

The Growing Conflict Between Humans and Wildlife: Law and Policy as Contributing and Mitigating Factors

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1. INTRODUCTION

Human-wildlife conflict (HWC) is an increasingly significant obstacle to the conservation of wildlife. The growing body of HWC literature tends to focus on biological, economic and local aspects associated with HWC. The factors driving HWC at the local level are, however, shaped in turn by numerous other factors, including laws and policies. In many cases, legal and policy measures—particularly those involving land-use planning and wildlife management—contribute to this growing problem. Yet law and policy can play an important role in supporting the mitigation and prevention of HWC. This article aims to identify predicaments and challenges in current legal and policy strategies and suggests options for reforming law and policy to mitigate HWC.

Part 1 reviews the nature and sources of HWC and illustrates the discussion with a specific conflict situation in Bwindi Impenetrable Forest National Park in Uganda, drawing on the author's own experience. Part 2 discusses some of the roles that law and policy have played in contributing to HWC in many places around the world. Part 3 discusses some efforts to address HWC and their mixed results. Based on this review, Part 4 discusses options for developing laws and policies that more effectively mitigate or prevent HWC.

2. THE HUMAN-WILDLIFE CONFLICT CRISIS

HWC occurs when humans or wildlife harm or threaten one another in the course of pursuing their needs or interests.² In particular, it includes cases

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² "Human-wildlife conflict occurs when the needs and behavior of wildlife impact negatively on the goals of humans or when the goals of humans negatively impact the needs of wildlife." World Parks Congress (WPC), *WPC Recommendations, Recommendation 20: Preventing and Mitigating*

where wildlife threatens, attacks, injures, or kills humans, as well as cases where wildlife threatens, attacks, injures, or destroys their livestock, crops or property. HWC also occurs when humans deliberately injure, abuse, or kill wildlife because of perceived or actual threats to their property, livelihoods, lifestyle, person, or family. Such conflict may occur, for example, when a jaguar has attacked someone's livestock, an elephant has raided someone's crops, or a person has poisoned a tiger because of the threat it may pose to their livestock and family.

When people perceive wildlife as impairing their interests, the conflict may intensify as they may retaliate against individual animals or entire populations. People may also retaliate against or reduce cooperation with conservation authorities if they feel that their own needs are being subordinated to those of wildlife, or that conservation authorities exclude them from decisions that affect their interests. For example, a person or community may retaliate against authorities by illegally killing the offending animal or other animals of the same species, or by illegally taking other wildlife species or other resources under protection; facilitating outside poachers in their illegal activities; or refusing to be involved with or support conservation programs in the region. "If protected area authorities fail to address the needs of the local people or to work with them to address [HWC] adequately, the conflict expands and intensifies . . . becoming a conflict not only between humans and wildlife, but *between humans about wildlife*."³

HWC is rapidly becoming one of the most important threats to the survival of many wildlife species, including large and highly endangered animals such as tigers, lions, wolves, elephants, and gorillas that are directly associated with the conflict. In addition, other endangered wildlife species not commonly associated with HWC may purposely or incidentally be harmed because of retaliatory poaching or habitat loss.

Direct causes of HWC increase include the expansion of human populations into or near to areas inhabited by wildlife, intensification and modification of human uses of those areas, and fragmentation and loss of habitat in those areas.⁴ Additional root causes of HWC include the designation of protected areas, where human activity is forbidden or strictly limited, that

Human-Wildlife Conflicts (8–17 Sept. 2003), <http://www.iucn.org/themes/wcpa/wcpa2003/pdfs/outputs/recommendations/approved/english/html/r20.htm>

³ Francine Madden, *Creating Coexistence Between Humans and Wildlife: Global Perspectives on Local Efforts to Address Human-Wildlife Conflict*, 9 HUM. DIMENSIONS OF WILDLIFE 247, 248–249 (2004) [hereinafter *Creating Coexistence*].

⁴ See FRANCINE MADDEN, THE HUMAN-MOUNTAIN GORILLA CONFLICT RESOLUTION PROJECT (HUGO): A PROBLEM ANALYSIS AND PROJECT DESIGN, INTERNATIONAL GORILLA CONSERVATION PROGRAMME (1999) [hereinafter *HUGO Analysis*]; Francine Madden, *Gorillas in the Garden: Human-Wildlife Conflict at Bwindi Impenetrable National Park*, POL'Y MATTERS (World Conserv. Union, Gland, Switzerland), Mar. 2006, at 180, <http://www.iucn.org/themes/ceesp/publications/newsletter/PM14-Section%20III.pdf> [hereinafter *Gorillas in the Garden*]; STEVEN KANSTOROOM, MARYLAND TASK FORCE ON NON-LETHAL WILDLIFE MANAGEMENT,

are insufficient in size for wildlife needs. Consequently, wildlife use human-occupied areas outside protected areas in order to survive, thereby triggering conflict. Contributing factors also include the lack of co-management and co-ownership opportunities for local people, and costs that are out of proportion to benefits for local people from living with their wild neighbours.

Many additional factors are part of the complex of causes that shape HWC or coexistence. The quality of the interaction between humans and wildlife is shaped by a mix of biological, social, historical, legal, geographic, political, economic, ethical, institutional, financial, cultural, and management factors. For example, in India livestock displacement of wild prey populations and poor anti-predator management of livestock led to high levels of snow leopard predation on livestock, which consequently led to resentment and retaliation by local people.⁵ Political, historical, and/or social injustices committed against local people by those in authority also may create the perception that crop or livestock losses are higher than they actually are.⁶ On the other hand, cultural values of reverence and tolerance for wildlife may ameliorate tensions between human populations and neighbouring animals.⁷

Unfortunately, conservation policies and programs sometimes focus narrowly on the biology of endangered species or the immediate economic losses to people. A combination of social, cultural, legal and equity factors can aggravate HWC by affecting local people's ability to tolerate wildlife and by undermining their commitment to conservation efforts.⁸ Local perceptions of injury from wildlife may be out of proportion to objective measurements of damage, but these perceptions are important indications that underlying issues have been ignored; thus, they must be understood and responded to in conservation policy if the support of local people necessary for conservation success is to be maintained.⁹ Misguided policies and laws, or gaps in legal and

REPORT TO GOVERNOR PARRIS N. GLENDENING AND THE MARYLAND GENERAL ASSEMBLY: FINDINGS AND RECOMMENDATIONS 4 (18 Jan. 2002), <http://dnrweb.dnr.state.md.us/download/wildlife/nltfreport.pdf>

⁵ Charudutt Mishra et al., *The Role of Incentive Programs in Conserving the Snow Leopard*, 17 CONSERV. BIOL. 1512, 1514 (2003).

⁶ Madden, *Creating Coexistence*, *supra* note 3, at 250.

⁷ Francine Madden, *Can Traditions of Tolerance Help Minimise Conflict? An Exploration of Cultural Factors Supporting Human-Wildlife Coexistence*, POL'Y MATTERS (World Conserv. Union, Gland, Switzerland), Nov. 2004 at 234 (2004), <http://www.iucn.org/themes/ceesp/Publications/newsletter/PM13-Section2-part2.pdf> [hereinafter Madden, *Traditions of Tolerance*].

⁸ Madden, *Creating Coexistence*, *supra* note 3, at 250; David Western & John Waithaka, *Policies for Reducing Human-Wildlife Conflict: A Kenya Case Study*, in PEOPLE AND WILDLIFE, CONFLICT OR COEXISTENCE? 357, 371 (Rosie Woodroffe et al., eds., 2005).

⁹ See Holly Dublin & Richard Hoare, *Searching for Solutions: The Evolution of an Integrated Approach to Understanding and Mitigating Human-Elephant Conflict in Africa*, 9 HUM. DIMENSIONS OF WILDLIFE 271, 277 (2004); Catherine M. Hill, *Farmers' Perspectives of Conflict at the Wildlife-Agriculture Boundary: Some Lessons Learned from African Subsistence Farmers*, 9 HUM. DIMENSIONS OF WILDLIFE 279 (2004) [hereinafter Hill, *Farmers' Perspectives*]; Laurie Marker & Amy Dickman, *Human Aspects of Cheetah Conservation: Lessons Learned from the Namibian Farmlands*, 9 HUM. DIMENSIONS OF WILDLIFE 297, 300 (2004).

policy frameworks, can contribute to HWC. By the same token, the mitigation and prevention of HWC will require supportive legal and policy frameworks.¹⁰

2.1 Case Study: People and Gorillas Around Bwindi Impenetrable Forest National Park, Uganda¹¹

Within its 331-square-kilometre area, Bwindi Impenetrable National Park in southwestern Uganda contains a montane rainforest of unusual biodiversity that is habitat for as much as one-half of the world's surviving population of mountain gorillas, *Gorilla berengeti berengeti*. The park's resident gorillas generate tourism revenues and the park itself creates both costs and benefits to local communities.

In the last dozen years, however, park managers at Bwindi have been confronted with the problem of increasing losses suffered by local people due to gorillas. In Bwindi, local people have experienced daily the negative ramifications of gorilla tourism. Gorilla groups that were deliberately habituated to human presence for tourism purposes raided crops in the village day after day after losing their fear of humans and open spaces. Lone males that had broken off from habituated groups were suspected to be the same gorillas attacking villagers near the northern, tourism-designated section of the park. These were serious problems for local people: children whose access to education was already limited were afraid to walk to school for fear of attack; villagers dependent on gardens for subsistence were afraid to tend them and suffered loss of garden production; villagers with crops to sell were at times inhibited from going to market because gorillas were nearby; and injured individuals were unable to carry out work essential to their livelihood, such as guarding crops. At the same time, increased contact with humans increased the exposure of gorillas to diseases which can have fatal complications, such as influenza and scabies.¹² Finally, the increased animosity toward the park for not attending to the gorilla problem increased the likelihood that someone would kill a gorilla in retaliation.

Increasingly, park managers felt a managerial responsibility to respond to these problems, both in fairness to injured parties and in the interest of maintaining community support for conservation. Unfortunately, national legal and policy frameworks in Uganda have tended to impose incongruous constraints on local management rather than provide the direction or authority needed to address the problem in a locally appropriate fashion. For example, Ugandan law in the 1990s prohibited the government from providing compensation for

¹⁰ Dublin & Hoare, *supra* note 9, at 277 (concluding that “[w]ildlife managers must . . . be supported by clear policies and legal frameworks at the national level” in order to address HWC).

¹¹ This discussion is drawn from Madden, *Gorillas in the Garden*, *supra* note 4.

¹² See *Id.* at 184.

damage due to wildlife, but provided no authority for alternative measures to address the costs to local people living with wildlife and near protected areas.

Different park managers (the park had three managers in the course of two years in the 1990s) handled the situation differently. Particularly in cases involving physical injury, managers felt an obligation to provide some financial coverage of medical bills associated with attacks, but under the “no compensation” law their actions were somewhat clandestine and the amount and type of compensation varied. Additional help in the form of food for victims or their family or other services might or might not be provided, at the discretion of the individual manager. Local people resented this inconsistent, inequitable and—from their point of view—capricious treatment.

To be sure, compensation, if it were legally instituted in Uganda for human-gorilla conflict, would be no more than a partial response to the problem. Compensation addresses only the economic aspect of a conflict that is equally a socio-political and ecological problem with links to land use, equity and empowerment.¹³

Within an unsupportive legal framework, the Uganda Wildlife Authority developed misdirected policies for human-gorilla conflict. In the late 1990s, for example, contrary to scientific opinion, translocation was formally and nationally promoted as the sole solution for a mountain gorilla whose behavior was a problem. Translocation, however, was inadequate for a number of reasons, including the small size of the park, the high probability the gorilla would return, the health risk to the gorilla, and the enormous expense. No alternatives to translocation were made available to local managers who needed flexibility to respond to local conditions. No direct consideration was given to root causes of the conflict, such as habituation, land-use planning, and marginalization of local people in management decisions. Hampered by a top-down framework of law and policy that forbade potentially useful tools like compensation, mandated ineffective ones like translocation, and provided no authority for local managers to respond to local conditions and no role in decision-making for affected local people, Bwindi management stumbled in its efforts to address HWC.

3. THE ROLE OF LAW AND POLICY IN HUMAN-WILDLIFE CONFLICT

Law and policy have a critical role to play in effecting more positive outcomes for HWC. Yet too often existing laws and policies exacerbate HWC, usually

¹³ Jessica Montag, *Compensation and Predator Conservation: Limitations of Compensation*, CARNIVORE DAMAGE PREVENTION NEWS (Coordinated Research Projects for the Conservation and Management of Carnivores in Switz. (KORA), Mari, Switzerland), Feb. 2003, at 2, 5, <http://www.kora.unibe.ch/pdf/cdpnews/cdpnews006.pdf>; Philip Nyhus et al., *Taking the Bite out of Wildlife Damage: The Challenges of Wildlife Compensation Schemes*, CONSERV. MAG, Spring 2003, <http://www.conbio.org/cip/article42tbw.cfm>

inadvertently. This section considers links between law and policy and HWC in the areas of land-use policies and local benefits and empowerment.

3.1 Land-Use Policies

Land-use policies have a direct bearing on the extent and severity of HWC.¹⁴ As one recent review of human-elephant conflict concludes, “[w]ildlife managers must . . . be supported by clear policies and legal frameworks at the national level, preferably involving land-use policy.”¹⁵

Land designated as protected is often inadequate to sustain the targeted wildlife. As a result, the land adjacent to a protected area, land used by the local population, is used by wildlife to realize its needs. Land-use policies must make accommodations for these overlapping needs.

Land-use policy can play a passive role in aggravating HWC where its inadequacy or absence allows human activities that cause conflict to take place or expand. In the case of Bwindi, for example, the lack of national or local land-use policies for areas adjacent to the park allowed increased settlement and increased farming of crops attractive to gorillas, enticing the animals to venture outside the park to raid crops.¹⁶ In Tanzania, it has been argued that the land-use policy for migration corridors and buffer zones adjacent to protected areas needs to take better account of HWC.¹⁷

In Bhutan, Buddhist philosophy teaches a balance and coexistence with nature. The eradication of a species through intensive hunting would seem incongruous with such cultural beliefs. However, land-use and wildlife management laws did not provide viable options for addressing HWC. Because of new protected area designation laws, a blanket prohibition on hunting across all lands, and lack of opportunity to participate in the development of any prevention or mitigation measures, farmers felt severely hampered in their ability to stop the heavy livestock depredation by wild dogs, *Cuon alpinus*. As a result, in the early 1980s, farmers across Bhutan violated local conservation laws by exterminating the population of wild dogs. Consequently, the

¹⁴ See e.g., ANDREW LOVERIDGE ET AL., LION CONSERVATION RESEARCH, WORKSHOP 2: MODELING CONFLICT (2002) [hereinafter *Lion Conservation Workshop*] (discussing the correlation between types of land-use and zoning policies, and levels of contact between lions and people in Africa); Bernard Toutain et al., *Pastoralism and Protected Areas: Lessons Learned from Western Africa*, 9 HUM. DIMENSIONS OF WILDLIFE 287, 292 (2004); Madden, *Gorillas in the Garden*, *supra* note 4, at 187–188.

¹⁵ Dublin & Hoare, *supra* note 9, at 277; see also Madden, *Gorilla in the Garden*, *supra* note 4, at 190 (concluding that prevention and mitigation of human-gorilla conflict near Bwindi National Park, Uganda would require major changes in patterns of land use in surrounding areas).

¹⁶ Madden, *Gorillas in the Garden*, *supra* note 4, at 185–188 (in the absence of land-use planning that takes account of presence of gorillas in Bwindi National Park, local Ugandans near the park have expanded cultivation of crops such as bananas, coffee, and maize along the park’s margins, tempting gorillas to leave the park to feed on these crops).

¹⁷ Vincent Shauri, Lawyers’ Envtl. Action Team (LEAT), *The New Wildlife Policy in Tanzania: Old Wine in a New Bottle?* (1999), <http://www.leet.or.tz/publications/wildlife.policy/wildlife.policy.pdf>

temporary extirpation of wild dogs throughout Bhutan may have contributed to an explosion in the population of bush pigs (a main prey species for the dogs), which are currently a top crop-raiding pest.¹⁸

Land-use and development policies can also actively intensify HWC. For example, land-use and development policies in some countries have encouraged nomadic peoples to settle in fixed communities and switch from pastoralism to agriculture, disrupting patterns of land use that had previously avoided conflict and even allowed people to benefit from the animals' presence. The Pheuls and Tuaregs of the Sahel, for instance, find fresh pasture for their flocks by following the path of African elephants, *Loxodonta africana*, across harsh desert areas.¹⁹ Their goats and cattle eat acacia branches torn down by elephants that otherwise would be unreachable. At some watering holes the nomads water their livestock by day, while the elephants drink at night. The people of the Sahel not only tolerate but revere the elephant as a "talisman." But national and international development programs have encouraged these people to settle in villages and farm and herd in areas around newly bored wells. When these water sources and the communities around them are placed near elephant migration routes, conflict is the inevitable result.

Similarly, land-use policies in East Africa have caused HWC by altering the Maasai people's pastoralist traditions and tolerance of wildlife. Aware that grazing their cattle alongside wildlife results in enriched pasture composition and variety, Maasai and other pastoralist peoples are favorably inclined to share the resources of the land with wildlife in order to reap the benefits.²⁰ If pastoralists like the Maasai are prevented from practicing livestock production, a common alternative is cultivation of crops which puts them in direct conflict with wildlife in the area.²¹ In East Africa, settlements are sometimes established along migratory pathways. Farmers who plant their crops along these migratory pathways are practically guaranteeing that crops will be raided. To protect their crops, farmers erect fences around their property, which in turn inhibits wildlife migration.²²

Yet the absence of land-use policies in pastoralist setting also can have a detrimental effect on HWC. Livestock herding can inadvertently affect

¹⁸ SONAM WANGYEL WANG, *THE IMPACTS OF WILDLIFE DAMAGE AND CONSERVATION POLICIES ON FARMER ATTITUDES IN JIGME SINGYE WANGCHUCK NATIONAL PARK, BHUTAN* (2004) (master's thesis, Cornell University).

¹⁹ This and subsequent discussions of this example are based on Hillary Mayell, *Satellites Reveal How Rare Elephants Survive Desert*, NAT'L GEOGRAPHIC NEWS, 27 Sept. 2002, http://news.nationalgeographic.com/news/2002/09/0927_020927_mali.html.

²⁰ G. Nasieku Tarayia, *The Legal Perspectives of the Maasai Culture, Customs, and Traditions*, 21 ARIZ. J. INT'L & COMP. L. 183, 186–189 (2004), <http://www.law.arizona.edu/Journals/AJICL/AJICL2004/Vol211/Tarayia.pdf>.

²¹ See David Ole Sur, *Opening Address, in WILDLIFE AND PEOPLE: CONFLICT AND CONSERVATION IN MASAI MARA, KENYA* 1, 2 (Int'l Inst. for Env't & Dev. (IIED) Wildlife & Dev. Series No. 14, 2003), <http://www.iied.org/pubs/pdf/full/9225IIED.pdf>

²² See Id. at 33–34.

wildlife behavior in ways that increase conflict. For instance, in northwest India, cutting of branches to feed cattle during the flowering and fruiting season “inhibits regeneration” of Asian elephants’ (*Elephas maximus*) food sources (acacia trees) because the branches and seeds are trampled under the cattle’s hooves.²³ As a result, elephants may have to range elsewhere to feed, raiding crops and destroying property in the process. Land-use policies should address the impact of livestock on wildlife conservation, recognizing that in some areas the presence of pastoralists with their herds may promote coexistence, while in other areas too many livestock may cause or exacerbate conflict.

Perversely, even the very wildlife and land-use laws and policies that seek to protect wildlife and habitat can compromise conservation of the species the law is intended to protect. Protected areas usually encompass too little habitat to support on their own viable populations of wildlife species. Many wildlife species also migrate significant distances over pathways that cannot feasibly be designated protected areas in their entirety. Thus, the wildlife necessarily inhabit landscapes surrounding protected areas.²⁴ Those areas are also populated with people who may incur significant costs from the presence of the wildlife, and may have lost traditional territories with the establishment of the protected area. In sum, the failure to designate and properly manage areas outside parks, in buffer zones and throughout migratory corridors at best leaves HWC unaddressed and at worst exacerbates it.

Land-use policies are also necessary where human populations have encroached on historically wild areas. In the United States, suburban sprawl is a major contributor to increased human-wildlife interaction (while farmers have battled birds and other animals that raid crops for centuries, as have their counterparts around the world). Deer, birds and rabbits feast on suburban gardens and human residents battle back, if they choose, with tin cans, coyote urine, fencing, netting and other deterrents. More severe are the wildlife-vehicle collisions that result in over 200 human deaths, countless injuries, and \$US 1.1 billion in vehicle damage annually.²⁵ Moreover, as predators like coyotes and mountain lions regain their footing in a human-dominated landscape across the United States, including its cities, the stakes are raised. Pets, livestock and even people can suffer casualties resulting from close contact between human settlement and wildlife.²⁶ Addressing these conflicts will require changes in land-use policies including patterns of residential and road construction and details such as waste disposal. To date, however

²³ Amirtharaj Williams et al., *Elephant-Human Conflicts in Rajaji National Park, Northwestern India*, 29 WILDLIFE SOC’Y BULL. 1097, 1102 (2001).

²⁴ Marker & Dickman, *supra* note 9, at 299.

²⁵ Rocky Mountain Insurance Information Association (RMIIA), *Deer and Other Wildlife on the Road*, http://rmiia.org/Auto/Traffic_Safety/Wildlife_on_the_road.htm (citing the National Highway Traffic Safety Administration and the Insurance Institute for Highway Safety).

²⁶ See DAVID BARON, *THE BEAST IN THE GARDEN* (2003); KANSTOROOM, *supra* note 4.

the design of land-use policies in the United States takes little account of HWC.

3.2 Costs, Benefits, and Local Empowerment

The costs of wildlife conservation often fall disproportionately on local people, whereas the benefits of a species' survival are often more widely dispersed. Laws and policies can play a significant role in minimizing costs and maximizing benefits to local people especially by empowering those most impacted by conservation efforts.

HWC can impose a variety of significant costs. Economic costs from crop raiding or livestock predation can be substantial. Crop raiding reduces the surplus crops available to market food and may even deplete food available to feed the family.²⁷ Education of children may be impeded if parents fear they will be injured on their way to or from school, or if children must stay home to help protect crops.²⁸ Injury and death can result from animal attacks. The fear and insecurity that the threat of wildlife attacks and raiding produces can be substantial and can have major effects on local people's way of life and sense of well-being.

To be effective, conservation policies and programs will need to find ways to prevent or minimize these costs and help local people gain benefits from wildlife.²⁹ Local people will be more tolerant of wildlife conflict if benefits accrue to them from the wildlife and threats are minimized.³⁰ Yet, too often policies and laws do not do enough to support increases in local benefits. Limited effective financial incentives exist that will offset the costs of conservation by providing benefits to the local people who bear those costs. National laws and policies either fail to address HWC altogether or fail to support local empowerment and action with respect to wildlife management. HWC has typically been sidelined and ignored in conservation policies and programs, an unwanted side-effect of conservation that few wanted to address, let alone acknowledge.³¹ Conservation policy in much of the world has intensified the conflict by eroding traditional mitigation methods.³² Such policies

²⁷ See CARE INTERNATIONAL IN UGANDA, RIGHTS, EQUITY & PROTECTED AREAS PROGRAMME, REPORT: ADVOCACY ON ENVIRONMENTAL RIGHTS AND ENTITLEMENTS 8 (2005) [hereinafter *CARE Report*].

²⁸ Madden, *Gorillas in the Garden*, *supra* note 4, at 183; *HUGO Analysis*, *supra* note 4, at 27; *CARE Report*, *supra* note 27, at 8.

²⁹ Mishra et al., *supra* note 5, at 1513; KELVIN KHISA, TESTING OF TECHNIQUES FOR RESOLVING CONFLICTS IN NATURAL RESOURCE MANAGEMENT: THE CASE OF NAIROBI NATIONAL PARK IN KENYA 9, 40 (2001), <http://www.unesco.org/mab/bursaries/mysrept/2001/Khisa/Khisa.pdf>; Henry Nicholls, *The Conservation Business*, 9 PLoS BIOL. e310 (2004), <http://biology.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.pbio.0020310>.

³⁰ See *Lion Conservation Workshop*, *supra* note 14, at 4.

³¹ See Western & Waithaka, *supra* note 8, at 370.

³² See RAYMOND BONNER, AT THE HAND OF MAN: PERIL AND HOPE FOR AFRICA'S WILDLIFE (1994).

intensify the conflict by denying local communities any economic use of wildlife.³³

Centralization can also impede effective responses to HWC. Even when legal and policy frameworks address the issue, they typically centralize control and standardize options for response at the national level. A review of escalating HWC in Kenya concluded that existing laws prevented participation by local communities in the planning and implementation of conflict resolution mitigation and prevention, contributing to local dependency and apathy.³⁴ Similarly, HWC policies in Uganda were also highly centralized and rigid, resulting in a tendency toward inaction at the local level, punctuated by inconsistent and sporadic case-by-case efforts to respond.³⁵

While similar causes and consequences recur across localities and regions, the response must involve participation and commitment by local people. This requires that they be involved not only in applying mitigation and prevention measures but also in formulating them, for example through co-management of wildlife and habitat by local people and governmental authorities. Policies should provide for devolution of conflict resolution and management to the “lowest practical and verifiable level.”³⁶ Thus, it has been observed that “individual effort and resourcefulness may be promoted when people feel some independence from the central system, rather than feeling that others are responsible for their well-being.”³⁷

In a case in India, for example, a centrally imposed shift away from local management of resources towards national control resulted in a decrease in sustainable livelihoods, a loss of diversification of income, and an increase in HWC.³⁸ In the 1960s–1980s, a series of changes in conservation and land-use laws nationally resulted in the loss of seasonal pastures, cultivated lands and grazing areas, which in turn required people to intensify their agricultural activities and turn to cash crops. Combined with shifts in the national political situation, this resulted in the termination of trade with neighbouring Tibet, and deprived local people in the Nanda Devi Biosphere Reserve in India of their ability to pursue diverse sources of income including various seasonal cropping, livestock husbandry, and trade practices. As a result, the economic losses from wildlife to crops and livestock are being “increasingly realized as

³³ See AN IMPOSSIBLE DREAM (Ian Parker & Stanley Blezard, eds., 2001).

³⁴ See Western & Waithaka, *supra* note 8, at 362.

³⁵ Madden, *Gorillas in the Garden*, *supra* note 4, at 185.

³⁶ Western & Waithaka, *supra* note 8, at 360. See also *Lion Conservation Workshop*, *supra* note 14, at 27.

³⁷ Mark Axelrod, *Book Review*, 23 STAN. ENVTL. L.J. 387, 387 (2004) (discussing findings and recommendations in RUCHI PANT, CUSTOMS AND CONSERVATION: CASES OF TRADITIONAL AND MODERN LAW IN INDIA AND NEPAL (Community Based Conservation in South Asia Series No. 7, 2002)).

³⁸ K.S. Rao et al., *Crop Damage and Livestock Depredation by Wildlife: A Case Study from Nanda Devi Biosphere Reserve, India*, 66 J. ENVTL. MGMT. 317, 320 (2002).

a serious negative impact of protected area management by the local people, often forcing them to illicit poaching of wildlife.”³⁹

Similarly, human-chimpanzee conflict was intensified near Budongo Forest in Western Uganda when farmers switched to sugar cane as a cash crop, in part due to government-supported initiatives to alleviate poverty.⁴⁰ Sugar cane was both more lucrative for farmers and a more attractive food source for chimpanzees than crops previously cultivated. Chimpanzees increased crop raiding, and farmers—who previously had enjoyed seeing the chimpanzees and reported little concern about their occasional incursions⁴¹—felt the losses more keenly and retaliated against them.

The promise of economic gain from nature-oriented tourism development intended to create conservation incentives, or even from newly implemented schemes to compensate for wildlife damage, can have also unintended effects. By encouraging human migration into the fragile areas outside protected areas, such conservation schemes can sometimes threaten the species and habitat they were intended to help protect. Certainly, local populations need to be supported and empowered in the management of wildlife outside protected areas, and financial incentives through poverty alleviation or other income generating or cost-offsetting schemes are important in building local tolerance of wildlife and support for conservation. But policies and practices should not directly or indirectly encourage migration into a conservation-sensitive area.

4. COMPLEX PROBLEMS, SOLUTIONS WITH MIXED RESULTS

To date, most analysis of HWC successes and failures has focused on biological and economic factors with relatively little attention to higher-level legal frameworks. This section reviews policy decisions that have had or could have both positive and negative results in different conservation and conflict situations. Further research is needed to obtain a better understanding of the patterns of success or failure associated with different combinations of policies and other factors. While the combination of conditions in each local HWC situation is unique, there are enough common features across regions and the globe to extract lessons for improving policy and law.

4.1 The Hunter and the Hunted—Game Laws

The failure to regulate hunting leaves HWC unresolved and can threaten the survival of a species. At one extreme, laws and policies encouraging unlimited

³⁹ *Id.* at 325.

⁴⁰ Hill, *Farmers' Perspectives*, *supra* note 9, at 282.

⁴¹ *Id.*

hunting can worsen HWC by essentially institutionalizing human attacks on and animosity towards a species. At the opposite extreme, total prohibitions on hunting can worsen HWC by, for example, facilitating over-habituation of wildlife to people, allowing unlimited expansion of wildlife populations that encroach on human interests, or preventing local people from responding to specific problem animals. Selective hunting can help mitigate and prevent conflict—the challenge is to find the balance point between the two extremes of unlimited hunting and total prohibitions on hunting.

Historically in the United States, large predators were seen as threats, particularly to livestock and desirable game species, and laws and policies promoting their extermination essentially institutionalized permanent HWC. Species such as mountain lions (*Felis concolor*), gray wolves (*Canis lupus*), and coyotes (*Canis latrans*) were largely extirpated from most of the country as a result of bounty hunting. For instance, from 1849 to 1965, Minnesota had a program in place where, even in its waning decades, an average of 188 wolves were bountied each year for \$35 each.⁴² Such state bounty programs were common, and were supplemented by federal animal control programs in the 20th century.⁴³

In contrast to this tradition, communities in and around Boulder, Colorado, United States, have generally chosen in the past ten to twenty years to take a tolerant, pro-coexistence stance with respect to their interactions with wildlife.⁴⁴ Boulder experienced great population growth and an extensive suburban sprawl into wildlife habitat. Land-use planning took little account of the potential for wildlife conflict, as residents welcomed backyard incursions by deer in residential areas, with little thought for the mountain lions that would follow. The cougars became habituated to human habitations and presence, and predictably, in the early 1990s a cougar killed a man on a jogging trail. Recognizing their role in bringing about HWC, however, Boulder-area communities have maintained tolerance of wildlife with little change in policies except to sanction the occasional killing of specific cougars that are imminent dangers to people.

Selective hunting can have positive effects on HWC. One benefit of hunting is that even highly managed and modestly implemented lethal tactics, coupled with non-lethal preventive measures, can keep predators wary and fearful of humans, prevent them from becoming habituated to human presence, and help maintain a safer distance.

Selective hunting is also an important means to eliminate problem animals to the benefit of the community. Hunting for this purpose must be

⁴² Steven H. Fritts, *Minnesotans for Sustainability, Wolf Depredation on Livestock in Minnesota*, http://www.mnforsustain.org/wolf_depredation_on_livestock_in_minnesota.htm (2002).

⁴³ BARON, *supra* note 26.

⁴⁴ *Id.*

properly managed, however, or it will be not only unproductive but potentially counter-productive. If hunters fail to target those individual animals most responsible for crop and livestock losses, the culling will not achieve the desired effect.⁴⁵ Indeed, killing a predator that posed no threat to humans or livestock may actually make more room for another individual that is a threat, thereby increasing HWC. In addition, hunters who wound but fail to kill a carnivore may actually worsen HWC, as sick, wounded, or old carnivores are more likely than healthy animals to seek easy prey such as livestock rather than targeting their natural prey.⁴⁶

Selective hunting may also be a means by which local people gain benefits from wildlife, thus reducing resentment. One study suggests that the greater political opposition to wolves than bears in Wisconsin is due in part to the fact that bear hunting is permitted and popular, while wolf hunting is illegal.⁴⁷

Licenses for hunting, as part of a selective hunting policy, can bring in revenue to support conservation programs, including mitigation of HWC.⁴⁸ For instance, revenues from bear hunting in Wisconsin has allowed managers to better protect the bears outside of hunting season, incorporate non-lethal controls to deal with problem bears, and more closely regulate permits to kill problem bears.⁴⁹

Conversely, laws preventing any form of hunting, sometimes termed anti-poaching laws, may criminalize traditional subsistence hunting and prevent selective elimination of problem animals, leaving the conflict unmitigated and alienating local people.⁵⁰ For example, consider a community that is repeatedly harassed by an old tiger that can no longer hunt wild prey. If the community lacks the means to eliminate or correct the problem, an otherwise tolerant community may turn against the protected area authorities and develop a negative attitude toward all tigers in the area, arbitrarily retaliating against the population of tigers, rather than targeting the one that caused the initial conflict. From a conservation perspective, this negative impact on conservation is not offset by any benefit, as older members of a species are likely to be non-breeding individuals that no longer contribute to the species' perpetuation.

⁴⁵ Adrian Treves & K. Ullas Karanth, *Human-Carnivore Conflict and Perspectives on Carnivore Management Worldwide*, 17 CONSERV. BIOL. 1491, 1493 (2003).

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ Laine R. Stowell & Robert C. Willging, *Bear Damage to Agriculture in Wisconsin*, in 5 PROCEEDINGS OF THE E. WILDLIFE DAMAGE CONTROL CONFERENCE 96, 100 (1991), <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1043&context=ewdcc5>.

⁵⁰ KHISA, *supra* note 29, at 1. *See also* WANG, *supra* note 18, at 20.

4.2 Wildlife Tourism

Wildlife and other nature tourism is an important and growing industry.⁵¹ Development for tourism and the influx of visitors has a profound impact on conservation challenges, including HWC.

Nature and wildlife tourism provides essential revenue to a country or a region and can be a powerful incentive to conserve wildlife and other biodiversity if it provides sufficient economic benefits to local people. In the case of Bwindi, discussed above, gorilla-oriented tourism provided the bulk of revenues needed to operate several parks in the country and was the source of some benefits for local communities as well. In cases such as in Nanda Devi Biosphere Reserve (and much of the Himalayan region of India and Nepal where wildlife damage to crops and livestock are viewed more seriously in light of restrictions on income generation opportunities in the last 50 years), properly designed and managed nature tourism can and has offered alternative income generation opportunities locally that can help communities build tolerance for wildlife.⁵²

At the same time, wildlife tourism activities can lead, intentionally or unintentionally, to habituation of wildlife, and conflict often results. For example, Torres del Paine National Park in southern Chile, which was created to protect guanacos (*Lama guanicoe*), also gave safe harbor to pumas (*Felis concolor*). Over the years, puma populations thrived and expanded their ranges under legal protection. The cats became less shy, more visible, more assertive, and increasingly accustomed to humans, particularly benign tourists who delighted in their close encounters with Chilean wildlife. In neighbouring communities, the pumas became increasingly brazen in their predation of sheep on farms, with kills occurring nightly. The warning signs of over-habituation were ignored until 1998, when a puma killed a tourist.⁵³ The Bwindi example above also demonstrates how habituation of wildlife for tourism can cause harm to local residents by worsening conflict, in that case as a result of increased crop raiding and human attacks.⁵⁴

⁵¹ Ecotourism, defined as “[r]esponsible travel to natural areas that conserves the environment and improves the welfare of local people,” in 2004 reportedly grew three times faster than traditional tourism. International Ecotourism Society (TIES), *Ecotourism Fact Sheet*, <http://206.161.82.194/WebModules/WebArticlesNet/articlefiles/15-NEW%20Ecotourism%20Factsheet%20Sept%2005.pdf> (2005).

⁵² Rodney Jackson & Rinchen Wangchuk, *A Community-Based Approach to Mitigating Livestock Depredation by Snow Leopards*, 9 HUMAN DIMENSIONS OF WILDLIFE, 307, 312 (2004), <http://www.snowleopardconservancy.org/pdf/A%20community-based%20approach%20to%20mitigating%20live-stock%20depredation%20by%20snow%20leopards%20-%20Jackson%20&%20Wangchuk.pdf>; Rao et al., *supra* note 38, at 320.

⁵³ See *Lion Conservation Workshop*, *supra* note 14, at 4.

⁵⁴ Madden, *Gorillas in the Garden*, *supra* note 4, at 182; HUGO Analysis, *supra* note 4 at 24.

4.3 Disease Transmission

Disease transmission between humans or domesticated animals and wildlife is frequent and can present a serious challenge to human-wildlife coexistence. Threats to livestock, pets and humans from transmission of disease impose costs on local people and create fear of wildlife.⁵⁵ Domesticated animals may transmit diseases to wildlife, including protected species, causing illness and death.⁵⁶ Humans may be sources of disease transmitted to some endangered wildlife species, such as gorillas.⁵⁷ Measures to mitigate HWC themselves may perversely facilitate disease transmission.⁵⁸ In order to prevent this insidious form of conflict, we need policies that will ensure that domesticated animals such as dogs and cattle are vaccinated properly against contagious diseases and that people and wildlife are kept a healthy distance apart from one another where that is not possible.

5. LAW AND POLICY RECOMMENDATIONS AND CONCLUSIONS

While more study is needed on policy and legal aspects of HWC, some preliminary conclusions can be drawn concerning avenues for improvement of relevant laws and policies. While the mix of circumstances of each HWC situation is unique, interesting commonalities are evident in the patterns of success and failure in HWC response, as well as commentators' recommendations improvement.

5.1 Land-Use Planning

Land-use policies, which frequently take no account of HWC, need to provide for the prevention and mitigation of HWC. An analysis of HWC in Maryland, for example, called for legislation that would require measures to minimize HWC in new development.⁵⁹ Recommendations included: the application of HWC expertise in the revision of land-use and construction codes, standards

⁵⁵ Around Yellowstone National Park, for example, there is continual tension and debate about the transmission of brucellosis from buffalo to cattle and its effect on rancher's livelihood and the health of the livestock. Roger Di Silvestro, *Bison on the Firing Line*, 35 NAT'L WILDLIFE (1997), <http://www.nwf.org/nationalwildlife/article.cfm?issueID=48&articleID=630>

⁵⁶ See *Lion Conservation Workshop*, *supra* note 14, at 32 (discussing transmission of the fatal disease of bovine tuberculosis from cattle to wild buffalo and lion populations in and around Kruger National Park, South Africa).

⁵⁷ Madden, *Gorillas in the Garden*, *supra* note 4, at 184; *HUGO Analysis*, *supra* note 4 at 37 (discussing transmission of human diseases to mountain gorillas in Uganda).

⁵⁸ See Laurence Frank, *Getting Along with Lions*, 106 WILDLIFE CONSERVATION 36, 40 (2003) (discussing the risk of transmission of canine distemper and rabies to wildlife from dogs guarding livestock against predators).

⁵⁹ KANSTOROOM, *supra* note 4, at 23.

and guidelines; consideration of wildlife habitat planning in the development and land-use review processes; establishment of land preservation areas and incentives to encourage cluster development; outreach and educational efforts such as information sheets on reducing HWC that realtors could distribute to new homeowners; and covenants requiring abatement techniques such as barriers and fencing, and prohibiting certain plants species that may attract wildlife.⁶⁰

As protected areas are generally inadequate to contain viable populations of wildlife, land-use planning must be conducted on a broad landscape scale, encompassing both protected areas and complex, multiple-use areas adjacent to them. For example, a predator management policy for the Laikipia District in Kenya drawn up at the request of the Kenya Wildlife Service recommended a zoning system that would manage interaction with large carnivores outside protected areas, while seeking to reduce the negative consequences of such wildlife on people and their livelihoods.⁶¹ Under the proposal the district would be divided into three zones—predator conservation, predator management and predator control—each of which would apply mitigation tactics reflecting a level of tolerance appropriate for that zone.⁶² Other analyses have offered similar recommendations for improvement to land-use planning.

5.2 Public Participation and Co-Management

Although HWC responses must draw on relevant expertise, they should not be defined unilaterally by experts or higher-level authorities. Rather, the policy and legal framework should provide for co-management involving not only government authorities but local people as well. The public, particularly local affected communities, should be fully involved in the development and implementation of HWC policies. The authority to define mechanisms to address HWC should be devolved to the lowest, most local level appropriate, to maximize creativity and flexibility to respond to local conditions.

Public participation and co-management are not only a matter of equity but in the long run are essential for securing the local support and involvement needed to achieve conservation.⁶³ Consistent with this, the Maryland recommendations discussed above call for greater public participation in decision making processes.⁶⁴ Similarly, a recent evaluation of Kenya Wildlife Service policies argues that planning in consultation with the locally affected communities will enhance the likelihood of success.⁶⁵ Where indigenous

⁶⁰ *Id.*

⁶¹ See *Lion Conservation Workshop*, *supra* note 14, at 12.

⁶² *Id.*

⁶³ Madden, *Gorillas in the Garden*, *supra* note 4, at 186; Dublin & Hoare, *supra* note 9, at 277; KHISA, *supra* note 29, at 2; Western & Waithaka, *supra* note 8, at 368.

⁶⁴ See KANSTOROOM, *supra* note 4, at 1.

⁶⁵ See *e.g.*, KHISA, *supra* note 29, at 45; Western & Waithaka, *supra* note 8, at 365–367.

or other local peoples engage in traditions and practices that contribute to coexistence with wildlife, HWC policies and programs should be designed to build on and support, rather than override, existing local traditions and practices of coexistence.⁶⁶

5.3 Costs and Benefits

Minimizing costs to local communities and enhancing benefits from the presence of wildlife are consistently identified as important components of effective mitigation and prevention of HWC.⁶⁷ To offset wildlife-induced losses, policies and laws should authorize the means to accrue local benefits as part of the response to HWC. The above-mentioned recommendations to the Kenya Wildlife Service for a predator management policy included among the top priorities the need for new ways to increase the financial benefits to those who “host” predators, including insurance schemes, tourism, and sport hunting of problem animals.⁶⁸ Yet such programs should not create perverse incentives. For instance, they should not encourage newcomers to resettle in precisely the area where human presence worsens conflict in order to obtain the benefits; this may require tailoring of eligibility criteria. In addition, tourism may improve the benefit/cost ratio for local people, but it must be managed so as to minimize the contribution it makes to HWC through processes such as habituation to human presence.⁶⁹

6. CONCLUSION

The absence of appropriate laws and policies or the existence of inappropriate laws and policies, whether they be directly or indirectly related to the human-wildlife interface, can have detrimental effects on wildlife and habitat conservation and human health and livelihoods. Law and policy makers have the ability to shape land-use planning and development processes, as well as empower local people to act for conservation. They should develop appropriate laws and policies on hunting, tourism, human settlement and other activities that will serve to prevent and mitigate HWC, rather than exacerbate it. Ideally, these laws and policies should ensure a shift in the balance of benefits toward local people, while minimizing the costs.

Laws help define the attitudes, beliefs and behaviors of people toward wildlife across a nation, not only through coercive force but through the

⁶⁶ Madden, *Traditions of Tolerance*, *supra* note 7, at 235.

⁶⁷ See e.g., *Lion Conservation Workshop*, *supra* note 14, at 34; Western & Waithaka, *supra* note 8, at 357; Madden, *Gorillas in the Garden*, *supra* note 4, at 189.

⁶⁸ See *Lion Conservation Workshop*, *supra* note 14, at 14.

⁶⁹ See e.g., *Lion Conservation Workshop*, *supra* note 14, at 4; Madden, *Gorillas in the Garden*, *supra* note 4, at 189.

authority and legitimacy of the process by which they are adopted and implemented. In all these ways, laws and policies have the ability to support or hinder existing attitudes and behaviors that contribute to coexistence. It is hoped that these preliminary observations will lead to more in-depth research and analyses of the effects of laws and policies on HWC and its prevention and mitigation.

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