think a lot of landowners probably thought about the public health issue first. . . . A lot of property owners say, 'Okay, I've got three dead birds on my property; what does that mean for myself, for my dog running around, for my kids swimming in the bay?'

Eventually, the disease killing the birds was diagnosed and local scientists had a good idea of the complex chain of interactions that led to the unprecedented outbreak, extending from burgeoning algae mats and invasive quagga mussels to sick gobies and dead loons.

Starting in January 2007, a team of five scientists and environmental advocates from NPS, Michigan Sea Grant, a local college, and two environmental nonprofit organizations collaborated to give public presentations on the cause of the bird deaths and to explain actions being taken to address the problem. From these meetings and the high-quality cov-

erage of their message in two local newspapers, the public learned that the type E botulism killing the birds did not pose a risk to human health. Public concerns about human health subsided. The clear, consistent, and accessible information from trusted sources (as the scientists and newspapers in this area were) quelled erroneous fears. But risk perceptions did not simply decrease; as human health concerns ebbed, concerns about wildlife and ecosystem health grew.

In nearly all of the risk communication that local residents were exposed to, scientists explained that the integrity of the whole ecosystem and a delicate food web had been compromised by exotic additions to the native biotic community (i.e., by the quagga mussels that played a complex but important role in allowing the botulism toxin to flourish). The public reacted strongly to these messages. The NPS biologist who delivered presentations at public meetings explained:

Once people learn more about the greater issues involved, their concerns start changing. People start using their minds and reacting in different ways—they think about writing letters to Congressmen and wondering what else they can do to remedy the situation.

The transition in types of risks perceived and their relative importance was aided by a strong attachment to the natural environment among many local residents. An editor of a local newspaper reflected on his conversations with community members:

People in general in this county like their natural resources, and when something like this starts happening, where birds are dying and botulism comes, they want to find out about (a) why it's happening, and (b) is there something they can do about it.

While many local residents possessed a foundation of concern for wildlife and the environment, a majority of our interviewees mentioned that it was only after exposure to risk communication messages that a sizable portion of local residents meaningfully focused on these types of risks.

The possibility that risk perceptions can evolve substantially over time, in terms of magnitude (more or less concern) and types of perceived risks, cautions managers to regularly re-evaluate whether the context has changed in a way that may have facilitated a shift in risk perceptions, including in response to their own risk communication efforts. The issue of variation in risk perceptions over time is simply another example of the importance of context specificity, but with respect to a temporal rather than a spatial scale. In the SBDNL example, the social context changed when risk communication introduced new information and perspectives into the public consciousness. One could also imagine cases where the shift in risk perceptions comes from a change in the epidemiological context (e.g., a change in incidence rates), variation in the environmental/geographic context (e.g., introduction of a new invasive species), or an alteration in the cultural/historical context (e.g., people learn to live with a disease that has been part of normal life for several years).

The fact that types of perceived risks evolve over time presents an opportunity for managers. Often, risk communication about wildlife and vector-borne diseases attempts to: (a)

reduce concerns that experts deem as over-reactive given available technical risk assessments, or (b) increase magnitude of risk perceptions about a certain type of risk (e.g., to human health) about which the public is insufficiently concerned. Experience in SBDNL suggests that another use of risk communication could be to increase concern for a different risk (such as the well-being of wildlife or ecosystem health) that could promote behavior that supports the mission of park managers.

Lesson #3: The importance of expectations

Risk communication often is intended to help the public better understand hazards to which people or things they care about are exposed. This view of risk communication assumes that one reason for differences in magnitudes and types of risk perceived by “experts” and “lay people,” or between different segments of the public, is that one group is misinformed or under-informed. While ignorance is at work in some circumstances, our study revealed several instances where risk perceptions varied for a different reason—experience with a hazard either reflected or diverged from expectations. In situations where expectations were met for what a hazard would be like and for what risks a hazard should pose, risk perceptions were lower in magnitude, and perhaps of a different type, compared with situations in which expectations were not met.

The role of expectations in influencing risk perceptions was clear at FINS. Most FINS employees and a subset of local residents perceived minimal to moderate risk to health from Lyme disease, yet another subset of the local population perceived a high level of health risk. The people in both groups were well informed about Lyme disease and aware of the same facts about the disease, its presence, and its history in the local ecosystem and community.

Some local residents were seasonal homeowners who only lived on Fire Island during the summer season and came from urban areas in which Lyme disease is not endemic. These people were on the island to vacation, and their expectations for an enjoyable vacation did not include ticks and Lyme disease. Many of these seasonal residents knew of the presence of Lyme disease but did not believe they should have to contend with it during their recreation time.

Other local residents and NPS staff simply accepted that the ticks were on the island to stay and that they had to accept this reality and adjust their behavior accordingly. A natural resources manager at FINS commented, “You can avoid exposure to ticks and Lyme disease on Fire Island. You have to go into the tick habitat to expose yourself to ticks. Why should people be so concerned about it?”

Of course, not all permanent local residents were willing to accept being exposed to Lyme disease when in their backyards. These individuals believed that a method of controlling ticks by applying permethrin to deer, called 4-poster devices, would greatly reduce tick populations on the island and thereby reduce exposure to Lyme disease. They expected NPS to apply this control method. The NPS natural resource managers, however, had concerns about whether the devices were consistent with the NPS’s pesticide policy and the NPS mission.

Like risk perceptions, expectations can evolve. Over time, some people who were initially very concerned about the presence of Lyme disease due to surprise over its presence at

FINS came to expect that exposure to the disease was part of the local reality. A law enforcement ranger at FINS observed, “[Lyme disease] was an issue du jour back then, but then people realized that ticks are everywhere and not just on Fire Island.” Because Lyme disease and ticks existed elsewhere, some local residents adjusted expectations for what they would encounter at FINS, which contributed to lowering the magnitude of risk perceptions.

People with nearly identical knowledge about a hazard, but with different prior expectations for what they could or should encounter, can perceive different levels of risk. This highlights the importance of understanding why people develop risk perceptions, in addition to knowing the degree of risk they perceive. A park may have data that show that public perceptions of risk substantially exceed technical risk analyses, but if this elevated level of risk is due to violated expectations, providing more information about the risk would be unlikely to have much effect.

Managers seeking to communicate with the public about hazards that deviate from expectations may wish to help people reflect on the reasonableness of their expectations. It is understandable that someone on Fire Island who did not believe that she or he would be exposed to Lyme disease would, upon learning of the hazard, have elevated risk perceptions compared with someone who expected such exposure. It is also clear that expectations can change over time. A manager may be able to help people form new expectations more quickly by using risk communication that places the hazard and its associated risks in a more acceptable context (e.g., “they’re a natural part of the environment”). For example, by explaining the history of Lyme disease locally, the reason for its presence in the ecosystem, and the extent to which the hazard is present not just at the NPS unit, but also in other areas locally, may facilitate a transition to a view of Lyme disease as something one could reasonably expect to encounter in the NPS unit; that is, the park is no different than other nearby open space in this respect. It would likely be more difficult for a manager to influence expectations about wildlife-associated disease when they arise from experience-based beliefs about what one should encounter. Even in such cases, however, information about the context in which the hazard is situated may help the public think about risks differently.

Conclusion

Risk communication about wildlife-associated diseases is certain to be a growing need for park managers as real and perceived concerns about such hazards escalate. While difficult to do well, this kind of communication may serve to reinforce people’s appreciation for the deep connection between human, wildlife, and environmental health and well-being. It is conceivable that if placed in this frame, wildlife-associated disease could be the focus of powerful interpretive programs taking an “ecological” approach to the topic. Such programs could emphasize the interconnectedness of human, wildlife, and environmental health and show how health in all these domains may be at risk from climate change, land use change, global movement of humans, introduction of exotic species, etc. Wildlife and public health experts, wildlife ecologists, human dimensions specialists, and education and interpretive specialists could collaborate to design such a program and be a service to citizens visiting, working in, and living beside parks.

Acknowledgments

We recognize the NPS Biological Resources Management Division (BRMD), for providing funding for this research, via an agreement through the Great Lakes/Northern Forest Cooperative Ecosystem Studies Unit (CESU). Margaret Wild and Kirsten Leong of the BRMD were instrumental in helping us design and execute this research. Staff from the three NPS units referenced in this paper provided valuable assistance. Steve Yancho, Ken Hyde, Bruce Badzik, and Mike Bilecki of NPS helped us identify appropriate interviewees and assisted with logistics during fieldwork. Richard C. Stedman, Katherine A. McComas, and William F. Siemer of Cornell University were advisors for the research and reviewers of draft manuscripts. We also wish to thank our 106 interviewees for sharing their experiences with us.

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