A Tale of Two Cities, With Bears: Understanding Attitudes Towards Urban Bears in British Columbia, Canada

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Abstract

The management of black bears (*Ursus americanus*) in urban and/or exurban settings is of growing concern as these mammals, along with coyotes, cougars and others, begin to re-colonize areas from which they had been extirpated. Urban and exurban landscapes can offer much needed habitat to these space-demanding creatures, thereby buffering habitat losses in other areas and protecting populations of these species, but only if conflicts between these animals and humans can be managed and minimized. In the case of urban black bears, they can become quickly ladled as a "problem" bear if they become too reliant on human garbage or other food sources such as fruit trees. A bear in conflict with humans usually becomes a dead bear. In collaboration with the Northern Bear Awareness Society in Prince George, British Columbia, Canada, UNBC researchers undertook two surveys of Prince George over a three year period and a companion survey in the city of Coquitlam, BC to examine attitudes towards urban bears. The research found that residents of both cities, in spite of regular and close encounters with black bears, strongly supported the presence and preservation of bears within an urban setting, largely due to conservation concerns. Both communities were supportive of non-lethal control of bears in conflict with humans and supported the use of warnings and fines to discourage human behaviors that created human-bear conflicts over lethal controls. These findings offer support for municipal governments to reconsider approaches to urban bear management.

Keywords: black bear management, public attitudes towards wildlife, urban wildlife

Introduction

For an increasing number of us in urban areas, bears, along with other adaptable larger wildlife, are regular if sometimes unwelcome, neighbors (Smith, Nielsen and Hellgren 2014), visiting our yards, investigating our garbage, checking out our bird feeders or garages and sporting in our swimming pools (much like some human neighbors). While they very rarely harm humans, or do worse than scatter the garbage around (Belant, Simek and West 2011), their chosen urban lifestyles can be hazardous to the bears as their human neighbors can be quick to complain to wildlife control officers who often choose to euthanize a "problem" persistent urbanized bear.

However, many urban humans also value wildlife, although possibly more in the abstract, leaving municipal governments and conservation services to seek out more complex responses to concerns around urban wildlife, particularly when those concerns have roots in careless human behaviors. Urban bears usually come in to conflict with humans when humans leave out attractants or behave in risky ways (such as approaching or trying to pet or photograph undeniably cute but wild animals). To address urban issues, government agencies, depending upon their powers and jurisdictions, have a suite of management options available ranging from fines for leaving out attractants or harassing wildlife to destroying any bear found in an inappropriate setting. Determining what is inappropriate, however, can very much depend upon public perceptions, both in terms of acceptance of animals in the city and in terms of willingness to change behaviors to protect them. Those interested in conserving vulnerable wildlife (and all three species of North American bears may be at risk in what remains of their range) need to also understand what might motivate both the public and politicians to take steps towards preserving wildlife rather than viewing it as undesirable nuisances. Therefore understanding public perceptions has multiple utilities for bears, government agencies and wildlife NGOs.

At the 2012 invitation of the Northern Bear Awareness Society (NBAS) (www.northernbearawareness.com), a non-profit organization concerned with the sensible management of urban bears in the city of Prince George, British Columbia, Canada, researchers from the University of Northern British Columbia undertook a survey of community attitudes towards urban bears and their management. The NBAS was particularly interested in both understanding how city residents felt about the presence of urban bears but also in identifying public receptivity to management approaches reducing the number of urban bears destroyed annually. While the 2012 results suggested that the Prince George public might be receptive towards human management over bear euthanasia (Booth and Ryan 2016), the sample size was small. In 2015, therefore, researchers undertook a second survey in Prince George. A comparison survey was also undertaken in another BC city that also had urban bears but, in contrast with Prince George, was active in managing human behavior to limit conflicts with bears. Coquitlam, BC is also far more urban in both its locale and its sensibility, allowing researchers to assess if attitudes towards bears and bear management might vary along a rural-urban gradient, as research suggests (Draheim et al. 2013; Smith et al. 2014).

The issue around bear management is serious, both in Prince George and in British Columbia. NBAS data indicates that between 1998 and 2011, the BC Conservation Service annually receives around 1,000 complaints regarding bears in Prince George and destroys around 40

(NBAS n.d.). These numbers fluctuate substantially from year to year; 2010 saw, for example, 1,861 complaints and 85 bears destroyed, while the following year saw only 480 complaints and 12 bears destroyed. 2016 saw 40 bears destroyed, while in 2017 26 bears were euthanized (https://www.myprincegeorgenow.com/61931/volume-bears-put-pg-still-high-northern-bear-awareness-society/). Table One compares bear complaints versus bear deaths in Prince George over a 10 year period.

(TABLE ONE ABOUT HERE)

While the numbers of bears euthanized has decreased recently, Ciarniello (2008: 1) notes that Prince George had the highest number of bear complaints and bears destroyed in all of British Columbia (in 2017 close to 500 bears were destroyed province-wide (https://www.cbc.ca/news/canada/british-columbia/human-bear-conflict-1.4342785)). From both a conservation perspective and a humane perspective, the ideal goal would be no bears destroyed, however to reach this goal, both government agencies and the public would need to reconsider their choices. The Prince George Urban Bear Perceptions study was undertaken to determine if the Prince George public would change their behavior, which might then lead to government agencies changing their policies.

Literature Review

Wildlife managers have three overarching concerns regarding managing human-wildlife interactions: that human population growth and habitat alteration has increased exponentially; the growing gap between environmental problems and functional, affordable solutions; and that, as a consequence, the earth must be managed as a human-dominated system (Jochum et al. 2014: 2). At the same time, researchers suggest that North America is witnessing a reinhabitation of humanized landscapes by extirpated species (Don Carlos et al. 2009; Gore et al. 2008; Jochum et al. 2014; Merkle et al. 2014; Morzillo et al. 2010; Zajac et al. 2012). Fox and coyotes likely never left, but bears, cougars and even wolves (Jochum et al. 2014; Smith et al. 2014), are increasingly appearing in urban and suburban areas.

As the public finds itself sharing space with these charismatic and adaptable, but also scary and unpredictable, neighbors, often in close proximity, wildlife managers and municipal officials struggle to find management strategies that protect both human and non-human residents while recognizing a new public interest in preserving rather than exterminating former "varmints". Encouraging humans to co-exist with large animals is critical for preserving biodiversity: as Bruskotter and Wilson (2014) note, human tolerance is the most significant factor in determining whether larger mammals, including bears, will survive in a highly developed and humanized North America. Barusch-Mordo et al. (2014: 8) argue that,

> Because urban areas can attract bears in poor food years, a time when the population growth may already be stressed, removal of bears that use the urban environment could negatively affect the population locally or regionally…

Urban areas serve as "refuges" for vulnerable wildlife during lean years, although not if an increased urban presence also leads to increased mortality due to human-wildlife conflicts.

Research on urban/suburbanizing bears largely focuses upon black bears (*Ursus americanus*), a more common sight in residential areas than grizzly bears (*Ursus arctos horribilis*), although some communities have both. Black bears suburbanize due to the presence of reliable food sources (Barusch-Mordo et al. 2014; Belant et al. 2011), in particular easily accessible garbage (Don Carlos et al. 2009; Noel and Pipenaar 2017) or fruit. Paquet and McCrory (2012: 35) note that

> ...when we don't manage non-natural attractants, we provide a smorgasbord for bears and teach them to associate people with sources of food. Couple this with the knowledge that bears have amazing capacity to learn and remember, and that sows teach their cubs how to survive in all habitats, including settled ones, and the picture on how and why conflicts develop between bears and people...emerges.

One study has suggested that bears may be invading human habitat due to ecological change and habitat alterations, as in years with good forage bears use fewer human sources (Barusch-Mordo et al. 2014). Urban foraging areas might be reversed if outlying habitat offers good foraging, resulting in increased bear health and survival. However, some bears may prefer human foods due to evolutionary advantages. Montana bears, for example were found to have deliberately changed foraging activities to fully capitalize upon the high quality human foods available in urban areas, in this case apple trees (Merkle et al. 2013) offering a high quality food. The authors note other studies demonstrating that "urban" bears change morphologically as well, becoming physically larger, enjoying better reproductive success, shorter activity periods and shorter denning times than their wildland counterparts due to superior food sources. (The quantities of food potentially available are staggering: the United Nations Environmental Program estimates that in the US, 30-40% of the food supply is wasted, equaling more than 20 pounds of food per person per month; in Canada almost 51% of food ends up being wasted and thrown out; while this is a serious concern for the human world, it is a substantial bonus for urbanized bears (http://www.worldfooddayusa.org/food_waste_the_facts [downloaded May 2, 2015].)

Other factors of interest to urban bears include possible habitat. Evans et al. (2014) found that black bear conflicts in Connecticut suburbs were linked to the presence of significant forest cover (at least 42%) intermixed with housing and significant forest edge. Bears are not only a problem in suburban areas but in the increasing "suburban" rural areas nearby. Bear complaints in these areas are also increasing sharply, although this might only indicate a growing number of humans keen on countryside but surprised by the presence of larger wildlife (Belant et al. 2011).

In addition to being intimidating, bears can damage popular suburban/exurban crops, especially fruit crops and apiaries, as well as bird feeders, buildings and cars in a quest for food. Bears learn very quickly and adapt feeding strategies appropriately (Belant et al. 2011: 17). Belant et al. (2011: 41) note that the

> integration of human attitudes and perceptions in management strategies will first require improved understanding of human behavior, which in turn will allow prediction of human behaviors that could be modified through education and awareness to reduce bear conflicts.

Thus, it is important for local/regional governments and provincial/state conservation services to understand and develop the best options for building good neighbor relations between bears and humans, for the good of the bear populations and the humans they live adjacent to. There are two general approaches: control the bear or control the human.

Controlling bears is widely practiced, usually through targeting bears that are creating challenges, those thought to be a threat or a nuisance. Some jurisdictions trap and relocate nuisance bears. However, research suggests that relocation can be costly and ineffective (Don Carlos et al. 2009; Belant et al. 2011), and other jurisdictions euthanize such bears (often live trapping and euthanizing out of public sight). Other methods, such as increased legal hunting, may be equally ineffective (Obbard et al. 2014. Removing individual bears from the breeding population may threaten the survival of the species regionally in the short term and nationally in the long term. The alternative to controlling bears, controlling humans, is equally complex and not always successful.

There are two key approaches to changing human responses to bears. The first is changing human behavior creating nuisance bears, such as eliminating access to garbage or fruit. The second is changing human perceptions about bears being in human spaces. The success of the first approach can be dependent upon the success of the second approach: people may only change their behavior if they value bears.

Controlling human behavior is simple, humans are required to eliminate access to garbage, unharvested fruit, bird-feeders, or pet food. This is accomplished through common tools including municipal and regional bylaws and strict enforcement and severe fines. In reality such initiatives are usually unpopular with local governments due to cost and public disapprobation during short elective cycles (Noel and Pienaar 2017).

Some jurisdictions do actively encourage municipalities to develop bear appropriate policies. British Columbia runs a Bear Smart Community program, administered between the BC Ministry of Environment, the BC Conservation Foundation and the Union of British Columbia Municipalities (http://www.env.gov.bc.ca/wld/bearsmart [accessed April 30, 2015]). It is a

> voluntary, preventative conservation measure that encourages communities, businesses and individuals to work together...to address the root causes of bear/human conflicts, thereby reducing the risks to human safety and private property, as well as the number of bears that have to be destroyed each year. (Introduction: http://www.env.gov.bc.ca/wld/bearsmart [accessed May 15, 2015]).

Being a Bear Smart Community brings other advantages, a redrafted 2016 Ministry of Forests, Lands and Natural Resources Operations Wildlife Policy allows Conservation Officers wider latitude in finding solutions to "nuisance" bears in Bear Smart Communities beyond euthanasia (British Columbia Ministry of Forests, Lands and Natural Resources Operations 2016).

This is a laudable initiative, but it faces two challenges: municipalities see no net benefit outside of a "paper" designation and the efforts required to meet the criteria can be cost prohibited (Dave Bakker, NBAS, personal communication, April 15, 2015). Where local and regional

governments face budget challenges, the voters can justifiably object to a redirection of expenditures from more immediate concerns.

Downloading responsibility and costs onto citizens is also problematic. Barrett et al. (2014) conducted experiments in Florida around bear-proof residential garbage cans, including an expensive bear-proof model and a less expensive modification to existing containers. The introduction of both model and modification sharply reduced bear-human interactions (from 28.2% of residents sighting bears to only 3.2% due to the expensive containers and from 47% of residents sighting bears to less than 10% after six months and 0% after twelve months for the modified can). However acceptance of the expensive model was moderated by fears of increased personal costs for acquisition or handling fees. The low cost modification received enthusiastic support, but its use was limited by other factors. However, another study in Colorado (Johnson et al. 2018) demonstrated that deploying bear-proof garbage cans significantly reduced bear-human conflicts and made residents more likely to comply with garbage ordinances (39% more frequently, which grew to a 60% increase over time). The new cans also increased public support for both bear management and human management efforts through required bear-proofing, suggesting that pre-emptive government action could create a feedback loop supporting government action.

To understand public willingness to bear-proof neighborhoods, and perhaps encourage government action, attitudes towards bears must be understood and managed, but this is complex. Human-wildlife encounters encompasses both social and ecological components and the inter-relationship between the two (Jochum et al. 2014: 2). Bears can be the darlings of the teddy-bear owning public, many viewing black bears quite positively, given their anthropomorphic appeal and low incidence of fatalities (grizzlies might be a different matter) (Gore et al. 2006). Studies demonstrate a prevalence of positive feelings towards bears (British Columbia - Booth and Ryan 2016; Colorado - Don Carlos et al. 2009), especially in comparison with mammals like wolves and cougars (Illinois - Smith et al. 2014).

Other studies suggest that demographics may affect perceptions of wildlife including bears. Urban residents appear more supportive of the presence of carnivores than rural residents (Draheim et al. 2013; Smith et al. 2014). This appears linked to actual experience, for example urban residents with little exposure to predators were more positive in their perceptions than rural residents with presumably greater experience. However, other studies also demonstrate that when urbanites actually experience predators (coyotes in Chicago, Illinois, for example or wolves in Norway), their attitudes became negative and they did not want them near their home (Smith et al. 2014).

Higher levels of education (Smith et al. 2014), masculine gender (Siemer at al. 2009), and younger ages (Morzillo et al. 2010) have also appear to correlate with more positive views of bears. However, other researchers suggest it is personal values that are critical in developing a tolerance for bears (Heneghan and Morse 2017). Siemer at al.'s (2009) literature review found that a number of factors might impact beliefs around bear encounters, including pre-existing value orientation (someone who already values wildlife or perceives a benefit is more likely to

tolerate a species), as well as personal experience (those with experience around bears worry less and tolerate their presence more).

Related research suggests that particular perceptions of predators in general and bears in particular are linked to associated perceptions of benefits and risks (Bruskotter and Wilson 2014). Benefits that include the social and ecological benefits of predators, are particularly critical to underpinning positive attitudes towards black bears: the greater the perceived benefit, the greater the tolerance for bears (Zajac et al. 2012). Knowledge of a species appears to offset perceptions of risk (Bruskotter and Wilson 2014; Zajac et al. 2012), as knowledge creates an increasing ability to control encounters. Thus, tolerance for a species is linked to perception of risks contingent upon appropriate information (knowledge) being provided through. Bruskotter and Wilson (2014) note that the public must perceive the benefits of a species that poses a risk; messaging that presents both risk and benefits associated with a predator is to be preferred to that only highlighting risks. Thus positive media coverage that emphasized the rarity of human fatalities due to black bear attacks can offset coverage of a bear fatality (Siemer et al. 2009), suggesting that even an extremely negative bear event could be mitigated through education and information (Gore et al. 2005). However, education alone does not reduce a sense of risk (Gore et al. 2006), rather it is actual experience with bears that decreases a perception of risk, although on the downside such comfort could increase actual risky behavior

A final significant factor facilitating acceptance is trust in the agency managing bears. Such trust lowered perceptions of risk and increased acceptance of bears (Bruskotter and Wilson 2014; Heneghan and Morse 2018; Zajac et al. 2012).

Other research has considered the linkage of knowledge with the choice of bear management strategies. In recent years, the public has come to prefer management strategies that are proactive (managers take steps to prevent bears from turning in to problems in the first place through education and information campaigns) over reactive (dealing with specific bears one on one) (Merkle et al. 2011). However, preferences can vary based upon a specific community's attitude towards bears as well as the situation (i.e. what the bear does) (Don Carlos et al. 2009). Other studies have found that education has limited success in changing peoples' behavior around bears, such as changing how garbage is stored or on keeping bird feeders or compost piles (Gore et al. 2008; Merkle et al. 2011).

However, if this literature review appears to presents contradictory findings, it supports a more substantive literature review by Johansson et al. (2016), which failed to find any conclusive evidence that education or information campaigns, experience with bears or participation in management strategies actually influenced peoples' fear about bears one way or the other. Despite such contradictory findings, municipal governments and conservation services, as well as wildlife advocates, still need to gain some insight into possible tools to manage the urbanized bears roaming their community. If urban neighborhoods do provide critical bear habitat in an overly humanized landscape, to protect bear populations limiting bear-human conflicts is a necessary and time-sensitive task.

Methods

The Prince George (BC) Urban Bear Perceptions study sought to determine if the public was willing to change their behavior around bears, possibly encouraging government agencies to change their bear management policies. Prince George is located in the north-central region of BC, and is largely a primary resource extraction and processing economy, reliant upon timber production, mining, and energy development, with a population of about 74,000. While urban, it is surrounded with rural and wild areas, and possesses extensive greenbelts in many residential neighborhoods providing corridors into the city for moose (*Alces alces*), cougar (*Puma concolor*), coyotes (*Canis latrans*), black bears (*Ursus americanus*) and occasionally grizzly bears (*Ursus arctos horribilis*).

Two surveys were undertaken. In the first 2012 survey, the intent was to develop a preliminary small, non-generalizable sample generally representative of different geographical sections of the city (with differing socioeconomic characteristics) and with different levels of likely experience with bears. The survey was conducted through door to door surveying. Two hundred and twenty two contacts were initiated with 71 questionnaires completed (32% response rate). While results suggested that residents felt positively towards urban bears and supported increased management of human activities rather than euthanasia of bears in conflict with humans (Booth and Ryan 2016), the sample size was too small to reach useful conclusions. Therefore in 2015, a second survey was undertaken.

The 2015 survey had two changes (although the 2012 and 2015 survey questions remained comparable). First, the second survey was targeted solely to residents in areas with known bear sightings. Second, after discussion with the NBAS, a companion survey in the city of Coquitlam, BC was run. Coquitlam also lives with a significant urban bear population with similar levels of complaints, although far lower euthanasia rates. In contrast with Prince George, Coquitlam is larger, very urban (in the greater Vancouver area) and urbane, with a wealthier and better educated population. Its municipal government also elected to practice Bear Smart protocols beginning in 2006 and in 2017 became a formally recognized Bear Smart Community. It was felt that comparing the views of the two populations would offer greater insight in to the Prince George results.

Both surveys utilized close-ended and open-ended questions, examining experiences with and knowledge of bears, frequencies of encounters, perceptions of bears, and whether socio-economic factors or different types of bear experiences affected perceptions of bears or of different management options, including managing bears and managing human actions. The survey also collected demographic data (gender, age, education, and presence of children).

In determining the samples, researchers did not attempt a representative sample based upon a subset of the Prince George and Coquitlam populations (74,003 and 189,284 respectively in 2016), due to mailing costs and limited funds. Working with online satellite photo-based maps of each city, neighborhoods were identified as "bear intensive" based upon the presence of habitat (within a 10 block proximity to green space or water) and by records of bear sightings occurring between 2012 and 2015 (BC Conservation Service). The selection was stratified, including a variety of socio-economic conditions. Within each neighborhood, mail routes by street were randomly selected and houses received a letter inviting participation in an online survey. Seven

hundred invitations were delivered in each city, for a total of 1,500 invitations. In Prince George, 20 mail routes were selected with a total of 5,313 houses possible as a sample. In Coquitlam, 46 routes were selected, with a total of 12,261 houses possible as a sample. The data was collated in an Excel data sheet.

Between the two Prince George surveys, 25 distinct neighborhoods in Prince George, in all sections of the city, and 13 distinct neighborhoods in the northern sections of Coquitlam were included in the survey initiative. Responses were not equitable across all neighborhoods. Although the sample was not fully representative of either city, it was as relatively inclusive as possible in its sampling.

Content analysis through hand coding was performed on all open ended questions. On closed ended questions, one-way tables were examined for data entry errors. The demographics and response to bear related questions were compared between cities using the $\chi 2$ test for independence for two-way tables, and where appropriate, Fisher's exact test for two-way tables. Three way tables were examined for differences in relationships between demographic variables and responses to bear related questions by city. Given the nature of the study, a level of significance of 5% was used to assess the significance of the relationship between variables.

Results

In Prince George there was a response of n = 137 (19.5%), while in Coquitlam there was a response of n = 133 (19%). Some responses might have been lost when the survey platform fault stopped completion of some surveys. Almost equal numbers of men and women participated in both cities. Demographically, responses trended as hypothesized. In Prince George, more respondents reported a rural background. Levels of education completed were higher in Coquitlam, but not extraordinarily so. Both cities were similar in terms of residing in the area for between 5 and 10 years. There were significantly higher numbers of people in Prince George who reported hunting, fishing and camping. Both cities reported relatively high levels of hiking activity. More residents in Prince George had children under 18 years living at home and had outdoor pets, but not significantly so. Both cities grew a lot of fruit trees. These findings are very reflective of what was expected across the two cities.

Where there was a significant difference was in reported knowledge about bears. More than 60% of Prince George respondents reported their knowledge levels as high or very high, while in Coquitlam 36% rated their knowledge as high or very high. Ninety percent in each city thought they understood what attracted bears, including garbage (Prince George 96%, Coquitlam 98%), garbage put out too early on collection day (Prince George 87%, Coquitlam 85%) and unsecured compost (Prince George 86%, Coquitlam 77%). However more people in Prince George (98% versus 88% in Coquitlam) understood that not picking fruit was a problem while significantly more people in Prince George (94%) than in Coquitlam (66%) understood the attraction of bird feeders.

There was one last set of perceptions measured: comparing levels of fear between encountering black bears, grizzly bears, cougars, and moose. Almost all respondents feared cougars more than the other animals. Almost all respondents feared grizzly bears more than black bears. On the

question of moose versus bear, both cities were split 50-50 on which was more frightening (moose are capable of attacking humans).

Several questions examined people's actual experiences with bears. A majority of respondents in both cities saw bears during the survey year. Most reported that they saw bears only occasionally, but the majority of respondents also saw them in close proximity. More Prince George respondents reported seeing bears in 2015 than in 2012, which would reflect the 2015 focus in bear intensive neighborhoods.

Table Two. Bear Sightings in Prince George (2012 & 2015) & Coquitlam (2015)

2012/2013 Prince George	2015 Prince George	2015 Coquitlam
52% saw a black bear during the survey year	71% saw a black bear in the survey year	95% saw a black bear in the survey year
79% said sightings were occasional	76% said sightings were occasional	63% said sightings were occasional
35% who saw bears saw them on their property	48% who saw bears saw them on their property	72% who saw bears saw them on their property

A significantly larger number of respondents in Coquitlam reported seeing bears. The frequency of bear sightings is not significantly different between the two cities. However, Coquitlam results suggest that they sight bears more frequently, specifically on garbage pickup day (24%), whereas Prince George observed less such coincidence (11%). Indeed, bears seem to have been far more visible in Coquitlam than in Prince George, while doing a number of different things: being spotted in the respondent's yard (Prince George 48%, Coquitlam 72%), being spotted in their neighbor's yard (Prince George 19%, Coquitlam 52%), and being spotted close to home (Prince George 50%, Coquitlam 78%). Spotting bears far away from home, and getting in to the respondents' garbage is greater in Coquitlam (Prince George 16%, Coquitlam 38%). Coquitlam also saw slightly more evidence of bears (69% occasionally, 23% often) than Prince George (56% occasionally, 23% often), but both saw the same amount of bear scat. While both cities have low levels of bears bringing garbage in to their yard (Prince George 13%, Coquitlam 30%), it is higher in Coquitlam. The only place where Prince George has greater issues is with bears getting in to bird feeders (Prince George 18%, Coquitlam 3%). Both cities were clear that they saw more bears doing no harm (Prince George 47%, Coquitlam 78%) than doing damage (Prince George 22%, Coquitlam 38%).

Respondents were asked if they felt positively or negatively about seeing a bear in various locations.

Table Three. Feelings About Bear Sightings in Prince George (2012 & 2015) & Coquitlam (2015)

2012/2013 Prince George	2015 Prince George	2015 Coquitlam
Seeing a bear in neighborhood	Seeing a bear in neighborhood	Seeing a bear in neighborhood
44% positive; 18% negative	36% positive; 28% negative	53% positive; 23% negative

Bears being in the city	Bears being in the city	Bears being in the city
49% positive; 14% negative	48% positive; 23% negative	58% positive; 18% negative

Bears are clearly appreciated in both cities but both cities preferred them somewhere else than directly in the neighborhood. Coquitlam is significantly more appreciative of both the neighborhood bear and the bear in the city, which is striking as more Coquitlam respondents report actually seeing bears. Prince George seems less positive about seeing bears in 2015 than in 2012 (but the 2015 survey did occur in bear intensive neighborhoods).

Comments from the survey offer more nuance on why people might be positive or negative:

> Mixed feelings. It's interesting to see them, they are a part of our forested environment but I'm a bit concerned at times when they are close to the elementary school and close to city park users. *Prince George*

> There are lots of bears in the area around Prince George, bears were here long before Prince George was, and we chose to build our homes where there are bears. So bears are a natural part of living in Prince George. *Prince George*

> I regret that bears in the city are subjected to such negativity. People and officials tend to take the most negative attitude towards their presence, thus the most aggressive actions are usually taken to remove the supposed threat. I therefore would not like to have the bears in the city because of this over reaction and negative manner which the bears are subject too. *Prince George*

> They need some where to go. I am not a fan of them being on my doorstep. But understand that they are looking for food and we take over the woods as they take over the city. *Prince George*

> Scared and afraid that they may be harmful to us especially to my children one day. *Coquitlam*

> We always get excited. We treat them with respect. I feel not too threatened because I feel if a bear gets all the way to my house they must have some street smarts and avoid humans. *Coquitlam*

> Life threatening given this is a wild animal and unpredictable. Family members are fearful of spending time outside being afraid a bear would suddenly appear behind them. *Coquitlam*

Some negative feelings appear associated with the perception of the risk bears potentially pose, especially to children. Others acknowledge that bears are often present due to human encroachment into habitat. An analysis of the comments regarding feelings about the presence of bears supports the quantitative data, but suggests that some "negative" feelings are associated less with the presence of bears and more with concerns over the bears' safety. Other comments suggest that the bears are not the problem, but the humans who behave poorly through making garbage available are the real issue.

Given the finding that many respondents feel positively about the presence of bears, it is not surprising that many choose not to file a report on their presence with the Conservation Service.

Table Four. Reports on Bear Sightings to Conservation Services in Prince George (2012 & 2015) & Coquitlam (2015)

2012/2013 Prince George	2015 Prince George	2015 Coquitlam
38% of those seeing bears made a report	27% of those seeing bears made a report	26% of those seeing bears made a report

It is notable that, while more respondents from Prince George reported seeing a bear in 2015 than in 2012, the number of reports dropped significantly to close to the level of Coquitlam. It is also worth noting that despite the data suggesting Coquitlam respondents enjoyed seeing bears more than those in Prince George, that greater dislike in Prince George did not influence reporting rates. The comments clarified this finding as many in Prince George chose not to file a report as they feared it would lead to the bear's euthanasia, suggesting that feelings about the presence of a bear may not fully influence the acceptance of lethal control measures.

This result is also explained by responses to a question on whether respondents felt that bears had value (without specifying the value). In Prince George 97% of respondents agreed bears had value, as did 95% of Coquitlam respondents. Both cities highly value bears, as the comments make clear:

> They are an important and most likely not entirely understood component of a healthy ecosystem. To lose them entirely would be a disaster. To see their numbers reduced from natural levels would negatively impact the biodiversity of the province. *Prince George*

> Bears are an integral part of the natural tapestry of our area - they are part of the intricate circle of life here. It can be scary, but it is also a treat and a pleasure to catch sight of a bear. We all need to share the space. *Prince George*

> I feel we all must learn to live with them. As long as developers are allowed to develop irresponsibly without regard for the environment or the wildlife there will be more bears. Their habitat must at all costs be protected. *Coquitlam*

We examined this response through three way tables with regard to demographics, and found no difference in feeling bears had value based upon gender. Nor did we find any difference across activities, hikers (93%) were as supportive of bears as were those who hunted (93%).

If bears are valued in Prince George and Coquitlam, but cause either problems for people or concerns around safety, how should issues with urban bears be dealt with? As suggested by the literature, we asked questions around the two options, controlling the humans or controlling the bears. We asked about support for three options (collapsed in 2012 into two): issuing warnings for creating attractants (i.e. unsecured garbage, unpicked fruit trees) or actually issuing a fine. We also asked specifically about the most serious attractant, unsecured garbage.

Table Five. Support for Restricting Human Actions in Prince George (2012 & 2015) & Coquitlam (2015)

2012/2013 Prince George	2015 Prince George	2015 Coquitlam
24% supported warnings or fines for creating attractants	82% supported warnings for creating attractants	82% supported warnings for creating attractants
	57% supported fines for creating attractants	64% supported fines for creating attractants
23% supported restrictions on accessible garbage	53% supported restrictions on accessible garbage	66% supported restrictions on accessible garbage

In both cities, there was very strong support for issuing warnings for creating attractants, 82% in favor in both cities. In Prince George this represents a significant increase in support over the 2012 survey (although that was complicated by including fines in the question). There is less support for issuing actual fines, however there is a significant majority in support in both cities. Oddly, there was also less support for creating actual restrictions around storing garbage (likely due to cost) but still a substantive majority in favor in Coquitlam and slightly less in Prince George. The Prince George response, however, indicated a very substantive increase in support for both fines and garbage restrictions over 2012 responses.

The second set of responses we examined were around controlling bears in urban settings either through trapping and relocating or by euthanasia.

Table Six. Support for Controlling Urban Bears in Prince George (2012 & 2015) & Coquitlam (2015)

2012/2013 Prince George	2015 Prince George	2015 Coquitlam
20% supported relocating a problem bear	58% supported relocating a problem bear	62% supported relocating a problem bear
20% supported killing a problem bear	23% supported killing a problem bear	14% supported killing a problem bear

The results demonstrated a significant level of support for relocating the bear in question, with relatively little difference between the two cities. In Prince George, there was a substantive increase in the level of support for relocation over 2012 support.

Conversely, there was little support for euthanizing bears, although Coquitlam showed far less support than did Prince George. Support for euthanasia rose slightly in Prince George between 2012 and 2015, but support remained less than a quarter of all respondents. When we examined demographics through three-way tables, we saw no difference in views of euthanasia on the basis of gender, age, income or education. Nor was there any difference based upon activity, hunters were as limited in their support for euthanasia as non-hunters.

A content analysis of the comments suggested a nuanced view of the realities around euthanasia, both acknowledging the need to deal conclusively with the risk presented by human habituated bears and an awareness of the politics surrounding such a decision.

> Bears can be dangerous. They are smart and if they become aggressive, they need to be dealt with…Relocation does not always work. Death is often the only way to keep people safe. Sadly. *Coquitlam*

> When a problem or injured bear HAS to be killed, it has to be killed. Far too often that isn't necessary. Sometimes they (specifically black bears) are treated as if they are so plentiful, it doesn't matter if a few dozen or more are shot by conservation officers, but my guess is that if a Kermode [white-phase bear] bear (for example) was a 'problem' in a neighborhood, all efforts would be made trap and relocate it. Habituated bears are human caused and as such we need to take the responsibility for that...and that responsibility is relocation NOT killing. *Prince George*

> A distinction needs to be made between a problem bear and a dangerous bear. The criteria for such a distinction has to be the behaviour of the bear and the real danger to people. A bear in the garbage is not necessarily a dangerous bear, even repeatedly. I suspect that most bears that are destroyed are done so out of convenience, political considerations, or economics. *Prince George*

> Bears are predators and having them within the City limits is an accident waiting to happen. The City should be proactive in having them removed and culling their numbers. *Prince George*

Given the reluctance to support controlling bears in conflict with humans through euthanasia and substantive support for controlling human behavior, did this translate in to actual reported behavior by respondents? It appears that this is the case, although the choices vary on what behavior is controlled.

Table Seven. Taking Personal Measures to Reduce Bear Attractants in Prince George (2012 & 2015) & Coquitlam (2015)

2012/2013 Prince George	2015 Prince George	2015 Coquitlam
80% control attractants	87% control attractants	93% control attractants
73% control their garbage	53% control their garbage	65% control their garbage
18% pick their fruit trees	41% pick their fruit trees	44% pick their fruit trees
10% control bird feeders	21% control bird feeders	30% control bird feeders

The vast majority of respondents in both cities took personal measures to restrict attractants that attract bears, and only slightly more in more bear-positive Coquitlam. However, not as many took steps to restrict access to garbage as might have been predicted in either city. Indeed fewer Prince George respondents controlled access to garbage in 2015 than in 2012. There were moderate, but significant efforts to control other attractants such as fruit left on trees and bird feeders. When we examined demographics through three-way tables, we saw no difference in a

willingness to limit bear attractants on the basis of gender, age, income or education. Content analysis of comments suggested that controlling attractants was motivated more by concern over the bears rather than risks created, although that too was a factor.

> Angry that people are so irresponsible as to leave garbage outside for the bears to get at. People cause problem bears. *Prince George*

> Amazing to see these animals in my environment. Also, nervous about having conflict between bears and humans. Very afraid that the bear(s) in my neighbourhood are being habituated to garbage and will need to be destroyed. *Coquitlam*

> The neighbors that cause all the bears to move into the area with their irresponsible garbage habits should be fined into the thousands for repeat offences. Our neighbor has no regard for our safety as we have to try to navigate the bears in her trash a few feet from our walkway and car. *Coquitlam*

> I don't want any bears to die because of my carelessness. *Coquitlam*

Discussion

The questions that prompted the Prince George Urban Bear Project and its two sets of surveys addressed what could be done to reduce the extraordinarily large number of largely black bears being destroyed in Prince George annually. While the BC government has not yet determined that black bears are at risk in the province (although 2017/2018 regulations protecting grizzly bears have passed. While black bears in particular are versatile and adaptable (as exploiting suburbia and exurban areas demonstrates), the population does need space and resources to thrive. As biologists have demonstrated (Barusch-Mordo et al. 2014; Bruskotter and Wilson 2014; Merkle et al. 2013), in the face of eroding wild habitat, urban greenspace can offer critical advantages to struggling species. Bears (and other large mammals) can hardly be faulted for taking advantage of usable habitat and food resources at a time of need. But fault them we do, with lethal consequences. As of May 2017, 161 bears had already been killed across British Columbia (Northern Bear Awareness Society n.d.), and there are questions about the level of support for bears in suburbia:

> Bears are magnificent animals and part of our ecosystems. To not have bears would be tragic. They should be supported in the wild! Not within municipal boundaries. *Prince George*

Understanding how people feel about resident wildlife such as bears is critical to determining appropriate responses by municipal and wildlife officials. While neither the 2012 or the 2015 survey numbers are large enough to be definitive or fully model our sample cities, they are strongly suggestive. While there were some differences between results in 2012 and 2015, possibly reflective of the 2015 survey focusing upon bear intensive neighborhoods, the results are congruent enough across space and time as to suggest reasonable confidence in the reliability and generalizability of the results. The key finding from both years is that Prince George is less hostile to its urban ursine neighbors than is often assumed, that the city's attitudes are not that different from Coquitlam, which has been managing human behavior around bears for over a

decade and, therefore, it is very likely that the Prince George public may be receptive to government management of human behavior that creates conflicts with bears.

Respondents in both cities see bears near their residence. Almost all the Coquitlam respondents saw a bear, as did about 70% of Prince George respondents (up from 2012), although most sightings were occasional. While the encounters are close to home (72% in Coquitlam saw bears on their property, while less than half in Prince George did), but for the most part these encounters were harmless (22% of Prince George reported harm, while 38% of Coquitlam reported harm). However, almost 100% of respondents from both cities valued these bears.

Unlike other studies, but similar to our 2012 findings (Booth and Ryan 2016), we found no evidence that the demographic characteristics suggested in the literature, such as gender, age, levels of general education or income (Draheim et al. 2013; Morzillo et al. 2010; Siemer at al. 2009; Smith et al. 2014) impacted perceptions of bears or of management strategies. We also found no real link between actual knowledge of bears increasing tolerance as other research suggests (Bruskotter and Wilson 2014; Zajac et al. 2012), rather we found greater tolerance within the public citing less knowledge of bears. However, actual experience with bears (Gore et al. 2006) may be a factor in increasing tolerance in our study, as the more experienced community, although less knowledgeable, was more tolerant. This research did, however, support findings that cognitive links, such as feeling that bears had value, were important (Bruskotter and Wilson 2014; Heneghan and Morse 2017; Siemer at al. 2009; Zajac et al. 2012), and suggests that this may be a key factor in support for bear conservation, if not in making people feel happy about finding bears on their doorstep (Smith et al. 2014).

We found limited evidence that perceived risks (Bruskotter and Wilson 2014) affected the perceived value of a bear. Both cities were aware that bears pose risks, but bears were still valued. The perception of risk might influence the tolerance for the proximity of bears as respondents from both cities liked the idea of bears in the "city" (Coquitlam 58%, Prince George 48%) although somewhat less in their yard or their neighborhood (Coquitlam 53%, Prince George 36%). This can be contrasted with views towards other "risky" species. Prince George also has an urban moose (*Alces alces*) population. The bear study demonstrated that both study cities were split 50%-50% on whether moose or bears were more dangerous. However, an earlier study in Prince George on attitudes towards moose (McDonald et al. 2012) found that, while residents of Prince George were aware of the risks moose could pose to humans, the vast majority (92%) enjoyed seeing moose in an urban setting even in the face of aggressive encounters or increased traffic accidents. This is in significant contrast to how much people enjoyed seeing bears in their neighborhood (36%). Moose can pose a significant danger to careless humans, possibly equivalent to bears, but clearly people are more comfortable with herbivores, no matter how large, versus creatures with fangs and claws.

Although respondents were not overwhelmingly in favor of bears in an urban/suburban setting, nonetheless, almost 100% of respondents, in both study cities, valued bears, for themselves and for their ecological roles. This approbation did translate in to tangible support. Despite relatively high numbers of bear sightings neither city rushed to report these sightings, slightly over a quarter of respondents in either city had called the Conservation Service as most feared that the

bears would be euthanized. Further, residents of both Prince George (87%) and Coquitlam (93%) have a very high level of activity controlling bear attractants, although less control their garbage Prince George (53%) and Coquitlam (65%). This is a substantial percentage willing to do the work necessary to protect bears, whether tolerating their presence without complaint or finding means to secure their garbage. While it is surprising that so many in Coquitlam do not, despite significant fines and enforcement, it is more surprising that so many in Prince George do control their garbage without major fines or enforcement.

The survey results also demonstrate significant support for their respective municipality taking action to control human misbehavior. Eighty-two percent of respondents in both cities supported issuing warnings for people creating attractants, such as unsecured garbage. Respondents were less enthused about actual fines (57% in Prince George supported fines compared with 64% in Coquitlam). However, there is relatively little difference between the two cities, although Coquitlam has existing substantive fines and enforcement (being a Bear Smart Community) and Prince George has limited fines and low enforcement. With over half of respondents supporting the use of fines, and over half supporting serious restrictions on accessible garbage, there is an opportunity for considering policy changes in Prince George. The support for changing human behavior is coupled with a genuine reluctance to euthanize a bear; only 24% in Prince George and 14% in Coquitlam supported euthanasia and only, given the comments, when the bear was a serious threat to humans rather than simply being a nuisance.

Such interest could be built upon in Prince George through developing support for controlling human actions that impact upon urban bears. There appears to be an unspoken assumption that, unlike a city like Coquitlam, with an urban and less utilitarian sensibility, Prince George would not be as receptive or willing to embrace the challenges of moving towards Bear Smart Community status (one attempt, in 2008, was not followed through). However, this research has demonstrated that there is not a significant difference in attitudes towards bears between the two cities. In both, people really value bears. In Prince George, there is a quite nuanced and sophisticated view of the value of a bear.

> Bears are an integral part of the natural tapestry of our area - they are part of the intricate circle of life here. It can be scary, but it is also a treat and a pleasure to catch sight of a bear. We can't assume to fully realize the roles that bears play in nature (for the most part, the roles that all living things play, and their interactive web, is beyond human knowledge/comprehension). We all need to share the space. *Prince George*

> Simply having all of the animals and plants that we're supposed to have (pre wildlife mis-management) is obviously an ecological plus. Where bears are, they are an important and most likely not entirely understood component of a healthy ecosystem. To lose them entirely would be a disaster. To see their numbers reduced from natural levels would negatively impact the biodiversity of the province. *Prince George*

Conclusion

> Every creature has value and has as much right as we do to exist. We all lose when we can't cohabitate. *Prince George*

While the research could not demonstrate any support for most of the theories posited about what does increase peoples' support for bears, especially urban bears, it did demonstrate support for the theory that it is cognitive factors that increase support. If people value bears they will act to support bears. Experience of bears, in this research, seemed to increase that valuing. While this is not to suggest that municipal officials should encourage human-bear encounters, it does suggest that, the simple presence of urban bears is not in and if itself a bad thing. Rather, as urban greenspace is increasingly essential to long-term wildlife survival, municipal officials should take seriously the need to focus upon controlling human behavior. Assuming that there will be opposition and choosing therefore not to act might not accurately reflect the views of community members and may instead be a lost opportunity to ensure the long term survival of the creatures that share the space with us.

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Table One. Bear Complaints and Bear Mortality in Prince George, BC 1994-2015

(Northern Bear Awareness Society, used with permission)

Prince George Bear Data 1994-2015