

UNDERSTANDING HUMANE EXPECTATIONS: PUBLIC AND EXPERT
ATTITUDES TOWARDS HUMAN-WILDLIFE INTERACTIONS

by

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

in

THE FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES
(Animal Science)

THE UNIVERSITY OF BRITISH COLUMBIA
(Vancouver)

January 2014

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Abstract

The field of wildlife management has been on a collision course with societal values regarding animal use for some time. Although wildlife populations are still managed largely under the “North American model of wildlife conservation” to accommodate consumptive uses, many people, often with different concerns, want to be heard in decisions about wildlife. These human dimensions present a challenge to wildlife management, a field in which policy has been generally driven by experts. This research used several public engagement methods to understand broader attitudes towards wildlife management and how to incorporate them into policy. Participants with varying levels of wildlife experience in British Columbia, Canada, were asked in online and telephone surveys for their attitudes towards, and acceptance of, specific wildlife activities and management practices. Findings indicate a gap between public and expert opinions on invasive (*e.g.*, relocation) and lethal management practices (*e.g.*, problem bears, predator control, protection of endangered species). Problems also emerged with the public view of wildlife feeding. This led to a review of its motivations, types and consequences, and an evaluative framework was proposed to assess when feeding is acceptable. When asked to rate the harm to wildlife caused in various ways (hunting, vehicle collisions, pollution, etc.), experts and the public largely agreed on the relative importance of harms, indicating considerable potential for finding common ground between conservation-oriented and welfare-oriented citizens. However, some current management practices, especially those involving killing animals, lacked broad public support and may be improved upon with public participation in policy development, especially with women, urban residents, those with low wildlife engagement and animal-protectionist values. This could take the form of public polling or increased representation on decision-making committees. Societal expectations for managing human-wildlife interactions in

BC documented by this research include ensuring that actions have an appropriate conservation purpose, are controllable, use humane methods, and appear fair to both people and wildlife. Including a broader public, educating both experts and the public on issues of humaneness, and strengthening wildlife and animal protection laws and enforcement, may serve to better align wildlife policy with societal values.

Preface

A version of Chapter 3 has been published: Dubois, S., & Fraser, D. (2013). Local attitudes towards bear management after illegal feeding and problem bear activity. *Animals*, 3(3), 935-950. The main ideas for the manuscript were developed and researched by Sara Dubois. This paper was co-authored by D. Fraser in the typical role of a primary supervisor, interpreting material, and editing drafts. The project received research ethics board approval from UBC under certificate number: H10-03335.

A version of Chapter 4 has been published: Dubois, S., & Fraser, D. (2013). A framework to evaluate wildlife feeding in research, wildlife management, tourism and recreation. *Animals*, 3(4), 978-994. The main ideas for the manuscript were developed and researched by Sara Dubois. This paper was co-authored by D. Fraser in the typical role of a primary supervisor, interpreting material, and editing drafts.

A version of Chapter 5 has been published: Dubois, S., & Fraser, D. (2013). Rating harms to wildlife: A survey showing convergence between conservation and animal welfare views. *Animal Welfare*, 22(1), 49-55. The main ideas for the manuscript were developed and researched by Sara Dubois. This paper was co-authored by D. Fraser in the typical role of a primary supervisor, interpreting material, and editing drafts. The research methodology was developed with the assistance of Dr. Peter Danielson and the Norms Evolving in Response to Dilemmas (NERD) team at the Centre for Applied Ethics at UBC. The project received research ethics board approval from UBC under certificate number: H10-00988.

A version of Chapter 6 has been published: Dubois, S., & Harshaw, H. W. (2013). Exploring “humane” dimensions of wildlife. *Human Dimensions of Wildlife*, 18(1), 1-19. The main ideas for the manuscript were developed and researched by Sara Dubois. This paper was

co-authored by H. W. Harshaw in the typical role of a supervisory committee member, interpreting material, and editing drafts. The research methodology was developed with the assistance of Dr. Peter Danielson and the Norms Evolving in Response to Dilemmas (NERD) team at the Centre for Applied Ethics at UBC. The project received research ethics board approval from UBC under certificate number: H10-00988.

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List of Abbreviations

BC = British Columbia

BC *PCA Act* = British Columbia Prevention of Cruelty to Animals Act

BCC = Biological carrying capacity

CCC = Cultural carrying capacity

HDW = Human dimensions of wildlife

MOE = Ministry of Environment

MFLNRO = Ministry of Forests, Lands and Natural Resource Operations

SCC = Social carrying capacity

WAC = Wildlife acceptance capacity

WSAC = Wildlife stakeholder acceptance capacity

Acknowledgements

When anyone asks me why I came back to school to do my PhD, the answer is simple: I came back for Dr. David Fraser. As my MSc supervisor and throughout the past decade in my career in animal welfare, Dr. Fraser has been my teacher, mentor, and cheerleader. I could not have asked for a more supportive, yet critical, but always pragmatic, supervisor. I was also privileged to have Dr. Dan Weary and Dr. Howard Harshaw enthusiastically participate on my supervisory committee, to ensure that my research captured the big picture questions of the fields of enquiry and that my methodology was sound and informed by broader applications. I sincerely thank Dr. Nina von Keyserlingk for always getting to the point and for helping me to navigate this journey. Chris McGill is kindly acknowledged for his gracious attention to detail, enthusiasm for students, and for shepherding my administrative needs. All of the students in the Animal Welfare Program have contributed to my academic growth by sharing their passion and knowledge, in particular my fellow compassionate conservationist Liv Baker.

I also praise my other supervisor, Craig Daniell, BC SPCA CEO, for his commitment to ensuring that evidence-based research is a foundation for the animal welfare profession in BC, and thus for allowing me to take a partial education leave and appreciating my work throughout these years. My BC SPCA colleagues are thanked for their incredible support, especially Paula Neuman for her encouraging friendship. This research would not have been possible without the funding from the Social Sciences and Humanities Research Council of Canada, the UBC Four Year Fellowship, the University of British Columbia Animal Welfare Program, and the 2012 Marion Judith Madsen Memorial Scholarship. Also noteworthy, I physically would not have been able to do this research without the skill and compassion of my spinal specialist Dr. Bishop and surgeon Dr. Street, who literally allowed me to walk again during the first year of my PhD.

I am very grateful to all those who participated in my research and the numerous organizations that assisted with survey distribution and promotion. I thank Dr. Peter Danielson, Dr. Cathy Schuppli and the NERD research team at the W. Maurice Young Centre for Applied Ethics for their informative discussions on question design and assistance with online survey programming and data retrieval. Sincere thanks are also extended to my undergraduate assistants Justine Vallieres, Cathy El-Hinn, Andrew Huang, Emma Strazhnik, Victor Chan, and Elaine Wu. The Christina Lake Stewardship Society, Allen Piche, and staff at the BC Ministry of Forests, Lands and Natural Resource Operations and BC Ministry of Environment are acknowledged for providing study background information and for their support to pursue such challenging issues in human-wildlife interactions in BC.

I am so fortunate to be surrounded by such bright and generous friends – I would be lost without my personal editing team and sounding board of Nicole Fenwick, Carol Morgan and Jennifer Bailey. Thank you for all your great feedback, support, and enduring friendships. Jackie McQuillan, Heather Klassen and Sandra Cameron, my sisters, I cannot put into words what it has meant to participate in all the important moments of your lives – you are forever my family.

Indebted to my parents, Joann and Peter, their endless encouragement plus moral and financial support have enabled me to pursue every passion and dream since childhood. I am so thrilled to watch you both finally take the time in your retirement to do the same. To my brother James and sister-in-law Sarah, thank you for having the most beautiful and compassionate redheaded children Kai and Annika, so I did not have to. Finally, my ever-patient and loving husband, Olivier, once again, you are owed years of my evenings and weekends – but I promise that quality will make up for quantity. That goes to my four-legged family too – Jade, Tiger and Dragon – many longer walks and uninterrupted lap time to come. ~ *With love, Sara*

Dedication

To Carol, for reminding me that if life is to be lived, that it should be a life worth living...

...and to Olivier, for making that life full of love, encouragement and humour

Chapter 1: Introduction

1.1 Background

Human activities have a long history of affecting wildlife on global and local scales, and at ecosystem, population and individual levels. Human relationships with wildlife began with core survival needs to hunt for food and protection. Transitioning from hunters to farmers, people domesticated some wild animals as livestock and companions. This led to the need to protect “useful” animals and human livelihoods by killing other wild animals that preyed on them or damaged crops. These early uses of predator and pest control differ somewhat from today’s practices, which are mostly used to enhance hunted populations and eliminate nuisance species. In modern times, we have captured wildlife for pets, entertainment and research. As human populations grow, and subsequent development activities cause additional habitat loss and pollution, indirect effects on wildlife may outweigh the direct and more visible harms like collisions with infrastructure (*e.g.*, buildings, wind turbines) and vehicles, or even intentional killing and capture activities. Even when well-intentioned, we can harm wildlife through ecotourism, feeding and rescue (Kirkwood & Sainsbury, 1996; Lott, 1996; Orams, 2002).

To address these effects on wildlife, the science of conservation works to preserve ecological systems, populations, and natural processes (Soulé, 1985), while the science of animal welfare strives to ensure a quality of life for individual animals (Fraser, 2008). Conservation values keystone species and biodiversity, while welfare applies equally to all sentient animals. Thus concern for reducing harms to wildlife is shared by conservation and animal welfare, and although there are areas for potential cooperation (Fraser, 2010; Paquet & Darimont 2010), the fields are often seen as separate or even mutually exclusive (Dauphiné & Cooper, 2011). This division is nowhere more obvious than in the professional practice of wildlife management.

Government and scientific wildlife agencies are committed to ecosystem-based management and are philosophically aligned with holistic environmental thinking, such as the “land ethic” (Callicott, 1989; Leopold, 1949). Although key animal welfare concepts, like promoting animal health, preventing suffering, and allowing animals to live in ways that suit their natural adaptations (Fraser, 2008), may not at first appear to be in conflict with conservation, the differences are apparent from the lack of animal welfare protection for free-living wildlife under provincial law (*e.g.*, Government of BC, 1996a). However, public concern for conservation and wildlife welfare in western nations does not appear to be so separate, as most people support the goal of preserving species biodiversity (Gallup, 2010) and believe that pain and suffering should be reduced where possible (*e.g.*, HarrisDecima, 2010).

The difficult task is to find common ground between conservation and animal welfare goals. This is necessary because not all welfare concerns are conservation concerns; for example, millions of common species are killed in pest control activities that inhumanely trap, shoot, or poison nuisance animals (Littin, 2010). Even a few of the threats to conservation have little effect on individual welfare, such as the effects of DDT on raptor eggs, where the developing egg is not yet capable of suffering. What common ground between conservation and animal welfare would look like, and how to achieve it, is a core theme that guided this research.

Without consideration for animal welfare within wildlife management, many common human-wildlife conflicts would lack practical guidance for the public as they fall outside conservation mandates for species at risk or hunted populations. For example, the “North American model of conservation,” which is the foundation for wildlife conservation and management in Canada and the United States (Geist, Mahoney, & Organ, 2001), provides insufficient direction for many human-wildlife interactions. The model declares that: wildlife is a

public trust resource that is of international interest; wildlife can be killed only for “legitimate purposes” and it cannot be legally sold (with the exception of furbearing species); and consumption should be determined by science and allocated by law democratically (Geist et al., 2001). This hunter-conservation construct (Dratch & Kahn, 2011), leaves little room for the consideration of animal welfare. Recent critiques of the model have only just begun to stir considerable ethical debate within the profession, and are attributed in part, to a shift in public attitudes towards wildlife (Dratch & Kahn, 2011; Nelson, Vuceitch, Paquet, & Bump, 2011).

As an example of the complex ethical issues that can arise in human-wildlife interactions, consider this scenario: a raccoon is found to be living in a hollow tree on a property. The property owner is neutral about the raccoon’s presence, but slightly concerned that the tree is not the best habitat for the animal given recent development of adjacent park land. A neighbour to the left loves raccoons, so much so they leave out pet food regularly to feed the animal. The neighbour to the right, however, feels raccoons are pests and may spread disease or attack their pets. As a locally abundant native species, there is no conservation concern for the population, and raccoons are legally killed on trap lines in non-urban areas. Furthermore, there is no law to prevent feeding raccoons or trapping and killing for nuisance purposes in this area.

What, then, is the right thing to do for this animal – trap and relocate, trap and kill, continue to feed or leave alone and “let nature run its course?” The response will vary between and within government agencies, humane organizations, wildlife groups and members of the public. Each alternative can be argued as the most humane option. Although society often wants to take the humane and legal route to resolve human-wildlife interactions, wildlife management recommendations may conflict and may not always reflect society’s position on the issues (Findlay, 2008). At the core of the urban raccoon dilemma is the community’s tolerance, which

is influenced by values and attitudes towards the animal and the perceived risk of its presence. The degree to which a community is informed, and the degree of input it has in wildlife management decisions, may also be critical to finding a humane resolution.

The raccoon scenario could be easily replaced by headline-grabbing stories of urban deer, habituated bears, pet-stalking coyotes or campground cougars. Our goal in finding a humane solution to human-wildlife interactions is to maximize benefits for both people and wild animals, and minimize conflict. Yet, if wildlife management recommendations are restricted to conservation only, this may constrain real-world decision-making and implementation success. Attempts to resolve these dilemmas must look beyond biological factors (resources, carrying capacity) to the experience of the people and animals involved. Managing human-wildlife interactions in a broader social context through the use of “human dimensions” methods can help to prevent or resolve conflicts over the management of these interactions (Bath & Enck, 2003).

Human Dimensions research refers to the study of how and why humans value natural resources, how humans want resources managed, and how humans affect, or are affected by, such decisions. Human Dimensions of Wildlife (HDW) inquiries strive to understand human attributes and how to incorporate that understanding specifically into wildlife management. HDW applies a variety of ideas and practices including cultural, economic, and social values; individual and social behavior; demographics; legal and institutional frameworks of management; communication and education; and, decision-making processes (Decker, Brown, & Siemer, 2001). The current chapter reviews the legal framework and definition of wildlife in Canada, using British Columbia (BC) (location of thesis research), as the context for current human-wildlife interactions. Further, the chapter examines applicable concepts in HDW as a basis for developing a more compassionate version of wildlife conservation and management.

1.2 Legal Protection for Wildlife

Understanding the legal protection for wildlife provides a framework for describing societal expectations for human and wildlife interactions. However, laws do not necessarily reflect what society supports or even what actually happens. Historically, wildlife populations have been managed to provide sustainable harvests (hunting, trapping) and reduce conflicts (Durward, 1973; Treseder et al., 1999). Typically, policies are driven by conservation mandates and business models that treat wildlife as a resource (*e.g.*, BC MOE 2009a). As a public resource, ownership of wildlife is vested in governments, who are to act on behalf of the public to steward wildlife. Correspondingly, legislation is designed to protect species and sometimes their habitats, but not individual animals. In Canada, aspects of both conservation and animal welfare are governed by provincial and federal legislation, which are administered by various agencies or branches within either provincial/territorial or federal government (Table 1.1).

1.2.1 Defining Wildlife

The term “wildlife” as defined by the various provincial and federal laws is important to understand to apply animal welfare legislation to “wildlife.” The *Migratory Birds Convention Act (MBC Act)* acknowledges most migratory bird species in Canada as wildlife. In particular, when the *MBC Act* was enacted in 1916, all bird species that were considered either useful or harmless to humans were listed, whereas species that were less desirable (seen as pests at the time; *e.g.*, raptors, herons, cormorants) were not protected under this federal legislation (Government of Canada, 1994). However, these species were eventually listed under BC’s *Wildlife Act* (Government of BC, 1996b & f).

Table 1.1 Wildlife Conservation and Animal Welfare Legislation and Agency Oversight Applicable to Wildlife in BC

Government	Agency/Branch	Wildlife legislation	Applicable to:	Animal Welfare legislation	(1) Applicable to: (2) Illegal to:
Federal	Environment Canada - conducts wildlife enforcement services - sets controls on international trade of threatened species - permits rehabilitation and research activities through department (Canadian Wildlife Service)	<i>Migratory Birds Convention Act</i> (Government of Canada, 1994) <i>Species at Risk Act</i> (Government of Canada, 2002)	- most migratory birds - endangered species		
	Department of Fisheries and Oceans - manages commercial, recreational and Aboriginal fisheries - permits marine mammals harvest and research	<i>Fisheries Act</i> (Government of Canada, 1985b)	- marine fisheries and marine mammals		
	Department of Justice - develops policy and reforms laws as needed (provinces responsible for prosecuting most <i>Criminal Code</i> offences)			<i>Criminal Code</i> (Government of Canada, 1985a)	(1) all animals (2) intentionally abuse or criminally neglect
Provincial (BC)	Ministry of Forests, Lands and Natural Resource Operations - issues licenses and permits for freshwater fishing, game hunting, trapping, rehabilitation, taxidermy, and research; restricts some feeding and possession - sets trapping, hunting, guiding regulations	<i>Wildlife Act</i> (Government of BC, 1996b & f) <i>Fisheries Act</i> (Government of BC, 1996c)	- raptors, birds, reptiles mammals, amphibians - controlled alien species - freshwater fish		
	Ministry of Environment - enforcement of fisheries, wildlife, environmental protection laws; human-wildlife conflicts - legislation, regulations and protected area management plans and wildlife species within	<i>Wildlife Act</i> (Government of BC, 1996b & f) <i>Fisheries Act</i> (Government of BC, 1996c)	- raptors, birds, reptiles mammals, amphibians - CAS - freshwater fish		
	Ministry of Agriculture - permits raising of fallow deer and bison for meat - permits breeding and keeping of mink, marten, fisher, fox, nutria, chinchilla for fur production	<i>Game Farm Act</i> (Government of BC, 1996d) <i>Fur Farm Act</i> (Government of BC, 1996e)	- specific furbearers - specific ungulates <i>Wildlife Act</i> exempts above species, treats as domestic animals	<i>Prevention of Cruelty to Animals Act</i> (Government of BC, 1996a)	(1) wildlife in captivity only, not free-living (2) cause critical distress

Before 2008, all exotic animals (wild animals not native to Canada) were not regulated in BC as they were not considered “wildlife” under the *Wildlife Act*. In that year, the provincial government enacted the Controlled Alien Species (CAS) Regulation following the 2007 death of a woman from a captive tiger in northern BC and several other high-profile exotic pet incidents (BC MOE, 2009b). The new regulation attempted to protect public safety by restricting possession, breeding, and display of the most dangerous exotic animals. Although 1,200 species of CAS species were prohibited, a long list of other exotic animals (*e.g.*, scorpions, kangaroos, serval cats), remain unregulated. Thus, although an important gap was filled in 2008, hundreds of exotic animal species are still unregulated in BC today and lack any federal designation. Thus, by not recognizing these remaining exotic animals as either CAS or “wildlife” under Canadian legislation, there are grounds to argue that they are excluded from animal welfare protection under the *BC Prevention of Cruelty to Animals Act (BC PCA Act)* (Government of BC, 1996a).

Moreover, free-living wildlife not held in captivity are not subject to the *BC PCA Act*. This applies to all species classified as “wildlife,” even domestic rabbits that were once owned and are now abandoned and living feral in parks and greenspaces. Since they are considered “Schedule C wildlife” under the *Wildlife Act* after only a few days of being stray pets, their rescue and rehoming may be conducted only under provincial permit. This was the case for the University of Victoria feral rabbit program, where almost 1000 feral rabbits were sent under permit to make-shift sanctuaries (University of Victoria, 2011). The inclusion of these animals as “wildlife” under the *Wildlife Act* may have been detrimental to their welfare as it prevented individual rehoming efforts, allowed municipalities to deny responsibility for stray animals, and enabled the inhumane killing of some rabbits because as free-living wildlife, they were not subject to legal protection under provincial animal welfare legislation.

1.2.2 Animal Welfare Legislation

There are two provincial acts that are relevant to animal welfare in BC. Under the BC *PCA Act*, a person commits an offense if they: deprive captive wildlife of adequate food, water, shelter, ventilation, space, care or veterinary treatment; do not seek treatment for captive wildlife that is injured, sick, in pain or suffering; or allow captive wildlife to be abused or neglected (Government of BC, 1996a). The *Wildlife Act* includes narrow animal welfare considerations for humane death and prohibits harassment of some free-living wildlife (Government of BC, 1996b). Schedule C of the *Wildlife Act Designation and Exemption Regulation* (Government of BC, 1996f) is an example of selective welfare protection, as there are no restrictions on killing or disturbing nests of non-native species (*e.g.*, European starlings, house sparrows, grey squirrels) and native species perceived as pests (*e.g.*, crows) at any time.

Federally, the animal cruelty section of the Criminal Code of Canada pertains only to intentional abuse or criminal neglect of animals, including free-living and captive wildlife. Yet, the Criminal Code permits wild animals to be killed and caused to suffer if this is in the pursuit of “a lawful purpose” (Government of Canada, 1985a). Under provincial law, activities like hunting and trapping, game or fur farming, and animal research, which may cause pain and suffering to wildlife (*e.g.*, using body-gripping traps, bow hunting, branding, drowning traps), are permissible because they are considered by wildlife authorities as reasonable and generally accepted practices (Government of BC, 1996a) of animal management.

Of national relevance to wildlife management and welfare, the Canadian Veterinary Medical Association (CVMA) states that a humane death is one that is quick and causes the least possible pain and distress (CVMA, 2011). Although this is not a legally binding statement, the recommendation can be used by provincial enforcement agencies in cruelty investigations. The

CVMA refers to the American Veterinary Medical Association guidelines on euthanasia for acceptable species-specific euthanasia methods for wildlife (AVMA, 2013). For wildlife used in research, the Canadian Council of Animal Care guideline on the care and use of wildlife has non-enforceable provisions for both captive and free-living wildlife (CCAC, 2003).

In summary, the existing legal protection for wildlife poses several causes for concern:

- 1) the definition of “wildlife” is not comprehensive and includes domestic species;
- 2) the BC *PCA Act* does not apply to free-living wildlife;
- 3) the unlimited killing of certain nuisance wild animals is acceptable; and
- 4) painful activities are allowed if deemed to be reasonable and generally accepted practices of animal management.

The lack of provincial welfare protection for free-living wildlife may have been based on observations that in nature, pain, suffering and death are commonplace and necessary. However, to claim that nature can be cruel, does not mean human activities that cause pain and suffering directly or indirectly to animals in the wild, are acceptable.

Clearly, the patchwork of wildlife and welfare legislation does not fully protect wildlife from human activities that can cause suffering and/or inhumane death. The question is whether the public would expect that wild animals – captive or free -living, native or exotic – are subject to at least some of the same protections as companion, research and farm animals? There is a need to understand broad public attitudes about wildlife management practices and policies, and what humane expectations they hold for human-wildlife interactions.

1.3 From “Human” to “Humane” Dimensions of Wildlife

Improving the legal protection of wildlife may help achieve more humane treatment if sufficient enforcement follows, but we can also look to the field of Human Dimensions of Wildlife for methodological parallels on how to elicit public attitudes to understand what else might motivate this change. This interdisciplinary field takes social considerations into account when proposing management actions and policy directions. As with the science of animal welfare, HDW perspectives not only address the biological dilemmas posed by animal use and management, but also the ethical challenges raised by evolving social values.

A core concept to the HDW field is the understanding of “impacts” defined by Riley and colleagues (2002) as the high-priority effects from wildlife-related interactions, defined and weighted by human values, as deserving of significant management attention. For example, urban deer may be a major management issue in one community because of increasing human-deer interactions and their “impacts” (*e.g.*, vehicle collisions, pet and human attacks). Yet, the overabundance of another species in the same community may not merit management attention because its impacts are not defined and seen to be of concern. Addressing the effects of interactions may be achieved by integrating human and ecological dimensions and through the use of stakeholder engagement (Riley et al., 2002). As HDW research continues to study impacts of wildlife to people, “humane dimensions” – impacts of human actions on individual wild animals – should also be investigated to help moderate interactions between wildlife and people.

1.3.1 Concepts of Carrying Capacity

An example where HDW weaves biological and social sciences together is seen in the term “carrying capacity,” a traditional concept in ecology first used in range management, now expanded to include human aspects. There are many different definitions of carrying capacity in

recreation and human dimensions sciences and to understand the evolution of each, a brief explanation is given (Figure 1.1). Additionally, Figure 1.1 contrasts the concepts in the context of a local wildlife management issue, the presence of non-native deer on an island.

Fallow deer were introduced on Sidney Island (a small island off Victoria, BC) in the 1930s and, in the absence of natural predators, they flourished until the 1980s. Since then, 11,000 deer have been removed by First Nations hunting, commercial hunting and landowner-initiated culls. The island's land base is 14% national park (with seasonal camping and day excursions) and 86% private land (Parks Canada, 2011). A deer management plan was developed in 2010 for the park area with the goal to reduce fallow deer populations to a level that restores the island's ecological integrity, improving endangered and rare vegetation and bird communities (Golumbia, 2010). Although the goal of this park plan was to restore ecosystem integrity, management plans can aim to address one or more of the several concepts of carrying capacity (Figure 1.1).

The traditional and primary concept of carrying capacity fundamental to ecology is "biological carrying capacity" (BCC) (or K-carrying capacity), which is defined as the maximum number of animals in a given population that can be supported by the resources of that area (Moss, Watson, & Ollason, 1982). Key to wildlife management, the BCC of any wildlife species can be manipulated by anthropogenic changes to environmental factors (*e.g.*, water, food, habitat). Given that humans have taken a major role in many of the earth's ecosystems (Vitousek, Mooney, Lubechenco, & Melillo, 1997), the idea of "letting nature run its course" rests on a simplistic and unrealistic view of the current world because most wildlife populations can no longer self-regulate through uniquely natural processes like predator/prey cycles, disease or stochastic events. Whether human actions are intentional or not, direct and indirect human effects on wildlife and the environment considerably alter BCC.

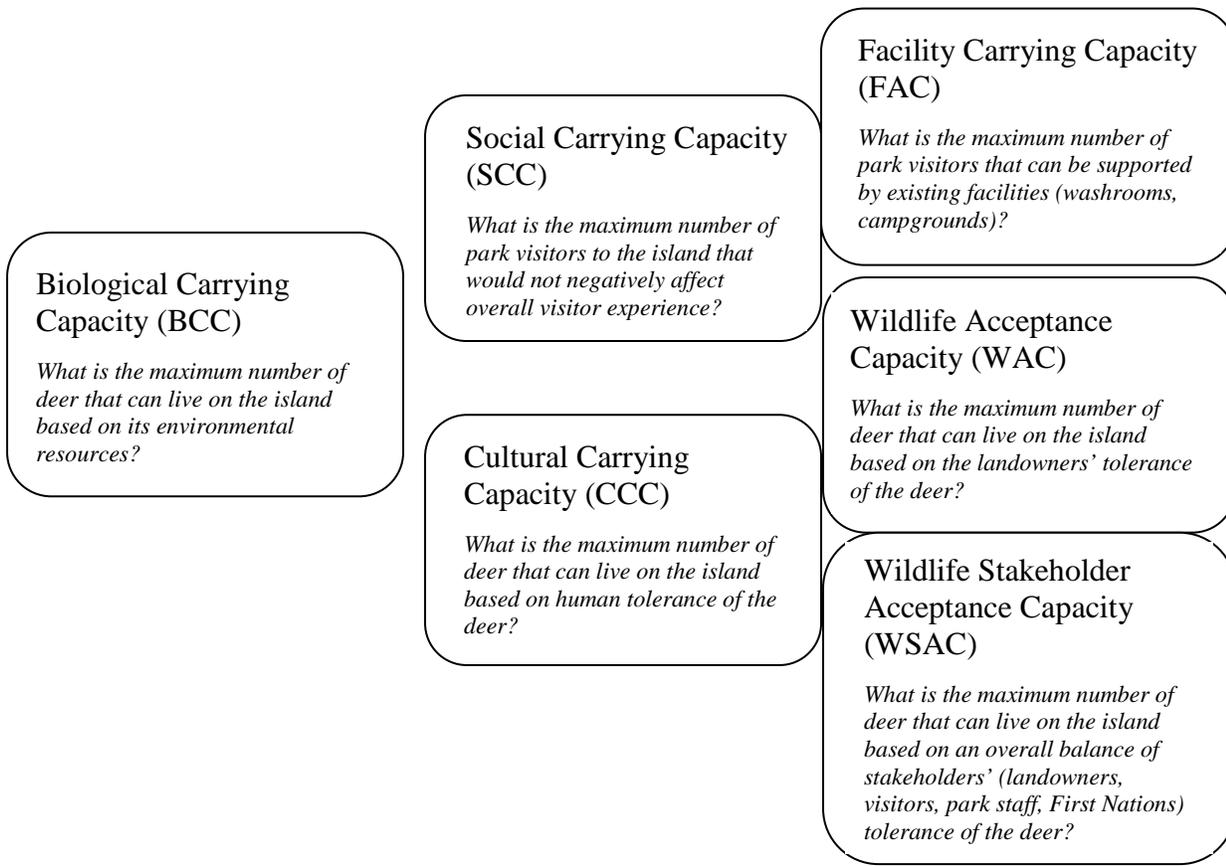


Figure 1.1 Carrying Capacity Concepts to Frame Fallow Deer Issues on Sidney Island, BC

New concepts of carrying capacity built upon BCC, have emerged to reflect the roles that humans play in ecological systems. “Social carrying capacity” (SCC) (also known as wilderness carrying capacity or recreation carrying capacity) is a term used in recreation management to describe visitors’ perception of the presence (or absence) of other people simultaneously using resources in the same area. It acknowledges how the density of people and their effects on natural areas affect the experience of other recreationalists in terms of their satisfaction and use of that environment (Hendee, Stankey, & Lucas, 1978; Shelby & Heberlein, 1981).

SCC has both an environmental and social component. For example, increased visitor use in a park can not only degrade the physical environment, but it may also spoil the experience of

other visitors as they could perceive more crowding and reduced access to points of interest. Like BCC, SCC can be manipulated, but not by environmental factors. In this example, park managers could alter park hours, access mode (non-motorized only) and even limit visitor numbers to achieve an acceptable level of use and satisfaction. In contrast, the concept of “facility carrying capacity” in recreation management refers only to man-made infrastructures and their ability to handle visitor needs, including such things as parking lots, campgrounds and restrooms (Shelby & Heberlein, 1984).

The integration of social experience, perceptions and beliefs, is also carried into the term “cultural carrying capacity” (CCC), which refers to the maximum number of wildlife that people will tolerate in an area (Ellingwood & Spignesi, 1986). Unlike SCC, tolerance in CCC is not based on an acceptable density of people in an area, but on the number of wildlife. In the case of CCC, capacity manipulation (altering maximum levels of wildlife tolerated) is achieved through information and education of the people that are concerned about the wildlife numbers.

In recognizing differences among stakeholders, Decker and Purdy (1988) introduced the concept of “wildlife acceptance capacity” (WAC) to describe the maximum wildlife population level in an area that is acceptable to a given group of people. This interpretation of tolerance is influenced by perceptions of whether the wild animal is a nuisance; if it competes with another species of interest to people; has role in disease transmission; is a risk to personal safety; or, if it damages property including livestock (Naughton-Treves, Grossberg, & Treves, 2003). It differs from CCC as it suggests that because different stakeholders will hold varying economic, aesthetic, ecological, educational, scientific and intrinsic values, they will also have different degrees of acceptance for the same species in the same place at the same time (Decker & Purdy, 1988). The problem with managing wildlife within this concept is that wildlife managers select

the stakeholders of greatest concern (*e.g.*, those thought to be most affected by the outcome) and manage wildlife within the WAC of that group. However, this results in competing economic, social, and political influences, and does not resolve conflict between stakeholders.

As the above example illustrates, the concept of carrying capacity has evolved to recognize that different stakeholders have different levels of acceptance for wildlife and people. In this sense, the goal of determining capacity is to minimize conflict and maximize levels of wildlife numbers (Minnis & Peyton, 1995). The most recent and expanded concept, “wildlife stakeholder acceptance capacity,” (WSAC) attempts to balance negative and positive effects on various stakeholders. Carpenter, Decker, and Lipscomb (2000) offer a definition of WSAC as both a tolerance of problems and desires for benefits. Patterns emerge when predicting WSAC. For example, people who have wildlife-related problems (*e.g.*, deer eating gardens), are more likely to have a reduced acceptance capacity for those animals (Zinn, Manfredi, & Vaske, 2000). However, people who perceive benefits from a species (*e.g.*, deer hunters), tend to be more tolerant of problems related to that species (Decker, Lauber, & Siemer, 2002).

As some stakeholders are affected by management decisions more than others, the tolerance of each stakeholder will depend upon their own interest in that species. Given the various stakes, it would be unfair to make management decisions using “one person one vote” or “majority rules” approaches. Thus to maximize social benefit in determining WSAC, wildlife managers can attempt to help stakeholders understand the stakes of others and weigh impacts of alternatives, through public participation activities (Carpenter et al., 2000).

Wildlife managers are interested in knowing how to determine and influence WSAC to reduce conflict between stakeholders and receive support for their programs. In situations where management actions are invasive or lethal (Loker, Decker, & Schwager, 1999; Smithem, 2005),

measuring WSAC can also be important to animal welfare. For example, if WSAC is high, extreme measures may not be required, whereas, if WSAC is low, invasive and lethal actions can be monitored to ensure they are conducted humanely. Although knowing WSAC does not mean managers will arrive at a unanimous community decision or the best decision for the animals, it may prepare them for public education campaigns or field operations when WSAC is exceeded.

Interestingly, in none of these existing definitions of carrying capacity are wild animals considered stakeholders. Thus to determine carrying capacity in terms of the proposed concept of “humane dimensions,” a steward or advocate for wildlife should serve to represent wild animals as a stakeholder in management decisions. Wildlife, having their own interests that can be promoted or subverted, also gain from interactions that maximize benefits and minimize conflict.

1.3.2 Thinking about Wildlife Turns into Action towards Wildlife

The extensive and diverse literature in psychology, sociology, and philosophy about values, beliefs, attitudes, norms and behaviour, also informs the fields of animal welfare and HDW. An understanding of each of these terms is needed to discuss how thinking and feeling about wildlife relates to how we act towards wildlife. In animal welfare science, behaviour can often be studied directly (*e.g.*, how farmers house mink, how zoo staff treat animals). Attitudes are studied because there may be some relationship to behaviour, but there is no assumption that behaviour will follow directly from attitudes. In HDW, a cognitive approach has been proposed as a way to assess how values and attitudes influence behaviour, to help wildlife managers understand how these concepts work among different social groups (Decker et al., 2002). Fulton, Manfredo, and Lipscomb (1996) first proposed “the cognitive hierarchy” in HDW to explain the relationship between values, beliefs, attitudes, and behaviours (Figure 1.2).

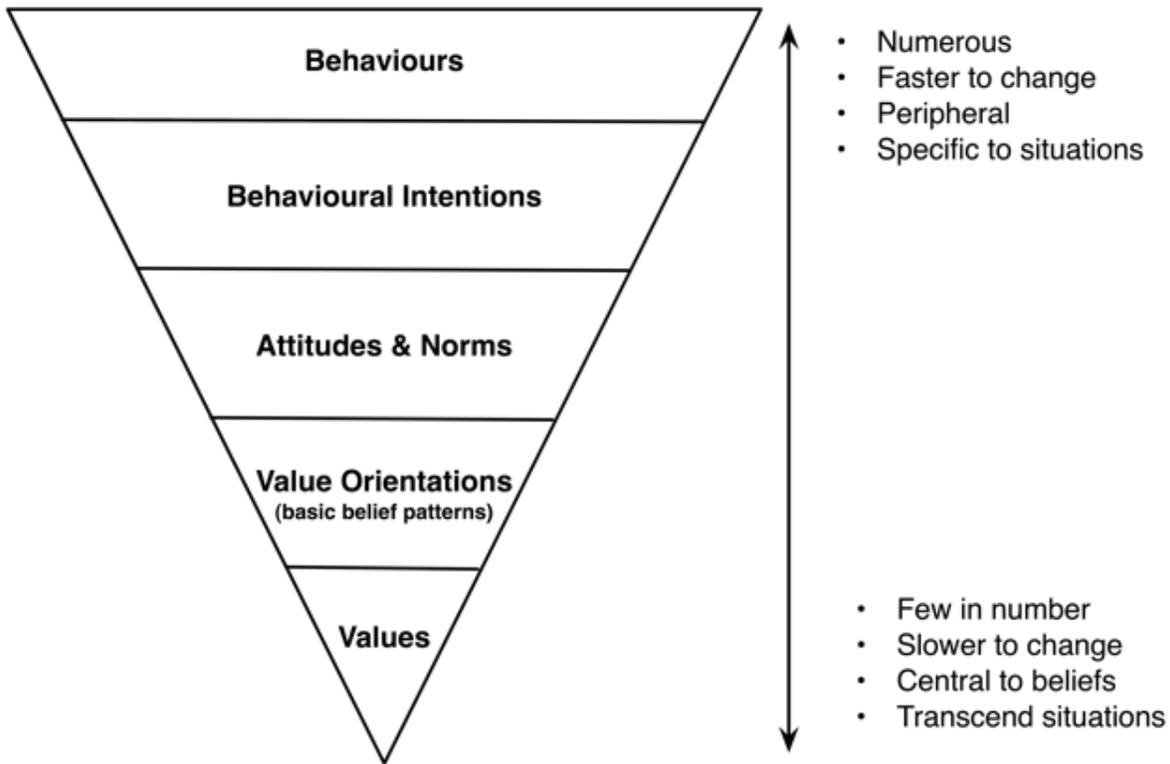


Figure 1.2 Cognitive Hierarchy in Human Dimensions of Wildlife
 (adapted from Pierce, Manfredo, Vaske, & Decker, 2001)

Values are the first-order cognitions which form the foundation of the cognitive hierarchy (Fulton et al., 1996) and influence beliefs, attitudes and behaviour (Homer & Kahle, 1988). Values develop slowly over time as part of an individual’s social and psychological development, are quite resistant to change, and form the set of rules for decision-making. Values refer to the desirable modes of conduct (*e.g.*, honesty, courage, ambition) or end-states of existence (*e.g.*, freedom, equality, and wisdom) achieved through such conduct (Rokeach, 1979). These moral values are captured in normative statements that indicate ideas of right and wrong, and how people ought to behave (*e.g.*, we ought to hunt bears and not eagles) (Fraser, 2008).

Values can be held by individuals or by groups of people as norms, which can evolve collectively over time. Inglehart (1977) suggested that societal values in the western world have changed dramatically over the past century towards post-materialist values. As economic and physical security needs are met, self-expression values have emerged over and above basic survival values. Thus, as societies have enough food to eat, shelter, and feel safe, they can act to fulfill other non-material goals. Animal welfare may be classified as one of these non-material goals, as groups of people desire to take measures to see that animals do not suffer in the process of securing primary needs (Bayvel & Cross, 2010). Furthermore, moving away from basic survival values has meant a shift from subsistence hunting of wildlife, to sport hunting and non-hunting activities like wildlife viewing. Shifting public values for wildlife may be difficult to evaluate (Conover & Conover, 2003), but they are even more challenging to change because they are shaped by the broader conditions of society; thus, wildlife management programs often seek to educate and influence stakeholders' attitudes instead (Manfredo, Teel, & Bright, 2003).

Normative beliefs are deep-set assumptions or convictions held as true about some thing, concept or person, reflecting how we think things ought to be in the world. Generally most beliefs are formed during childhood, but they can evolve throughout life (Fishbein & Ajzen, 1975). Beliefs represent our own personal truth and can be spiritual, political, economic, moral, social, and intellectual. On the other hand, conceptual beliefs (*e.g.*, the world is flat) can change considerably over time with experience and acculturation.

Attitudes are the positive or negative evaluations people have when they view either things or concepts (Ajzen, 2001; Ajzen & Fishbein, 2000; Fishbein & Ajzen, 1975). It follows that people with positive attitudes toward these things (*e.g.*, raccoons) are likely to have favourable responses (*e.g.*, happy to see a raccoon), while people with negative attitudes (*e.g.*,

dislike raccoons) are likely to have unfavourable responses (*e.g.*, fear, anger). Although, predicting the acceptability of wildlife management actions has been generally focused on cognitions (*i.e.*, values, beliefs, or attitudes), reactions to wildlife can also be emotionally driven thus warranting their study (Jacobs, Vaske, Dubois, & Fehres, 2014). Most research on emotions towards wildlife have addressed fear; however, it has been suggested that other emotions may also have predictive potential in wildlife decision-making (Jacobs et al., 2014).

Numerous studies have looked at the relationship between attitudes about wild animals and demographic variables such as urban/rural residence (Messmer, 2000), level of education (Manfredo et al., 2003) and gender (Kellert & Berry, 1987). Attitudes are studied in HDW to understand what people think about certain species, current management programs and proposed changes, and new programs (Decker et al., 2002). In many instances, wildlife managers want to predict behavioural responses (*e.g.*, voting support or opposition, willingness to partake in new programs) from understanding attitudes about wildlife (Koval & Mertig, 2004; Teel, Krannich, & Schmidt, 2002).

Several models explain how attitudes translate into behaviours. The theory of reasoned action (TRA) is perhaps best known and works under the assumption that people process information and use it to calculate how to act (Ajzen & Fishbein, 1980; Fishbein & Manfredo, 1992). In the TRA, because measuring behaviour itself can be difficult, the intention to perform a behaviour is used as a predictor of an action. Attitudes towards that behaviour (*e.g.*, the act of feeding a raccoon) rather than towards the entity (*e.g.*, raccoons) determine the behavioural intentions (Fishbein & Manfredo, 1992). In addition, the subjective norms of a specific social context (*e.g.*, neighbourhood dislikes raccoons) can influence behavioural intentions alongside attitudes. Norms are the shared beliefs about the acceptability of a specific action or situation

(Fishbein & Manfredo, 1992). However, it has been suggested that this theory may be flawed because behavioural intentions do not always lead to actual behaviours, as an individual may have incomplete control over their behaviours (Fazio, 1990).

The theory of planned behaviour (TPB) is a second model used to explain the relationship between attitudes and behaviour through behavioural intentions, and is an extension of the TRA (Ajzen, 2001). The TPB includes “perceived behavioural control” which incorporates an individual's perceived ease or difficulty of performing the particular behaviour (Ajzen, 1991). Both theories have also been criticized because they assume that people go through an elaborate cognitive process to decide whether to engage in a particular behaviour (Eagly & Chaiken, 1993). To account for spontaneity and unplanned behaviour, more direct models linking attitudes to behaviour have been developed (McCleery, Ditton, Sell, & Lopez, 2006). These “attitude-to-behavioural process” models are based on the idea that behaviour is a function of how individuals perceive a situation, and that their perceptions are a function of their attitudes (Fazio, 1990). Social norms are also at play, and can either counter or complement people's view of the situation (Fazio, 1990).

Studying attitudes to understand potential behaviour towards wildlife is important as it may inform programs that aim to reduce negative human-wildlife interactions, and extensive research has focused on this approach (Butler, Shanahan, & Decker, 2001; Kellert, 1993; Kellert & Berry, 1987; Peterson, Lopez, Mertig, & Liu, 2011; Reading & Kellert, 1993). Attitudinal research in animal welfare has also been key to understanding stakeholder motivations and identifying opportunities for humane improvements (Kauppinen, Vainio, Valros, Rita & Vesala, 2010; Knight, Vrij, Bard, & Brandon, 2009; Schuppli & Weary, 2010). Recently, some studies

have crossed both disciplines (Bjerke, Ost Dahl, & Kleiven, 2003; Martínez-Españeira, 2006; Muth et al., 2006).

However, a criticism of attitudinal research is the assumption that attitudes can predict future human behaviours (McCleery et al., 2006). As relationships may not be strong or direct, researchers attempting to use attitudes to predict and prevent unwanted behaviours in wildlife management or animal welfare may not consider exactly how they are related (McCleery, 2009). Although an individual's attitude towards a species or a policy may be known, this does not always predict how they will act. Thus, the "value-belief-attitude-behavioural intention-behaviour" hierarchy can guide our assessments, but it does not fully explain actions towards wildlife – thus restricting interactions between people and wildlife to those that maximize mutual benefits and minimize conflict can be challenging.

1.4 Thesis Aims

Wildlife management is an expert-driven process in Canada that seeks to conserve, as government agencies suggest, a valued public trust resource. Unlike in the United States where hunting and trapping revenues directly fund federal and state Fish and Wildlife Departments, wildlife management in Canada is funded by general tax revenue. Yet, these same tax payers are generally disconnected from wildlife policy and decision-making. If the public knew how wild animals can be legally treated, they would likely find many to be unacceptable given the public's preference to protect diversity and reduce suffering. Wildlife managers may be reluctant to open up discussions on wildlife welfare because the outcomes may restrict research, resource extraction, conservation and recreation activities which currently cause suffering or prevent

animals from living natural lives. However, management decisions for a public resource shared by all Canadians should arguably be informed by public values and social norms.

Wildlife policy and management that reflect changing societal values on wildlife welfare is needed, and research is required to explore methods for tapping into these public values. Animal welfare-based research into the ethical concerns over the quality of life for wild animals can inform public discourse, as often the trade-offs to individual welfare are not considered when issues are initially framed around conservation. Where conservation and welfare dilemmas in wildlife management meet, there should be a means for the public to be informed and have input into policy development.

The goals of this research are to understand the perceptions of non-traditional wildlife stakeholders and experts and the gaps between them, to develop opportunities to close these gaps in policy development. Although the survey methods were not meant to collect data that was representative of the general public, this research is able to compare broad perspectives, identifying issues, strength and relative importance of concerns, and differences in attitudes. Further, this thesis aims to explore various ways to engage the public to inform humane wildlife policy. Chapter 2 reviews relevant literature in wildlife risk communications, as the public and experts have various wildlife values and experience, often overestimating or underestimating the risk of wildlife interactions. This chapter also explores public participation methodologies to provide a context for the methods used in following chapters.

The research chapters begin with Chapter 3, a random study of a small BC community involved in a contentious wildlife issue. The telephone survey looked at local attitudes towards bear management in the context of illegal feeding, both before and after problem bear activity. Chapter 4 reviews the complex motivations, types and consequences of wildlife feeding, and

presents a summary of related BC wildlife bylaws. A framework to evaluate wildlife feeding in research, wildlife management, tourism and recreation is proposed. Results from an exploratory online study of BC stakeholders with various levels of wildlife engagement, is presented in Chapters 5 and 6. Using current examples of management dilemmas, Chapter 5 assesses group differences and similarities in the perceptions of harms to wildlife, while Chapter 6 evaluates attitudes towards the humaneness of wildlife management activities. Chapter 7 summarizes the overall research findings and concludes with key recommendations on how humane wildlife policy may be developed by taking broader public values into account.

1.5 A Note on Reflexivity

Although a mixed methods approach was used in this research in order to gather and analyze data as objectively as possible, my subjective experience as a researcher must be recognized. In any qualitative approach, the researcher's underlying biases should be declared, as the interpretation of data and reporting of results is filtered through a lens informed by both personal and professional backgrounds. Working in the humane movement for the past decade on wildlife issues, and interacting with provincial wildlife managers in my job, has given me access and insight into this field. My undergraduate education in biology and previous graduate studies in animal welfare have informed my beliefs and attitudes towards wildlife management and influence how I collect, interpret and analyze research. Although I hold my own views about criteria for humane human-wildlife interactions, I have attempted to seek understanding of my participants' beliefs, attitudes and behaviours towards wildlife, while limiting the influence of my own values.

Chapter 2: Understanding Risk and Public Participation in Wildlife

Management

2.1 Understanding Risk in Wildlife Management

Risk assessment can be defined as judgment that includes an objective or technical component (probability of event occurring and severity of event consequences) and a subjective or value-based component (perception of event), regarding an actual or potential hazard (Sandman, 2006). As Slovic, Finucane, Peters, and MacGregor (2004) explain, people base their risk judgments not only on what they think about the risk but also on what they feel about it. The field of risk research has evolved to treat diverse problems such as environmental risks, health risks, and more recently wildlife-related risks (Gore, Siemer, Shanahan, Schuefele, & Decker, 2005; Muter, Gore, & Riley 2009; Needham & Vaske, 2008; Riley & Decker, 2000a), with a common set of methods and theories. Risk in wildlife-related events is, then, a function of the perception of the wildlife risk and the actual hazard level of the wildlife risk.

Sandman (2011) characterizes risk as the sum of the hazard (measurable, real or potential negative event) and the outrage (emotional response to perception of the hazard). When outrage or concern is low, high hazard events should be approached with precautionary advocacy, such as warnings: “Beware of bears in park.” One dimension of risk important to wildlife management decisions is the use of expert judgment to determine the likelihood of a negative event happening. In this example, wildlife managers can assess the probability of bear encounters in the area based on bear natural history, habitat overlap, time of year, reported sightings, *et cetera*. The public however, may be insufficiently concerned about a serious hazard of bears in the park for many reasons. On the other hand, a low hazard event as evaluated by

experts, such as cougar attacks, may have the potential for high outrage and lead to the public being excessively concerned about a small hazard (Sandman, 2006). In situations where wildlife risks are either over- or under-estimated, welfare can be compromised (*e.g.*, bears and cougars are relocated or shot), as more often it is the risks to people and not to wildlife that are considered.

Risk communication is key to addressing situations where risk perceptions between groups diverge. It is a process by which experts transfer information about risks to non-experts (Arvai, 2007). However, a top-down, one-way model of risk communication is no longer the norm as public involvement in decision-making increases; yet this does not eliminate the need for expert assessments of technical risks (De Rodes, 1994). Examples of experts in wildlife management may be biologists, veterinarians, and policy makers, while non-experts or lay persons, often categorized as the general public, would be anyone without training in this discipline. Three dimensions of risk communications include: how – the process of communication; what – technical or information content being transmitted; and why – the intent of the process (*i.e.*, to inform or influence risk management decisions) (Arvai, 2007).

2.1.1 Types of Wildlife Risk

Research over the past few decades has established that experts and the public perceive risk differently (Morgan, Fischhoff, Bostrom, & Atman, 2002). In the context of wildlife issues, risk perception studies focus on individuals' concerns about hazards they associate with wildlife. Among the general public, concerns are influenced by a combination of values, beliefs, attitudes, past experience and social feedback (including media), whereas experts typically evaluate the need for wildlife management actions based on “assessed risk” which measures the probability and severity of a hazard based on scientific assessment, expert judgment, or a combination of

both. However, wildlife managers also need to account for perceived risk (*i.e.*, the public's perceptions of a threat or hazard) and consider both the risk *from* and *to* wildlife.

Perhaps the most studied wildlife-related risk factor is the potential for wildlife to transmit diseases to people (Clarke, 2009; Peterson, Mertig, & Liu, 2006; Vaske, Shelby & Needham, 2009). When zoonotic diseases increase in local prevalence, they contribute to a decreasing tolerance for wildlife and a heightened risk perception. In this case, the importance of risk communications is to raise awareness without also raising unnecessary alarm (Decker et al., 2010). Additionally, wildlife-related risk assessments can also address potential conflicts such as property or crop damage (as effects on livelihood) and personal safety (Kaltenborn, Bjerke, & Nyahongo, 2006; Muter et al., 2009). Risk management can be a decision-making tool that helps to identify, assess, and prioritize the disease or conflict risk to be managed. Further, as public perceptions of wildlife-related risks do not always agree with expert judgment, risk communications are used to facilitate decision-making by identifying and incorporating both public risk perceptions and expert assessments into the process (Gore et al., 2009).

Many risks to wildlife from people also exist. From global estimates on the effects of climate change and pollution, to regional assessments of wildlife killed by infrastructure, managers have to weigh the risks to wildlife populations and individual animals. For example, the construction of buildings has multiple risk factors which kill and injure several hundred million birds annually (Klem, 1990). In addition to contributing to habitat loss, buildings pose significant collision hazards for birds, as clear and reflective surfaces are invisible to them (Klem, 2008). Further, lighting from buildings can confuse migratory birds by reducing number of visible stars, resulting in birds that continuously circle and die of exhaustion (Rich &

Longcore, 2005). However, these risks to individual birds and local populations may not be taken seriously by policy makers if they are not affecting species of concern (Klem, 1990).

Risks to wildlife populations are often studied in a framework such as an environmental impact assessment, where the goal is to mitigate risks of human activities (*e.g.*, resource development, road development). However, risks to wildlife can often be underestimated (Ferrer et al., 2011), and may favour the value of one species over others (Wanless, Cooper, Slabber, & Ryan, 2010). To recognize the unintended and often neglected welfare harms (Fraser & MacRae, 2011), there is a role for animal welfare to serve as a variable in environmental impact assessments. Although risk is often thought of in terms of human mortalities in environmental and health sciences, wildlife-related risk discussions need not be limited to wildlife deaths, but also consider suffering and quality of life.

2.1.2 Mass Media in Human-Wildlife Risk Perception

Wildlife-related media stories are regularly featured in BC news programming, such as problem bear sightings, urban deer activity, and cougar encounters, among others. Media coverage can considerably affect public perceptions of, and attitudes towards, wildlife, especially when reports emphasize attacks on pets and people (Riley & Decker, 2000b). Media reports tend to be more negative than positive (Lichtenberg & MacLean, 1992), and negative events carry greater weight and are likely to be more powerful than positive events (Slovic, 1993). Therefore, peoples' perceptions of risk from certain wildlife can be very high compared to the actual objective risk of an encounter, and may even negatively affect efforts to protect these animals (Herrero, 2005). Conservation or welfare concerns for a wild animal generally become secondary as the perceived level of threat to public safety increases. This is why managing risk and its communication can be a valuable tool to wildlife conservation and wildlife welfare.

Kasperson and colleagues (1988) proposed the “social amplification of risk” framework to explain how individuals’ risk perceptions are influenced as events and interactions are communicated through interpersonal and mass communication. Also, media coverage frequency differs across media (newspaper *vs.* television) and regions (urban *vs.* rural). These differences also influence wildlife-related risk perceptions (Corbett, 1992), and in turn, affect attitudes towards wildlife and Wildlife Stakeholder Acceptance Capacity (Heberlein & Stedman, 2009). How and where risk communications take place are important to understand for those wanting to reduce risks and protect both people and wildlife. Hence, wildlife managers need to be aware of the role of mass media in communication campaigns (Gore & Knuth, 2009), and learn to work with media to publish accurate and useful risk communication messages, especially following a newsworthy human-wildlife interaction (Siemer, Hart, Decker, & Shanahan, 2009).

On the other hand, the anthropomorphization of wildlife which is glorified in the media may attenuate people’s perceptions on wildlife risks. Little research has looked at these effects but several recent local examples of underestimating wildlife risks are telling. The stories of the soda-drinking and Elvis-listening deer in Ucluelet, BC, and the Great Dane’s enduring friendship with a deer in Comox, BC, were sensationalized across television, print and internet media (CBC News, 2009; CTV News, 2011). When government officials investigated the cases, there was a strong public outcry fearing the deer would be killed; in essence, the outcry defended the illegal actions of the people who habituated the deer. Overwhelmed by the media attention and public complaints, wildlife officials did not lay charges and no actions were taken towards the deer. In these cases and others that involve portraying wildlife as pets, the low perception of risk to both people and animals is detrimental to wildlife welfare and further skews public beliefs on what are appropriate and humane relationships with wildlife.

The intentional feeding of deer, raccoons, squirrels, skunks and even bears can create habituated, food-conditioned and often food-aggressive wild animals that are sometimes labelled as a nuisance. The keeping of young and injured wild animals by non-professional rehabilitators can also lead to the transmission of zoonotic diseases and create nutritional, medical and behavioural conditions that result in painful and unnatural lives for these wild animals. Here, acknowledging the hazards and concern for both people and wildlife is critical, as management actions are tried in the court of public opinion. Furthermore, increasing transparency in wildlife-related risk management decisions through public participation may increase trust in the wildlife agencies that have to make these difficult decisions (Frewer, 1999).

2.2 Public Participation in Wildlife Management

Public concern for wildlife can include both conservation and animal welfare concerns. In traditional wildlife conservation, wild animals are commonly seen as a public resource held in trust by the government for the benefit of all citizens similar to forest or water resources. However, the “public trust doctrine,” which serves as the foundation for the “North American model of wildlife conservation” (Geist et al., 2001), excludes most captive or exotic wildlife. In contrast, public concerns for wild animal welfare have traditionally been held for wildlife kept under our care (*e.g.*, zoos, circuses, research, pets, farmed), irrespective of being native or exotic, privately or publically owned. Yet, increasingly concerns for wildlife suggest all animals that are potentially harmed by human influence are of broad moral interest (Fraser & MacRae, 2011; Sainsbury, Bennett, & Kirkwood, 1995). Thus, for wildlife policy development to be inclusive of public concerns, all wildlife species and individuals should be considered.

Although defining the role of the public in wildlife management has been the subject of much Human Dimensions research (Chase, Decker, & Lauber, 2004; Decker, Krueger, Baer, Knuth, & Richmond, 1996; Enck & Brown, 1996; Stout, Decker, Knuth, Proud, & Nelson, 1996), the role of the public in wildlife welfare and its application to management is less defined. Given the significant overlap of public interest for wildlife (public owns wildlife and generally cares about its welfare), it appears there is scope for a societal contribution to decision-making that does not limit public participation to considering wildlife only as a resource commodity, as currently managed in BC (BC MFLNRO 2013a).

2.2.1 The Practice of Public Participation

Public participation (or citizen participation) can be defined broadly as the involvement of individuals who may be affected by or interested in a decision, with the expectation that their participation will be meaningfully incorporated into the decision-making process (IAP2, 2010). Although terms like “engagement” and “consultation” are often used interchangeably with participation, they may be limited to an exchange of information without necessarily influencing decisions. Moreover, “stakeholder participation” may refer only to involvement of those with a known stake in the decision, who are often identified through stakeholder analysis (Reed, 2008). In wildlife management, government agencies conduct stakeholder analysis and make assumptions about suitable representatives. This may lead to a biased selection of stakeholders, where only traditional stakeholders are invited to participate. Here, the term public participation is defined as a process where meaningful societal input from direct and indirect stakeholders is developed through iterative dialogue and incorporated into a decision-making process. The result of public participation may not be consensus, a decision that receives widespread agreement, but a fair and equitable process that achieves consent (Curtis & Hauber, 1997).

One of the first descriptions of the power relations in public participation is Arnstein's (1969) Ladder of Citizen Participation, a typology of eight participation levels. In this model, citizen participation efforts vary in the level of control given to citizens, with power increasing as processes move up the rungs of the ladder from non-participation, through degrees of tokenism, to finally achieve citizen power (Arnstein, 1969). Many contemporary descriptions of public participation are based on this ladder however, as Arnstein (1969) suggests, true participation can occur only in partnerships with shared decision making and when authority is delegated to the public.

In general, participatory approaches are often classified along a continuum (Figure 2.1) and differ from education or public relations exercises that involve only a one-way flow of information (Ambus & Krishnaswamy, 2009). Engagement begins with two-way exchanges and can work up into consultation, but these processes lack the requirement for participation to be incorporated into decisions. Public participation is achieved then in collaborative processes that divide responsibility for decision-making and provide some assurance that participation will influence the decision. Co-management is an advanced step, where a true partnership between agencies and groups representing the public is formed to share responsibilities and authority for decisions (Chase, Schusler, & Decker, 2000). Processes used to achieve levels of participation can vary from websites and surveys, to open houses, town hall forums, and the use of a citizen task force. Selecting those methods deemed most effective by experts in the management context is important, but the methods should also be in line with the preferences of the public if decision-makers want to gain their credibility and trust, and maintain good public relations (Decker & Bath, 2010).

Information Exchange	Consultation	Collaboration	Co-management
Information is communicated primarily in one direction, with limited opportunity for dialogue.	Public opinions are sought and considered in expert or managerial decision-making. Information flows in two directions but decision-makers not obliged to integrate comments received.	Public representatives are actively involved in developing solutions and directly influencing decisions. Involves iterative activities, dialogue, and in-depth working relationships with more focus on joint responsibilities.	Decision-making authority is shared by stakeholder groups who also hold responsibility for organizing public participation.
<i>Examples:</i> Discussion paper Fact sheet Website	<i>Examples:</i> Open house Public hearing Focus group	<i>Examples:</i> Round tables Workshops Citizen Task Force	<i>Examples:</i> First Nations and government treaty to manage forests and wildlife

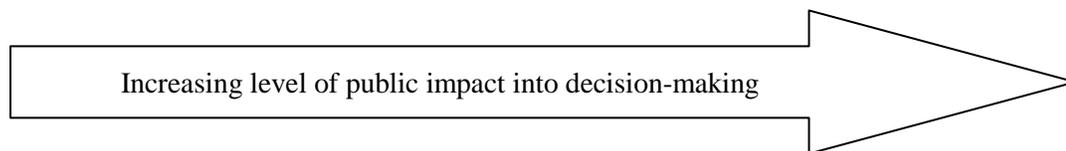


Figure 2.1 Continuum of Public Participation

(adapted from Ambus & Krishnaswamy, 2009)

As public expectations for participatory decision-making in both resource and wildlife management increase (Decker et al., 1996; Harshaw, 2010), the field of public participation has evolved as a professional practice for various fields in search of an effective tool to work with the public. The core values of the International Association of Public Participation Practitioners (IAP2, 2010) include:

- public participation is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process;
- public participation includes the promise that the public's contribution will influence the decision;
- public participation promotes sustainable decisions by recognizing and communicating the needs and interests of all participants, including decision makers;

- public participation seeks out and facilitates the involvement of those potentially affected by or interested in a decision;
- public participation seeks input from participants in designing how they participate;
- public participation provides participants with the information they need to participate in a meaningful way; and,
- public participation communicates to participants how their input affected the decision.

There are some concerns about the use of public participation as it may appear to cost time, effort and money to conduct; there may be issues with getting proper engagement and meeting public expectations; and it may lead to “lowest common denominator” results (Ambus & Krishnaswamy, 2009). However, the benefits of public participation are that it can result in more informed decisions, generate long-term and sustainable solutions, increase acceptance of the decisions, and reduce opposition that could, in the end, delay decisions. Also there may be a hesitation to undertake public participation when research projects are technically complex and require specialized knowledge. Here, the participants must negotiate the terms of participation (such as training for participants) under such challenging circumstances (Harrison, 2011).

2.2.2 Public Participation in Human Dimensions of Wildlife and Animal Welfare

HDW research on public participation demonstrates that the process is more important than the decision itself. Chase, Siemer, and Decker (2002) believe the attributes key to public participation in wildlife management are that the process: uses scientific information, has a genuine influence on the decision, treats all citizens equally, and promotes communication and learning. In two cases studies of public participation in controversial wildlife issues, Chase and colleagues (2004) found that the quality of the process was more important to participants than it being quick and inexpensive. Past engagement strategies that may have offered fast and cheap

feedback on policies are being reconsidered, as a diverse set of engagement approaches is being recognized. For example, since public meetings are geographically confined and may be dominated by traditional stakeholders such as hunters and trappers, some managers are concerned that policies based on input from public meetings may not reflect the attitudes of the broader public, especially non-consumptive stakeholders (Decker et al., 1996). Further, new technologies may offer cost-effective communication tools that are able to elicit responses from large and diverse membership bases (Danielson, 2011; Ormandy, Schuppli, & Weary, 2013; Schuppli & Weary, 2010), and may be what is needed to bring science-based policies closer in line with public perspectives.

While wildlife management has some recent history of public participation in the United States, limited engagement actions in Canada do not constitute participation as previously defined. For example in BC, participation strategies include the use of the Provincial Hunting and Trapping Authorization Team and engagement websites (BC MFLNRO 2013a). The former is a restricted stakeholder committee composed of the province's hunting, trapping, bow hunting, and guide outfitter associations, which meet bi-annually with wildlife managers to divide up harvest allocations. The BC government also advertises public consultation via new engagement website created in 2011, which offers unidirectional opportunities for the public to comment on management plans or regulation changes. However, the website carries the warning that "*there will be no Ministry response to comments posted on the website. Also note there will be no response to comments on regulation proposals sent via the Fish and Wildlife Email address*" (BC MFLNRO 2013b). The highly controversial wolf management plan is a recent example where the public could submit comments, but they would not receive any feedback and there was no indication that their comments would be considered in policy development (BC MFLNRO

2012). More than 40 years after Arnstein (1969) introduced the Ladder of Citizen Participation for public policy development, the BC Government appears to be content to remain in the rungs of tokenism.

Given the current lack of public participation opportunities in wildlife management in BC, a variety of potential engagement methods were explored in this research. In the next chapter, a case study was conducted to capture the Wildlife Stakeholder Acceptance Capacity of a small BC community facing problem bear management issues. In this notorious illegal bear feeding incident, the potential for the social amplification of risk was high, given the world-wide media coverage of the event and the nature of small town gossip. Public attitudes towards wildlife in such contentious dilemmas are important to capture to inform management decision-making, and in this case, there was an opportunity for public participation to inform interventions as they unfolded. The broader implications of this study underscore the value of understanding local attitudes, in addition to those of the general public and experts, towards policy and management actions.

Chapter 3: Local Attitudes towards Bear Management after Illegal Feeding and Problem Bear Activity^φ

3.1 Introduction

Many lessons have been learned over decades of bear conflict management in North America (Hopkins et al., 2010; Hristienko & McDonald, 2007; Mazur, 2010), with the response of government agencies to human-bear interactions evolving over time (Spencer, Beausoleil, & Martorello, 2007). Although expert-driven policy has generally directed bear management in BC (M. Badry, BC Ministry of Environment, personal communication, 2010), the public has increasingly come to expect participatory decision-making in both resource and wildlife management, facilitated by the growth of social science research in the fields (Decker, et al., 1996; Harshaw, 2010; Manfredo, Decker, & Duda, 1998). A potential benefit of increasing public participation is that an understanding of public attitudes may lead to better communication of management goals and greater support for the actions taken (Don Carlos, Bright, Teel, & Vaske, 2009; Lauber & Knuth, 2000).

In August 2010, the story of more than 20 Canadian “pot bears” appeared in the international media after a police raid of a property near Christina Lake, a seasonal tourist town in the interior of BC near the United States border, with fewer than 1,000 permanent residents. The investigation discovered an alleged marijuana-growing operation and numerous docile black bears, seemingly curious about the presence of the police (Hoggan, 2010). Photographs and reports of police standing beside the bears quickly dominated local news and spread to

^φ A version of this chapter has been published: Dubois, S., & Fraser, D. (2013). Local attitudes towards bear management after illegal feeding and problem-bear activity. *Animals*, 3(3), 935-950.

international news agencies (Belfast Telegraph, 2010; OneIndia News, 2010; The Australian, 2010). Media stories spoke of a “Bear Lady” living in the woods (National Post, 2010) and an online video showed “The Bear Dude” (The Bear Dude, 2010) who described feeding dog food to the bears for years, and denied reports that the bears were being used to “guard” the marijuana production.

Upon hearing that generations of bears had been fed on the property for over two decades, members of the public (mostly non-local) began creating online petitions and Facebook pages to “Save the Christina Lake Bears.” Public concern that the bears would be killed by the authorities was legitimate as there are limited non-lethal options for dealing with highly “habituated” bears that are “food-conditioned” (definitions as per Hopkins et al., 2010). Further, the current provincial “problem” bear policy supports killing such bears rather than relocating them (BC MOE, 2010). Finally, black bears do not hold any special conservation status in BC; the estimated population of 120,000–160,000 province-wide is considered healthy, and several thousand are hunted annually (BC MOE, 2001). In fact, BC has one of the highest black bear populations in North America; the government receives about 10,000 bear complaints annually (Spencer et al., 2007), and several hundred problem black bears are killed annually as a result of human-bear conflict (M. Wolowicz, BC Ministry of Environment, personal communication, 2011). Therefore, killing these particular food-conditioned bears was a likely option for wildlife officials.

However, contrary to current policy and laws against feeding dangerous wildlife, the government agency responsible for bear management in BC decided to allow the food-conditioned bears to continue to be fed by the resident until they started hibernation, given the time of year (late summer), the complexity of the issue (high number of bears, criminal court

case pending), and significant media attention (CBC News, 2010). However, the authorities required that more natural foods be introduced to the diet (such as fruits and vegetables) and that all feeding cease after hibernation. Although this was an unusual case for wildlife managers in BC, human encroachment into wildlife habitat and a wide availability of attractants has meant that some black bears populations are becoming increasingly reliant on anthropogenic food sources (Beckmann & Berger, 2003), creating more potential for human-bear conflict. Most problem black bear incidents result from the unintentional feeding of bears that access fruit trees, garbage and other attractants (Beckmann & Berger, 2003; Mazur, 2010; Merkle, Robinson, Krausman, & Alaback, 2013), rather than intentional feeding as in this case.

There were many media reports on opinions of the broader public about saving the food-conditioned bears, but little was known about the views of Christina Lake locals. Therefore, a random digit dialing telephone survey of the community was initiated to understand participant opinions and perceptions of local bears. As attitudes can change over time and with experience, the survey was repeated after the initial management intervention (lethal removal of problem bears). As management decisions directly affect local residents, who may or may not share the views of the greater public and/or experts, the telephone study was able to take an active approach by surveying local attitudes on the highly publicized problem bear issue as it was still unfolding.

The first survey aimed to understand attitudes and beliefs about bears in general; tolerance levels specifically towards the food-conditioned bears before they awoke from hibernation (*i.e.*, before any possible interaction between the community and the bears); and levels of public support for wildlife management options and penalties for intentional feeding. The second survey with the same individuals was designed to see whether attitudes towards the food-conditioned bears, management options, and penalties changed after a spring, summer and

fall during which there would be a high potential for bear activity and human-bear conflict. Thus, the following chapter explores local attitudes regarding bear feeding and management, to understand any gaps between public-expert views and identify areas for better alignment of education and policy initiatives.

3.2 Methods

3.2.1 Survey Design

Given the quantity of data desired, the limited time for pre- and post-intervention questioning, and uncertainty of ensuring a sufficient number of responses to less personal surveys (mail or internet), a telephone survey was selected as the research tool. Additionally, mail surveys can be costly and time consuming (Gigliotti, 2011) and an internet survey was not chosen due to difficulty in targeting only Christina Lake residents and the unknown extent of internet usage in this remote area. However, a telephone directory of households was publicly available for random sampling. Cost effective and easy to administer (Lavrakas, 1993), telephone surveys face considerable challenges in an era of growing technology (Kempf & Remington, 2007; Kuusela, Callegaro, & Vehovar, 2008; Lavrakas, 1993; Tucker & Lepkowski, 2008). Despite these concerns, this method was a valid option for this study as the remote mountainous location has limited mobile telephone service and most homes continue to have a land line.

In the first (conducted in February 2011, 8 multi-part questions) and second survey (conducted in December 2011, 8 multi-part questions), participants were asked to describe their general bear sighting experiences as either “positive” (uneventful, comfortable), “negative” (uncomfortable, stressful), or “neutral.” A five-point scale (*1 = not supportive at all to 5 = very supportive*) was used to measure support for varying management strategies for the food-

conditioned bears. Both closed and open questions were asked and bears were referred to in the survey calls as either “general bears” or the “fed bears.” Answers to closed questions were designed to be analyzed in a pre-coded format (*e.g.*, male = 0, female = 1) (Gillham, 2008). Calls were not recorded, but qualitative responses and post-survey comments were noted verbatim and some are presented as quotes.

The first question in the initial survey asked about length of residency in Christina Lake to determine the respondent’s eligibility for the survey (Dillman, 2000) and gender of respondent was noted. The next question asked if there was a registered hunter in the household. Questioning then progressed from questions about frequency of bear sightings and safety concerns in general, to questions on attitudes towards past and future management strategies specifically for the food-conditioned bears (listed in Table 3.2). Finally, an open-ended question on what respondents felt would be an appropriate penalty for feeding these bears was asked.

The second survey was administered to the same person who participated in the first survey within the sampled household. It focused on observed bear activity within the past year, including any problem bear activity and attitudes towards this. Given that all participants knew the location of the bear feeding, they were asked how far in kilometers they lived from this property. Participants were also asked to score recent management strategies for the food-conditioned bears and advise what strategies they would recommend to other communities facing similar circumstances. Also respondents were asked if they agreed or disagreed with the proposed legal charges for feeding the bears (as full penalty details were not known at this time). As part of survey development, the questions were reviewed with a government biologist familiar with the bear issue and a polling company manager with expertise in public opinion surveys.

3.2.2 Sampling and Recruitment

As individuals within one household likely would have discussed this well-known local event, household rather than individual was selected as the research unit. A household was categorized as a “hunting household” if it included at least one registered hunter, whether or not that individual was still active. Interviewers asked the person who answered the call if an adult (over 18 years of age), permanent resident of Christina Lake, was in the household and willing to participate. Of completed calls, almost all individuals who answered the call volunteered to be the respondent, while a few passed the call onto a parent or spouse. The 2006 Christina Lake census reported 475 households in the area, averaging 2 individuals per household (BC Stats, 2006). To achieve a sample size with 5–10% margin of error and 95% confidence level, the random digit dialing survey would require a sample between 81 and 213 households (Kalsbeek, Botman, Massey, & Liu, 1994).

In order to randomize potential participants, residential telephone numbers listed in the 2010 print and 2011 online telephone directories for Christina Lake were entered into a spreadsheet and assigned a random number, which was then sorted from lowest to highest. Interviewers were given a sequential page of new numbers for each call session and/or a list of numbers from previous uncompleted call attempts. To advise participants about the first survey and to help legitimize participation, newspaper advertisements were published in the Christina Lake News (print) and The Boundary Sentinel (online) to inform the community that they might be contacted to participate in research survey by telephone.

3.2.3 Data Collection and Analysis

Telephone numbers were called in the randomized order until the call was completed or five attempts were made (Kalsbeek et al., 1994; Lavrakas, 1993). Calling sessions totalled 100

hours for the first survey (calls to all area non-business phone numbers) and 60 hours for the second (only calls to past participants), and included a variety of week days and evenings, and weekend sessions. Interviewers logged all call attempts. For completed calls, interviewers read the survey script verbatim, ensured eligibility (adult, Christina Lake resident), briefed respondents on their anonymity and confidentiality, and received verbal consent before recording answers. Although respondents were anonymous during the survey, they were given the option of providing a first name or nickname to be reached for the second survey.

Quantitative results produced descriptives and frequencies compiled in SPSS, which was also used to calculate inferential statistics (Vaske, 2008). T-tests were used to assess differences by gender and hunting activity in attitudes towards management options as evaluated by the five-point scale. A paired t-test was used to determine any change in participants' attitudes towards penalties for feeding. Chi-squared tests were used to assess residents' attitudes towards bears and support for management actions based on the distance they lived from the property of concern. Qualitative analysis of text responses and comments involved inductive content analysis (Elo & Kyngäs, 2008). Reporting of comments was categorized as "few" (<5% of participants), "some" (<50%), "many" (50–75%) and "most" (>75%) participants. Quotes (reported in italics) were chosen as representative statements of important themes or unique noteworthy insights.

3.3 Results

3.3.1 Recruitment

In the first survey, 1478 call attempts were made to 610 telephone numbers listed in the directories. Ineligible numbers included business numbers (33), non-working numbers (143), numbers with no eligible respondent (3), and hearing impairment or language barrier (2).

Unknown number status (150) included all “no answer” and answering machines. Of the remaining 279 eligible and known working numbers, 159 households completed the survey (for ± 6.13 margin of error) and 120 declined. The response rate of 43% for the first survey was calculated according to the method of CASRO (Vaske, 2008). To help determine non-response bias, non-respondents in the first survey were asked if there was a registered hunter in the household to distinguish if there was a completion bias between hunting and non-hunting households. However, too few non-respondents answered this question, as most hung up quickly after refusing to participate in the survey because of no interest or no time. This variable was thus not useful to estimate non-response bias, but interviewers did note gender of non-respondents, which showed a similar ratio for refused surveys (45% male, 55% female) as for completed surveys (39% male, 61% female) ($p > 0.05$, Fisher’s Exact test). The gender ratio of refused surveys did not differ significantly from that of the 2006 census data of the area (50% male, 50% female) (BC Stats, 2006) ($p > 0.05$, Fisher’s Exact test).

In the second survey, a maximum of five attempts were also made to the same 159 households. Of these, there were 150 eligible and known working numbers with 123 households completing the second survey, 3 declining, and 24 were unreachable, for a CASRO response rate of 82% of original respondents. Response rates from this survey were average-to-high compared to a majority of response rates in RDD surveys assessed in meta-analyses (20-50%); these studies suggested that phone-based survey methods achieve response rates that are comparable to traditional mail surveys (Baruch & Holtom, 2008; Holbrook, Krosnick, & Pfent 2008).

3.3.2 Participants

Since results could reflect household attitudes on the issue and not just individual opinions, few individual demographic variables were collected. In the first survey, 61% of

respondents were female, 75% of households were non-hunting, and 86% had lived in the area for more than 10 years. Demographic data were almost identical in the second survey, as 123 of the 159 original participants were re-surveyed. All respondents had heard of the bear feeding incident from media or other locals, and many said they knew it was going on long before the recent media attention. Several respondents recounted anecdotes about the well-known residents buying excessive amounts of dog food and about bears following these individuals into town.

3.3.3 Awareness of Bears and Attitudes towards Bears in General

When asked in the first survey how frequently respondents observed general bear activity in 2010, signs of bears (scat, markings, tracks, damage) were seen more than once by 82% of respondents and actual bears on properties were observed more than once by 69%. Most respondents reported seeing bears in the general Christina Lake area in the past year. Usually, respondents related bear sightings to the presence of garbage, compost or fruit trees on their properties. Many respondents indicated that local residents were more accepting of the bears' presence than "*summer visitors*." Some respondents said they had seen fewer bears in 2010 than previous years, while others suggested they had seen more. Respondents noted that the local landfill, where "*dump bears*" had often been seen and tolerated, was converted to a transfer station in 2010, likely leaving these bears without their usual source before winter.

When asked in the second survey about general bear activity over the past year, 50% of respondents stated they observed more bear activity in the general Christina Lake area in 2011 over 2010, but 32% saw about the same and only 18% saw less. Sightings of bears on respondents' properties in 2011 were also reported as higher than in 2010 by 45% of respondents, while 39% saw about the same and only 16% saw less. Further, signs of bears (scat, markings, tracks, damage) on respondents' properties were also reported to be seen more

frequently in 2011 over the previous year by 44% of respondents, while 45% experienced about the same amount of signs and 11% observed less.

When asked to describe their bear sighting experience as positive, negative or neutral, most respondents in the first survey had a mixed, neutral-to-positive attitude with a “*live and let live*” approach and said it was normal for living near bear habitat (Table 3.1). Some respondents indicated they were more cautious as bears approached settled areas, while others felt their dogs and fences gave them protection. Although many had generally positive views of local bears, some expressed negative attitudes towards the bears if they came onto their properties. A few suggested they did not walk in high bear activity areas as they felt in general that bears were not afraid of people. Significant concerns over safety were expressed by a few that experienced bear destruction on their properties (*e.g.*, destroying sheds, appliances) or attempts to enter a home.

Table 3.1 Percentage of Respondents Stating that They Felt Positive, Neutral or Negative towards General Bear Sightings Across Two Surveys
(February and December 2011)^a

Attitudes	Bears in general Christina Lake area		Bears on own property		Signs of bears on own property	
	<i>First</i>	<i>Second</i>	<i>First</i>	<i>Second</i>	<i>First</i>	<i>Second</i>
Positive	40% *	16% *	27% *	15% *	17%	13%
Neutral	43%	40%	33% *	43% *	42%	47%
Negative	17% *	44% *	40%	42%	41%	40%

^a Based on the 123 respondents who completed both surveys

* Significant difference between first and second surveys ($p < 0.05$) by Fisher’s Exact test

Although attitudes towards both seeing bears and signs of bears on their property were negative, signs of bears were qualified as an “*annoyance*” related to having to clean up feces,

being messy, or damage to trees and fences rather than fear of the bears' presence. Many respondents shared concerns captured by this participant:

“Seeing a bear on your property is both positive and negative. Positive because they are wonderful animals and negative because of the damage they cause. They can be annoying because of the damage but they are nice to have around.”

In the second survey, fewer of the same respondents felt positive about seeing bear signs and bears, both on their property and in the area (Table 3.1). Most notably, more respondents felt negative towards seeing bears in Christina Lake and more felt neutral towards seeing bears on their property, in 2011 than in 2010 ($p < 0.05$ Fisher's Exact test). Many respondents knew of serious damage caused to property that was not related to garbage, compost or fruit trees, including destruction of sheds, trailers, cabins and cars. Several unusual reports of very persistent bears seeking food, and bears opening doors and entering vehicles, were cited as examples of learned behaviour by the food-conditioned bears. Compared to respondents who lived at least 10 km from the property, those who lived within 5 km of the property were more likely to have generally negative attitudes towards (1) bears in the Christina Lake area, (2) bears on their property, and (3) signs of bears on their property, as determined by a Chi-squared test ($p < 0.01$) in each case.

3.3.4 Bear Activities in 2011

During the summer and fall of 2011, the BC Conservation Officer (CO) Service received 260 bear complaints in the Christina Lake area, in contrast to an average of 33 complaints received annually and the previous maximum number of 56 complaints from the area in 2004 (Christina Lake Stewardship Society, 2012). Complaints in 2011 included extensive property

damage, bears entering residences, and multiple vehicle break-ins. The CO Service destroyed 24 bears in 2011 in the area (not including bears killed by private landowners), as compared to the previous maximum of 4 bears killed by the CO Service in 2004 (Christina Lake Stewardship Society, 2012). Of these, 18 were large males, which is unusual as normally 2–3 year olds and orphaned cubs or yearlings are killed as problem bears. In 2011, “Bear Aware”, a government-sponsored education program focused on managing food attractants, was offered in the community for the first time in several years (La Croix, 2011), in an attempt to reduce conflicts in light of the feeding event.

In the second survey, over 90% of respondents were aware of bears being killed in 2011, mostly for nuisance activities and for being too close and not afraid of people. Very few participants knew how many bears had actually been killed. Most respondents based their information on local “*talk around town*” rather than personal experience or media reports. Media outlets were monitored for related stories throughout the summer, but only one report of bear deaths in late-September emerged; hence, media did not appear to influence attitudes between surveys.

One-quarter of respondents believed the bears that were killed were the food-conditioned bears. Just over half were unsure, however, and suggested that some were likely “*garbage-conditioned*” and “*dump bears.*” Several respondents pointed out that since the resident was caught feeding bears again in the summer of 2011, some bears must have been back at the property of concern. Fourteen respondents did not believe the 24 bears killed were the food-conditioned bears, including a respondent who felt very neutral towards bears in general, and suggested that “*stomach contents should have been checked*” to confirm if in fact they were the fed bears that were supposed to be targeted.

3.3.5 Attitudes towards Pre-Hibernation Management of Bears

When asked in the first survey, before the nuisance bear activity, how supportive they were of four management options (continue feeding until hibernation, trap and relocate, trap and place in captivity, humanely kill), 62% households were somewhat or very supportive of the government decision in fall 2010 to feed until hibernation. These respondents believed it was the “best,” “fairest” and “most viable” option given the time of year. Also, it “*would have been cruel not to feed last fall*” and it “*saved neighbours grief*.” Several households that opposed the decision said that the feeding had gone on for a long time and that government was fully aware and did not act appropriately in the past. They suggested it was “*too late for these bears*” and that “[*they*] *are unhealthy and now the whole ecosystem is thrown off*,” as it was a “*death sentence first day they were fed*.” In contrast, a few individuals said the government should have left the people feeding the bears alone, as it had been happening without incident for years.

Many households supported the option of relocating the bears, stating that the authorities should “*give it a try*” because “*it was not the bears’ fault*.” Those opposed said relocation would not work and the bears would return or become someone else’s problem. Both captivity and humane killing (by government officials) were strongly opposed by three-quarters of households. A common view was that “*there has got to be a better option than killing*.”

Women were more likely to support relocation than men ($p = 0.015$) and were less supportive of killing ($p = 0.012$). Hunting households were significantly less supportive of relocation in fall 2010 than non-hunting households ($p < 0.001$) and slightly less opposed to humane killing in fall 2010 than non-hunting households ($p = 0.026$), although many hunting households opposed humane killing as they felt there were better solutions.

3.3.6 Attitudes towards Post-Hibernation Management of Bears

When asked in the first survey what the food-conditioned bears would do on emerging from hibernation, most respondents believed the bears would return to where feeding previously occurred because it had been happening for so long. Almost all respondents thought that once the bears realized no food was being provided, they would seek other human-sourced food. Some expressed concern for neighbouring properties and believed the bears would come closer to town. Although many were hopeful, few believed that bears would go back to the wild and forage naturally. Weather and food availability in spring and summer were suggested as significant factors in determining natural foraging opportunities.

When asked their views about five possible management options for the food-conditioned bears once they emerged from hibernation, few respondents used the categories of “somewhat supportive” and “somewhat unsupportive,” so these results were combined respectively with “very supportive” and “not supportive” in Table 3.2. Almost two-thirds of the households said they supported prohibiting feeding and allowing the bears to live in the same area and forage naturally. Continued feeding of the bears on the property was strongly opposed. Relocation was supported by many households but a quarter of respondents were opposed to this option. Three-quarters of respondents did not support captivity, although a few felt it was preferable to killing. Humanely killing the bears in spring 2011 was not supported by more than two-thirds of respondents. A t-test for independent samples found that women were more supportive of relocation than men ($p = 0.007$), but there were no gender differences for the other options. Compared to hunting households, non-hunting households were more opposed to humane killing ($p = 0.002$) and more supportive of relocation ($p = 0.010$).

Table 3.2 Percentage of Respondents Expressing Different Levels of Support for Post-hibernation Management Options for the Food-conditioned Bears
(in first survey, February 2011)^a

Level of support	No feeding, natural food only	Keep feeding	Trap and relocate	Trap and captivity	Humanely kill
Not supportive	21%	89%	26%	75%	70%
Neutral	11%	6%	6%	6%	7%
Very supportive	65%	5%	67%	18%	23%

^a Results do not add to 100% in some cases because 0–3% responded with “don’t know or “no opinion”

3.3.7 Attitudes towards Bear Management after the Summer

When contacted in the second survey, after the bear activity in summer and fall of 2011, two-thirds of respondents supported the government decision to kill the problem bears but, most acknowledged that killing was not the end they had wanted. Numerous respondents said the government should have “*keep a closer eye on the people doing it,*” since it was well known to be happening for many years. A third of respondents were not supportive of the decision to kill the bears, but these views were split between those who opposed killing and preferred “*diversionary feeding*” or believed the government “*should have relocated [the bears] immediately last year,*” and those who believed the residents “*should have been punished and bears killed right away.*” Those respondents who lived more than 10 km from the property of concern were less supportive of government actions than those who lived closer (Chi-square $p < 0.05$).

When asked what management actions they would recommend if another community faced similar challenges with intentional bear feeding, participants ranked relocation as most preferable. However, many recognized that relocation was unlikely to be successful and that bears would return or cause problems elsewhere. Allowing food-conditioned bears to continue to

live in the area was ranked second, but the “*live and let live*” approach was recognized as having limits of tolerance. Killing, although disliked by many as an option, was seen as a last resort to be used when public safety becomes a concern. Diversionary feeding (intentional feeding away from original source) was generally not seen as acceptable.

3.3.8 Respondents’ Views on Penalties for Feeding Local Bears

When asked in an open-ended question in the first survey, what an appropriate penalty would be for feeding the bears, 78% of households felt the bear-feeding residents should be held responsible somehow for their actions, although they differed on what would be appropriate. Close to half of these respondents thought a significant penalty was needed (high fine, jail time or both, seizing residents’ land), sharing this respondent’s concern: “*Yes huge fine and jail time. I love animals but I love kids too.*” But some believed fines were not realistic because the residents “*lived off the land.*” Others felt the residents should not be put in jail as the feeding was not a malicious act and because jail might not be a deterrent to future feeding. The remainder of the pro-penalty respondents said the residents should perform community service and/or pay compensation directly for future management interventions, or as one respondent explained: “*It depends on what happens to the bears.*”

However, 17% of respondents opposed any type of penalty (a few suggested a warning only), as many said they knew the residents and their good intentions. Although the feeding was seen as a misguided and reckless act, it was viewed as a non-violent crime and “*jail isn't for feeding bears.*” Some respondents felt the feeding had gone on for so long without issue; education of feeders was needed; and that although an outsider may agree with a penalty, locals may not, as one respondent expressed: “*as an insider, knowing the people, no penalty.*” Eight respondents did not want to comment on penalties as they knew the residents personally.

In the second survey, when asked about the appropriateness of the current legal charges against the feeders, attitudes toward penalty options did not change significantly (paired sample t-test $p = 0.081$), but some respondents felt there should now be some consequence, especially in light of the repeated feeding in 2011 and the high number of bears that had to be killed.

3.4 Discussion

3.4.1 Local Attitudes towards Management Options

Although this community was very experienced with bears and tolerant of their presence in general, attitudes towards bears became more negative between survey phases after increased sightings and higher problem-bear activity. These results agree with findings of other studies where increased experience of conflict can lead to more negative attitudes towards wildlife (Ericsson & Heberlein, 2003; Songorwa, Buhrs, & Hughey, 2000; Williams, Ericsson, & Heberlein, 2002). Although many respondents believed the government decision to feed the food-conditioned bears in fall 2010 was the best decision at the time, the majority opposed continued feeding in spring 2011 and wanted better monitoring of the property in future. Consistent with studies of other species associated with human-wildlife conflict, participants who lived closest to the property with the food-conditioned bears held the most negative attitudes and were most supportive of lethal actions after summer (Karlsson & Sjostrom, 2007).

Relocation was the preferred outcome for most participants, although some were unsure whether it would be effective, as the bears might return, become another community's problem, or not survive in a new environment. Captivity and diversionary feeding were not supported for this situation or future incidents of intentional bear feeding. Before the busy summer, most respondents felt that the food-conditioned bears should be killed only as a last resort if they

became a threat to people. Those bears that appeared unusually determined to obtain anthropogenic foods and not leave human areas were killed by COs. Other bears that were reported as a nuisance in the local area were also trapped and killed, presumed to be the food-conditioned bears. Overall though, the community wanted another option to lethal, reactive management, especially given a lack of pro-active prevention.

Relocation was also favoured by the public in other situations of human-bear conflict as shown by surveys of residents of Vancouver Island (Lancaster & Campbell, 2010) and Colorado (Don Carlos et al., 2009). In the present survey, verbal comments showed that many understood the potential pitfalls of relocation, which is often dictated by social pressure over biological merit (Spencer et al., 2007). One respondent declared that, “*generations of bears*” were “*forced into a life of crime,*” when describing the actions of the bears when they broke into homes, cabins and cars, in search of food. However, given the community’s strong desire to give these bears a “*second chance,*” an option of relocating some of the bears (juveniles only) which had less food-conditioning experience and the best possibility of success (Landriault, Brown, Hamr, & Mallory, 2009), could have been explored by government to increase overall support for management. Public support for relocation versus killing indicates a large gap between the public and expert opinion on management methods for mitigating this conflict. As relocation often ends badly for at least some animals, future public education on management strategies should better communicate the humaneness and limitations of practices in order to achieve better alignment of public and expert views.

The notion of fairness and justice were ongoing themes throughout the study, as the bears appeared to some participants as being “forced” into their problematic behaviour and thus killing them would not be fair. This demonstrates the complex motivations behind public views of

wildlife management, which is generally expert-driven. There is likely no easy way to resolve this expert-public gap without a significant investment in education and attempts to create shared levels of understanding of both the public's and expert management's thinking on difficult conservation issues. This study can however offer a common solution, the importance of preventive action on wildlife feeding. Once wild animals have become food-conditioned, there are simply no attractive management options. Killing, even if done humanely, is seen by the public as unfair; relocation, although more palatable to the public, is seen by experts as not viable or not humane.

A number of other potentially significant issues raised were known only by the local community. First, many respondents believed that a fear of bears was exaggerated by seasonal tourists who were less tolerant of bears and made hasty nuisance reports. Tracking resident type in nuisance bear calls could have determined whether there was a disproportionate reporting frequency reflecting a lack of experience and tolerance with bears. Further, the closure of the garbage dump was never discussed in media or in government reports, but numerous respondents wondered if any of the bears killed in 2011 were those displaced from the landfill. Marking the food-conditioned bears in fall 2010 or checking stomach contents (for the presence of dog food) of the killed bears might have provided answers to these concerns from locals.

The value of public participation in wildlife management decision-making has been well documented (Decker et al., 1996; Lauber & Knuth, 2000; Reed, 2008), but local attitudes may be distinct from broader public attitudes. This study suggests that local resident experience, including knowledge of past feeding activities and other factors such as the landfill closure, could have provided insight for management actions. If locals knew of past feeding and were on board with management strategies, they may have reported that it had restarted; officials could

have then acted quicker to stop the activity before so many bears were involved, and perhaps fewer would have been killed. Separately tagging the “pot bears” and any known problem bears from the landfill may have confirmed which were targeted by lethal actions, resolving unanswered questions from locals and increasing support for intervention. Future studies of contentious management dilemmas may also benefit from distinguishing local from broader societal attitudes; in this case, the Canadian public reacting online and in the media had no idea about the complexity of the feeding event or community impact.

3.4.2 Perceptions of Wildlife Feeding and Consequences

Local residents, although clearly aware of the feeding, allowed it to continue for many years without reporting it to the authorities. Moreover, several respondents indicated, and government officials confirmed, that a number of food-conditioned bears from the same property were killed approximately 10 years earlier under the same circumstances. Further, despite the killing of at least 24 bears, attitudes towards penalties shifted little as the need for consequences was emphasized between the two surveys. It is notable that many participants did not regard the illegal feeding of bears as a serious offence that merited significant penalties; they believed the individuals feeding the bears were misguided but well-motivated and generous, rather than as engaging in behaviour that harms animals. Hence, participants did not favour serious punishment of the offenders and eventually the justice system concurred¹. In fact, the feeding became a focus for enforcement only when the perpetrators were investigated for an entirely different offense.

¹On March 24, 2011, “The Bear Dude” pleaded guilty to feeding dangerous wildlife (Shepard, 2011), an offense under the BC *Wildlife Act* that carries up to a \$100,000 fine and/or a year in jail. Sentencing for the 2010 incident was delayed until December 2011. However, in November 2011 charges were laid again against two individuals for feeding dangerous wildlife again on the same property that year (The Province, 2011). On May 24, 2012, “The Bear Dude” received a \$6,000 fine for feeding dangerous wildlife (CBC News, 2012).

This case highlights a significant problem with the public view of wildlife feeding. As seen here, feeding inevitably leads to poor outcomes for the animals – death, relocation, or captivity – but the general “*laissez-faire*” attitude towards feeding all wildlife demonstrates that the public does not seem to see it on par with other forms of animal harm. This concept is explored in greater detail in Chapter 4. Thus, there is a major need for education so that people understand that illegal feeding of such wildlife is a serious form of harm to animals. The only approach is for both the authorities and the public to not tolerate such wildlife feeding and exercise the same vigilance that would be directed to other forms of animal harm (*e.g.*, neglect, abuse). Moreover, although much research has focused on measuring the success of managing problem bear behaviour (Beckmann, Lackey, & Berger, 2004; Mazur, 2010), more research is needed on measuring the success of deterrents for human behaviour, like public education (Gore, Knuth, Curtis, & Shanahan, 2006) and attitudinal changes (Merkle, Krausman, & Booth, 2011), as well as the effectiveness of enforcement and penalties (Baruch-Mordo, Breck, Wilson, & Broderick, 2011).

3.5 Conclusions

In contrast to wildlife experts, most participants supported relocating the food-conditioned bears or allowing them to remain in the area ahead of killing, despite the acknowledged problems of relocation. The general finding that people prefer non-lethal methods to lethal alternatives in contrast to experts is not surprising and adds to growing literature that highlights the disconnect between the public and experts on wildlife management issues. The strongly polarised management options of relocation and killing signal a need to address the current limitations of mitigating conflict with bears, and explore the use of more deterrents (for both people and bears) to expand the overall management toolbox. Intentional wildlife feeding

should be one management issue where the public and experts agree on the importance of preventive and unified action. Yet, in this case most locals were aware of the years of feeding but did not report it, evidently failing to see it as a serious form of harm, even after 24 bears had been killed.

Contrary to the “save the bears” websites and social media campaigns which mostly reflected idealism, local attitudes were diverse, more contextualized and pragmatic, as residents seemed more aware of the consequences. In fact, locals were not merely pragmatic, seeking the best outcomes for themselves; they also included notions of fairness and justice for the bears, noting that it was not the bears’ fault. Given that managers want to retain community support and ensure reporting of illegal feeding, lethal solutions should be a last resort and proactive alternatives (*e.g.*, evaluative education and strict enforcement of feeding penalties) should be standard tools for human-wildlife conflicts.

The next chapter explores the world-wide phenomenon of intentional feeding of wildlife (legal and illegal), and its diverse effects on conservation, animal welfare and public safety. The study undertakes a review of the motivations, types, and consequences of feeding wildlife, to propose an evaluative framework for making decisions about the appropriateness of feeding wildlife in the context of research, wildlife management, tourism and recreation.

Chapter 4: A Framework to Evaluate Wildlife Feeding in Research, Wildlife Management, Tourism and Recreation^ϕ

4.1 Introduction

Feeding wildlife is a long-standing issue for wildlife managers and governments trying to reduce human-wildlife conflict (Marion, Dvorak, & Manning, 2008; Pragatheesh, 2011; Southwick, Siddiqi, Farooqui, & Pal, 1976). Both unintentional and intentional feeding can cause harm to diverse wildlife species. Unintentional feeding occurs when wild animals are attracted to garbage, compost, landfills, gardens, fruit trees, pet food and other anthropogenic foods. Although these foods may improve welfare by reducing foraging needs in the short-term (Beckmann & Berger, 2003), in the long-term, anthropogenic foods can cause suffering (Semeniuk, Speers-Roesch, & Rothley, 2007; Semeniuk, Bourgeon, Smith, & Rothley, 2009) increased conflict with humans and the death of food-conditioned wildlife (Hoffman & O’Riain, 2012; Marion et al., 2008; Peine, 2001; Thiemann, Stahl, Baruch-Mordo, & Breck, 2008).

Intentional feeding of wildlife is necessary in captive environments where wild animals depend completely upon human husbandry (such as in wildlife rehabilitation). However, it also occurs across a spectrum of semi-captive and wild environments (Orams, 1996), the most widespread and socially accepted example being backyard bird feeding. Studies in Australia have investigated this popular activity to assess the extent of feeding, who feeds and the underlying motivations (Howard & Jones, 2004; Ishigame & Baxter, 2007; Jones & Howard, 2001; O’Leary & Jones, 2006; Rollinson & Jones, 2003); yet, the full ecological impacts of bird

^ϕ A version of this chapter has been published: Dubois, S., & Fraser, D. (2013). A framework to evaluate wildlife feeding in research, wildlife management, tourism and recreation. *Animals*, 3(4), 978-994.

feeding are still poorly understood (Jones, 2011), and there is a lack of other comprehensive studies outside Australia (Jones & Reynolds, 2008). Globally, there are many other intentional feeding activities documented for species, like bears, ungulates, primates, sharks, dolphins and waterfowl; yet, few studies have measured the long-term effects on the animals.

A general perception is that feeding wildlife recreationally does not conflict with conservation goals and, in some situations, may appear to contribute toward them; however, little research has focused on assessing these beliefs. The science of animal welfare offers another approach by assessing whether feeding advances the quality of life of the individuals involved. Although animal welfare science has traditionally focused on harm to animals under direct human care (farm, companion and captive animals), the science is also applicable to unintentional and indirect harm to free-living wildlife (Fraser & MacRae, 2011). Animal welfare assessment considers if an activity promotes physical and psychological well-being, prevents suffering and allows animals to live in ways suited to their natural adaptations (Fraser, 2008). Further, gauging the harm of feeding wildlife should also consider the severity of the welfare effects (*i.e.*, the number of animals affected, duration and the capacity of the animal to suffer) (Kirkwood, Sainsbury, & Bennett, 1994), which will vary according to the type of feeding and species involved.

Incorporating animal welfare concerns alongside conservation goals may seem inappropriate, because conservation operates at the level of species and ecosystems, whereas animal welfare focuses on animals as individuals (Soulé, 1985). Yet, animal welfare and conservation share a common goal of reducing harm to animals and the common problems of increasing human population and industrialization, which threaten ecosystems, populations and individual animals. Where human-wildlife conflicts emerge and direct conservation goals are not

affected, framing wildlife management issues with an animal welfare perspective may assist in resolving issues, (*e.g.*, Baker & Dubois, 2012).

This chapter reviews the diverse literature on the motivations and types of intentional feeding. Specifically, examples involving bears and deer in BC are presented alongside a summary of wildlife feeding bylaws in the province. Further, an evaluative framework is proposed for assessing when feeding is ethically and biologically justifiable, and may assist policy-makers, educators and managers to make decisions about the appropriateness of feeding wildlife in its various forms.

4.2 Types of Wildlife Feeding: Motivations and Outcomes

A review of wildlife feeding literature was conducted in Web of Science™ using individual, and combinations of, search terms: *wildlife, feeding, intentional, attractant, provision, and supplemental*, with snowball discovery of articles from citations within these primary sources. Peer-reviewed articles were the focus of the review, with government or parks reports also being considered from the grey literature. Media citations for the BC case study were found using Google Alerts™ for specific news stories on the deer culls and Christina Lake bear feeding incident.

4.2.1 Motivations for Feeding Wildlife

Motivations for feeding wildlife include benefits to animals and benefits to people. Suggested benefits to animals include improved survival and breeding rates (Martin, 1987; Robb, McDonald, Chamberlain, & Bearhop, 2008) and increased public awareness, leading to support for conservation (Cannon, 1999). Reported benefits to people include: pleasure from contact with nature; feelings of usefulness by providing food; gaining the trust of animals; education of both

adults and children; entertainment; aesthetic benefits; and to observe or photograph animals (Horn & Johansen, 2013; Horvath & Roelans, 1991; Ishigame & Baxter, 2007; Jones, 2011; Lott, 1996; Wiles & Hall, 2003). Motivations behind official feeding programs may include increasing populations of hunted species (*e.g.*, using baiting or winter supplementation) or protecting crops, both in forestry (Ziegltrum, 2008) and agriculture (Kavčič, Adamič, Kaczensky, Krofel, & Jerina, 2013).

Ethical reasons can also motivate people, as some people feel that feeding wildlife is a way of counteracting human actions, such as habitat destruction (Howard & Jones, 2004), and compensating for a lack of natural foods in urban/suburban environments (Rollinson & Jones, 2003). The perception that feeding benefits and assists wild animals motivates others (Horvath & Roelans, 1991). A blurred distinction between wild and domestic animals may be another underlying motive for feeding wildlife (Wiles & Hall, 2003). In the unusual case of persistent bear feeding in BC presented in Chapter 3, the feeder expressed a feeling of protection and attachment to “*his*” bears, and similar feelings were reported by individuals’ feeding birds in Australia (Jones, 2011).

4.2.2 Types of Wildlife Feeding and Outcomes

Four broad categories can be used to describe the types of intentional feeding of free-living wildlife: (1) research, (2) management, (3) tourism and (4) opportunistic.

4.2.2.1 Research Feeding

The feeding or “provisioning” of free-living wildlife is used occasionally in scientific studies. Natural or novel foods are provided directly (by hand) or indirectly (at feeding stations), sometimes in an attempt to tame or habituate the animals, so that they can be observed and

studied more closely. In Gombe, Tanzania, for example, food items were used to habituate chimpanzees to close human proximity in order to facilitate behavioural observations (Goodall, 1968). However, the feeding led to questions about the validity of the observations (Reynolds, 1975) and to interspecies aggression between chimpanzees and baboons (Wrangham, 1974), which caused poor welfare in some individuals.

Supplemental feeding may also be used to answer ecological and biological questions about a species, such as home range size, survival, growth rates, behaviour, reproduction and distribution (Boutin, 1990; Robb et al., 2008; Ward & Kennedy, 1996), by removing or mitigating the effects of food as a limiting factor (Martin, 1987; Sullivan, Sullivan, & Krebs, 1983). Feeding experiments with songbirds, for example, have revealed changes in singing and territorial behaviour (Saggese, Korner-Nievergelt, Slagsvold, & Amrhein, 2011), while provisioned woodland birds were observed to advance their nest construction (Smith, Harrison, Martin, & Reynolds, 2013). Studies involving feeding today are generally short-term, involve small sample sizes, aim to avoid permanent food-conditioning and are overseen by research ethics committees when conducted by academic institutions. Research feeding studies are also important to improve the understanding of other types of intentional feeding to determine if there is broader applicability to other wild populations (Harrison et al., 2010; Jones & Reynolds, 2008).

4.2.2.2 Management Feeding

Management or “supplemental” feeding can be used to achieve conservation objectives, such as increased survival or reduced human-wildlife conflict. Such prescribed feeding can help to recover or re-establish species (Martínez-Abraín & Oro, 2013). For example, feeding has been used to support the recovery of endangered species, like the Mauritius kestrel (Jones et al.,

1995), bearded vulture (Oro, Margalida, Carrete, Heredia, & Donázar, 2008) and Iberian lynx (López-Bao, Palomares, Rodríguez, & Delibes, 2010). However, such efforts are not always without risk, as they can promote disease and infection (Blanco, Lemus, & García-Montijano, 2011; Palomares, López-Bao, & Rodríguez, 2011). Feeding is also used as a strategy to reduce human-wildlife conflict (Jones & Thomas, 1999; Kaplan, O’Riain, Eeden, & King, 2011). Some nature reserves allow for official feeding by reserve staff in an attempt to prevent conflicts that can arise from interactions with tourists who attempt to see (and sometimes feed) the animals; however, such interactions may not necessarily be curtailed by these efforts (Unwin & Smith, 2010).

In North America, large-scale winter feeding of ungulates commonly occurs (Bartoskewitz, Hewitt, Pitts, & Bryant, 2003; Smith, 2001) with the intention of preventing deaths, controlling wildlife damage to agriculture and promoting hunting opportunities (Dunkley & Cattet, 2003). The supplemental foods, however, are also available to other species, such as raccoons and skunks. These mesopredators may be attracted to the area and thrive, potentially damaging the ecosystem (Cooper & Ginnett, 2000). In addition, the strategy can directly conflict with government wildlife health recommendations and can unnaturally inflate ungulate populations (Schwantje, 2009; Schwantje, 2012). Further, the practice of baiting (supplemental feeding done to aggregate wildlife for capture or hunting) raises concerns for individual animal welfare and population health (Dunkley & Cattet, 2003) and is seen as contradictory to the ethical hunting principle of “fair chase” (Organ, Muth, Dizard, Williamson, & Decker, 1998). The transmission of parasites and disease, such as bovine tuberculosis and chronic wasting disease, at both types of highly frequented feeding sites may in fact be negating conservation

goals (Miller, Kaneene, Fitzgerald, & Schmitt, 2003; Navarro-Gonzalez et al., 2013; Rudolph et al., 2006; Spraker et al., 1997).

4.2.2.3 Tourism Feeding

Wildlife tourism is a growing industry that provides visitors non-consumptive interactions with wild animals. Feeding can support tourism by making the animals predictably and reliably viewable. Examples of species fed in tourism include: primates that are fed, so that time-constrained tourists in Japan can see a “monkey-on-demand” (Knight, 2010); brown bears that are led to Finnish-Russian feeding sites to entertain 4,000 visitors annually (Kojola & Heikkinen, 2012); komodo dragons whose feeding attracts more than 30,000 visitors to Indonesia annually (Walpole, 2001); salt-water crocodiles lured by staged feeding cruises in Australia (Ryan, 1998); African wildlife drawn to safari lodges by carcass feeding or watering holes (Knight, 2009); and dolphins, fish, stingrays and sharks that are fed in warmer climates, like Hawaii, Australia, South Africa, Mexico and the Caribbean (Clua, Buray, Legendre, Mourier, & Planes, 2010; Corcoran et al., 2013; Fitzpatrick, Abrantes, Seymour, & Barnett, 2011; Foroughirad & Mann, 2013; Milazzo, Anastasi, & Willis, 2006).

The behavioural and ecological consequences of tourism feeding have been studied among aquatic and land-based species in both protected and non-protected areas. Feeding wild animals can affect both individuals and populations, as animals may experience food-based aggression and social stress (Lott, 1996). Studies have also documented population-level changes in abundance (Clua et al., 2010), behaviour and distribution (Corcoran et al., 2013), as well as behavioural changes in inter-connected species (Milazzo et al., 2006) and overall ecosystem concerns (Turner & Ruhl, 2007).

For individual animals, research has shown that food-conditioned wildlife may suffer nutritionally, become dependent on unreliable food sources (Orams, 2002; Semeniuk et al. 2007), habituate to people and become more susceptible to predators and vehicle collisions (Donaldson, Finn, & Calver, 2010; Orams, 2002). Even when such feeding programs are highly regulated, food-conditioned animals have a high potential for being harmed (Smith, Samuels, & Bradley, 2008). Other reported concerns include higher parasite loads (Semeniuk et al., 2009) and decreased overall health, reproduction and fitness (Fitzpatrick et al., 2011). For example, research into dolphin feeding programs in Australia found increased survival of offspring when anthropogenic feeding decreased (Foroughirad & Mann, 2013). Intentional feeding is particularly concerning in such a highly social species as dolphins, since harmful behaviours can be learned from conspecifics (Donaldson, Finn, Bejder, Lusseau, & Calver, 2012).

Proponents claim that tourism feeding is a useful conservation tool to monitor populations (Meyer, Dale, Papastamatiou, Whitney, & Holland, 2009) and that it promotes indirect conservation benefits through awareness (Green & Higginbottom, 2000). Others suggest that the effects on individual animals are minimal and that economic benefits to local people are considerable (Hammerschlag, Gallagher, Wester, Luo, & Ault, 2012; Kojola & Heikkinen, 2012). Economic alternatives to tourism, such as hunting or land clearing for agriculture, may in fact be more detrimental to the wildlife, and thus, the net balance of positive and negative effects of wildlife tourism are often hard to determine (Green & Higginbottom, 2000). In species, such as sharks, the indirect-use value from tourism even helps to ensure that a live animal is more desirable to the local economy than a dead one, benefitting both conservation and welfare (Clua, Buray, Legendre, Mourier, & Planes, 2011). Yet, the long-term animal welfare implications of wildlife feeding should still be studied and included in evaluating the acceptability of feeding.

In protected areas, feeding may contribute to good local public relations, but it can also devalue nearby wildlife research if animals are unnaturally drawn to people (Milazzo et al., 2006). Even in non-protected areas, wild animals within viewing range are also within a range where they may cause nuisance to local residents (Knight, 2009). Caution should be taken especially in tourism programs when feeding animals that pose lethal risks to people, as continuous and long-term feeding activities can lead to intra- and inter-species aggression (Clua et al., 2011). Feeding can also act as a facilitator to the illegal pet trade, as wild animals habituated to tourists may be more vulnerable to poaching (Ménard et al., 2013).

4.2.2.4 Opportunistic Feeding

Opportunistic feeding at roadsides, public spaces and in backyards allows individuals to interact closely with wildlife. Feeding wildlife in public locations is generally discouraged, and occasionally prohibited, but often involves species that are perceived as relatively harmless (Mallick & Driessen, 2003; Marion et al., 2008). A common scene in North American parks is that of jays or chipmunks begging picnickers for an opportunistic meal (Marion et al., 2008), whereas in Asia and Africa, primates may be the local beggars (Baker & Dubois, 2012; Pragatheesh, 2011). The consequences of opportunistic feeding on migration patterns, non-target species, disease transmission and trophic cascades needs more study (Jones & Reynolds, 2008; Orros & Fellowes, 2012; Robb et al., 2008). For highly food-conditioned and habituated animals, withdrawal of feeding can lead to increased stress and aggression as food becomes less and less available (Marion et al., 2008).

Wild bird feeding is the most popular form of wildlife interaction in Western culture (Chapman & Jones, 2009), and its biological and conservation merits continue to be debated (Harrison et al., 2010; Robb et al., 2008; Saggese et al., 2011). Provisioning inappropriate foods,

the spread of disease at feeders and window strikes are the greatest animal welfare concerns of backyard bird feeding (Klem, 2008; Robinson et al., 2010; Rollinson & Jones, 2003). Feeding waterfowl is also an international phenomenon, but there is little known about its effects (Chapman & Jones, 2009) aside from its contribution to environmental degradation and water pollution (Turner & Ruhl, 2007).

Opportunistic backyard feeding of raccoons, squirrels, skunks, bears, coyote and deer (either directly or indirectly via bird feeders) also contributes to poor welfare (as discussed above) and neighborhood nuisance issues in both urban and rural settings. Even before public safety becomes an issue, the animals may be trapped and relocated or killed by concerned residents. The extent of this feeding is difficult to assess, because unlike bird feeding, which can be estimated from the purchases of related supplies, most foods types are also used for human or domestic animal consumption.

In summary, there is little evidence of any benefit to the animals' long-term welfare from opportunistic feeding. Recent evidence suggests that even winter bird feeding, although widely practised, may even be detrimental to some populations (Plummer, Bearhop, Leech, Chamberlain, & Blount, 2013), contrary to popular beliefs. Feeding can cause some wildlife to lose their fear of people and associated flight response, leading to nuisance and/or aggressive behaviours (Orams, 2002). In North America, sensational stories of humans or pets interacting closely with habituated bears and deer are not uncommon and spur considerable public debate over culling (CBC News, 2009; Mcginnes, 2012; Salem News, 2009). In a prominent case in Australia, the cull of food-habituated dingoes was ordered by the government after a deadly attack on a child (Burns & Howard, 2003).

4.3 British Columbia, Canada – A Case Study of Feeding Wildlife to Death

British Columbia, Canada, has abundant populations of grizzly bear, black bear, moose, elk, deer and coyote, together with organized wildlife viewing opportunities for various species, including whales and eagles. Feeding for research or management is limited (Dunkley & Cattet, 2003) and tourism feeding is not officially condoned for any species. Feeding of all “dangerous wildlife” (*i.e.*, bears, cougars and wolves) is prohibited and subject to high fines (Government of BC, 1996b). Enforcement of this provincial law is complaint-based and currently does not include ungulate species. Backyard bird feeding is a popular pastime regulated only by local municipal bylaws that may seasonally restrict or prohibit feeders, due to the risk of attracting wildlife deemed “dangerous.” Generally, feeding of all wildlife in regional, provincial and federal parks is either prohibited or discouraged.

Nonetheless, recent incidents of feeding led to numerous wildlife deaths in the province. In summer, 2011, 24 black bears were killed by officials in the small town of Christina Lake after a high-profile and decade-long case of illegal bear feeding at a private residence (see Chapter 3). Residents of the community knew about the feeding for years, but failed to see it as a serious form of animal harm, even after an earlier incident, when many bears had been killed. As seen in Chapter 3, the survey of the community highlighted a lack of education and enforcement on the issue. Between December 2011 and March 2013, three communities (Cranbrook, Kimberley and Invermere) conducted controversial urban deer culls, removing 172 mule and white-tailed deer, in an attempt to reduce deer-human conflict (CBC News, 2011; Estabrooks, 2012; Hopper, 2013; Klassen, 2012). Opportunistic deer feeding by locals is cited as one factor contributing to growing urban ungulate conflict in the province (Hesse, 2010). Unlike some deer culls in the United States, however, these culls were not conducted to address risks associated

with chronic wasting disease or lime disease, which are non-existent and rare (respectively) in the province (Henry & Morshed, 2011; Parmley, Himsworth, & Nogueira-Borden, 2008). Previous deer culls in BC had been limited to islands with sensitive and endangered habitats and sparse human populations (Gaston, Golumbia, Martin, & Sharpe, 2008; Golumbia, 2010). An educational program to prevent human-wildlife conflict in BC had previously focused on human-bear interactions. However, due to increased (real or perceived) conflicts, the program has broadened to include other species, rebranded as WildSafeBC (Coastreporter, 2013).

To describe the regulatory environment in the province, wildlife feeding bylaws were reviewed for BC's 155 municipalities. An online search of bylaws for garbage and attractant management, animal control, and wildlife feeding, was conducted between February and May 2012 on BC municipal websites. Each municipal bylaw department was also contacted by phone (up to three call attempts) to: clarify the meaning of the existing bylaw or to confirm the lack of any feeding bylaw; to determine if new feeding bylaws were being considered; and, to assess the number of relevant bylaw infractions and/or fines given. The analysis showed that 72% had no bylaws prohibiting intentional wildlife feeding or managing attractants, like garbage. Bylaws to manage garbage, generally requiring households to use wildlife-resistant containers and/or to put out garbage only on the day of collection, were present in 9% of communities. A variety of feeding bylaws existed in 12% of municipalities; some restricted feeding by species (deer, birds, pigeons and fur-bearers); several banned all feeding in parks; and a few prohibited backyard bird feeding annually between April and October. The final 7% had combined garbage/attractant and feeding bylaws. In summary, the regulation of wildlife feeding with bylaws is low and inconsistent in BC; although a few communities focus on selected problem species, in general, feeding is not seen as an enforcement priority, with few fines levied.

Overall, BC has fairly restrictive policies on research, management and tourism feeding, but current education and regulations to prevent opportunistic feeding appear minimal. Signage and threats of fines may not be as effective as peer pressure from members of the public who express disapproval of the activity and may be the most promising way to discourage feeding (McCleery, 2009). Opportunistic feeders are often well-intentioned, believing that feeding benefits or causes no harm to animals. However, without negative social feedback, they may not be aware that much feeding is inappropriate. Better management and education campaigns incorporating animal welfare into a framework to evaluate feeding activities may help people to recognize (and hence help to prevent) the harm that feeding often causes.

4.4 Framework for Evaluating Feeding

Different types of wildlife feeding activities can be evaluated using three factors which arose inductively from the literature review: the ability to control the activity (C) and its effects on conservation (E) and on the long-term welfare of animals (W) (Table 4.1). First, the ability to control the activity (regulate, monitor or intervene) is important to ensure that intended outcomes are achieved and to reduce public safety risks. The positive effects on conservation include contributing to the understanding of the species, saving endangered species and improving population survival. Activities that are of educational or economic value to the local people can also have positive effects on conservation, for example, by giving animals indirect-use economic value. The negative effects on conservation would include facilitating poaching and promoting the spread of disease. The long-term effects on animal welfare are influenced by the number of animals affected, the potential for physiological and physical stress, the duration of feeding relative to an animal's life expectancy and whether it disrupts natural foraging.

Table 4.1 Wildlife Feeding Acceptability Framework: Four Types of Feeding Activities Evaluated by their Ability to be Controlled (C) and Their Effects on Conservation (E) and Animal Welfare (W)

Factors (C, E, W)	Research	Management	Tourism	Opportunistic
C: feasible to regulate/monitor/intervene	++	+	-	--
C: safe for the public	++	+	- *	- *
E: contributes to understanding the species	++	+	+	-
E: contributes to saving endangered species	+	++	-	-
E: contributes to population survival	+ *	+ *	-	-
E: does not facilitate poaching or disease	+	- *	-	- *
E: contributes to public education	N/A	N/A	+/- **	+ *
E: provides economic benefits	N/A	+	+/- **	-
W: affects relatively few animals	++	+	- **	--
W: does not cause physiological stress to animal	+	+	- *	- *
W: does not cause physical harm to animal	+	- *	- *	- *
W: affects only a small portion of lifespan	++	+	-- *	-- *
W: does not disrupt natural foraging	+	-	-- *	-- *

Items are rated high (+ +), somewhat high (+), somewhat low (-) or low (- -), not applicable (N/A) based on general knowledge of the literature. The use of * indicates that the evaluation may vary for different cases; specifically, * = depends on the species involved and ** = depends on the tourism operator.

Assessments of high or low effect were subjectively judged by two independent assessments of the feeding type from examples in the literature review and based on researcher experience with such feeding examples. Differences between individual animals, as well as

differences between species, are recognized based on their potential to be habituated and to pose a physical threat to humans. Furthermore, research to date has studied the effect of feeding terrestrial species more than aquatic species; however, the framework is intended as a general guideline for assessment, which can be adapted to the many different species and circumstances involved.

Using the framework in Table 4.1, several reported examples of each type of feeding (research, management, tourism and opportunistic) were evaluated in Table 4.2. The acceptability of each example was rated based on the three factors. For the most part, a feeding activity was deemed acceptable only if it could be controlled, if it had a beneficial conservation effect and if it did not compromise an animal's long-term welfare. Considerations for the feeding effects on the conservation or welfare of non-target animals were also considered; that is, feeding may be deemed unacceptable if it has negative consequences for other species.

Table 4.2 Application of the Wildlife Feeding Acceptability Framework to Reported Examples of Wildlife Feeding Based on their Ability to be Controlled, have Beneficial Effects on Conservation, and have a Positive Long-term Effect on Animal Welfare

Feeding activity example	Ability to be controlled	Beneficial conservation effect	Positive long-term effect on animal welfare	Feeding acceptable?
<i>Research</i>				
Northern Goshawk study (Ward & Kennedy, 1996)	++	+	+	Yes
Townsend's Chipmunk study (Sullivan et al., 1983)	++	+	+	Yes
Woodland bird study (Saggese et al., 2011)	++	+	+	Yes
<i>Management</i>				
Kestrel species recovery (Jones et al., 1995)	++	++	++	Yes
Winter deer feeding (Miller et al. 2003; Rudolph et al., 2006; Spraker et al., 1997)	-	-	-	No
Boar baiting (Navarro-Gonzalez et al., 2013)	-	--	--	No
Crop protection (Kavčič et al., 2013; Ziegltrum, 2008)	+	-	+ / -*	No
<i>Tourism</i>				
Dolphin feeding (Smith et al., 2008)	-	-	-	No
Primate feeding (Knight, 2010)	-	-	-	No
Bear feeding (Kojola & Heikkinen, 2012)	-	-	-	No
Komodo dragon feeding (Walpole, 2001)	-	-	-	No
Shark feeding (Clua et al., 2011)	+ / -**	+	-	Yes **
<i>Opportunistic</i>				
Backyard bear feeding (Chapter 3)	--	--	-	No
Backyard bird feeding (Jones & Reynolds, 2008)	-	+	Neutral	Yes ***
Dingo feeding (Burns & Howard, 2003)	-	--	-	No

Items are rated high (+ +), somewhat high (+), somewhat low (-), low (- -) or neutral; * = depends on the species involved; ** = depends on the tourism operator; *** = acceptable with conditions: appropriate food by species and season, prevention of non-target species attraction, does not increase the risk of predation (e.g., from cats) or of window strike and does not increase intra- or inter-species aggression.

4.5 Discussion

According to the criteria proposed, many research and management feeding programs would appear acceptable, because they can be controlled, are intended to benefit populations and may improve individual welfare. In contrast, most baiting intended to increase hunting opportunities would be judged unacceptable, because it does not benefit the animals' long-term welfare or conservation, is difficult to control and may expose both target and non-target animals to disease and increased human-wildlife conflict (Cooper & Ginnett, 2000; Martínez-Abraín & Oro, 2013). There is a need for wildlife managers to clearly communicate the objectives and benefits of feeding programs so as to distinguish acceptable feeding, notably in research and management, from other types.

In most of the tourism examples evaluated, feeding was deemed unacceptable. Even in highly regulated activities with relatively harmless animals, any short-term benefit to the animals' welfare appeared to be far outweighed by the negative long-term effects of poor physical and psychological health and the production of unnatural behaviours. Understandably, feeding in tourism is appealing to both tourists and companies, because it can increase the potential of seeing otherwise elusive and exotic animals (Orams, 2002). However, encouraging the feeding of certain animals in certain places, as in tourism feeding, can contribute to public misunderstanding about the overall risks of wildlife feeding (*e.g.*, Baker & Dubois, 2012).

Opportunistic feeding often leads to negative welfare and/or human-wildlife conflicts for mammals and some bird species, in addition to being poorly controlled and serving no conservation purpose. As seen in the BC case studies, the feeding of deer and bears (as well as many other species) will continue to trouble communities without effective local bylaws, enforcement and education. Such feeding can lead to animals being culled or relocated, with

negative effects on their welfare (Massei, Quay, Gurney, & Cowan, 2010). These traditional conservation tools, targeting wildlife rather than human behaviour, have limited short-term success and may not be accepted by the public (Baruch-Mordo et al., 2011). There is an ongoing need for research to measure the effectiveness of communication, education and links between attitudes and behaviour-modification to improve programming over time (Gore et al., 2006; Hockett & Hall, 2007). Repeat feeding offenders need to be monitored and fined consistently and community support against feeding encouraged; as seen in Chapter 3, often, locals are aware of the problem before the authorities are.

Wildlife feeding is often claimed to be an enjoyable and beneficial conservation activity. According to the analysis proposed above, feeding is unacceptable in a great many circumstances. The variety of possible feeding interactions, the range of underlying motivations, the benefits and risks to animals and the inconsistency of approaches to restrict feeding present a confusing situation for wildlife managers. The framework presented here could help managers and educators communicate with the public about which types of feeding are acceptable and unacceptable. This would improve the current status of mixed messages regarding feeding; for example, the acceptability of winter supplemental feeding and feeding exotic animals as a tourist attraction, when similar feeding in parks or backyards is discouraged.

Currently, options for managing wildlife feeding include prohibition, ignoring the problem or managing the feeding (Orams, 2002). However, bans are unrealistic for some types of feeding, and current approaches towards regulated and unregulated feeding programs lack consistency. A more promising approach may be to change public perceptions about wildlife feeding through repeated education and regular enforcement. Forms of feeding that are dangerous to animals, for example, by creating disease risk or human-wildlife conflict, need to

become socially unacceptable. The proposed evaluative framework may assist policy-makers, educators and wildlife managers in establishing which feeding is acceptable, so that unacceptable forms can be targeted through regulations and social pressure.

4.6 Conclusions

In summary, many wildlife feeding activities lead to problems of public safety, conservation and animal welfare. By considering these types of effects in combination, managers and policy-makers may be able to identify acceptable and unacceptable forms of wildlife feeding as a basis for regulations, public education and enforcement. Further, the concept of harm to animals needs to be expanded to even well-intentioned human actions such as wildlife feeding. Opportunistic and tourism feeding activities which have negative long-term effects on animal welfare may even be more wide-spread and detrimental than intentionally harmful actions like hunting.

In the next chapter, the concept of harm to wildlife is explored among groups of wildlife stakeholders in BC. One of the perceived barriers to public participation in wildlife management is that the public and experts, having various conservation and welfare values and different perceptions of wildlife risk, will disagree fundamentally on harms to wildlife, and thus solutions to mitigating these harms. However, it may be that there are areas of both high and low agreement, the latter providing guidance on where experts would benefit from broader public participation to inform policies and their implementation.

Chapter 5: Rating Harms to Wildlife: A Survey Showing Convergence

Between Conservation and Animal Welfare Views^ϕ

5.1 Introduction

Wildlife conservation and animal welfare share the common goal of preventing harm to wildlife, but the differences between these areas of concern have been a focus of much discussion. From the beginning, conservation science has set out to protect the integrity and continuity of natural processes, populations and ecological systems (Soulé, 1985), whereas animal welfare science focuses on the quality of life of individuals (Fraser, 2008). Furthermore, conservation attaches special value to rare and keystone species that are important for biodiversity (Soulé, 1985), whereas animal welfare applies to all sentient animals (Fraser, 2008). Consequently, despite many areas of potential co-operation (Fraser, 2010), conservation and animal welfare concerns are often seen as both politically and practically distinct (Fulton & Ford, 2001; Soulé, 1985).

Different wildlife value positions are particularly clear in ethical theory. On the one hand, Aldo Leopold's holistic, non-anthropocentric "land ethic" values the beauty and integrity of biotic communities, and appears compatible with some harms to individual animals (culling, pest control) if these are needed for ecological purposes (Callicott, 1989). In contrast, Regan's (1983) theory of animal rights claims inherent and equal value of all animals that meet his criterion for "subjects-of-a-life," and holds that such animals should not be treated as resources or harmed in order to achieve other goals. Perhaps fearing the loss of recreation and research opportunities

^ϕ A version of this chapter has been published: Dubois, S., & Fraser, D. (2013). Rating harms to wildlife: A survey showing convergence between conservation. *Animal Welfare*, 22(1), 49-55.

(Schmidt, 1990), North America's largest wildlife professional association denounced animal rights in a position statement (TWS, 2011). Potentially more compatible with conservation is an ethic of animal welfare (Hutchins, 2007), which promotes health, prevention of suffering, and allowing animals to live in ways that suit their natural adaptations (Fraser, 2008).

Nonetheless, a division between conservation and animal welfare is largely engrained in the professional practice of wildlife management. Government wildlife agencies generally work within conservation mandates and legislation that protect endangered and threatened species, preserve their habitats and maximise biodiversity (*e.g.*, BC MOE, 2011). Such policies may include narrow welfare considerations for "humane" death and preventing "harassment" to individuals of certain species (*e.g.*, Government of BC, 1996b), but as previously discussed, legal protection for the welfare of free-living wildlife is often limited (*e.g.*, Government of BC, 1996a). The conflict between conservation and animal welfare is particularly apparent in controversial issues such as the control of feral cats (Longcore, Rich, & Sullivan, 2009) and non-native species (Perry & Perry, 2008), sport hunting (Curnutt, 1996), and wildlife rehabilitation (Dubois & Fraser, 2003; Kirkwood & Sainsbury, 1996; Wimberger, Downs, & Boyes, 2010).

Although these divisions exist in philosophy and professional practice, most people believe that animal pain and suffering should be reduced where possible (*e.g.*, HarrisDecima, 2010) and support the goal of preserving species biodiversity (Gallup, 2010). However, it is less known how people perceive and rate human activities that harm wildlife when both conservation and animal welfare are involved. The goal of the research in this chapter was to compare and explore how members of the public, including those with conservation versus animal welfare orientations, rate the importance of different activities that harm wild animals.

5.2 Methods

5.2.1 Design

A wildlife values survey (WVS) was administered through the online engagement tool “YourViews,” which serves as a platform for surveys to explore attitudes about ethical issues in science and technology (Ahmad et al., 2006). All YourViews surveys require creation of a password-protected user profile which limits participation to once per survey and records demographics including gender, age category, education level, country of origin, and country of residence. Additional mandatory demographics, specific to the WVS, included province of residence and urban or rural residency (rural < 50,000 residents). Optional demographics asked participants about wildlife activities they enjoyed or supported, and any organizational memberships. Also, participants could indicate whether they were a wildlife professional (paid) or enthusiast (unpaid). Those that selected “yes” to such formal involvement were then asked to identify the type of wildlife engagement, including the activity, their role, and their length of engagement.

Three open-ended lead-up questions on harmful activities to wildlife were asked to understand participants’ views on global, local, and species-specific harms, respectively. Written responses were used to help establish the Wildlife Value Orientation (described below) of participants. The main research question asked participants to score the level of perceived harm to wildlife (“in terms of overall number of animals impacted globally”), caused by 12 pre-defined human activities (Table 5.1) using a scale of 1 (least) to 7 (greatest). These activities were selected as a diverse sample of activities broadly known to have significant but different effects on wild animals and populations (Dubois & Fraser, 2003; Fraser & MacRae, 2011; Kuhnen, Remor, & Lima, 2012; Massei et al., 2010; Salafsky et al., 2008; Sainsbury et al., 1995;

Woods, McDonald, & Harris, 2003). “Harm” was intentionally not defined in order to leave the interpretation up to respondents. An optional open-ended text box for comments allowed participants to explain their scores. Participants were not able to neither see scores or comments from other participants, nor go backwards between pages to change their answers to a previous question.

Table 5.1 Definition of 12 Human Activities that Harm Wildlife
(in order presented to participants)

Activity	Definition
Cat Predation	The death or injury of birds, small mammals, reptiles and amphibians by free-roaming owned and unowned cats
Urban Development	The conversion of wildlife habitat to human habitat
Poaching	The illegal capture or killing of wild animals, which may lead to the transport and sale of live animals or their parts or meat
Road/Railroad Kill	The death or injury of wild animals during the approach or crossing of roads and railroad lines
Sport Hunting	Legal hunting of wild animals for recreation or in pursuit of a trophy, whether or not any meat is taken for consumption
Window Strikes	The death or injury of wild animals as a result of impact with buildings or structures with reflective glass or which maintain lights at night
Relocation	The capture and movement of wild animals from one habitat to another
Resource Development	Logging, mining, drilling or other activity in pursuit of non-animal resources
Pest Control	The killing of any wild animal perceived to be a nuisance, the methods of which (poison, traps, etc.) may cause death or injury to other non-targeted animals
Pet trade	The legal capture, transport and sale of wild animals as pets
Pollution	The discharge of chemical pollutants into any water, air or soil system
Agriculture	The conversion and use of wildlife habitat to grow crops or raise livestock for food production

5.2.2 Recruitment

The recruitment strategy was designed to explore and compare the views of British Columbians who were concerned primarily about wildlife conservation or primarily about animal welfare. Recruitment first targeted individuals with high levels of engagement with wildlife, either as a paid professional (*e.g.*, biologist, manager, policymaker, guide outfitter, rehabilitator, veterinarian) or as an unpaid enthusiast (*e.g.*, hunter, trapper, naturalist). This recruitment included direct emails to the BC Wildlife Federation (a hunting and trapping organisation) and to wildlife professionals through government and non-profit directories. Participants were also encouraged to disseminate the survey invitation to other British Columbian wildlife professionals and enthusiasts.

Additional recruitment targeted members of the public in BC with an interest in wildlife but low personal or professional engagement. This involved email solicitations in membership e-newsletters of the BC Society for the Prevention of Cruelty to Animals, Vancouver Aquarium, Wildlife Rescue Association of BC, and the Vancouver Humane Society. Members of these non-profit organizations are generally donors and volunteers, who were considered to have lower engagement than staff working for such organizations. Direct emails to past YourViews survey participants were also sent. Although available by open access on the internet, the survey link was only distributed by email and non-British Columbians were excluded from analysis. As recruitment was not random, the survey was intended to explore comparisons rather than provide a representative sample of the population.

5.2.3 Analysis

The variable Wildlife Engagement level (high or low) was determined by participants' responses to questions about their professional and unpaid activities, including their roles and the

duration of their involvement. Participants who self-identified as wildlife professionals or enthusiasts were verified for the designation of “high engagement” by checking that they were involved for at least three years as a paid professional or five years as an unpaid enthusiast. Demographic characteristics of participants who did not self-identify as wildlife professionals or enthusiasts were reviewed, and all participants who met the above criteria for “high engagement” were classified as such, while all others were classified as “low engagement.”

The Wildlife Value Orientation of participants was designated as either conservation-oriented or welfare-oriented based on the wildlife activities they enjoyed, the organizations they supported, and themes from their responses to the three lead-up questions on harms, as assessed by inductive content analysis (Elo & Kyngäs, 2008). The conservation-oriented group included individuals who hunted or trapped, and/or supported hunting, land preservation or conservation organizations, and/or who expressed most concern about effects on ecosystems and populations in their open-ended responses. The welfare-oriented group did not hunt or trap, supported animal welfare organizations and/or focused on harm to individual animals in their open-ended responses. Individuals who supported both conservation and animal welfare organizations, or neither, were classified by themes identified in their responses to the open-ended questions.

Means and standard errors of the harm scores were calculated by demographic group for each of the 12 human activities and Spearman correlations were calculated between the two groups for each variable tested. The harm scores, treated as a continuous dependent variable, were analysed by hierarchical regression in SPSS to determine significant demographic predictors (Vaske, 2008). All binomial independent variables were entered into the model in the following *a priori* order such that each variable was tested after taking the effect of the preceding variable(s) into account: gender, residency (urban or rural), Wildlife Engagement, and Wildlife

Value Orientation. For example, any significant differences between urban and rural residents would be after adjustments for gender, while significant differences based on Wildlife Value Orientation would be after adjustments for all other variables in the model.

A subset of participants with the most contrasting Wildlife Value Orientations was also analysed. This included the 22 most conservation-oriented participants, all of whom reported that they hunt or trap, support land preservation and hunting/trapping organizations, and do not support any animal welfare or animal rights organizations. Also included were the 11 most welfare-oriented participants, all of whom reported that they support animal welfare and animal rights organizations, do not support land preservation or hunting/trapping organizations, and do not hunt or trap. Mean harm scores were calculated for these two groups and a Spearman correlation compared their rankings of the 12 activities.

5.3 Results

A total of 339 British Columbians participated in the main research question regarding harms to wildlife. These included 229 females, 105 males and 5 participants who did not indicate gender. Age ranges were 19–29 (14%), 30–39 (22%), 40–49 (18%), 50–59 (27%), and 60–above (17%), with five who did not indicate age. Participants divided as 227 urban and 112 rural residents, while 227 were designated as “low engagement” with wildlife and 112 were designated as “high engagement.” For Wildlife Value Orientation, 192 participants were classified as conservation-oriented and 147 as welfare-oriented.

Across all groups, including conservation-oriented and welfare-oriented participants, the four human activities that destroy or alter habitat (urban development, pollution, resource development, agriculture) were consistently rated as most harmful to wildlife and were ranked in

the same order (Table 5.2). Activities that cause direct and intentional harm (poaching, pest control, pet trade, sport hunting) generally received moderate harm scores, while unintentional harms (road/railroad kill, window strikes, cat predation, relocation) were scored slightly lower. Rankings of the 12 activities were highly consistent among demographic groups tested. Spearman rank order correlation coefficients showed almost perfect agreement between conservation-oriented and welfare-oriented participants ($r_s = 0.96, p < 0.01$) and between urban and rural participants ($r_s = 0.96, p < 0.01$). Agreement was also high between women and men ($r_s = 0.89, p < 0.01$) and between high and low engagement groups ($r_s = 0.86, p < 0.01$).

Despite similar rankings, there were some differences in the level of harm attributed to activities by the different groups. Compared to men, women consistently rated the 12 activities as more harmful, with the largest difference seen in sport hunting (Table 5.2). Urban residents rated most activities as slightly more harmful than did rural residents, with the exception of cat predation and road/railroad kill, which rural residents rated as significantly more harmful than their urban counterparts (Table 5.2). Individuals with low wildlife engagement rated all activities as more harmful to wildlife compared to those with high engagement levels, with the exception of cat predation (Table 5.2). Harm scores of welfare-oriented participants were consistently higher than those of conservation-oriented participants, with the largest differences ($p < 0.01$) seen in poaching, pet trade and sport hunting (Table 5.2). Of the 12 activities, relocation received the lowest ranking of harm across all groups. Based on qualitative comments, it seems the term was variously understood to mean introduction of invasive species, relocation of problem animals, and movement of native species within their range.

Table 5.2 Mean Score and Standard Error of Perceived Harm to Wildlife Caused by 12 Human Activities and Spearman Rank-order Correlation Coefficient for Demographic Groups
(on a scale of 1 = least harm, to 7 = greatest harm)

Activity	Gender		Residency		Wildlife Engagement Level		Wildlife Value Orientation		Strong Wildlife Value Orientation	
	Female n = 229	Male n = 105	Urban n = 227	Rural n = 112	Low n = 227	High n = 112	Animal Welfare n = 147	Conservation n = 192	Animal Welfare n = 11 ^a	Conservation n = 22 ^b
Urban Development	6.8 ± 0.04	6.3 ± 0.11**	6.7 ± 0.05	6.5 ± 0.09	6.7 ± 0.05	6.5 ± 0.10	6.8 ± 0.05	6.5 ± 0.07	6.8 ± 0.12	6.0 ± 0.32
Pollution	6.4 ± 0.07	5.8 ± 0.13	6.3 ± 0.07	6.0 ± 0.12	6.4 ± 0.06	5.7 ± 0.13**	6.4 ± 0.08	6.0 ± 0.09	6.4 ± 0.24	5.3 ± 0.34**
Resource Development	6.2 ± 0.07	5.5 ± 0.16**	6.1 ± 0.08	5.7 ± 0.15	6.2 ± 0.08	5.5 ± 0.14**	6.1 ± 0.10	5.8 ± 0.10	6.4 ± 0.31	4.3 ± 0.40**
Agriculture	5.9 ± 0.09	5.5 ± 0.14	5.9 ± 0.08	5.4 ± 0.15**	5.9 ± 0.09	5.5 ± 0.14	5.9 ± 0.11	5.6 ± 0.10	5.8 ± 0.42	4.5 ± 0.45
Poaching	5.3 ± 0.09	4.1 ± 0.16**	4.9 ± 0.10	4.9 ± 0.16	5.3 ± 0.09	4.2 ± 0.15**	5.4 ± 0.12	4.6 ± 0.11**	4.6 ± 0.43	3.6 ± 0.34
Pest Control	4.8 ± 0.10	3.4 ± 0.17**	4.6 ± 0.11	4.1 ± 0.19	4.9 ± 0.11	3.5 ± 0.15**	4.9 ± 0.13	4.0 ± 0.13	4.7 ± 0.52	2.4 ± 0.28
Pet trade	4.7 ± 0.11	3.7 ± 0.16	4.4 ± 0.11	4.2 ± 0.17	4.7 ± 0.11	3.6 ± 0.16**	4.9 ± 0.13	3.9 ± 0.12**	4.8 ± 0.55	2.8 ± 0.31
Road/Railroad Kill	4.7 ± 0.10	4.1 ± 0.15**	4.4 ± 0.10	4.8 ± 0.14**	4.7 ± 0.10	4.3 ± 0.15	4.8 ± 0.12	4.4 ± 0.11	4.6 ± 0.43	4.5 ± 0.33
Window Strikes	4.3 ± 0.10	3.3 ± 0.16**	4.0 ± 0.11	3.9 ± 0.16	4.3 ± 0.10	3.4 ± 0.15**	4.4 ± 0.12	3.7 ± 0.12	4.6 ± 0.41	2.2 ± 0.32**
Sport Hunting	4.3 ± 0.11	2.8 ± 0.18**	4.0 ± 0.12	3.6 ± 0.19	4.4 ± 0.11	2.7 ± 0.16**	4.6 ± 0.14	3.3 ± 0.13**	4.2 ± 0.52	1.3 ± 0.14**
Cat Predation	3.8 ± 0.11	3.7 ± 0.18	3.6 ± 0.11	4.0 ± 0.18	3.5 ± 0.11	4.1 ± 0.17**	3.9 ± 0.14	3.6 ± 0.13	3.5 ± 0.58	3.6 ± 0.43
Relocation	3.5 ± 0.11	2.5 ± 0.15**	3.2 ± 0.10	3.2 ± 0.17	3.4 ± 0.11	2.7 ± 0.15	3.6 ± 0.13	2.9 ± 0.11	4.0 ± 0.56	2.2 ± 0.35
<i>Spearman rank-order</i>	$r_s = 0.89^{**}$		$r_s = 0.96^{**}$		$r_s = 0.86^{**}$		$r_s = 0.96^{**}$		$r_s = 0.69^{**}$	

** = $p < 0.01$ (Critical value $r_s = 0.67$ for $p < 0.01$, $n = 12$, two-tailed test)

^a subset of $n = 147$ strongly animal welfare-oriented participants ^b subset of $n = 192$ strongly conservation-oriented participants

The subset of 22 strongly conservation-oriented and eleven strongly welfare-oriented participants were also similar to each other in their relative rankings ($r_s = 0.67$, $p < 0.01$). The four activities that destroy or alter habitat (urban development, pollution, resource development, agriculture) were ranked highest by both groups, with conservation-oriented participants also ranking road/rail kill as harmful as agriculture (Table 5.2). Despite the overall similarity, the welfare-oriented participants rated direct killing activities (sport hunting, pest control, pet trade, poaching) as more harmful than the conservation-oriented participants. Welfare-oriented participants also ranked cat predation as least harmful of all 12 activities, whereas the strongly conservation-oriented participants ranked cat predation as the sixth most harmful activity.

In the hierarchical regression analysis, independent variables were entered into the model by a fixed order of entry as per the regression “stepwise” method based on the correlation between dependent and independent variables (Vaske, 2008): gender, residency, Wildlife Engagement, Wildlife Value Orientation. The model accounted for significant variation in harm scores for all 12 activities (Table 5.3). However, the percentage of variance explained (adjusted R^2) ranged from a very low 5.5% for cat predation, to a moderate 24.5% for sport hunting. Collinearity tolerance and variance inflation factor values were > 0.1 and < 10 , respectively, for all tested variables across all activities, and therefore no collinearity was deemed to be present.

Gender was a significant predictor of harm scores for six activities, as women generally scored direct harms higher (Table 5.3). Residency was a significant predictor of harm scores for agriculture, road/railroad kill and cat predation. Wildlife Engagement was a significant predictor of harm scores for six activities, with low engagement participants generally scoring harm higher, with the notable exception of cat predation. Wildlife Value Orientation was a significant predictor for most activities, as conservation-oriented participants generally scored harms lower.

Table 5.3 Results of Hierarchical Regression Analysis of Perceived Harm to Wildlife Caused by 12 Human Activities by Demographic Group

Activity	R^2 Adjusted coefficient of determination	Standardized Beta Coefficients (β)			
		Gender (Female vs. Male)	Residency (Urban vs. Rural)	Wildlife Engagement Level (Low vs. High)	Wildlife Value Orientation (Conservation vs. Welfare)
Urban Development	0.081**	-0.146*	-0.042	0.030	0.301**
Pollution	0.112**	-0.078	-0.055	-0.088	0.355**
Resource Development	0.090**	-0.090	-0.096	-0.199**	0.123
Agriculture	0.058**	0.003	-0.116*	-0.039	0.257**
Poaching	0.181**	-0.195**	0.084	-0.176**	0.248**
Pest Control	0.209**	-0.197**	-0.024	-0.171**	0.320**
Pet trade	0.151**	-0.095	0.012	-0.137*	0.312**
Road/Railroad Kill	0.057**	-0.164**	0.121*	-0.041	0.007
Window Strikes	0.129**	-0.111	0.095	-0.070	0.462**
Sport Hunting	0.245**	-0.118*	0.019	-0.182**	0.506**
Cat Predation	0.055**	-0.026	1.55**	0.262**	0.309**
Relocation	0.103**	-0.229**	0.069	-0.041	0.197*

* = $p < 0.05$, ** = $p < 0.01$

5.4 Discussion

This study was not designed to provide a random or representative sample, but to compare differences between groups, who hold primarily conservation values versus those who align primarily with animal welfare values. The online engagement tool attracted a wide distribution of ages and wildlife experience, an urban-to-rural ratio (2:1) that over-represented rural populations in the province (rural population = 14% of provincial population; Government of Canada, 2005), and a high female demographic, in contrast to traditional wildlife surveys which are often gender-biased toward males (Jacobson, Brown, & Scheufele, 2007).

It was not expected that the harm scores would necessarily agree with expert or empirically correct ratings of harm. For example, window strikes received relatively low ratings, whereas Klem (1990) concluded, on the basis of extensive research, that windows are an extremely important hazard to birds. Interestingly, all groups rated road/railroad kill as more important than sport hunting, in line with the expert conclusion of Forman and Alexander (1998) that roads and vehicles have eclipsed hunting as the leading direct human cause of death to vertebrates in North America. Further, respondents may have rated harms differently among species if specific examples were used, however a dozen echoed this respondent's view:

“These answers would change if targeted towards a certain species or group of species but they are listed as I see it for overall number of animal globally.”

5.4.1 Conservation and Welfare Views on Harms to Wildlife

If the concerns of participants were affected only by a conservation or animal welfare focus, then those with welfare orientations would be expected to give the highest scores to activities that harm individual animals based on the number of animals affected, the nature and duration of the harm, and the capacity of the animals to suffer (Kirkwood, et al., 1994); whereas participants with conservation orientations would give the highest scores to activities that harm populations, species, or ecological systems, without consideration for harms to individuals. However, the results indicate that the two groups were in almost complete agreement regarding the relative importance of the various activities, ranking the 12 activities in almost the identical order and identifying the same four activities (urban development, pollution, resource development, agriculture) as most harmful to wildlife.

In the full sample, however, it is conceivable that extreme conservation or welfare views were diluted by the inclusion of many less-polarised participants in the two categories. The

subset of the most extreme conservation-oriented and welfare-oriented participants was examined to test this possibility. Even in these polarised groups, however, there was still significant agreement on the relative importance of activities, with top rankings given by both groups to the four activities that destroy or alter habitat.

Human activities have been classified as affecting wildlife either directly or indirectly and either intentionally or unintentionally (Fraser, 2012; Fraser & MacRae, 2011). In this study, indirect and unintentional harms to animals (resulting from habitat alteration and pollution) were scored as most harmful by all groups. These harms may stand out because they have enduring impacts by changing physical, chemical and biological environments, affecting wild animals throughout their lives, and affecting both current and future generations. Further, such harms may affect a wide range of taxa and at all levels, including individuals, populations and ecosystems. The fact that both conservation-oriented and welfare-oriented groups ranked these types of harms highest suggests scope for broad agreement that may be missed when the groups disagree on specific issues or management actions.

Activities that cause direct harm to wildlife – such as poaching, pest control, pet trade, road/railroad kill, sport hunting – were generally rated more moderately by all groups. The moderate harm level may have been assigned to these activities because they tend to inflict harm on only current generations, may be limited to small portions of the animal's life and apply to only certain species groups. Direct harms may also have received only moderate harm scores because they are generally open to control and management. In contrast, indirect and unintentional harms to animals, for example from urbanization and pollution, provide little scope for control over the eventual effects on animals.

5.4.2 Demographic Influence on Views of Harm

Although the different demographic groups ranked harms in a very similar order, the level of harm attributed to activities was consistently higher for certain groups than others. Firstly, women in this survey scored all activities as more harmful than men did, the effect of gender being strongest for activities that involve direct killing. Many studies on the attitudes and values of wildlife stakeholders have also demonstrated differences between men and women (*e.g.*, Czech, Devers & Krausman, 2001; Zinn & Pierce, 2002), with women showing greater opposition to activities that pose potential harm to animals (Kellert & Berry, 1987). Women are typically under-represented as wildlife stakeholders because they participate less often than men in traditional conservation activities, and thus their views are often missed in standard surveys of licensees, such as hunters and trappers.

Rural or urban residency is often used to contrast attitudes and values towards wildlife (Heberlein & Ericsson, 2005; Kellert, 1976). However, residency is becoming more fluid as many people who grew up in rural areas move into urban areas and some urban residents relocate to a rural lifestyle (Messmer, 2000). Differences were small in this survey, with urban residents scoring harm slightly higher than rural residents for all activities except cat predation and road/railroad kill. These two activities may have been perceived as more harmful by rural residents because of higher wildlife populations in rural areas and rural residents' greater appreciation of the effects of these unintentional harms (Messmer, 2000). Alternatively, road kill and victims of cat predation may be less noticeable in urban areas due to city services.

Highly engaged professionals and enthusiasts – a group generally supportive of using sport hunting as a conservation tool – are traditionally those who influence wildlife policy. In contrast, low-engagement and animal welfare-oriented participants assigned significantly higher

harm scores to all forms of intentional killing. Wildlife managers should take into consideration the influence of these variables in addition to possible gender and residency effects.

5.5 Conclusions

Given the broad agreement on ranking activities that harm wildlife, wildlife managers should be able to develop management actions that address broadly held priorities, including the priorities of both conservation-oriented and welfare-oriented citizens. Moreover, considerations can be made for the generally higher harm scores towards direct killing activities, by inclusion of groups not traditionally consulted about wildlife management (women, low-engagement, and welfare-oriented). Here, managers need to consult broadly to ensure that specific policy decisions are aligned with diverse and widely held public values.

The next chapter presents additional results from a series of qualitative questions on the Wildlife Values Survey about these divisive management issues including: trading-off individual animals to protect populations, killing other species to protect an endangered species, and the acceptability of invasive monitoring and population reduction techniques.

Chapter 6: Exploring “Humane” Dimensions of Wildlife^φ

6.1 Introduction

The field of Human Dimensions of Wildlife has evolved over the past 30 years from studies of hunter satisfaction and recreation use enquires to a dynamic discourse between natural and social sciences. The focus is now on human values and behaviors regarding wildlife and the environment (Manfredo, 1989; Manfredo et al., 1998). HDW research parallels the science of animal welfare, which assesses quality-of-life issues related to animal suffering in use and management, and addresses ethical challenges raised by evolving social values. For example, public concerns about animal welfare are widespread in agriculture and animal research (Crettaz von Roten, 2009; TNS Opinion & Social, 2007).

Human Dimensions research has documented the recent shift from utilitarian values (which endorse human use and manipulation of wildlife) to a protection orientation (which endorses human protection and appreciation of wildlife) (Manfredo & Zinn, 1996; Zinn, Manfredo, & Barro, 2002). Value orientations toward wildlife have been reframed in recent research to reflect the rise of a mutualism value orientation over one of domination (Manfredo, Teel, & Henry, 2009; Teel & Manfredo, 2009). According to Manfredo and colleagues (2009), the “domination wildlife value orientation” extends the utilitarian orientation to reflect an explicit hierarchy in which humans have mastery over wildlife. People holding this value orientation are more likely to accept asserting total control over wildlife, including those actions that may result in the death of animals.

^φ A version of this chapter has been published: Dubois, S., & Harshaw, H. W. (2013). Exploring “humane” dimensions of wildlife. *Human Dimensions of Wildlife*, 18(1), 1-19.

In contrast, what Manfredo and colleagues (2009) call the “mutualism wildlife value orientation” extends the protectionist orientation to reflect an egalitarian ideology in which the welfare of all beings is emphasized. People holding this value orientation are less likely to condone actions that result in harm to wildlife, and may in fact view wildlife in anthropomorphic terms (Manfredo et al., 2009; Teel & Manfredo, 2009). The shift to a mutualism wildlife value orientation suggests that the role that “humane” dimensions play in wildlife management should also be investigated. “Humane” has been defined here as the ethic of animal welfare, which seeks to promote animal health, prevent suffering, and allow animals to live in ways that suit their natural adaptations (Fraser, 2008).

Animal welfare value orientations also include protectionist and utilitarian values, and the interplay between conservation and welfare values may inform wildlife management decision-making. For example, across three studies of conservation values, those holding protectionist orientations were less willing to accept destroying an animal than were those with utilitarian orientations (Zinn, Manfredo, Vaske, & Wittmann, 1998). Additional knowledge about animal welfare could inform this process, as knowing how many animals would be killed, what methods would be used, and understanding the humaneness of alternatives (*e.g.*, relocation) could influence public attitudes toward lethal interventions. Although it may not be possible to change value orientations shaped by broader conditions of society (Manfredo et al., 2003), animal welfare considerations of management programs could influence attitudes on specific issues. This may be useful in guiding policy, program implementation, and public education.

As described in Chapter 5, an exploratory online survey of a wide cross-section of stakeholders about wildlife management in BC was carried out. The following chapter focuses on three wildlife management scenarios from that survey used to prompt discussions about the

humane dimension of such practices to explore demographic influences on decision-making. Based on past studies (Dougherty, Fulton, & Anderson, 2003; Heberlein & Ericsson, 2005; Koval & Mertig, 2004; Zinn & Pierce, 2002), female and urban participants were expected to be less likely to accept invasive or lethal interventions, while those with utilitarian values or a high level of experience with wildlife would be more likely to accept invasive or lethal practices.

6.2 Methods

6.2.1 Design

The Wildlife Values Survey administered on the YourViews platform first described in Chapter 5 was also used in this research. The platform includes a means of arriving at a social decision using “reason-based” questions (Danielson, 2010). Questions using this design are called “N-reasons” – “N” to indicate that reasons may express a social norm. The method of questioning allows participants to record reasons for their “Yes” or “No” decision or select a reason already recorded by previous participants. Participants were not able to revisit or change their answers; however, in this part of the survey only, they were purposely able to view, and refer to, answers from previous participants in their “wave” (recruitment cohort).

6.2.2 Recruitment

As explained in Chapter 5, the recruitment strategy was designed to explore and compare the attitudes of BC residents who have an interest in wildlife issues. Recruitment was done in two waves so that two separate sets of responses could be generated for the same N-reason questions. (In Chapter 5, the recruitment cohort was not important for analysis and thus waves were combined). The first wave (June 2010) targeted individuals with high levels of wildlife engagement, either as a paid professional (*e.g.*, biologist, guide outfitter) or as a volunteer

enthusiast (*e.g.*, hunter, naturalist). Wave 1 recruitment included emails to available membership lists and directories of wildlife organizations, relevant professional groups and government departments. Additional snowball recruitment was encouraged through email invitations to register on YourViews to other BC wildlife professionals and enthusiasts. Wave 2 (July 2010) targeted the general public with an interest in wildlife, but who generally had low engagement. Recruitment involved solicitations in volunteer and membership e-newsletters of non-profit wildlife and animal welfare organizations and direct emails to previous survey participants.

Relevant stakeholders were approached first as they are familiar with the management scenarios and are often asked by government to provide input on management issues. Given the exploratory nature of this research, and lack of publicly available lists of wildlife professionals or enthusiasts, results may not be generalized beyond the samples. The study intended to describe a range of attitudes about wildlife welfare and to inform future surveys of these groups.

6.2.3 Questions

“N-reason” questioning asks participants to consider a scenario followed by a question, to which they respond by voting Yes/Neutral/No. In addition to their vote, participants must provide a reason or select an existing reason created by a previous respondent. As each reason was displayed by sequence authored (from most recent to earliest), all but the first participant had the option of selecting an existing reason. Each reason was also displayed with an updated percentage of its popularity among respondents. Participants had the option of splitting their vote among multiple reasons. Thus, analysis required quantitative summaries of voting tallies and qualitative assessment of each reason.

Although recency was used to display newly authored N-reasons, concerns for primacy effects were minimal, as past N-Reasons research tested the reliability of three groups answering

the same question and found the groups came to the same social choice despite facing different sets of reasons (Danielson, 2010). Also, if recency was an issue, the first reasons observed (most recently authored) would have been selected most often by participants, which did not occur. Displayed popularity scores did not appear to deter participants from reading all reasons or creating new ones, as new reasons were authored regularly throughout both waves.

The first N-reason question had participants consider trading off the lives of individual animals to save their population. This scenario asked whether to cull individual bighorn sheep with a temporary, but infectious, eye disease that caused blindness, to protect others in the same population. Participants were told the disease was not fatal, but could cause deaths from affected animals falling from cliffs and could rapidly spread throughout the isolated population. Respondents indicated their level of agreement with sacrificing individuals to save the population and their reason.

In a second scenario participants were asked whether they believed that interventions to protect one species justified the killing of another. The five-part N-reason question proposed management dilemmas between an endangered species and other species (see Table 6.2 – each question was displayed on a separate web page). The fate of the endangered Vancouver Island marmot would be affected by proposing changes to the number and species of predators or game animals culled. Finally, in a third scenario, to investigate perceptions of invasive management techniques, participants rated the level of acceptability of harm to black bears. Using a five-point scale of “acceptability” plus an open comment box, participants rated harm caused by specific population monitoring and population reduction methods (see Table 6.3), which differed by degree of invasiveness.

6.2.4 Demographic Characteristics

Demographic information collected included: gender, age, urban/rural residency, wildlife experience level, wildlife interests, and organizational membership. Level of “Wildlife Engagement” (either high or low) was assigned to participants based on professional and volunteer activities, roles, and duration of activity, with high engagement professionals with a minimum of three years of paid involvement, and for non-professionals with a minimum of five years of involvement in wildlife activities. “Wildlife Use Value Orientation” was assigned based on answers to wildlife activities and organizational support. This determination differed slightly from Wildlife Value Orientation used in Chapter 5, to align with Human Dimensions terminology and to establish a neutral user category. Participants were classified as “utilitarian” if they hunted or trapped and supported hunting and/or land preservation organizations, but did not support animal rights organizations. “Neutral use” individuals did not hunt or trap, and did not support animal welfare or animal rights organizations. “Protectionist” individuals did not hunt or trap but supported animal welfare and/or animal rights organizations.

6.2.5 Analysis

Proportional votes per reason were calculated so that each participant had only one vote, although it might have been split over many reasons. Inductive content analysis (Elo & Kyngäs, 2008) was used to identify themes in reasons during multiple iterations of text analysis. Quotes are presented in italics and were selected as the best examples of the voting choice or as otherwise indicated. Means and standard errors of acceptability scores were calculated by demographic group, and t-tests or ANOVAs were conducted for group comparisons. Gender, residency, Wildlife Engagement, and Wildlife Use Value Orientation were independent variables

used to assess the variation in the dependent variable acceptability. The Spearman rank-order correlation coefficients by each group pairing were also calculated.

6.3 Results

6.3.1 Participants

A total of 351 participants provided demographic information (Table 6.1) and 341 of these completed the entire set of N-reasons questions. Wave recruitment groupings were used to compare responses in N-reasons questions between Wave 1 and Wave 2. All responses, however, were pooled for comparisons about the ratings of management technique acceptability. With the exception of 16 participants, all were current residents of BC. Given the dynamic nature of creating and commenting on N-reasons, non-residents could not be removed from the sample. However, differences between BC and non-BC residents' mean acceptability scores were tested by independent samples t-test and only one significant difference was found ($p < 0.05$), as non-BC residents differed from BC residents only in responses to sterilization with no non-BC residents supporting sterilization.

Table 6.1 Participant Demographic Characteristics

	Wave 1 June 2010 (n = 116) Recruitment target high engagement	Wave 2 July 2010 (n = 235) Recruitment target low engagement	Overall June-July 2010 (n = 351) Waves combined
Wildlife Engagement	High = 77% Low = 23%	High = 10% Low = 90%	High = 32% Low = 68%
Wildlife Use Value Orientation	Utilitarian = 35% Neutral Use = 30% Protectionist = 35%	Utilitarian = 2% Neutral Use = 16% Protectionist = 82%	Utilitarian = 13% Neutral Use = 20% Protectionist = 67%
Gender	Female = 39% Male = 61%	Female = 83% Male = 15% No answer = 2%	Female = 68% Male = 30% No answer = 2%
Residency	Rural = 41% Urban = 59%	Rural = 27% Urban = 73%	Rural = 32% Urban = 68%
Age	19–29 = 8% 30–39 = 16% 40–49 = 17% 50–59 = 31% 60–above = 28%	19–29 = 18% 30–39 = 26% 40–49 = 18% 50–59 = 24% 60–above = 12% No answer = 2%	19–29 = 14% 30–39 = 22% 40–49 = 18% 50–59 = 27% 60–above = 17% No answer = 2%

6.3.2 N-Reasons: Intraspecies Trade-offs – Populations versus Individual

When participants were asked to consider the killing of individual wild animals to save others within the same population, the majority of participants from both waves (69% and 71%, respectively) voted No to culling any individuals (Q1 – Table 6.2). Yes-voting participants within Wave 1 (13%), the mostly “high engagement” group, tended to agree with this reason:

“...the culling of the infected would likely be in the best interest of the overall herds health... ...In reality, the answer is not a simple yes or no but one that should be carefully thought out... ...Unfortunately today with current financial and manpower

Table 6.2 Number of N-Reasons Created and Percent of Yes/Neutral/No Votes by Recruitment Wave on Proposed Lethal Control Management Strategies

N-Reason Questions	Wave	% Yes and # Reasons	% Neutral and # Reasons	% No and # Reasons
Q1) An isolated bighorn sheep population is being monitored closely because it is experiencing an outbreak of a natural eye disease that is spreading gradually throughout the population. So far the few individuals with the disease are easy to identify as their eye infection quickly causes temporary blindness. Although the disease is not fatal, some of the sheep are dying from falling off the cliffs. If left alone, the disease could affect all individuals in this population. Should the affected individuals be culled?	1 (n = 116) Reasons = 19	13% 4	18% 5	69% 10
	2 (n = 235) Reasons = 30	4% 4	25% 8	71% 18
Q2a) There is a proposal to cull wolves and cougars, up to ten individuals in total, in an effort to reduce predators during the initial re-establishment of the marmot population. Would this be acceptable?	1 (n = 115) Reasons = 20	25% 8	26% 1	49% 11
	2 (n = 233) Reasons = 31	4% 4	3% 4	93% 23
Q2b) An alternative proposal recommends the culling of up to ten golden eagles to control marmot predators during their initial re-establishment. Would this be acceptable?	1 (n = 115) Reasons = 15	33% 6	1% 1	66% 8
	2 (n = 233) Reasons = 27	2% 1	3% 3	95% 23
Q2c) Initial estimates of the impact of predators were too low. To address this, a new proposal has been made to cull over one hundred individual predators, wolves and cougars, in order to achieve low predator levels until viable re-establishment of the marmots is achieved. Would this be acceptable?	1 (n = 115) Reasons = 17	27% 7	3% 1	70% 9
	2 (n = 233) Reasons = 31	1% 1	6% 4	93% 26
Q2d) An alternative strategy to address the under-estimation of predator impacts would be to increase the annual hunting quota of elk by 30%, which would result in several hundred game animals being killed. By reducing the elk population, fewer prey animals will be available for predators which could result in a decrease in the number of predators. This strategy assumes that the threat of wolf and cougar predation to marmots will also decline. Would this be acceptable?	1 (n = 111) Reasons = 16	3% 1	1% 1	96% 14
	2 (n = 230) Reasons = 32	2% 3	7% 5	91% 25
Q2e) Local wildlife managers decided to implement a strategy that culls wolves and cougars, up to ten individuals in total. This program has been in place for one year and marmot re-establishment results are promising. However, a permanent annual cull of up to ten predators has been proposed in order to sustain low predator levels indefinitely. Would this be acceptable?	1 (n = 111) Reasons = 14	25% 8	1% 1	74% 5
	2 (n = 230) Reasons = 29	1% 1	3% 3	96% 25

constrains within governmental wildlife management agencies I suspect the cheapest route would be taken rather than the appropriate one.”

Wave 2 participants who voted Yes (4%) indicated that *“It is better to cull a few than to lose them all.”* Wave 1 participants who voted Neutral (18%) asked for more information about the scenario. Wave 2 Neutral voters (25%) also asked for more information about the disease and species, with almost one-quarter supporting this popular Neutral reason:

“I agree with those who said there is not enough information provided to properly answer the question, but I don’t generally have a problem with the concept of ‘intervention’ where the risk is very high and there is a very high degree of ‘certainty’ that the ‘cure’ will be efficacious.”

Most Wave 1 participants that supported No reasons highlighted that the disease is natural and that nature should be left to take its course so a healthier population would result. One No reason in Wave 1 (3 votes) disagreed with this majority: *“I think that the diseased sheep should be removed and treated, not killed.”* In Wave 2, 60% of No voters opposed the cull as they felt nature should be left alone to run its course. One third of these No voters suggested that intervention may be required if the species was endangered, or if the isolated population harboured unique genetic diversity. Almost 40% of all No votes in Wave 2, however, recommended some form of medical treatment or isolation for the affected sheep or management to prevent falls. Those opposed to the cull in Wave 2 believed there were alternatives and offered these two main rationales:

“There are better, more humane ways, of intervening. Why not try to cure the illness instead of killing the animal?”

“If the herd is being monitored closely and the disease is ‘spreading gradually’ then the individual animals should (according to the statement) be easily identified and therefore able to be treated without need of more drastic intervention like culling.”

6.3.3 N-Reasons: Interspecies Trade-offs – Killing in a Species to Protect Another

When participants were asked to consider culling up to 10 predators (wolves and cougars) to protect endangered Vancouver Island marmots (Q2a – Table 6.2), only half of Wave 1 participants voted No, while 93% of Wave 2 participants opposed the cull. One quarter of votes from Wave 1 participants supported the cull and emphasized that due to the critical status of the marmots, healthy predator populations could be reduced if predation was a driving cause of marmot mortality. The most popular Yes reason suggested that it may not be the most publically acceptable action:

“If wolf predation is a primary risk to this marmot species going extinct then culling wolf [sic] in a science based manner is acceptable. Although this may not be publicly popular; it is effective and ethical... ..The ethical question is do you ignore the predation issue that is not publicly popular and allow a species to become extinct for evermore.”

In Wave 2, the few Yes supporters (4%) suggested culling was necessary to restore balance as the marmots are the priority, with the most popular Yes reason being:

“We made this mess by reducing the marmot population and threw the natural balance off, therefore, we have to try to restore that balance . . .”

Just over one-quarter of Wave 1 participants voted for the one Neutral reason, which suggested a cull was not sustainable if other measures to preserve the marmot population for the long-term were not undertaken:

“The real issue is habitat loss. A predator cull, or predator exclusion may be necessary in the short term to re-establish the decimated marmot population but in the long-term habitat restoration and prevention of further logging close to VI marmot habitat is the only way to make a wild population of VI marmots truly self-sustaining. I have no ethical problem with a predator cull... ..but feel that such a cull would be unethical in the absence of a clear plan to protect habitat...”

Wave 2 Neutral participants (3%) emphasized the role of human interference:

“One would have to consider the effects of culling the predators in order to keep the marmot alive. Could some predators be relocated? What should happen if fish were endangered? Would we start culling humans or should we just try to keep humans away from fish . . .?”

The half of Wave 1 participants who opposed the cull cited that a cull would be temporary, not address habitat loss, unfairly punish predators, and that it ignored alternatives (e.g., fences, colony stewards). Some suggested that humans do not fully understand, nor can control, the interactions between species or the consequences of a cull. A few suggested that efforts to save the marmots were a waste of resources and unnecessary:

“We need a new paradigm for management of endangered species. Species go extinct, that is natural; causes of extinction (= human activities) need to be addressed. . . . In this case, culling predators seems too short term and unlikely to succeed.”

Most Wave 2 participants voted No; a majority suggested the cull may create another imbalance:

“Killing the wolves and cougars may just create another imbalance. Continue to captive breed and re-introduce until the population stabilizes.”

Habitat issues and continuing captive breeding programs were emphasized in many Wave 2 No reasons. Yet some participants felt it was just wrong to cull because it was human interference that caused the original endangerment:

“Simply because we shouldn't kill one species at the expense of another, especially when it is the humans who have caused the problem in the first place. Only efforts that do not harm other species should be made, and focus should be on habitat reconstruction and human exclusion.”

The second marmot question (Q2b – Table 6.2) proposed an alternative predator cull of up to 10 golden eagles (a protected but not endangered species). One-third of Wave 1 participants voted Yes, and although they recognized that habitat loss needed to be addressed, most believed the healthy eagle population would sustain the cull and that tough decisions have to be made:

“Clearly habitat loss is the overarching issue, however at this point without predator reduction we run the risk of having these marmots only in zoos. At this point we need to ask ourselves the question: Is it better to have marmots with predator reduction even as a long-term solution or to have no wild marmots at all?”

Two-thirds of Wave 1 participants voted No to the culling of golden eagles, most citing ecosystem tampering and the need for long-term habitat restoration:

“This is a classic case of trying to correct an environmental problem by creating a new one. These predators are not new to the ecosystem and are not the cause of the decline in numbers – why should they now have to pay the price? And do we really think that killing more animals is a sustainable solution...?”

The majority of votes in Wave 2 (95%) were for No responses. Opponents were concerned about ecosystem imbalance and lack of habitat, and supported solutions like captive breeding (without awareness of its own welfare costs) and non-lethal protection measures:

“Killing/culling the eagles may well create imbalances in other species. Continue to breed and re-introduce marmots till population stabilizes.”

Many No voters in Wave 2 thought the approach was short-sighted and some believed harming one species to save another was not right:

“Removing a territorial predator opens up the territory for another one. We can’t keep killing off species to protect other species. This is not sustainable.”

The third marmot question (Q2c – Table 6.2) proposed increasing the cull of wolves and cougar from 10 to over 100. Yes and No votes again differed by wave, with Wave 1 resulting in over one-quarter of participants voting Yes, and only a few votes for one Neutral reason. These participants who voted in favor of culling over 100 predators felt the predator populations would recover and are not at risk like the marmots:

“The goal is to save marmots, a species which occurs in only one spot in the world. Wolves, cougars and golden eagles as species are not at risk... ...If we're to deviate from science, I would suggest it would be prudent to examine the ethics and morality of allowing a species to disappear from the wild versus the ethics and morality of reducing populations of other species which are abundant....”

For Wave 2, only one Yes reason explained that healthy predator populations can sustain the cull and Neutral respondents asked for more information on the predator species status.

The majority of Wave 1 No voters (70%) explained their opposition to the increased cull in relation to the skewing of ecosystem dynamics with potentially unknown and far reaching consequences. Some also expressed this concern:

“Where do we stop once we start the killing? When new predators move in to fill the void do we kill them too . . .? Still doesn’t guarantee the marmot re-introduction will be successful. It may still fail . . .”

A majority of Wave 2 respondents (93%) opposed an increased predator cull, as it did not address habitat loss, but they believed captive breeding and monitoring should continue. Overall, they indicated that culling does not fix problems, but creates new ones. Many Wave 2 participants expressed a moral concern that it is just not acceptable to cull predators when human actions caused the marmot decline:

“The only intervention by humans that is ethically justified is restoring a wrong we have been responsible for. So, if the marmots are endangered because humans have caused habitat destruction, captive breeding to increase populations is an ethical solution. Causing further destruction to wildlife through culling predators to correct a wrong we have committed only makes our involvement more shameful.”

The fourth marmot question (Q2d – Table 6.2) proposed increasing elk hunting, which are also depredated by cougars and wolves. Generally both recruitment waves opposed this option. In both waves, participants that voted Yes supported increased hunting of elk to restore a balance and Neutral reason supporters felt the idea was too convoluted to be predictable and could go either way.

Although the majority of Wave 1 participants supported No reasons (96%), there were two distinct groups: those that previously supported predator culls and those that opposed them.

The former did not support primary prey reduction theory in principle and opposed increasing elk hunting because high predation would continue as expressed by this popular reason:

“This does not address the issue of high predation. Although reducing the elk population may reduce the wolf population it also poses increased risk that other species will be targeted or that the wolf in the area will simply change their hunting patterns and prey.”

The latter group in Wave 1 however, did not support increased hunting of elk, some because they felt the theory was misguided, but most because habitat loss was still unresolved and human interference continued to harm others species, as explained in this reason:

“The real cause, habitat destruction is still not being addressed... why should one species suffer for another? WE are the problem not wolves or bears or eagles. Cull humans.”

The majority of votes in Wave 2 (91%) opposed increasing the elk hunt because it would again be too much human intervention or as was expressed in one reason: *“This is the same interventionist management-by-death game with more dominoes and more assumptions.”* The most popular Wave 2 reason opposed the increased elk hunt because one species was still being killed to protect another and they preferred non-lethal solutions:

“The strategy is still to kill (whether through intentional culling or increased game-hunting) one species to protect another. If the intent is to increase the marmot population, then breed the marmots... ..Unfortunately, while us humans usually have the best intentions, it seems we get sucked into a vicious cycle of species management.... ..at what point do we just let nature run its course? We should not be contributing to the decrease of animal populations through intentional killing.”

Here participants opposed intentional killing, but encouraged the breeding of marmots for release into a new environment, apparently without recognizing that many of these marmots would die.

The final marmot question (Q2e – Table 6.2) extended the cull of ten animals (wolves and cougars) from a one-time to a permanent annual cull. Although the majority of both Wave 1 and 2 participants opposed the cull extension, the waves differed by vote percentages, 74% versus 96%, respectively. In Wave 1, one-quarter of votes supported Yes reasons but only 1% supported the one Neutral reason. The most popular Yes reason in Wave 1 explained:

“Clearly there should be a long term management plan but until such a time that habitat can be restored you do what has to be done.”

A majority of Wave 1 participants opposed the extension, most selecting this No reason:

“The problem here is habitat loss... ...Ongoing culls of predators would perhaps allow marmot survival, though not in a truly viable and self-sustaining manner, without properly sustainable management of the surrounding habitat. This is not a useful outcome at all – it creates an ongoing cost, both financial and ethical, associated with the permanent cull... The solution here is long term habitat protection, period.”

The majority of Wave 2 opposition to the extension was because it would mean there would be a permanent intervention to balance the ecosystem, potentially creating more imbalance to other species, when it should be left to stabilize with the addition of captive bred marmots, as the most popular reason explains:

“This assumes the local wildlife officials understand the balance/imbalance of ALL population levels. Continue to breed and re-introduce marmots and leave the other healthy populations alone.”

Overall, respondents believed that a permanent cull would cause more harm than good.

6.3.4 Acceptability of Wildlife Management Techniques

As qualitative comments from the previous questions were linked within each recruitment wave, the analyses reflected the views of mostly high engagement (77%) versus low engagement (90%) participants. However, as participant responses to questions on acceptability of wildlife management techniques were not related to those of other participants, it was possible to conduct quantitative analyses for all demographic variables (gender, residency, Wildlife Engagement and Wildlife Use Value Orientation) independent of wave recruitment cohort.

When participants were asked to score acceptability of harm on a scale of 1 (not acceptable) to 5 (completely acceptable), the least invasive monitoring practice – remote observations with motion-activated cameras – was highly acceptable (average 4.4–4.8) across all demographic groups (Table 6.3). The acceptability of onsite field surveys to observe bears was also highly acceptable. The collection of DNA from hair removed by barbed wire (a non-invasive monitoring technique) was generally acceptable across participants, with “high engagement” participants rating it as more acceptable than their counterparts. Trapping, sedation and radio-collaring bears for monitoring was moderately acceptable among participant groups (average 3.0–4.0). Trapping, sedation and surgical implantation of a monitoring device was the least acceptable monitoring technique overall (average 2.1–2.9). Women, “low engagement” participants, and those with protectionist values were significantly less supportive of invasive monitoring techniques than their counterparts.

Participants were then asked, if all costs were equal, to indicate the acceptability of three population reduction methods which differed in the type of harm to the bears. Overall, the option of trapping, sedation and relocation was moderately acceptability (average 2.3–3.4) among groups. Here, women, “low engagement” participants, and those with “protectionist” values were

Table 6.3 Mean Score and Standard Error of Acceptable Harm to Bears by Management Activity and Spearman Rank-order Correlation Coefficient for Demographic Groups

(on a scale of 1 = Not acceptable; 2 = Slightly acceptable; 3 = Somewhat acceptable; 4 = Mostly acceptable; 5 = Completely acceptable)

Management Activity	Gender		Residency		Wildlife Engagement		Wildlife Use Value Orientation		
	Female n=238	Male n=107	Urban n = 238	Rural n = 112	Low n=238	High n=112	Utilitarian n = 46	Neutral n = 70	Protectionist n = 234
<i>Non-invasive monitoring techniques</i>									
a) Remote observations with motion-activated cameras to photograph bears	4.7 ± 0.05	4.6 ± 0.09	4.8 ± 0.04**	4.5 ± 0.10**	4.7 ± 0.05	4.7 ± 0.08	4.4 ± 0.18	4.7 ± 0.09	4.7 ± 0.05
b) Individuals conduct field surveys on site and visually search for the bears	4.1 ± 0.08	4.2 ± 0.11	4.2 ± 0.07	4.0 ± 0.13	4.1 ± 0.08	4.2 ± 0.11	4.1 ± 0.19	4.2 ± 0.14	4.1 ± 0.07**
c) Barbed wire is wrapped around natural rubbing trees; hair removed when bears rub and hair DNA tested to identify individuals	3.9 ± 0.10**	4.3 ± 0.11**	4.0 ± 0.09	4.0 ± 0.14	3.7 ± 0.10**	4.6 ± 0.08**	4.7 ± 0.10**	4.0 ± 0.15**	3.8 ± 0.10**
<i>Invasive monitoring techniques</i>									
d) Trap and sedate bears to radio-collar them; monitor signals emitted; radio-collars programmed to fall off a few months later	3.0 ± 0.09**	3.7 ± 0.13**	3.2 ± 0.09	3.2 ± 0.14	3.0 ± 0.09**	3.6 ± 0.12**	4.0 ± 0.17**	3.3 ± 0.16**	3.0 ± 0.09**
e) Trap, drug and surgically implant abdominal tracking devices into bears; implants emit monitoring signals for > 1 year	2.1 ± 0.10**	2.9 ± 0.15**	2.3 ± 0.10	2.5 ± 0.15	2.1 ± 0.10**	2.8 ± 0.15**	3.3 ± 0.24**	2.4 ± 0.18**	2.1 ± 0.10**
<i>Population reduction techniques</i>									
f) Trap, drug and relocate enough bears to another area to balance population	3.3 ± 0.09**	2.9 ± 0.15**	3.3 ± 0.09	3.0 ± 0.14	3.4 ± 0.09**	2.7 ± 0.14**	2.3 ± 0.19**	2.9 ± 0.17**	3.4 ± 0.09**
g) Trap, drug and sterilize enough bears so population rates will drop	2.6 ± 0.10	2.3 ± 0.14	2.5 ± 0.10	2.5 ± 0.14	2.5 ± 0.10	2.5 ± 0.14	2.0 ± 0.20	2.6 ± 0.18	2.6 ± 0.10
h) Cull enough bears to balance the population	1.7 ± 0.09**	2.7 ± 0.16**	1.9 ± 0.09**	2.3 ± 0.16**	1.6 ± 0.08**	2.8 ± 0.16**	3.8 ± 0.21**	2.4 ± 0.19**	1.5 ± 0.08**
<i>Spearman rank-order</i>	r _s = 0.85**		r _s = 0.96**		r _s = 0.70		U-N r _s = 0.73 N-P r _s = 0.97** U-P r _s = 0.64		

** = $p < 0.01$ (Critical value $r_s = 0.81$ for $p < 0.01$, $n = 8$, two-tailed test)

statistically more supportive of this option than their counterparts. Trapping, sedation, and sterilization was less acceptable than relocation as a population reduction method across all groups, but only significantly different between men and women.

Culling was the least acceptable option for population reduction and received very low support from women, urban residents, “low engagement” participants and those with “neutral use” or “protectionist” values (Table 6.3). “High engagement” and “utilitarian” participants believed culling to be more acceptable than relocation and sterilization; seven participants also suggested that increased hunting quotas could resolve the problem. However, three of their counterparts suggested there be a strict condition for any culling along these lines:

“Culling would be acceptable if it is carried out by professional biologists and NOT hunters, as hunters often shoot what they see and don’t discriminate between male, female, young or old. They also tend to shoot the biggest, healthiest ones, which goes against natural population control.”

Assessing differences between demographic groups, Spearman rank-order correlation coefficients were calculated to determine how each ranked the acceptability of management techniques relative to their counterparts (*e.g.*, men versus women). The strength of concerns between men and women differed among invasive techniques, but men and women ranked the harms in a similar order ($r_s = 0.85$) (Table 6.3). Agreement in ranking sequence was also high urban and rural participants ($r_s = 0.96$) and between those with “neutral” and “protectionist” values ($r_s = 0.97$). However, the greatest differences in both strength of concerns and ranking of acceptability were seen between “low” and “high” engagement participants and those with “utilitarian” and “protectionist” values.

6.4 Discussion

As previously discussed, wildlife management decisions in North America have traditionally been made by government experts with some input from wildlife use stakeholders who directly benefit from policies. As government agencies seek input from a greater diversity of stakeholders, the rise of public participation in environmental policy development (Reed, 2008) has translated into similar opportunities in wildlife management (Enck & Brown, 1996; Meuser, Harshaw, & Mooers, 2009). The overall goal of the Wildlife Values Survey was to connect wildlife managers to both quantitative and qualitative opinions of diverse BC stakeholders. Using this mixed-methods online survey, participants were asked not only if they supported or opposed decisions, but why. Unlike mail surveys, participants could consider responses from other participants and either agree with their reason, or create their own reason. This led to more informative responses, as votes alone could be similar across different stakeholder groups, but the reasons behind the votes may differ vastly. This level of inquiry parallels more qualitative assessments of surveying diverse stakeholder groups (Tindall, 2001).

6.4.1 Intraspecies Trade-offs

Most participants opposed killing individuals to save a population. Wave 1 participants opposed a cull because they felt nature should be left to run its course, leaving a stronger population. Although some Wave 2 participants discussed leaving nature alone, 40% believed the animals should be treated or isolated during the temporary outbreak to protect themselves and others. If participants were only asked to vote Yes/Neutral/No without explaining their choice, the waves could have appeared to select No for the same reason. Many participants in Wave 2 (mostly general public) did not want a cull, instead supporting interventions to provide humane

care to the animals. This sentiment was almost non-existent in Wave 1 which consisted mostly of wildlife professionals and enthusiasts.

6.4.2 Interspecies Trade-offs

The proposed culling of predators to protect endangered animals met with mixed responses in Wave 1 (mostly wildlife professionals and enthusiasts), which debated when interventions to protect one species might justify the killing of another. Those that supported culling believed healthy predator populations could undergo reductions without population consequences, and that such measures were warranted to protect endangered species. There was more support for a one-time small intervention (ten animals) than for a one-time large intervention (100 animals), or an extended intervention (ten animals annually). Changing predator species from cougars and wolves (hunted species) to golden eagles (protected species) reduced support levels in Wave 1. Participants who opposed culling believed it was not fair to kill specific predators because it is not their fault that the marmots are endangered, rather habitat loss and human activities caused the crisis to marmots. Thus in fairness, the impositions should be placed on people, not other species.

The vast majority (90%) of Wave 2 (mostly the general public) consistently opposed culling predators to protect endangered species, no matter the number, predator species, or duration. Opposition in both survey waves cited various reasons for not supporting culling: habitat loss; imbalance of ecosystem; unknown consequences of changes; and the sense that the culls were only a temporary solution. Alternatives like captive breeding and non-lethal predator deterrents were supported but their inherent welfare implications were not mentioned. Wave 2 participants also frequently raised concerns related to fairness, indicating that culling was not appropriate because predators were not at fault, and it was unfair to kill to protect other species.

This underscores the role played by perceptions of justice in the social acceptability of management practices, especially when proposing to kill certain animals to protect animals of another population.

6.4.3 Wildlife Management Techniques

Based on previous studies, female and urban participants were expected to be less supportive of invasive or lethal interventions, while those with utilitarian values or a high level of experience with wildlife would be more supportive. The survey results support this previous work with the exception that urban or rural residency did not appear to influence acceptability of invasive practices, but only those that were lethal. The invasiveness of some management techniques may go too far in the minds of some wildlife stakeholders, often placing managers in the middle of a debate between conservation and animal welfare.

The questions regarding the acceptability of wildlife management techniques sought to identify a threshold for the acceptability of practices, and how the perception of certain techniques differed among demographic groups. Most participants believed non-invasive monitoring techniques were highly acceptable, with some apprehension towards hair removal for DNA testing. Yet this non-invasive technique is well-established in wildlife management and there is an obvious opportunity for public education to inform “low engagement” participants and those with “protectionist” values about the benefits and low impact of this practice, as they indicated that it was less acceptable than their counterparts.

Public education could also be used to explain the effects of relocation and re-introductions. Although relocation was generally rated as acceptable, “high engagement” individuals and those with “utilitarian” values were less supportive; the low success rate and negative impacts on relocated animals were discussed by some participants who were familiar

with the practice. However, the general public is often unaware that relocation can be inhumane and ineffective for some species (Massei et al., 2010) and communicating this in management recommendations is important. This is also true for re-introductions (Fischer & Lindenmayer, 2000) as the captive breeding and release of marmots was highly supported without regard to its animal welfare implications. Radio-collaring was generally acceptable to all, whereas monitoring with implants was only slightly acceptable. As the least acceptable monitoring technique, practicality and invasiveness of implants were concerns.

In terms of population reduction, surgical sterilization was only slightly acceptable across groups. Although rarely used, the public often suggested it as an alternative to culling (Lauber & Knuth, 2007). However, participants believed that the technique takes too long to be effective, is expensive, has unknown behavioral consequences, and it is highly invasive. Sterilization by injection programs might have received different support, but was not proposed in this survey, as the method is rarely used in BC. Relocation was more acceptable than surgical sterilization for all categories of participants. The results indicate a need to outline the humaneness of such interventions when considering such options, and present as criteria for the public to consider.

The acceptability of culling varied strongly across demographic groups. As traditional wildlife surveys are often gender-biased toward men (Jacobson et al., 2007), women's attitudes toward culling could be under-represented without broader public consultation. However, differences in the acceptability of management practices were greatest between those with different levels of wildlife engagement and among those with different values on wildlife use, as they varied in strength and relative importance of concern. Wildlife policy and practices are generally developed by "highly engaged" biologists and managers with stakeholder input from "utilitarian" groups like hunting organizations. Consequently, there is a mismatch between

public perception and acceptability of practices and actual practices that needs to be addressed with broader public consultation, and inclusion of “humane” dimensions to reduce the impact of an impending collision between human activities and wildlife management.

6.5 Conclusions

Based on the survey responses, there are generally three reasons people oppose invasive and lethal wildlife management methods. The first is the perceived need to manage or kill wild animals. If for population management, nuisance or disease control, sport, trophy, fur, or sustenance, support or opposition will reflect attitudes based on individuals’ wildlife use and animal welfare values. A second reason for opposing killing in particular, is the concept of fairness, as other species should not have to die because of human actions like the endangerment of species or creation of nuisance animals. These are enduring values unlikely to change with an assessment of the humaneness of practices. Context is the final consideration: the method, duration, number of animals and degree of harm experienced. Exploring the “humane” dimensions of wildlife management (*i.e.*, management that explicitly promotes animal health and prevents suffering, and seeks solutions that permit animals to exist in environments that suit their natural adaptations) has the potential to improve animal welfare within conservation practices while maintaining their scientific integrity. Although more research is needed to show how reducing animal suffering and invasive practices can support management efforts, the acceptance of animal welfare science by conservation managers and practitioners is also required.

Chapter 7: General Discussion and Recommendations

7.1 Review of Thesis Aims

The goals of this thesis were to understand broad attitudes towards human-wildlife interactions using several various public engagement methods, and to determine how to incorporate these attitudes to inform humane wildlife policy. The thesis began by outlining the context of wildlife management in BC by providing the definition of wildlife and the legal framework within which wildlife is managed. Next, applicable concepts in Human Dimensions of Wildlife literature were reviewed to demonstrate its parallels with animal welfare science, as both interdisciplinary fields address biological dilemmas posed by the human use of animals, but also confront the ethical challenges raised by evolving social values.

Having various values, beliefs, and attitudes regarding wildlife, as well as different experiences with wildlife, the public and experts can hold a range of expectations for what constitutes humane wildlife management. To begin understanding these differences, relevant literature in wildlife risk communications was presented to acknowledge how the risk of wildlife interactions can be overestimated or underestimated among different stakeholders. This led to an exploration of public participation methodologies which demonstrate that as public engagement in decision-making increases, trust in wildlife agencies to steward public resources such as wildlife, may also increase. I propose that a better alignment of wildlife policies and practices with societal values for humane animal use, can serve as a basis for developing more enlightened wildlife management, in turn, advancing understanding and support for programs.

In the first research chapter (Chapter 3), the wildlife stakeholder acceptance capacity of a small BC community involved in a contentious wildlife issue, with high social amplification of risk, was studied. Pre- and post-management intervention surveys captured local attitudes

towards bear management in the context of illegal feeding, both before and after problem bear activity. Here, public opinions on relocation and killing of food-conditioned wildlife were revealed, and were similar to those expressed by low engagement participants in Chapter 6. Also the community did not see wildlife feeding as a serious harm to animals, a theme then explored within the context of opportunistic feeding in Chapter 4. To understand this apparent discrepancy between wanting a humane outcome for the bears and tolerating illegal feeding, a review of the complex motivations, types and consequences of wildlife feeding was undertaken, along with a summary of BC wildlife bylaws for a broader enforcement context. An evaluative framework is then proposed, to make biological and ethical decisions about the appropriateness of feeding wildlife in the context of research, wildlife management, tourism and recreation.

The following two research chapters analyze results from an online survey of BC stakeholders with various levels of wildlife engagement. Assessing differences and similarities in the perceptions of harms to wildlife between conservation-oriented and welfare-oriented participants, Chapter 5 showed that both groups agreed on the greatest harms, suggesting the potential for the public and experts to find common ground on certain issues. However, in the case of activities that involve direct killing, differences were evident between experts and non-traditional wildlife stakeholders. Using examples of wildlife management dilemmas in BC, Chapter 6 further evaluated public and expert attitudes towards lethal and invasive management activities. Both conservation and welfare rationales were expressed by participants, yet there was an obvious mismatch between actual practices and public acceptability of practices. To improve the acceptability of such practices, addressing these gaps with broader public participation appears feasible, as the methods used in this research demonstrate there is sincere public interest in engaging with human-wildlife interaction management issues.

7.2 Limitations of Research

As this research was conducted in BC, the legal framework that underlies wildlife management policy and practice is most relevant to this province. Furthermore, the management dilemmas used as examples in the research may be more relevant to BC and its composition of diverse wildlife and multicultural human populations. However, there are broader implications from the study for human-wildlife interactions, through the value of researching differences between public and expert attitudes on humane wildlife practices, and using public participation strategies to bridge these gaps.

The terms “expert” and “public” were used throughout this research to employ terminology consistent among the fields of risk management, public participation and HDW, yet there are some limitations to such generalized use of these terms. In Chapters 3 and 4, expert opinion was based on official BC government policies (relocation, problem bears and wildlife feeding) and informal conversations with BC government officials during data collection. Public views were in fact surveyed in Chapter 3, and documented public activities in the wildlife feeding literature were used as a basis for public attitudes towards feeding in Chapter 4. In Chapters 5 and 6, conclusions about experts were based on the views expressed by participants with high levels of wildlife engagement (paid wildlife professionals or unpaid enthusiasts), whereas public attitudes were summarized from those participants with low wildlife engagement. These demographic groupings may not reflect traditional “expert” and “public” contrasts, but were appropriate for conclusions in this study and the culture of wildlife management in BC.

All surveys inherently have some degree of error. In Chapter 3, accurate representation of the community’s perspectives was more practical because it was a small community that could be intensively sampled. It is apparent that this is not always possible when surveying the public,

unless conducting extensive polling to match census representation. In this random digit dialing telephone survey, sampling error was addressed with a high sample size and response rate. Some coverage error was possible as not all homes in Christina Lake have fixed-line telephones, although mobile telephone usage is limited in this remote geographic area. This is unusual compared to many urban communities, as mobile telephone use is gradually replacing fixed-lines, and thus traditional telephone survey methods are being challenged.

Non-response error can occur when results are correlated with a type of person that is underrepresented in the sample. In this telephone survey, non-respondent and respondent gender was recorded and did not differ. However, other differences between respondents and non-respondents could not be tested. Under different circumstances, an intercept survey (initial in-person contact) could have been a complementary method to gain information on non-respondents in Christina Lake. Face-to-face community meetings or virtual town hall meetings by telephone may be also have been effective in this context.

Online surveys have both pros (inexpensive, quick to administer and gather data, wide-reaching) and cons (sampling validity, participant bias, technology barriers) (Vaske, 2011). In Chapters 5 and 6, the exploratory online wildlife values survey was not intended to be a representative survey, sampling a known population. As a research tool that uses purposive sampling, it was intended to describe perspectives of wildlife professionals and enthusiasts (high wildlife engagement) with those of the general public (low wildlife engagement), identifying issues, strength and relative importance of concerns, and differences in attitudes towards management practices. Such strategic online engagement can target various groups of stakeholders to inform decisions or other participatory processes, and serve as one of many tools for wildlife managers especially when funding is limited.

7.3 Overall Conclusions

Traditional approaches to wildlife management have yet to catch up with societal concerns for the humane treatment of wildlife for several reasons:

1. Wildlife managers recognize that the interests of wildlife stakeholders are changing, yet, wildlife continues to be managed within the North American model of conservation, an expert-driven and hunter-conservation framework, with welfare issues remaining on the fringe. This was most evident from findings in Chapter 3 and 6 regarding invasive and lethal management activities; however, considerations for welfare in sanctioned wildlife feeding programs that serve specific conservation goals (*e.g.*, winter deer feeding and baiting), were also absent in the literature review in Chapter 4.
2. Current definitions of wildlife and existing legal protection for free-living wildlife do not fully reflect public values, as there are certain societal expectations for animal use given an increased awareness of humane issues and evolving norms. The concept of justice for equal and humane treatment of wildlife (predator, endangered species, or non-endangered species) was shown in Chapter 6, yet protections for these species vary under the law. Further, the theme of fairness was raised in Chapter 3 for individual free-living animals who were not seen as being “at fault” for their actions. The currently limited legal coverage for these animals is contrary to protections for other animals (*e.g.*, companion, research and farm) that are influenced by human activities.
3. Although the field of Human Dimensions of Wildlife can offer wildlife management some tools from the social sciences to address human values and behaviour, humans are still the focus of concern in much HDW research. This is seen in the determination of a societal carrying capacity for wildlife based purely on a balance of multiple stakeholder tolerance,

where wildlife themselves do not have representation as a stakeholder. Perhaps determining how to represent wildlife as a stakeholder would appear to be too challenging, as diverse groups can hold conservation and/or animal welfare views and may differ on how to achieve this. Chapter 5, however, suggests there are important areas of agreement that could unite stakeholders who aim to reduce harms to wildlife. Nonetheless, for certain management activities (*i.e.*, lethal, invasive), there are concerns not currently being heard.

Understanding animal welfare value positions and addressing concerns of humaneness within the management context, may influence attitudes toward conservation practices, and help managers better communicate with the public and generate support for their programs. Reducing the potential harm and suffering of individual wild animals may also improve research and management efforts. For example, wildlife managers achieve more reliable data if animals are not injured or impaired when tagged for monitoring.

Further, knowledge of the animal welfare effects of management practices can benefit wildlife management decision-making that may otherwise overlook serious welfare issues in favour of conservation goals. As seen in Chapters 3 and 6, the humaneness and effectiveness of relocation was recognized as a concern among those highly engaged with wildlife, but not necessarily among those with less wildlife experience. This may explain the confusion of its ranking as a harm to wildlife in Chapter 4. However, the idea of re-introducing a captive-bred endangered species, such as the marmots in Chapter 6, did not generate the same concern in any participants, despite the extensive failures and deaths in these programs. Here, the public and experts may both support programs that are in fact detrimental to wildlife welfare.

This research also revealed similarities between the most conservation-oriented and animal-welfare-oriented groups – such as the greatest harms to wildlife in Chapter 5 and the

disregard for wildlife feeding as a serious harm to animals seen in Chapters 3 and 4. Concerns for invasive and lethal management interventions were reoccurring topics in Chapters 3, 5 and 6, again mostly among the public, yet some were also voiced from within the expert community. This debate within the expert community is rarely given much attention and more forums for ethical reflection on practices are needed in the profession. Lethal control and invasive techniques will continue to be used to serve broad conservation goals and may always cause debate, but ensuring humane treatment as defined by an ethic of animal welfare, as well as fair or just treatment, is an important dimension to add to the field of wildlife management.

This idea of fairness seen in Chapters 3 and 6 was strongest amongst the public, but it was not completely foreign to some experts who held similar reservations. In addition to conservation goals and humaneness being important, individuals also want to apply a criterion of acting fairly. Fairness in the treatment of animals, as well as fairness in decision-making is important to people. For management actions, this suggests that policies should be discouraged from showing favoritism or discrimination to certain species or individual animals. Increasing public participation in decision-making may also help to establish how the benefits and burdens of these decisions should be distributed among both animals and people. Most recently, the lack of fairness in a management decision in Invermere, BC was tested in a BC Supreme Court case, where locals felt they were not adequately consulted about a deer cull (CBC News 2013).

We have also seen in BC that conflicting scientific evidence in wildlife policy (*e.g.*, trophy hunting of grizzly bears) can create different management recommendations that can conflict with one another and with society's concern for the well-being of individual animals. Thus, to create wildlife policy that balances societal values with both ecological and animal welfare science, we need to engage the public in a participatory process which is meaningful and

functional and not based on wildlife science alone. In fact, not doing so may actually put communities and wildlife managers at risk of legal action as seen in Invermere. ‘One-size-fits’ all wildlife management decisions may no longer be able to stand up in the court of public opinion.

7.4 Recommendations and Future Research

Specific recommendations from this thesis research serve to apply social values to the development of wildlife policy, integrating humane dimensions as a component of wildlife management decision-making:

1. Given the unrecognized harms posed by recreational wildlife feeding and a lack of policy consistency among municipalities, the *BC Wildlife Act* should introduce prohibitions against feeding and requiring attractant management for all wildlife species. These should be enforceable by any peace officer, thus allowing for bylaw officers and SPCA constables to participate in enforcement, as not all areas have Conservation Officers.
2. The *BC PCA Act* should be expanded to include free-living wildlife, to offer equal protections to the only remaining group of animals under human influence without such coverage, and meet society’s goals of fairness. This could provide the public with some reassurance that invasive and lethal management programs will have oversight with at least the same attention as the killing of animals for food or in research.
3. Wildlife managers and conservation officers should receive animal welfare science education to improve the humaneness of invasive and lethal practices, and be kept informed of new research on non-lethal or more humane alternatives (*e.g.*, Darimont, Reimchen, Bryan, & Paquet, 2008; Walker, Mellish & Weary, 2010). The considerable amount of suffering and death experienced in relocations and re-introductions, and the ineffectiveness of culling, are

examples found in this research, where increased awareness of their effects within wildlife agencies could benefit wildlife.

4. Public outreach about wildlife management should include measures on the humaneness of interventions, and employ the appropriate use of wildlife risk communications in the media. In this research, people were clearly unaware of the humane implications of releasing animals in a foreign location, and this ignorance appeared to lead them to disagree with killing. Hence, the gap between public and experts might be narrowed by public education on the effects of relocation and re-introductions, in addition to those of wildlife feeding.
5. Public participatory methods should be used to gauge to public values on contentious management strategies, not unidirectional websites; this may include the polling of the public, where surveys are representative of BC census populations to reflect, gender, geographic, wildlife experience and cultural variation. This thesis showed there is both an interest and a desire for engagement from the public on wildlife issues.
6. In cases where public polling may not be suitable, decision-making forums like the Provincial Hunting and Trapping Authorization Team should be open to other non-user stakeholder groups. Further, animal welfare stewards should serve on expert wildlife policy decision-making committees to represent the interests of wildlife. This would help address issues of fairness by giving wildlife representation in decision-making, respecting their inherent value irrespective of their ability to be used as a resource.

Future research should aim to measure the effectiveness of the above recommendations through tracking participation of stewards and non-user stakeholders on committees; monitoring the change in knowledge of wildlife practitioners and the public from outreach and education efforts; analyzing the frequency and tone of human-wildlife interactions reported in the media

over time; examining enforcement statistics of wildlife and cruelty laws; and by evaluating the use of public polling research as part of decision-making, and in turn, changes in the public trust of wildlife management.

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