

**LEGAL RESPONSES TO HUMAN-WILDLIFE CONFLICT:
The Precautionary Principle, Risk Analysis and the 'Lethal Management' of
Endangered Species**

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Abstract

Sharks can kill, wolves and bears can maim, and bats and birds can spread disease. Human existence has a long history of such conflicts. But as our populations and activities expand, human-wildlife encounters are an increasingly common source of tension. Some species pose a risk to humans, including through the spread of disease, but may also be endangered or at risk of extinction themselves. In such cases, there is a duty to conserve (nature), but also to protect (the public). Deciding how to respond requires decision-makers to make difficult but important value judgments. This article searches for ways to improve the legal processes for managing these unique situations of human-wildlife conflict. It investigates whether principles of international environmental law and human rights can be part of the solution, and if so, to what extent. The analysis concludes that one of the foremost roles for law is to prescribe processes for decision-makers which are rational, balanced and transparent. Existing principles like the precautionary principle are relevant, but they are only part of a broader risk analysis which must also account for human rights, communities and cultural values.

Introduction

Culling wildlife to protect against livestock loss, disease or risk of injury is highly contentious.¹ The debate is muddled by various issues relating to animal welfare, rights to

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¹ In this article, we use both the term 'cull' and 'lethal management' although there are noted differences between the two. Culling generally refers (rather colloquially) to deliberate attempts to reduce population sizes, whereas lethal management is a broader term which can extend to individual animals that pose a risk to human interests in some form.

culture, health and other human rights as well as the potential for environmental damage.² Nevertheless, lethal management is increasingly being viewed as an anthropocentric 'precautionary' measure to avoid the infliction of injury or disease to humans, even where the species concerned is endangered or threatened. In January 2014, for instance, the Australian Government allowed the lethal control of endangered shark species off the coast of Western Australia claiming it was in the 'national interest.'³ Following, a 'rigorous examination' of the proposal, the Western Australian Environmental Protection Agency eventually recommended the program not go ahead.⁴ In other Australian states the practice of drum-lining⁵ continues unabated.⁶ Likewise, in the United States, State and Federal agencies have lethally controlled hundreds of endangered mountain lions due to 'depredation complaints on livestock and on pets and [also] because of concerns for human safety.'⁷ Gray wolves in the United States and Canada have also been targeted for similar reasons.⁸

² P Dickson and WM Adams, 'Science and Uncertainty in South Africa's Elephant Culling Debate' (2009) 27(1) *Environ Plann C Gov Policy* 110.

³ For a copy of the 'Statement of Reasons' for the exemption, see Commonwealth of Australia 'Statement of Reasons for granting an exemption under section 158 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) <www.environment.gov.au/epbc/notices/pubs/158-statement-shark-drum-line-deployment.pdf> accessed 1 November 2015.

⁴ Western Australia Environmental Protection Authority, 'EPA recommends Shark Hazard Mitigation Drum Line proposal should not be implemented' (11 September 2014) <<http://www.epa.wa.gov.au/news/mediastmnts/pages/eparecommendssharkhazardmitigationdrumlineproposalshouldnotbeimplemented.aspx>>; see also K Woolaston and E Hamman, 'The operation of the precautionary principle in Australian environmental law: An examination of the Western Australian White shark drum line program' (2015) 32 *EPLJ* 327.

⁵ Drum-lining is the process of luring and catching sharks using a barrel (i.e. the drum) attached to the sea floor and baited with a hook. The practice is fatal to sharks.

⁶ G Burke, 'Queensland: 621 sharks killed off Queensland coast through control program' ABC News (online) (21 August 2015) <<http://www.abc.net.au/news/2015-08-21/621-sharks-killed-off-queensland-s-waters/6715136>>.

⁷ E Rominger 'Culling Mountain Lions to Protect Ungulate Populations: Some Lives Are More Sacred Than Others.' Transactions of the 72nd North American Wildlife and Natural Resources Conference Wildlife Management Institute March 20 to 24, 2007 in Portland, Oregon, <www.wildlifemanagementinstitute.org>.

⁸ M Musiani and PC Paquet, 'The Practices of Wolf Persecution, Protection, and Restoration in Canada and the United States' (2004) 54(1) *BioScience* 50. It should be noted that Gray Wolves are endangered in some areas but not others. In the Northern American state of Alaska, for instance,

The threat of disease can also result in a decision to cull endangered wildlife. In China, in the face of ‘misinformation and media hysteria’⁹ concerning the H5N1 ‘bird flu’, culling of wild birds was reported despite evidence the practice is rarely successful.¹⁰ At around the same time, the decision of a zoo in Thailand to euthanize dozens of tigers thought at risk of spreading the virus was particularly contentious.¹¹ In Australia, flying foxes have also been targeted to protect against equine influenza (the ‘Hendra Virus’)¹² notwithstanding the vital role flying foxes play in seed dispersal and pollination in some of Australia’s World Heritage listed Wet Tropics.

In all these instances, human interests take precedence over species despite the fact that they are endangered. The point of this article is not to add to the ever-expanding thicket of literature surrounding animal welfare, animal rights and species justice.¹³ Rather, it explores the narrower question of what *legal processes* ought to guide decision-makers in these instances of conflict. The issue of human-wildlife conflict has been well studied in the conservation literature,¹⁴ however, discussion of these issues has largely been overlooked in the legal discipline. There is thus a need to consider how best to design legal responses to

Gray Wolves are reported to be in ‘healthy numbers’. See B Stallard, ‘Gray Wolf stays endangered despite conservationists’ request’ Nature World News (online) (4 July 2015) <<http://www.natureworldnews.com/articles/15484/20150704/gray-wolves-stays-endangered-despite-conservationists-request.htm>>.

⁹ BirdLife International (2008) ‘The H5N1 avian influenza virus: a threat to bird conservation, but indirectly’ <www.birdlife.org/datazone/sowb/casestudy/176> accessed 1 November 2015.

¹⁰ C Feare ‘Conservation implications of Avian Influenza’ (2005) 14 RSPB Research Report.

¹¹ M Thornley ‘Avian influenza ravages Thai tigers’ (2008) 82(11) Australian Veterinary Journal 652.

¹² See for example, R Plowright, H Field, C Smith, A Divljan, C Palmer, G Tabor, P Daszak, and J Foley, ‘Reproduction and nutritional stress are risk factors for Hendra virus infection in little red flying foxes (*Pteropus scapulatus*)’ (2008) 275 Proceedings of the Royal Society B: Biological Sciences 861.

¹³ See for example, R Garner, *A Theory of Justice for Animals: Animal Rights in a Nonideal World* (Oxford University Press 2013);

¹⁴ See for example, M Conover, *Resolving Human-Wildlife Conflicts: The Science of Wildlife Damage Management* (CRC Press 2001); R Woodroffe, S Thirgood, and A Rabinowitz (eds), *People and wildlife: conflict or coexistence?* (Cambridge University Press, 2005); KK Karanth, AM Gopalaswamy, R DeFries and N Ballal ‘Assessing Patterns of Human-Wildlife Conflicts and Compensation around a Central Indian Protected Area’ (2012) 7(12) PLoS ONE e50433, doi:10.1371/journal.pone.0050433; and MM Draheim, F Madden, J-B McCarthy and ECM Parsons, *Human-Wildlife Conflict: Complexity in the Marine Environment* (Oxford University Press, 2015). Other relevant literature is referred to throughout this article.

human-wildlife conflict, particularly from a normative standpoint.¹⁵ The issue is all the more worthy of discussion where it intersects with other legal norms such as human rights.¹⁶ Moreover, in line with recent calls for improved evaluation of existing environmental jurisprudence (as opposed to the mass proliferation thereof),¹⁷ whether existing principles of international environmental law and human rights can be marshalled to provide an effective solution is investigated.

This article is structured in three parts. Part One provides an overview of the existing literature surrounding human-wildlife conflicts. It defines 'conflict' and highlights the common thread which suggests societies respond to wildlife encounters in emotional and irrational ways. Part One also highlights the role of culture in both creating and responding to instances of conflict. Part Two introduces a new aspect to the debate, one which questions the 'lethal management' of endangered wildlife which pose a risk to humans (health or otherwise). There are several endangered species which have been the subject of deliberate 'state-sanctioned' controls (by either culling or lethal management) including the white shark in Australia, the Zanzibar leopard, wild birds in China, tigers in Thailand, the grey wolf in the United States, and flying foxes in Australia.¹⁸ Each of these instances raises interesting questions about risk analysis and how decisions to euthanize an endangered species are actually made. Finally, Part Three examines a 'dual' role for the precautionary principle as a tool for assessing the risks to both humans and wildlife. This final part also raises the conflicting concerns about human rights (the right to culture, life and health in particular) and, in the end, suggests that more work is required to clarify the contributions that the precautionary principle and human rights can make to risk analysis and decision-making in situations of human-wildlife conflict.

¹⁵ J Smits, 'Redefining Normative Legal Science: Towards an Argumentative Discipline' (2009) 7 TICOM Working Paper 45.

¹⁶ See for example, D Shelton, 'Resolving Conflicts between Human Rights and Environmental Protection: Is there a Hierarchy?' in E De Wet and J Vidmar (eds), *Hierarchy in International Law: The Place of Human Rights* (Oxford University Press 2012).

¹⁷ P Martin and A Kennedy (eds), *Implementing Environmental Law* (Edward Elgar, 2015).

¹⁸ As noted earlier, mountain lions in the United States (US) have also been subject to lethal management. Those instances would make an interesting case study of human-wildlife conflict and the legal responses thereof. However, they are not considered in this article given the inclusion of the Gray Wolf example which presents similar issues for discussion in the US context. For further information about the lethal management of US mountain lions refer to Rominger above (n 7) and for a good discussion of the issues, see C Papouchi, 'Effects of Sport Hunting Mountain Lions on Safety and Livestock' Mountain Lion Foundation (online) 7 August 2006 <http://www.mountainlion.org/sport_hunting.asp>

I. Human- Wildlife Conflict

Humans interact with wildlife in many ways. Indeed humans have done so for many centuries. Such encounters can be positive or negative; however, often this interaction is considered as having a largely negative impact on wildlife. This impact can stem from interactions such as modifying or eliminating habitat as a result of development or agriculture, living alongside wildlife, and more obvious interactions such as hunting or taking wildlife for sustenance. The other consideration in this interaction, and one that can raise much more compelling arguments to a large portion of the population, is the impact that wildlife has on human populations. This impact is broad-ranging and can include loss of livestock and property, loss of time and money dealing with this loss and opportunity costs, where people forgo the economic or lifestyle choices due to impositions placed on them by the presences of wildlife or conservation of wildlife.¹⁹ In addition to this, perhaps the 'least common but most emotive' threat from wildlife is the killing or endangering of people.²⁰

A. Defining the Conflict

But how does one define human-wildlife conflicts? And how might human society recognise them when they occur? One generally accepted definition which followed the *International Union for the Conservation of Nature (IUCN) World Parks Congress* in 2003 provides that '[a conflict exists] when wildlife requirements overlap with those of human populations, creating costs both to residents and wild animals.'²¹ Such a conflict may occur, for example:

*...because a lion has attacked someone's livestock or a gorilla has raided a person's crops. The conflict also occurs when a person or community seeks to kill the lion or gorilla, or when a person retaliates against the authorities that are in charge of conserving wildlife and its habitat.*²²

¹⁹ For a thorough discussion of the risk that wildlife pose to humans see S Thirgood, R Woodroffe and A Rabinowitz, 'The Impact of Human-Wildlife Conflict on Human Lives and Livelihoods' in R Woodroffe, S Thirgood, and A Rabinowitz (eds), *People and wildlife: conflict or coexistence?* (Cambridge University Press, 2005).

²⁰ *Ibid*, 1.

²¹ IUCN World Park Congress (WPC), Preventing & mitigating human-wildlife conflicts (2003) WPC recommendation 20.

²² F Madden, 'Creating Coexistence between Humans and Wildlife: Global Perspectives on Local Efforts to Address Human-Wildlife Conflict' (2004) 9(4) *Human Dimensions of Wildlife* 247, 248.

A similar definition is put forward by Conover: '[wildlife conflicts are] situations occurring when an action by either humans or wildlife has an adverse effect on the other.'²³ Others suggest that the nature of the conflict needs to be broken down further still and to consider costs to humans and costs to wildlife separately.²⁴

A common aspect of most definitions seems to be the requirement for a 'conflict,' not merely an 'encounter'. There appears to be a need for a negative outcome ('costs' or 'adverse effects') to humans or wildlife or both. On the weight of the literature, and in the interests of moving towards a more substantive legal discussion, this article proposes a very broad definition and defines conflict as: any significant interaction between humans and wildlife which results in an adverse effect (including perceived effects) on either wildlife or humans or both.

The term 'adverse effect' is consistent with that used by Conover (above). The only other point to add, at least in the confines of this paper, is that it is important to be careful in distinguishing between the conflict and human responses to conflict. In many ways, responses are a separate form of conflict in and of themselves. Readers will note the inclusion of 'perceived effects' in the definition, as the literature reveals human responses to conflicts seem to be as much about 'perception' of conflict as it is about actual physical encounters.²⁵ Thus, this article discusses legal options for analyzing and managing the actual risk as well as the perception of risk.²⁶

B. Responses to Human Wildlife Conflict

Responses to human-wildlife conflicts are continually shaped by history, politics and cultural practices and beliefs.²⁷ In many instances, humans are likely never to encounter a particular animal except perhaps in a zoo. Yet anxiety in relation to that animal, individually and collectively, can rise to levels where people cease to think or act rationally, or consistently with the science. Instances of 'dangerous' conflict are actually extremely rare. In fact, a

²³ Conover above (n. 14) at 8.

²⁴ J Young, M Marzano, R White, D McCracken, S Redpath, D Carss, C Quine and A Watt, 'The emergence of biodiversity conflicts from biodiversity impacts: characteristics and management strategies' (2010) 19 *Biodiversity and Conservation* 3973.

²⁵ A Dickman, 'Complexities of conflict: the importance of considering social factors for effectively resolving human-wildlife conflict' (2010) 13 *Animal Conservation* 458, 458.

²⁶ In this article 'endangered species' is defined to be a species which has been included on the IUCN red list between the categories 'near threatened' to 'critically endangered'. See IUCN, 'Red List' <<http://www.iucnredlist.org/>> accessed 1 November 2015.

²⁷ H Wiczorek-Hudenko, 'Exploring the Influence of Emotion on Human Decision Making in Human-Wildlife Conflict' (2012) 17(1) *Human Dimensions of Wildlife* 16.

conservative figure puts the world-wide number of humans killed or seriously maimed by wildlife each year 'in the hundreds.'²⁸ Despite the media hype, for instance, the number of unprovoked fatal shark attacks in Australia sits at just under one per year.²⁹ Many more people are reported to die from drowning each year.³⁰

While the likelihood of the risk of harm is therefore not great, decisions relating to interactions with wildlife are often not made purely on rational or 'risk-based' grounds. This is embedded in human culture and in human history. Hudenko, for instance, maintains that 'many people may have preconceived ideas about wildlife based on their upbringing, cultural influences or prior experience'.³¹ Madden agrees, suggesting that very often, the level of public outcry is entirely disproportionate to the loss of livestock or property and that 'public outcry often has much more to do with perceptions of potential risk, as well as a lack of control over addressing the problem.'³² '[E]ven a small level of wildlife damage,' Dickman reports 'can still elicit harsh responses.'³³ For Manfredo and Dayer this is the one 'common thread' in responding to human-wildlife conflicts.³⁴ In their words: 'the thoughts and actions of humans ultimately determine the course and resolution of the conflict.'³⁵ Human responses to these conflicts have the potential to have serious consequences. As Dickman concludes, 'conflict between humans and wildlife is one of the most widespread and

²⁸ See Woodroffe, Thirgood, and Rabinowitz above (n 18) 14. More recent data, is available from the Food and Agriculture Organization of the United Nations (FAO). For example, in relation to human-lion encounters: FAO, 'Managing the conflicts between people and lion: Review and insights from the literature and field experience.' (2010) Wildlife Management Working Paper 13, <<http://www.fao.org/docrep/012/k7292e/k7292e00.pdf>> and also in relation to Africa as a whole: FAO, 'Human-wildlife conflict in Africa: Causes, consequences and management strategies' (2009) FAO Forestry Paper 157, <<http://www.fao.org/docrep/012/i1048e/i1048e03.pdf>>.

²⁹ Targonga Zoo, 'Australian Shark attack file' <<https://taronga.org.au/animals-conservation/conservation-science/australian-shark-attack-file/latest-figures>> accessed 1 November 2015.

³⁰ Ibid.

³¹ Hudenko above (n. 27).

³² Madden above (n. 22) at 250.

³³ Dickman above (n. 25) at 461.

³⁴ M Manfredo and A Dayer 'Concepts for Exploring the Social Aspects of Human–Wildlife Conflict in a Global Context' (2004) 9(4) Human Dimensions of Wildlife 317.

³⁵ Ibid, 317.

intractable issues facing conservation biologists today.³⁶ Thus, effective strategies for decision-making are desperately needed.³⁷

The influence of culture in creating and responding to wildlife conflict has received increased attention in the literature. So much so, in fact, that there is now a strong argument that the management of human–wildlife interactions should be ‘informed by a more systematic understanding, use, and application of biological, social, and cultural knowledge and norms.’³⁸ In other words, society and culture, and people’s perceptions about animals - rightly or wrongly - are *as important* to managing conflict as the raw scientific data. As Dickman reports, human perceptions of risk are ‘heavily influenced by social and cultural perceptions, values history and ideology.’³⁹ To develop an effective response, an improved understanding of social and cultural perceptions of wildlife is needed, accompanied perhaps by attempts to influence those perceptions in ways which are beneficial for both species and communities.

The influence of human culture on wildlife is not always particularly positive and can sometimes result in irreversible ecological outcomes. Consider for instance, the case of the Zanzibar leopard (*panthera pardus adersi*) hunted to extinction on the African island of Zanzibar. To the people of Zanzibar, the Zanzibar leopard, (the largest wild carnivore on the Island) had long been a ‘culturally salient animal.’⁴⁰ The leopard was protected from hunting during colonization by the British between 1920s and the 1950s. After the Zanzibar revolution in 1964, however, the new government sponsored an eradication program.⁴¹ The decision-making process around the state-sponsored hunting of leopards seemed to have revolved largely around the ‘cultural demonization’ of the species.⁴² Attacks on dogs, poultry, sheep goats and even people had been reported throughout the early half of the 20th century⁴³ and this ‘undoubtedly generated a fear which was disproportionate to the

³⁶ Dickman above (n. 25) at 458.

³⁷ Ibid.

³⁸ Madden above (n. 22) at 253.

³⁹ Dickman above (n. 25) at 459.

⁴⁰ M Walsh and H Goldman, ‘Killing the King: The Demonization and Extermination of the Zanzibar Leopard’ in E Dounias, E Motte-Florac and M Dunham (eds) *Animal symbolism: Animals, keystone of the relationship between man and nature?* (Éditions de Institut de recherché pour le développement, 2007) 1133-1182, 1151.

⁴¹ H Goldman and M Walsh ‘Is The Zanzibar Leopard (*Panthera pardus adersi*) Extinct?’ 91(1) *Journal of East African Natural History* 15, 16.

⁴² Walsh and Goldman above (n. 40).

⁴³ Ibid, 1138.

probability of their occurrence.⁴⁴ It appears, however, that this fear was compounded by spiritual and cultural beliefs that witches exercised a form of 'magical control' over the leopards to harass and intimidate islanders.⁴⁵ Today, by most accounts, the Zanzibar leopard is believed to be now extinct.⁴⁶

The case of the Zanzibar leopard reveals interesting insights about the nature of human and endangered wildlife conflict. More specifically, as Walsh and Goldman conclude, the case of the leopard illustrates:

*...how attitudes and actions towards a salient animal can be configured and reconfigured in the context of a complex and changing political and ecological landscape – and how this can have disastrous and irreversible consequences for the animal concerned.*⁴⁷

The demonization of other species has also influenced the creation of and human responses to wildlife conflict. The tiny *aye aye* (*daubentonia madagascariensis*) for example, is an endangered lemur native to Madagascar. Some communities have labelled the *aye aye* 'a harbinger of doom' and it is thought by some to bring bad luck to crop yields.⁴⁸ Some even believe that the entire village should be burned down if an *aye aye* is seen nearby.⁴⁹ As a result the *aye aye* has been hunted and this, in addition to other pressures, has caused a population decline of over fifty percent in the last thirty years.⁵⁰

Interestingly, sharks are one species that have been revered but also respected throughout much of the world. Coastal communities in Eastern Indonesia, for instance, have a special spiritual relationship with whale sharks.⁵¹ In Hawaiian culture, tiger sharks and

⁴⁴ Ibid, 1139.

⁴⁵ Goldman and Walsh above (n. 41) at 16.

⁴⁶ Walsh and Goldman above (n. 40) at 1135; see also Goldman and Walsh above (n 41).

⁴⁷ Walsh and Goldman above (n. 40) at 1134.

⁴⁸ IUCN, 'Red List of Threatened Species' *Daubentonia madagascariensis* (*aye aye*) e.T6302A16114609, accessed 01 November 2015.

⁴⁹ Dickman above (n. 25) at 462.

⁵⁰ IUCN, above (n. 48).

⁵¹ J Karam, D Dwyer, C Speed and M Meekan, Assessing traditional ecological knowledge of whale sharks (*Rhincodon typus*) in eastern Indonesia: a pilot study with fishing communities in Nusa Tenggara Timur, final research report for Dept. of Environment, Water, Heritage and the Arts, Canberra, tender 2007/01363 (Charles Darwin University, School for Environmental Research, 2008).

white sharks have historically been linked with ‘influential spirits.’⁵² Likewise, in the South Pacific island nation of Fiji, sharks are closely associated with spiritual beings. The Fijian god *Dakuwaqa*, for instance, was believed to ‘manifest himself as a great shark’.⁵³ On the other hand, in Western cultures, sharks have tended to be demonized. Peter Benchley’s 1974 novel ‘Jaws’ had a profound effect on some Western community psyches and one which the media has ‘exploited’ over the years.⁵⁴ Community reactions to sharks often flow through into government policy. Indeed, Australian scholar, Dr Christopher Neff, who has studied the politics of shark attacks, argues that the numbers can often be misrepresented. He maintains that shark bites are in reality totally random events but that they ‘are not perceived that way.’⁵⁵

As can be seen, human interactions with wildlife are multidimensional, and in particular are culturally constructed. This makes the task of developing an effective legal framework for dealing with these situations all the more challenging. Nevertheless, culture and cultural practices are highly relevant to all forms of wildlife management. Decision-makers must simultaneously walk a delicate line between cultural sensitivity and scientific rationalism. The issue of culture and species conflict is further considered against the backdrop of human rights in Part Three.

II. The Lethal Management of ‘Dangerous’ Endangered Species

A. What is ‘Lethal Management’?

‘Lethal management’ or ‘lethal control’ are terms commonly used in lieu of ‘persecution’ of particular species.⁵⁶ ‘Culling’ is a narrower term and generally refers (in a colloquial way) to the intentional or state-sanctioned reduction of a population of species as a direct response

⁵² L Taylor, *Sharks of Hawaii: Their Biology and Cultural Significance* (University of Hawaii Press, 1993).

⁵³ JM Brunnschweiler, ‘The Shark Reef Marine Reserve: a marine tourism project in Fiji involving local communities’ (2010) 18(1) *Journal of Sustainable Tourism* 29-42, 37.

⁵⁴ B Francis, ‘Before and after Jaws: Changing Representations of Shark Attacks (2012) 34(2) *Great Circle: Journal of the Australian Association for Maritime History* 44-64, 44.

⁵⁵ C Neff, ‘Shark bite statistics can lie, and the result is bad policy’ (16 January 2014) *The Conversation* (online) < <http://theconversation.com/shark-bite-statistics-can-lie-and-the-result-is-bad-policy-21789>>.

⁵⁶ Woodroffe, Thirgood, and Rabinowitz above (n. 19) at 2.

to human-wildlife conflict.⁵⁷ Lethal management measures can be undertaken by individuals and groups, and also by State bodies and private institutions (private zoos for instance).

There have been many past attempts to minimise conflict by introducing non-lethal methods to control wildlife, and these attempts are ongoing. They include such things as chemical repellents,⁵⁸ live trapping and relocation, and exclusion zones.⁵⁹ Unfortunately, evidence suggests that for many types of conflict a complete resolution through non-lethal means is highly uncommon, despite rigorous and continued scientific and social efforts.⁶⁰ As a result, it is often the case that the conflict escalates to the point where it is considered that the numbers of a species needs to be controlled using lethal means.

Lethal management is by no means an accepted practice. There are wide-ranging conservation impacts, together with moral arguments against its use. Lethal management has directly led to the extinction of several species.⁶¹ More commonly, it has led to a very substantial contraction of their geographical ranges and steep reduction in population numbers. For example, it has been suggested that lethal management has had a significant effect on diminishing elephant numbers with some authors reporting in some parts of Africa 'problem animal control' is as prevalent a cause of death as ivory poaching.⁶² There are likely to be various other effects on the species itself, such as effects on the locality of the species, behavioural effects and other indirect impacts.⁶³ In addition to this are the effects on other species and on the environment more generally when the species which is targeted is a 'keystone species'.⁶⁴

⁵⁷ Whilst culling is normally focussed on reducing a population of species, lethal management can also include controlling particular individuals or small groups of species that pose a risk to human safety or other interests.

⁵⁸ S Baker, S Ellwood, R Watkins and D MacDonald, 'Non-Lethal Control of Wildlife: Using Chemical Repellents as Feeding Deterrents for the European Badger *Meles meles*' (2005) 42(5) *Journal of Applied Ecology* 921.

⁵⁹ S Vantassel, 'Wildlife management professionals need to redefine the terms: Lethal control, nonlethal control, and live trap' (2012) 6(2) *Human-wildlife Interactions* 335.

⁶⁰ Dickman above (n. 25) at 459.

⁶¹ Woodroffe, Thirgood, and Rabinowitz above (n. 19) at 3.

⁶² For example, in Botswana from 1989-1996, 239 dead elephants were reported to have been lethally 'controlled' whereas 259 were 'poached.' See Woodroffe, Thirgood, and Rabinowitz above (n. at 18) 7.

⁶³ For a fuller discussion of the effects on wildlife see Woodroffe, Thirgood, and Rabinowitz above (n. 18) at 8-9.

⁶⁴ Woodroffe, Thirgood, and Rabinowitz above (n. 18) at 10.

Lethal management is often a decision based on emotion, which has been made as a result of a human fatality or injury. Killings are therefore often viewed as 'retaliatory'.⁶⁵ After undertaking various case studies and attempting to characterise the nature of attacks on humans, Quigley and Herrero were left with the 'overwhelming impression...that people have dealt with the subject in a manner that is commonly less than objective'.⁶⁶ This reflects the powerful influence of culture and emotion in response to conflicts discussed above.

In addition, the effectiveness of specific lethal management programs are frequently called into question. In China in the mid 2000's, bird flu was thought to be transmitted by migratory birds, including many endangered species. In 2005, at Qinghai Lake, hundreds of waterbirds were reportedly culled despite limited evidence of the birds carrying the disease or of their ability to transmit the disease to humans.⁶⁷ At around the same time, a private zoo in Thailand reportedly took the controversial 'pre-emptive' step of culling dozens of tigers, which were also believed to transmit the disease.⁶⁸ This was despite the World Health Organisation's position that they posed no serious risk to humans.⁶⁹

Notwithstanding the challenges associated with lethal management, there are arguments that it does have a legitimate role to play in the protection of human safety and livelihood, as well as conservation.⁷⁰ Treves and Naughton-Treves, for instance, provide three reasons why lethal management may be valuable;⁷¹

1. If the lethal management is controlled, it does have the potential to reduce the threat to public safety and livelihoods, without the threat of extinction to the species.
2. Removing problem wildlife has the potential to pacify locals and deter them from instigating their own (and potentially more harmful) lethal management.

⁶⁵ H Quigley and S Herrero, 'Characterization and prevention of attacks on humans', Systems' in Woodroffe, Thirgood, and Rabinowitz (eds) above (n. 18) at 28.

⁶⁶ *Ibid.*, 47.

⁶⁷ BirdLife International above (n 9).

⁶⁸ M Thornley 'Avian influenza ravages Thai tigers' (2008) 82(11) Australian Veterinary Journal 652.

⁶⁹ 'Bird flu tigers facing mass cull' BBC News (20 October, 2004)

<<http://news.bbc.co.uk/2/hi/asia-pacific/3760560.stm>>.

⁷⁰ It is noted that many animal welfare organisations are, however, likely to strongly disagree with the appropriateness of lethal management practices in most instances of conflict.

⁷¹ A Treves and L Naughton-Treves, 'Evaluating lethal control in the management of human-wildlife conflict' in *People and wildlife: conflict or coexistence?* in Woodroffe, Thirgood, and Rabinowitz above (n. 19) at 87.

3. The removal of some of a problem species may select for conspecifics [that is, a member of the same species] that naturally avoid human contact, forcing directional selection for a 'wilder population' of that species.

State-based lethal management, as a last resort, would appear to be more effective at protecting public health whilst maintaining a species than, say, villagers or farmers left to their own means. In addition, in some instances where public safety is at serious risk, lethal management may be unavoidable.

B. Lethal Management of 'Dangerous' Endangered Species

It seems paradoxical to consider the lethal management of an endangered species. Where a species is facing extinction, or indeed plays a valuable role in sensitive ecological processes, why would a State deliberately further its demise? Yet governments around the world have considered and implemented such programs. In North America, the Gray Wolf (*canis lupus*) was for a long time considered a direct threat to public safety and livestock. Where it once ranged over most of the Northern Hemisphere, human development has impacted its habitat and lethal persecution has threatened its survival.⁷² Today, large populations of the wolf can be found only in northern Canada and Alaska.⁷³ Like the Zanzibar leopard (above) and the white shark (below) the gray wolf seems to have suffered from a form of state-sponsored demonization. Indeed, most of the campaigns to eradicate the wolf were government-led:

Until recently, bounty programs had been established, suspended, and reinstated in various North American jurisdictions. Wolves have been poisoned, trapped, snared, and shot from the ground and air. The most successful strategy used to exterminate wolves has probably been the poisoning campaigns that involved personnel hired by government agencies.⁷⁴

The endangered white shark (*carcharodon carcharias*) - also known as the 'great white' or 'white pointer' - has recently been the target of lethal control programs in Australian coastal waters. Although the Eastern Australian states of Queensland and New South Wales have been culling sharks for decades,⁷⁵ the West Australian Government recently sought approval for a three year lethal control (baiting and drum-lining) program in response to several recent

⁷² Musiani and Paquet above (n. 8) at 50.

⁷³ Ibid.

⁷⁴ Ibid.

⁷⁵ Australian Government, *Recovery Plan for the White Shark* (Commonwealth of Australia 2013) 35.

shark attacks.⁷⁶ Despite the scarcity of evidence on white shark behavior and populations, and particularly on distribution and migratory patterns,⁷⁷ Australian State and Federal agencies seem intent on lethal management without proper regard to the level or scope of the risk to humans.⁷⁸ Further, such unfocused control programs often catch marine species which pose no threat to human safety.⁷⁹ From 2014 to 2015, the Queensland shark control program killed over several hundred sharks as well as dozens of turtles, dolphins, whales and dugongs.⁸⁰

Sharks are one species that, perhaps unlike any other, raise serious and very real fears in many people. This is despite the low risk of encountering one in the wild. As Kock and O'Riain point out:

*...although sharks rarely injure or kill people, when they do it induces strong negative responses from the public, fueled by sensationalist media coverage.*⁸¹

In examining human responses to shark attacks, Peace questions traditional suggestions that 'anti-predator' responses to wildlife are somehow 'genetically hard-wired' into humanity. He argues that human reactions are heavily influenced by popular culture and by the media claiming that the fascination with white sharks 'lies in their capacity to keep us mindful that nature ... was once a force well beyond the dictates of culture...'⁸² Peace again raises the conflict between culture and species discussed above. Unlike other apex predators (lions, tigers, bears etc.), white sharks continue to generate fear, Peace writes, because they exist outside of the 'commanding process of [human] enclosure'.⁸³ When a species cannot be

⁷⁶ Woolaston and Hamman above (n. 4).

⁷⁷ Australian Government above (n. 75) at 6.

⁷⁸ Woolaston and Hamman above (n. 4).

⁷⁹ G Cliff and S Dudley, 'Reducing the environmental impact of shark-control programs: a case study from KwaZulu-Natal, South Africa. (2011) 62 Marine and Freshwater Research 700.

⁸⁰ In total, 621 sharks were caught from 2014-2015 off the coast of Queensland, including: 8 White Sharks; 251 Tiger Sharks; 111 Bull Sharks; and 173 other Whaler Sharks. See ABC News, 'Queensland: 621 sharks killed off Queensland coast through control program' (21 August 2015) <www.abc.net.au/news/2015-08-21/621-sharks-killed-off-queensland's-waters/6715136>.

⁸¹ A Kock and JM O'Riain, 'Living with white sharks: non-lethal solutions to shark-human interactions in South Africa in Conflicts in Conservation' in S Redpath, R Gutiérrez, A Evely, KA Wood and JC Young (eds) *Conflicts in Conservation: Navigating towards solutions* (Cambridge University Press, 2015) 237.

⁸² A Peace, 'Shark attack! A cultural approach' (2015) 31 *Anthropology Today* 3, 7.

⁸³ *Ibid.*

tamed, it appears more likely that demonization and negative cultural reactions will strongly influence human responses. As examples, consider some of the other prominent community-led demonization and eradication campaigns including wolves in Norway⁸⁴ and bears in Japan.⁸⁵

The potential for endangered species to spread disease, however, adds an entirely new dimension to the debate. In today's increasingly globalized world, infectious diseases, like bird flu, the Ebola virus, swine flu, equine influenza and so forth can have serious geopolitical and security ramifications in addition to public health impacts. The prompt lethal management of migratory species might be seen as 'precautionary' or 'pre-emptive' measure, even without strong evidence the disease can transmit to humans. China's 'Qinghai Lake' wild bird destruction (discussed above) is one example of this. In that instance, 'public paranoia' fueled emotional responses, even where there was 'general scientific consensus about the minor role that wild birds play in spreading the disease.'⁸⁶

Another example is the Australian governments' approach of controlling endangered grey headed flying foxes thought to transmit equine influenza (Hendra Virus), which is fatal in horses and, in rare cases, humans.⁸⁷ One interesting aspect of the flying fox example is that bats are also critical for pollination of Australian forests, including its World Heritage Wet Tropics.⁸⁸ Nevertheless, immediate human concerns are 'always paramount', says the Queensland Government which implemented the program: '[we need to put] the health and wellbeing of the community as the central consideration regarding flying-fox roost management.'⁸⁹ All of this begs the question about how decision-makers should best approach decisions about lethal control of dangerous (or potentially dangerous) threatened

⁸⁴ J Linnell, EJ Solberg, S Brainerd, O Liberg, H Sand and P Wabakken 'Is the fear of wolves justified? A Fennoscandian perspective' (2003) 13(1) Acta Zoologica Lituanica 27.

⁸⁵ J Knight, 'Culling demons: The problem of bears in Japan' in John Knight (ed), *Natural enemies: People-wildlife conflicts in anthropological perspective* (Routledge, 2000).

⁸⁶ BirdLife International, above (n. 9).

⁸⁷ R Plowright, H Field, C Smith, A Divljan, C Palmer, G Tabor, P Daszak, and J Foley, 'Reproduction and nutritional stress are risk factors for Hendra virus infection in little red flying foxes (*Pteropus scapulatus*)' (2008) 275 Proceedings of the Royal Society B: Biological Sciences 861.

⁸⁸ ABC News (online), 'Breeders want flying fox culls to stop hendra' (8 July 2008) <www.abc.net.au/news/2011-07-08/breeders-want-flying-fox-culls-to-stop-hendra/2787200>

⁸⁹ Queensland Government Department of Environment and Heritage Protection, 'Authorised flying-fox roost management' <www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/roost-management.html> accessed 1 November 2015.

species, to reach decisions which best serve the long-term welfare of both humanity and the species in question.

III. Negotiating Conflict: Towards an Effective Legal Response

One of the foremost challenges of law, and indeed international environmental law, is to develop decision-making frameworks which are capable of negotiating competing interests. There is an important difference between law and policy worth noting here. On the one hand, policies set the goals (or strategies) that the government of the day intends to follow. But on the other hand, the law is, for all intents and purposes, the governmental tool for achieving those goals.⁹⁰ In many ways, the law ought not to prescribe particular outcomes, but to uphold, above all, proper process, which respects the discretion of democratically elected decision-makers, provided they act in good faith, in accordance with the Rule of Law,⁹¹ and consistent with internationally recognised human rights norms.⁹² Relevantly, the precautionary principle, a key feature of this paper, is particularly concerned with supporting proper decision-making processes as opposed to mandating particular outcomes.⁹³

This last section considers what might contribute to a sensible legal framework where public health and conservation managers are faced with potential risks to both

⁹⁰ For an interesting take on the difference between law and policy, see TJ Low, 'Law vs. public policy: a critical exploration' (2003, Summer) *Cornell J of Law & P Policy* 493+. *LegalTrac*. Web. 19 Jan. 2016.

⁹¹ The ultimate role of law in democratic society is, of course, a contentious one. Indeed it has been since the early natural law theorists like Aristotle (384-322 BC) and later St Thomas Aquinas (1225-1274 AD). Enlightenment thinkers such as Hobbes, Locke and Rousseau progressed the role of law society in the pursuit of 'man's' individuality (over state suppression) and more recent philosophies have focused on the significance of concepts like due process and the theory of procedural justice. See for example, J Rawls, *A Theory of Justice* (Harvard University Press, 1971); and, for a different take: A Sen, *The Idea of Justice* (Harvard University Press, 2009). In the context of environmental law, the notion of procedural justice has been taken up, alongside issues of distributive justice, and justice as recognition under the movement of environmental justice. See for example, D Schlosberg, *Defining Environmental Justice: Theories, Movements, and Nature* (Oxford University Press, 2007) and G Walker, *Environmental Justice: Concepts, Evidence and Politics* (Routledge, 2012).

⁹² Consistency with human rights norms is an important constraint on government decision-making and forms the basis for many of the arguments made in this article.

⁹³ E Fisher and R Harding, 'The precautionary principle and administrative constitutionalism: the development of frameworks for applying the precautionary principle' in E Fisher, J Jones and R von Schomberg (eds), *Implementing the Precautionary Principle: Perspectives and Prospects* (Edward Elgar, 2006).

humans and other species. It begins by considering existing principles of human rights and exploring instances of conflict between human rights and environmental law.

A. Conflict with Human Rights

International human rights treaties impose obligations on states to respect, protect and fulfil human rights.⁹⁴ These obligations are implemented through various legislative and policy instruments, and states are afforded a degree of discretion in the steps they choose to take.⁹⁵ The relationship between human rights and the environment is complex and multifaceted. While in many ways protection of the environment and human rights can be mutually supportive, in other situations the two objectives may be quite incompatible. In cases of human-wildlife conflict, tension arises between the competing objectives of protecting human rights and protecting the environment, particularly where the wildlife involved are endangered or threatened species. As shown in the case of the Zanzibar leopard (discussed above), there may also be cultural considerations which lead to the persecution and ultimate extermination of certain species or otherwise impact on the survival or welfare of wildlife.

Many human rights possess environmental dimensions. Most commonly this is understood as a relationship where good environmental conditions are a prerequisite to the fulfilment of human rights.⁹⁶ For instance, air and water pollution can represent a threat to the enjoyment of the rights to health⁹⁷ and to an adequate standard of living.⁹⁸ The obligations to protect and fulfil these rights would consequently require that states take steps to address pollution. In some situations, particular species of wildlife could pose a threat to the enjoyment of human rights. For example, the potential for animals to spread disease has obvious impacts on the right to the highest attainable standard of health.⁹⁹ Policies designed to manage populations of mosquitoes, flying foxes and other species considered

⁹⁴ H Steiner, P Alston and R Goodman, *International Human Rights in Context* (Oxford University Press, 2007) 185-189.

⁹⁵ See *International Covenant on Civil and Political Rights*, opened for signature 16 December 1966, 999 UNTS 171 (entered into force 23 March 1976) Art. 2 ('ICCPR'); *International Covenant on Economic, Social and Cultural Rights*, opened for signature 16 December 1966, 993 UNTS 3 (entered into force 3 January, 1976) Art. 2 ('ICESCR').

⁹⁶ P Birnie, A Boyle and C Redgwell, *International Law and the Environment*, (Oxford University Press, 2009) 282; A Boyle, 'Human Rights and the Environment: Where Next?' (2012) 23(3) *European J of Int'l L* 613, 614.

⁹⁷ ICESCR above (n. 95) Art. 12.

⁹⁸ *Ibid*, Art. 11.

⁹⁹ *Ibid*, Art. 12.

dangerous to human health can therefore be justified from a human rights perspective on the basis that they are necessary to protect and fulfil the right to health. In serious cases of human-wildlife conflict the right to life may also be affected.¹⁰⁰ This right has been defined to include not just the right to be protected from arbitrary deprivation of life, but also to be protected against potentially life-threatening conditions.¹⁰¹ The right would therefore seem to justify taking action such as relocating or eradicating species which pose a serious threat to human life.¹⁰²

Other sorts of legally protected rights can also be indirectly implicated by human-wildlife conflict. For example, where feral or wild animals predate upon livestock or destroy crops this has the potential to interfere with economic rights such as the right to earn a living by work of one's choice or the right to an adequate standard of living.¹⁰³ For people who rely on subsistence agriculture, these impacts could interfere more directly with the enjoyment of rights to food, water and an adequate standard of living.¹⁰⁴ One of the justifications for the West Australian shark control program was the impact that the shark attacks (or the fear of shark attacks) were having on the local tourism industry and other local business interests.¹⁰⁵ Similar arguments have been made more recently in northern New South Wales following a spate of incidents which led to a reported downturn in trade for surf shops

¹⁰⁰ ICCPR above (n. 95) Art. 6.

¹⁰¹ Human Rights Committee, *General Comment 6: The right to life (Article 6 of the Covenant)* UN Doc HRI/GEN/1/Rev.9 (Vol 1) (30 April 1982); Human Rights Committee, *Communication No 67/1980*, UN Doc CCPR.C/17/D/67/1980 (27 October 1982) 20 ('*Port Hope Environmental Group v Canada*'); *Sawhoyamaya Indigenous Community v Paraguay (Merits, Reparations and Costs)* (2006) IACHR (Ser C) No 146 [161]; *Budayeva and others v Russia* (European Court of Human Rights, Application Nos 15339/02, 21166/02, 20058/02, 11673/02 and 15343/02, 20 March 2008); *Oneryildiz v Turkey* [2004] XII Eur Court HR 657.

¹⁰² Of course, paradoxically, the eradication of certain species 'in the name of human rights' may in fact have serious consequences for human health and well-being. For example, the removal of certain keystone marine life (like sharks) may disrupt wild fish stocks which impact upon the sustenance rights of remote islander and coastal communities in the region.

¹⁰³ ICESCR, above (n. 95) Arts. 6 and 11.

¹⁰⁴ *Ibid*, Art. 11.

¹⁰⁵ J McHugh, 'Sharks take a bit out of WA Surfing Business' *WA Today* (online) (19 March 2013) <www.watoday.com.au/wa-news/sharks-take-a-bite-out-of-wa-surfing-business-201303192gdah.html>; S Holland, 'Shark anxiety strikes WA behaviour and tourism hit', *WA Today* (21 November 2014) <www.watoday.com.au/wa-news/shark-anxiety-strikes-wa-behaviour-and-tourism-hit-20141121-1rifo.html>.

and other businesses in the affected towns.¹⁰⁶ This impact could be understood as an interference with people's economic rights, and governments (arguably) have an obligation to take measures to address these impacts.

There is another sense in which human social, economic and cultural rights are relevant to human-wildlife interaction. Rather than viewing wildlife as a potential threat to humans, certain species can also be regarded as a natural or cultural resource to which certain groups may claim rights to hunt or otherwise utilise. Most notably this applies to indigenous peoples who may hunt and fish particular species as part of their cultural practices or traditional forms of livelihood. Or certain species play important ceremonial, totemic or spiritual roles for certain peoples. In circumstances where culturally significant species are endangered or threatened, there will be additional reasons for protecting those species, and a broader range of considerations will be at play.

International human rights law protects people's cultural and religious rights in a number of ways. The International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural Rights, (ICESCR) both guarantee the right of peoples to self-determination, including the right to use natural resources.¹⁰⁷ The ICCPR also guarantees to all ethnic, religious and linguistic minorities the right to practice their culture.¹⁰⁸ The human rights affirmed in international law are expanded and explained in the *United Nations Declaration on the Rights of Indigenous Peoples* (UNDRIP), which, although voluntary, still requires that States assure indigenous peoples' rights to practice their cultures and customs, particularly with respect to their lands and waters.¹⁰⁹ Where traditional customs and practices involve the taking or use of particular species, such

¹⁰⁶ T Forbes, 'Spate of shark attacks and close calls take toll on NSW north coast towns; surfers call for shark cull' ABC News (12 August 2015) <www.abc.net.au/news/2015-08-12/shark-attacks-close-calls-affecting-businesses-nsw-north-coast/6693080>

¹⁰⁷ ICCPR above (n. 95) Art. 1; ICESCR above (n. 95) Art. 1.

¹⁰⁸ ICCPR above (n. 95) Art. 27.

¹⁰⁹ United National Declaration on the Rights of Indigenous Peoples ('UNDRIP') adopted 13 Sept. 2007, Arts. 25 and 26. Similar rights are protected in the International Labour Organisation's *Indigenous and Tribal People's Convention*, opened for signature 27 June 1989, ILO Convention 169 (entered into force 5 September 1991) Arts. 4, 7, 15 and 23. The close relationship between indigenous peoples and biological resources is also recognised in the *Convention on Biological Diversity*, opened for signature 4 June 1992, 1760 UNTS 79 (entered into force 29 December 1993), see Preamble and Art. 10.

conduct would be protected by the UNDRIP and states would be required to make allowance for it in their domestic laws.¹¹⁰

In a post-colonial context, the justifications for permitting indigenous taking of certain species of wildlife are well-accepted.¹¹¹ It is also commonly asserted that indigenous hunting and fishing is part of a culture of environmental stewardship which is consistent with sustainability.¹¹² In such a context, human rights principles support decision-making which would permit a limited impact on the environment in order to fulfil recognised rights and correct historic injustice. However, it should not always be assumed that indigenous lifestyles are necessarily compatible with environmental conservation, and questions arise where indigenous peoples may be utilising species for more commercial reasons.¹¹³ In such situations, rights to maintain traditional practices and to pursue economic self-reliance must be balanced against the demands of sustainability.¹¹⁴

There are other cultural uses of nature and wildlife which may not be so easily justified on human rights grounds, and for which decision-making frameworks are more problematic to identify. For example, recreational hunting could be argued to be an exercise of cultural rights, although this argument has been rejected in a number of cases where it was held that a ban on hunting did not amount to a breach of human rights.¹¹⁵ It might also

¹¹⁰ UNDRIP above (n 112) Arts. 11, 24, 25, 26, 31. In Australia, Indigenous rights to hunt or fish are partly protected in a range of state and federal legislative instruments including the Native Title Act 1994 (Cth); Aboriginal and Torres Strait Islander Communities (Justice, Land and Other Matters) Act 1984 (Qld); and Torres Strait Fisheries Act 1984 (Cth).

¹¹¹ See UNDRIP above (n 112) *Preamble*, which recognises that Indigenous peoples have suffered historic injustices as a result of colonisation and dispossession of their lands, and recognises the need to promote Indigenous rights derived from cultural and spiritual traditions associated with those lands.

¹¹² *Ibid*; see also ILO Convention 169 above (n 112) Arts. 8, 17; *Rio Declaration on Environment and Development* UN Doc (1992) A/CONF.151/26 (vol I); 31 ILM 874, Principle 22.

¹¹³ B Richardson, 'Indigenous Peoples, International Law and Sustainability' (2001) 10(1) *Review of European Community and Int'l Environmental Law* 1, 3.

¹¹⁴ See for example, the *Convention on Biological Diversity* above (n 112) Art. 10, which obliges States to preserve traditional and customary uses of biological diversity that are compatible with conservation and sustainable use. The *Fur Seal Treaty* permitted the hunting of seals by indigenous peoples but placed limitations on the practice designed to prohibit hunting in commercial quantities for commercial purposes: *Preservation and Protection of Fur Seals*, opened for signature 7 July 1911, 37 Stat 1542, TS 564 (entered into force 5 December 1911, terminated 23 October 1941) Art. IV.

¹¹⁵ This was argued by the appellants in *Whaley and Another v Lord Advocate (Scotland)* [2007] UKHL 53. In that case the House of Lords rejected the argument that a ban on fox hunting represented a breach of the Human Rights Act 1998 (UK)

be argued that cultural rights entitle humans to use natural spaces such as forests, rivers or beaches for enjoyment. When these spaces present dangers to human welfare, issues arise as to the appropriate response. For example, beach culture plays a large part in Australian coastal communities but is potentially threatened by the impact of sharks, crocodiles, jellyfish or other dangerous species. These cultural uses of wildlife or wild spaces are not specifically protected by human rights law outside of an indigenous context, yet where human-wildlife interaction presents a risk to human rights then there may be a duty on states to take protective action.

From all of this, questions arise as to the threshold of risk to human rights which should trigger the obligation to take action and how the obligation to protect human rights should be balanced against other obligations. How ought the law manage the conflict between conflicting human rights and environmental laws? Human rights law does provide some guidance for how to balance competing human rights obligations¹¹⁶ but little direction for how human rights duties should be reconciled with other competing interests such as the protection of the environment.¹¹⁷ The suggestion is made, as will be further explained, that

<www.publications.parliament.uk/pa/ld200708/ldjudgmt/jd071128/whaley-1.htm>; see also *Adams v Scottish Ministers* (2004) SC 665; *R (Countryside Alliance) v Attorney General* [2007] QB 305.

¹¹⁶ See for example, the ICCPR above (n 95) which provides that the exercise of certain rights may be limited where it is necessary to protect public health, public order, national security or the rights of others (Arts. 12, 19, 21 and 22).

¹¹⁷ In recent years, attempts at creating and protecting procedural rights with respect to the environment have been introduced. Consider for instance the implementation (predominately in Europe) of the *Aarhus Convention on access to information, public participation in decision-making and access to justice in environmental issues* opened for signature 25 June 1998, 2161 UNTS 447 (entered into force 30 October 2001) ('Aarhus') which has, at least to some extent, guaranteed procedural rights for people to access environmental information and challenge environmental decisions. Aarhus, however, does little to reconcile substantive instances of human rights and environmental conflict except to provide some legal avenues for the resolution thereof. Moreover, it should also be noted that a 'right to a healthy environment' has been enshrined in scores of national constitutions such as Ecuador (Title II, Chapter II) and South Africa (section 24) which guarantee some substantive protections with respect to 'healthy living' and 'sustainable use of resources' for humans, but as Lewis notes: '[many of these] constitutions employ a very wide range of language, and are open to interpretation. Even an apparently simple formulation such as 'right to a healthy environment' raises significant questions as to the scope and content of the right. How is a 'healthy environment' to be defined?' See B Lewis, 'Environmental rights or a right to the environment? Exploring the nexus between human rights and environmental protection' (2010) 8(1) *Macquarie J of Int'l and Comparative Environmental L* 36-47, 43. Thus, whilst the presence of a constitutional right may be positive, it is likely to provide little scope for managing conflict between environmental rights

other principles of international law are better equipped for identifying and assessing the potential risks. The most well-known and probably best suited of which is the precautionary principle.

B. The Precautionary Principle: What Role Could It Play?

The precautionary principle is often construed as a key principle of international environmental law.¹¹⁸ Although various definitions abound, it generally provides that where there is a credible threat of serious or irreversible harm to the environment, scientific uncertainty should not be used as a reason for postponing action to prevent that harm.¹¹⁹ The principle has multiple aspects and the confines of this paper do not permit a full canvassing of the extensive literature written about the precautionary principle.¹²⁰ It is sufficient for the present discussion that pursuant to the precautionary principle:

*...authorities are prepared to tackle risks for which there is no definitive proof that there is a link of causation between the suspected activity and the harm...*¹²¹

Despite its growing presence in international agreements, there has been some reluctance to accept that the precautionary principle has been elevated to the status of a 'principle' of international law¹²² Doubts seem most prevalent in area of 'Anglo-Saxon' jurisprudence.¹²³

and other human rights. If anything, it is likely to cast further doubt in those instances. A major focus of this article, therefore, is on whether the precautionary principle - as a principle relevant to both human health and environmental law - can play a conciliatory role in instances of competing rights, not in securing further rights to begin with.

¹¹⁸ S Alam, JH Bhuiyan, T Chowdhury and E Techera, *Routledge Handbook of International Environmental Law* (Routledge, 2013) 46-50; see also N de Sadeleer, *Environmental Principles to Legal Rules* (Oxford, 2002) ch 3.

¹¹⁹ *Rio Declaration* above (n. 115) Principle 15.

¹²⁰ See de Sadeleer above (n. 121) at 275.

¹²¹ N de Sadeleer, 'The Precautionary Principle in EU Law' (2010) (N°5) Aansprakelijkheid Verzekering En Schade 173-184 <<http://ssrn.com/abstract=2293606>> 173-174. It is important to point out that precaution is not the same as prevention. Prevention is itself a separate principle of international environmental law. For a discussion of the principle of prevention, which originates from the 1938 *Trail Smelter Case* is closely related to the polluter pays principle, see: See de Sadeleer above (n 121) 62-63.

¹²² The various definitions of the principle appear to be an obstacle to general acceptance. See A Sirinskiene, 'The Status of Precautionary Principle: Moving Towards a Rule of Customary Law' (2009) 4 (118) *Jurisprudence* 349-364.

¹²³ *Ibid.*

Whether it forms part of 'customary international law' and thus a 'source' of international law under Article 38 of the Statute of the International Court of Justice is particularly contested in the literature. Some fifteen years ago, the Honourable Paul Stein AM, a former Judge of the New South Wales Land and Environment Court (in Australia), suggested that: 'the preponderance of opinion nowadays is that the principle has become part of international customary law'.¹²⁴ Indeed, some institutions like the International Tribunal for the Law of the Sea (ITLOS), appear to have treated it as part of customary law.¹²⁵ Today, however, the 'preponderance of opinion' is probably far less certain than Stein AM suggested. Whilst the use of the word 'principle' might imply immediate recognition as a principle of international law, whether it is or not is still largely up for debate.

Although the principle is most well known in environmental law, it also has a well-documented history in public health.¹²⁶ For example, the principle has been used to assist decision-makers when the effect of an action is uncertain such as in the early cases surrounding asbestos and occupational health and safety.¹²⁷ Further, the European Court of Justice (ECJ) has viewed the principle as 'an integral part of the decision-making processes leading to the adoption of any measure for the protection of human health'.¹²⁸

Like environmental law, public health entails trade-offs between public benefits on the one side and private rights/competing public interests on the other.¹²⁹ Proponents of the use of precautionary principle in health and environmental law appear to hold very similar values, placing health of the natural world above economic development, private interests and political agendas. International treaties have addressed the principle this way. The 2001

¹²⁴ The Hon. PL Stein AM, 'Are decision-makers too cautious with the precautionary principle?' (2000) 17(1) Environmental and Planning Law J 10.

¹²⁵ D Kazhdan, 'Precautionary Pulp: Pulp Mills and the Evolving Dispute between International Tribunals over the Reach of the Precautionary Principle' (2011) 38(2) Ecology Law Quarterly 527 at 533.

¹²⁶ World Health Organisation (WHO) 'The precautionary principle: protecting public health, the environment and the future of our children' (2004)

<www.euro.who.int/__data/assets/pdf_file/0003/91

173/E83079.pdf>; BD Goldstein, 'The Precautionary Principle Also Applies to Public Health Actions' (2001) 91(9) Am J Public Health 1358.

¹²⁷ See for example, the U.S case of *AFL-CIO v Hodgson*, 99 F.2d 467, 1974, where the Court found there was insufficient evidence surrounding the effects of asbestos and so the Occupational Safety and Health Administration had a right to regulate the use of the substance even where such regulation would adversely affect businesses.

¹²⁸ Case C-326/01, *Monsanto Agricoltura Italia*; see also de Sadeleer above (n. 124) at 178.

¹²⁹ L Gostin, 'A theory and definition of Public Health Law' (2007) 10 J Health Care L & Policy 1, 4.

Stockholm Convention on Persistent Organic Pollutants,¹³⁰ for instance, states the principle as a main objective in analysing the risk posed by persistent organic pollutants to both human health and to the environment.¹³¹ Likewise, the principle has been used with respect to both the environment and health in the *Cartagena Protocol on Biosafety*.¹³² The Cartagena Protocol allows parties to refuse the import of 'living modified organisms' on a precautionary basis where there is lack of scientific certainty on 'the extent of the potential adverse effects of a living modified organism on the conservation and sustainable use of biological diversity... taking into account risks to human health'.¹³³

One major benefit of the precautionary principle in addressing the issues raised in this paper is that it can be applied to the assessment of risks to humans and species. When the principle is triggered (in instances of threats of serious or irreversible harm), questions might be asked: What is the real risk of a shark attack in this area? How likely is it that this species will transmit the disease to humans? What does the best available science say? Similarly, if a cull is proposed, it must be asked; is there a risk that culling this population will have a long term negative impact on the species? What does the best available science say? What other 'risk averse' options are there to a cull?

At this initial stage - information gathering - the precautionary principle has great value. By enabling an assessment of the extent of a particular risk, it ensures that health and conservation authorities act in a way which is informed by scientific and other cogent evidence. However, the gathering and evaluation of information - in and of itself - is not sufficient to guide decision-making in situations of human-wildlife conflict. Other principles are required which can assist in managing the risks identified.

The precautionary principle is part of the broader process of risk analysis which involves a two-part process of first: risk assessment; then followed by risk management.¹³⁴ While acquiring information about potential risks is a crucial first step, deciding how to manage those risks is considerably more problematic. As De Sadeleer puts it, managing the very 'public' question of 'how safe is safe?' is decidedly more difficult.¹³⁵ What can the precautionary principle contribute to this second part of the decision-making process?

¹³⁰ *Stockholm Convention on Persistent Organic Pollutants* adopted 22 May 2001, entered into force 17 May 2004.

¹³¹ *Ibid*, Art. 4.

¹³² *Cartagena Protocol on Biosafety to the Convention on Biological Diversity* adopted 29 January 2000, entered into force 11 September 2003.

¹³³ *Ibid*, Arts. 10(6) and 11(8).

¹³⁴ De Sadeleer above (n. 124) at 173, 176 & 177.

¹³⁵ *Ibid*, 178.

In cases of human-wildlife conflict, it is argued that there are two limitations to the utility of the precautionary principle as a guiding concept for decision-making. The first is that the principle is not well-equipped for taking account of non-scientific, unquantifiable factors which may be relevant to a decision, such as cultural, religious or other indirect impacts. In particular, it does not easily accommodate the broader contexts in which a decision is made. As De Sadeleer admonishes: 'the risk is not just a question for the experts...' He continues;

[I]t takes on a distinct individual meaning once situated within its political social and economic context...accordingly a risk management decision must be taken by politicians.¹³⁶

The second limitation is that the precautionary principle does not include detailed guidelines for how competing interests are to be balanced. Where protection of an endangered species conflicts with protection of human health, for example, the principle does not explain what weight should be attached to these various interests or how to resolve the tension between them. It does set out the general principle that decisions ought to be precautionary in nature, and should try to avoid or minimise harm where possible, but it is less useful in judging how much harm ought to be tolerated. So, while the precautionary principle is very useful at the first step of risk analysis (risk assessment), other principles, norms and processes need to be incorporated to guide the second step (risk management). Those principles are lacking.

It is here that human rights principles may be of use. By incorporating human rights into the analysis decision-makers would not only be able to assess a broad range of human impacts, including social, cultural and economic impacts, but could also identify any relevant legal obligations which governments are required to uphold. Where a legally enshrined human right is at stake, decision-makers may be justified in giving priority to the protection of that human right over environmental impacts. At all times, however, this decision-making should be guided by the overarching purpose of the precautionary principle, which is to ensure that risks of harm are adequately assessed and decisions are made rationally, proportionately and cautiously. The gravity, likelihood and urgency of threats to both human rights and the environment must be assessed and any action taken in the name of human rights protections should be confined to that which is necessary and proportionate.

Take as a brief example of this discussion, the Chinese waterbirds instance referred to above. If such a circumstance were to arise again, Chinese authorities would be required, pursuant to law, to accumulate all accurate and reliable scientific information on the risk to

¹³⁶ Ibid.

human health and, at the same time, information on the threats to the survival of the species by a possible act of human intervention (i.e. a cull). Then, at the second stage of the decision-making process the risks to both birds and humans could be appropriately managed by a broader base of decision-makers weighing the relevant human rights against the informed risks to the waterbird population and having regard to considerations of necessity and proportionality. The decision-making process, if time permitted, should of course be underpinned by public consultation and freely available information.¹³⁷

The above thoughts are exploratory in nature and more work needs to be done to investigate the best methods for managing situations of human-wildlife conflict, particularly where lethal management of endangered species is concerned. While both the precautionary principle and human rights have a place, the exact relationship between them requires greater examination, as does the possible contribution of other closely-related principles of governance such as accountability and transparency.¹³⁸

¹³⁷ The principle of Public Participation and access to information is another principle of international environmental law that must be abided by. For a general discussion see for example, J Razzaque, 'Information, Public Participation and Access to Justice in Environmental Matters' in Alam et al above (n. 113) at 137-153.

¹³⁸ The principle of accountability is inextricably linked to the proper implementation of the precautionary principle. See for example, the United Kingdom's Inter-Departmental Liaison Group on Risk Assessment 2002 report which noted: 'action(s) in response to the precautionary principle should accord with the principles of good regulation, i.e. be proportionate, consistent, targeted, transparent and accountable'. (Inter-Departmental Liaison Group on Risk Assessment) 2002, *The Precautionary Principle: Policy and Application*, UK Government, <<http://www.hse.gov.uk/aboutus/meetings/committees/ilgra/pppa.htm>>; see also D Peterson, 'Precaution: principles and practice in Australian environmental and natural resource management' (50th Annual Australian Agricultural and Resource Economics Society Conference in Manly, New South Wales, February 2006) 30 accessed 17 December 2014 at 26, 29 and 33. Likewise, the principle of transparency is closely linked to the precautionary principle (see Peterson, *ibid*). For a broader discussion of the relationship between accountability and transparency in decision-making see J Fox, 'The uncertain relationship between transparency and accountability,' (2007) 17(4-5) *Development in Practice* 663-671; also A Bianchi and A Peters, *Transparency in International Law* (Cambridge University Press, 2013) 5. In this article, we have adopted a broad view of the precautionary principle such that it would encapsulate aspects of both accountability and transparency (applying the precautionary principle correctly may in fact be evidence of applying those other principles), but of course there are other more nuanced elements of those principles which are worth exploring in their own right and in relation to one another.

Conclusion

Instances of conflict between humans and wildlife are nothing new. Such encounters predate civilization but with increasing global populations, resource use and urban sprawl, human interactions are becoming increasingly diverse.¹³⁹ For the most part, wildlife-human encounters are positive; enriching and inspiring human existence. Throughout the world, they are a source of economic and community wellbeing, deeply entrenched in many indigenous cultures. But to the modern world, they can also be an increasing negative source of conflict; threatening livestock and crops, spreading disease and providing competition for scarce natural resources.¹⁴⁰

The argument in this article is that legal responses to instances of conflict are under-evaluated and in need of further academic attention. Through the lens of several brief examples, the more vexed question of lethal management of endangered species has been investigated, in part to show how complicated and multi-faceted such decisions can be. To avoid the proliferation of environmental law (for the sake thereof), an approach which sits within the existing frameworks of environmental law and human rights has been explored. The most relevant mechanism, the precautionary principle, is a crucial part of risk analysis, but it cannot fully accommodate the multitude of complex and interrelated factors which ought to be considered. It is suggested that human rights principles have a place within the decision-making framework, but further work is required to explore exactly how that framework ought to be constructed to ensure that actions taken are proportionate and scientifically justifiable.

¹³⁹ Woodroffe, Thirgood, and Rabinowitz above (n. 19) at 13.

¹⁴⁰ Ibid.