CHAPTER 16

The Human Dimensions of Conflicts with Wildlife around Protected Areas

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Protected areas are credited with saving a number of wildlife populations from regional or rangewide extinction, and they remain a cornerstone of conservation (Terborgh et al. 2002; Woodroffe and Ginsburg 1998). They have also faced substantial criticism for undemocratic imposition of a societal goal on local peoples (Cernea and Schmidt-Soltau 2006; West and Brockington 2006). Allegations of social inequity often intensify when wildlife populations recover near to human ones. In particular, individual, far-ranging, large-bodied wild animals will eventually leave protected areas and resume an ancient competition with people for the necessities of life. This competition consists of wildlife eating crops, livestock, and other resources we claim, or occasionally attacking people. This human-wildlife conflict (HWC) can further undermine political support for protected areas and can revive calls for eradication of the problematic wildlife (Feral 1995; Okwemba 2004). HWC occurs worldwide and its annual frequency and severity has been rising for three reasons: (i) human uses of wildlife habitat are expanding in many regions, (ii) a few wildlife populations are recovering and expanding into areas with people and property; and (iii) environmental changes such as climate change are driving some sensitive species into areas with more people and property (Gompper 2002; Treves et al. 2002; Raik et al. 2005; Breitenmoser 1998; Hunter et al. 2007; Cope, Vickery, and Rowcliffe 2005; Knight 2003; Naughton-Treves et al. 2003; Linnell and Broseth 2003; Regehr et al. 2007).

Because a traditional and widespread response of affected human communities is to kill problem wildlife and clear wild habitat (Treves

and Naughton-Treves 2005), natural resource managers and wildlife protectionist groups become involved. Political conflicts ripple outward from there. Thus, HWC is more than simple competition for space, food, and life; it pits different nature values against one another and demands attention from economic, legal, social, and environmental policy makers (Knight 2000a).

Academics and lay audiences have paid more attention to HWC in the last fifteen years. Between 1992 and 1999, Google Scholar returned 3,140 hits for "human AND wildlife AND conflict OR depredation OR damage" compared with 8,060 hits between 2000 and 2007. Public attention has also increased. Searching all Web pages in 2007, Google returned 2,010,000 hits for the same (similar to 2,060,000 hits for "wildlife AND disease" or 1,980,000 hits for "wildlife AND ('climate change' OR 'global warming')." The growing attention and energetic research efforts have advanced understanding and made clear how HWC can undermine wildlife protections and reverse conservation gains.

This chapter examines peoples' responses to HWC, especially those of wildlife managers and individuals who live and work in and around protected areas. Protected areas reveal the fundamental dilemma posed by global and national concerns for biodiversity conservation on the one hand and individual and economic motivations to safeguard human life and livelihood on the other hand. Thus, the chapter pays particular attention to political clashes because these are the most likely to affect wildlife policy and protected-area management.

Background, Definitions, and Assumptions

HWC is defined here as wildlife threats to property, recreation, and human safety. This chapter examines HWC involving larger animals (greater than two or three kilograms) with particular attention to predation on livestock by mammals. Although smaller animals cause far greater damage in aggregate, this focus is justifiable on several grounds. First, large carnivores and other megafauna (e.g., elephants) have special ecological importance and are often icons of protected areas and wildlife conservation groups. Second, carnivores and megafauna are particularly sensitive to human causes of mortality, according to Woodroffe and Ginsburg (1998). Indeed, these authors concluded that humans were the foremost threat to carnivore populations globally. The risk of extirpation of carnivore populations was most severe around small, protected areas, presumably because their far-ranging habits and

resultant encounters and competition with people placed them in harm's way. Efforts to separate large wildlife from people (the core strategy of protected areas) may have reduced the geographic extent of some HWC (Riley, Nesslage, and Maurer 2004), but it has also magnified the consequences at the boundaries (Naughton-Treves 1997). Widespread efforts to "soften" park boundaries and integrate people's economic needs will have a profound effect on HWC rates and distribution in the future, as will climatic changes that further fragment wild habitat or shift it in altitude and latitude.

HWC takes various forms according to the animal, its behavior, or the human community involved (Sillero-Zubiri, Sukumar, and Treves 2007). But patterns repeat. Fishermen may resent sharks for "stealing the catch" just as game hunters resent wolves for taking "their" elk; and bear damage to timber in Japan resembles moose damage in Sweden. In addition, local communities appear to respond in a limited number of ways to HWC, whereupon wildlife managers typically counterreact in a limited number of ways.

In interpreting human responses to HWC, one should keep in mind well-established features of human dimensions theory. First, wildlife values are believed to take shape early in life and change slowly (Bright and Manfredo 1996; Manfredo, Teel, and Bright 2003; Bruskotter, Schmidt, and Teel 2007)—thus, recent experiences rarely change basic values or beliefs (Heberlein and Ericsson 2005; Manfredo and Dayer 2004). In contrast, recent experiences and reports from associates may shape attitudes toward management as well as tolerance for HWC (Karlsson and Sjostrom 2007; Naughton-Treves, Grossberg and Treves 2003; Naughton-Treves and Treves 2005). Second, a complex mix of individual, social, and environmental factors correlate withperceptions of environmental hazards and their management (Manfredo and Dayer 2004). For example, lack of control or predictability of hazards may intensify perceived risk (Starr 1969), and HWC is not easy to predict or mitigate (Treves et al. 2004, 2006; Wydeven et al. 2004; Backeryd 2007). Third, we should expect incongruence between perceptions of HWC and scientific measures of wildlife damage (Treves et al. 2006). Perceptions and attitudes are influenced by testimonials and entertaining stories that may reflect (a) extreme events and imagination, (b) long memories and a history of human-animal interactions, and (c) experiences from a broad region. By contrast, systematic field data on HWC events and losses tend to emphasize variation around averages and shorter time periods in smaller regions. For example, the costliest and most frequent crop raider

around Kibale National Park, Uganda, was the baboon, but most respondents reported a stronger dislike of elephants (Naughton-Treves 1997). Similarly, wolves have caused less damage to property and attacked fewer people in North America than have bears, yet people report higher fear of and anger about wolves (Kellert 1985; Montag, Patterson, and Sutton 2003). Rather than conclude that people are irrational about wildlife or controlled entirely by social tradition and symbolism, human dimensions researchers assume a multivariate role of intrinsic (individual experience and evolutionary history) and extrinsic (economic, social, and cultural) factors in shaping perceptions and attitudes.

Evidence for perceptions of HWC comes from a variety of social scientific studies and is typically measured by interview, self-administered questionnaire, or focus group. Measuring people's behavior is difficult when reactions are influenced by social norms or behavior is illicit ("shoot, shovel, and shut up"). Therefore, the data are dominated by self-reported perceptions and emotions or researchers' inferences of these, with all the weaknesses this can entail.

Perceptions of HWC and Attitudes toward Its Management

When threats derive from large, wild animals, affected people often report fear, anger, or hopelessness. Women and children tend to report higher levels of fear than men (Kaltenborn, Bjerke, and Nyahongo 2006; Kellert 1980). Fear is understandable given an evolutionary history of attacks by large, dangerous wildlife and current, widespread reporting of conflicts, despite their absolute and relative rarity (Beier 1991; Linnell and Bjerke 2002; Treves and Palmqvist 2007). More often than emotional responses, researchers measure perceptions of wildlife in relation to economic losses, risk. and vulnerability. Table 16.1 summarizes some common predictors of tolerance for different wildlife.

There is also a long tradition in the United States of measuring attitudes toward management of HWC (Kellert 1980, 1985; Manfredo et al. 1998; Williams, Ericsson, and Heberlein 2002). Such studies often expose sharp contrasts between those who hold protectionist wildlife values and those who hold more utilitarian values, such as rural residents with low residential mobility, those having less formal education, older people, men, those with lower incomes, and those with more direct experience with wildlife damage. Similar results are beginning to emerge from other countries (Ericsson and Heberlein 2003; Hill 1998; Knight 2003, 2000b; Kuriyan 2002).

TABLE 16.1 **Predictors of Tolerance for Conflict-causing Wildlife**

	HIGHER TOLERANCE	LOWER TOLERANCE
Socioeconomic predictors		
Land availability	Abundant	Scarce
Labor availability	Abundant, inexpensive	Rare, expensive
Coping strategies	Varied, collective	Narrow, individualized
Social unit absorbing loss	Communal, group	Individual, household
Value of wildlife	High (game, tourism, etc.)	Low (pest, vermin)
Value of property	Low	High
Type of damage	Subsistence	Cash or emergency reserve
Alternate income	Various	None
Ownership of wildlife	God, self, community	Government, elite
Ecological predictors		
Wildlife body size	Small, non-threatening	Large, dangerous
Wildlife group size	Solitary	Large
Damage pattern	Cryptic	Obvious
Timing of damage	Early crop or young livestock	Late crop or adult livestock
Circadian timing of damage	Diurnal	Nocturnal
Damage per incident	One or few	Surplus or many
Frequency of raiding	Rare	Chronic

Source: Naughton-Treves and Treves 2005

Different values, perceptions, and attitudes toward HWC based on urban-rural divisions or differences in reliance on natural resources can easily generate political clashes over HWC because people often disregard or discount the views of those with different values. As Gill (199[illegible]oted, if wildlife managers are drawn from rural backgrounds rather than urban areas, then one tends to see greater conflict with protectionists than with the communities threatened by wildlife. For example, the U.S. Department of Agriculture wildlife control agency staffed by individuals with rural or user group backgrounds (Gill 1996) has faced decades of criticism from protectionists (Robinson 2005). By contrast, in many poorer countries, urban elites most often benefit from university training and are more likely to join the civil service as natural resource managers than would rural agriculturalists. Hence, political clashes over HWC tend to pit the affected communities against the state in poorer countries (Hazzah and Dolrenry 2007; Hill 2004; Karanth and Madhusudan 2002).

Behavioral Responses to HWC

Following threats from wildlife, people typically act, and their behavioral responses can be classified simply (table 16.2). Direct retaliation against wildlife is clearly most directly opposed to wildlife protections. Human retaliation can "drain" protected areas because humans can enter and carnivores can exit. In Laikipia, Kenya, one [illegible]her's intolerance of lions produced a population sink for a wide region (Woodroffe and Frank 2005). In an example of rapid decimation, villagers destroyed eleven leopards while trying to eliminate [illegible]uman killer in India (Karanth and Madhusudan 2002).

Killing many wild animals to control a few is sure to draw the attention of wildlife managers and protectionist interests, setting the stage for more political clashes over mitigation of HWC and over the purpose and future of protected areas. In some cases, interventions may cause indirect problems (table 16.2). For example, guard animals such as free-running dogs may spread disease or injure wildlife (Bowers 1953). Building barriers may constrain wildlife movements; in the case of elephants in southern Kenya, the result was drastic changes in vegetation within the fenced area (Kahumbu 2002). Some deterrents using chemicals, lights, sounds, or fires may have unintended consequences for nontarget wildlife.

TABLE 16.2 **Common Interventions to Mitigate Human-wildlife Conflicts**

CLASS OF INTERVENTION AND SUBTYPES	POTENTIAL, SIGNIFICANT NEGATIVE IMPACTS ON WILDLIFE IN PROTECTED AREAS	POTENTIAL, SIGNIFICANT NEGATIVE IMPACTS ON PEOPLE AFFECTED BY WILDLIFE
Direct Interventions reduce the severity or frequency of interactions with wild animals:		
Barriers	Barriers may block wildlife movement paths.	Some barriers may impede use of resources from the protected area or impose property regimes on communally owned resources.
Deterrents and Repellents	Use of chemicals, fires, lights, or sound may disrupt non-target wildlife. Target wildlife may be displaced to other locations, disrupting established social networks and damaging other properties.	Some repellents and deterrents may pose health hazards or safety risks.
Guards (animals or human)	Some domestic animals introduce health hazards or safety risks	Some domestic animals introduce health hazards or safety risks.
Change in human behavior or husbandry	This will have variable effects.	This will have variable effects. It may intensify political and economic inequity.
Manipulation of wildlife (lethal control, relocation, sterilization, etc.)	Manipulations may harm individuals, disrupt social networks, or relocate the problems.	Manipulations may exacerbate or relocate the problems.

CONTRASTS BETWEEN WEALTHY AND POOR NATIONS

In some areas of Europe and North America, changing societal values toward nature have spurred protectionist policies. Enforcement of these policies has facilitated wildlife recovery in some regions or promoted reintroduction efforts in others (Breitenmoser 1998; Gompper 2002; Hunter et al. 2007; Mech 1995). By contrast, in many poor agrarian nations, the range of large carnivores has contracted, even within

and Their Potential, Significant Impacts on Wildlife and People

CLASS OF INTERVENTION AND SUBTYPES	POTENTIAL, SIGNIFICANT NEGATIVE IMPACTS ON WILDLIFE IN PROTECTED AREAS	POTENTIAL, SIGNIFICANT NEGATIVE IMPACTS ON PEOPLE AFFECTED BY WILDLIFE
Indirect interventions raise tolerance for wildlife threats:		
Annulment of wildlife protections	Unsustainable uses of wildlife and protected areas may follow.	If unsustainable uses ensue, ecosystem services from the protected area may degrade.
Compensation	Fewer resources may be left for protected area management.	This may create dependence on donors or intensify political and economic inequity.
Incentives	Fewer resources may be left for protected area management.	This may create dependence on volatile market forces or external inputs. it may intensify political and economic inequity.
Environmental Education and Research	Misinterpreted or misguided research can lead to unsustainable management.	This may intensify political and economic inequity.
Participation and Co-management	Unsustainable uses of wildlife and protected areas may follow.	This may intensify political and economic inequity.

e: Treves et al. 2006

protected areas (Plumptre et al. 2007; Rajpurohit and Krausman 2000). Poor countries rarely have adequate resources to enforce wildlife protection policies, so they have attempted an alternative conservation approach variously called community-based conservation, participatory co-management, and so on. A key aim of this alternative is to channel benefits to local communities by sharing revenue from consumptive or nonconsumptive use of wildlife (Archabald and Naughton-Treves 2001; Brandon and Margoluis 1996; Frost and Bond 2006; Loveridge, Reynolds, and Milner-Gulland 2007). Wildlife managers in wealthier nations are increasingly turning to similar methods (Carr and Halvorsen 2001; Raiket al. 2005; Wiedenhoeft, Boles, and Wydeven 2003). Collaborative wildlife management is a key area for

future research on HWC. Some predict involvement of affected households in co-management would raise tolerance for wildlife damages by itself (Treves et al. 2006).

A further difference between wealthy and poor nations is the populace surrounding protected areas. In many developing countries, politically marginalized peoples inhabit protected areas or their margins, often in poverty (Hazzah and Dolrenry 2007; Karanth 2005; Karanth and Madhusudan 2002; Naughton-Treves et al. 2003a; Mishra et al. 2003). By contrast, wealthy countries have seen an increase in recreational use of protected areas along with an increasing number of jobs created by protected areas or wildlife industries (Duffield and Neher 1996; Hunter et al. 2007). Also, wealthy nations build more houses and more expensive ones adjacent to wildlife habitat (Torres et al. 1996; Tucker and Pletscher 1989). As a result, populations fringing protected areas are often neither poor nor politically marginalized. We found that wealthier, better-educated landowners with larger holdings and herds were more likely to seek and win compensation for wolf damage in Wisconsin (Naughton-Treves, et al. 2003b). In addition, influential or wealthy landowners may have more direct access to policy-makers or litigate more effectively.

Conclusion

HWC stands out among challenges faced by wildlife managers as a situation that has often escalated into political clashes. Contrasting wildlife values between affected households, wildlife managers, and wildlife protection interests are the most common cause of political clashes. When the various actors drawn into HWC incidents respond differently to data than to testimonials, one may find political clashes arising earlier and more perniciously than in areas where the primary actors are swayed by the same sources of evidence and modes of communicating them. Anger arising from economic losses, fear of wildlife, or distrust of government also precipitates more intense political clashes. Confronting angry people can put wildlife managers or protectionists on the defensive. Defensive responses may lead listeners to minimize wildlife threats by referring to their relative rarity or perceived low value of the losses (e.g., Valentino 1998). Wealthy nations' protected areas are often surrounded by wealthy people who will demand accountability from wildlife managers, whereas poorer nations' protected areas are often fringed by the poor and politically

marginal, to whose defense champions of economic development and poverty alleviation will leap (Karanth 2005). Political clashes, in turn, have sometimes undermined political support for protected areas and wildlife managers, at many levels. Protected areas have been annulled or their boundaries changed, and wildlife policy has been altered dramatically (Feral 1995; Okwemba 2004). Wildlife managers have lost authority and flexibility to manage wildlife that damage property, after their chosen management interventions did not satisfy a litigious or populous interest group (Gill 1996; Torres et al. 1996).

Because the stakes can be high in HWC situations, theoreticians and field researchers should study the politics and measure the sociopolitical acceptance of proposed management *before* it is implemented and then disseminate the results and lessons efficiently to wildlife managers and policy makers. Human dimensions researchers are challenged to move beyond description and understand causality of perceptions and attitudes, as well as to guide the selection, design, and monitoring of creative interventions..

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