Kananaskis country's road to coexistence: exploring expert perceptions of roadside bear viewing and management strategies

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In North America, bear viewing is becoming increasingly popular with visitors to parks and protected areas. In the face of heightened visitation pressures in parks, the phenomena of roadside bear viewing poses risks to humans and wildlife. A related challenge is the formation of "bear jams," which is traffic congestion caused by people stopping or slowing down to view bears. Using Peter Lougheed Provincial Park (PLPP) in Kananaskis, Alberta, as a case study, we examined the gaps in our understanding of roadside bear viewing from a human dimensions approach. To gain insight into management strategies, risks, and observed human behavior associated with roadside bear viewing, semi-structured interviews (n=22) were conducted with expert participants, including park staff members, non-profit organization employees, and biologists. Responses emphasized the need for consistent messaging and better communication regarding respectful roadside bear viewing behaviors, and recommendations for specific forms and methods of communication. Results of this study indicate that a holistic and adaptive approach could mitigate roadside bear viewing risks while also balancing conservation and recreation goals. Among the key contributions of this study is its insight into roadside bear management and viewing from a social sciences and human dimensions perspective

KEYWORDS

human-bear conflict, bear viewing, grizzly bear, park management, wildlife tourism, Alberta (Canada), expert interviews, human-bear coexistence

1 Introduction

In North America, wildlife is playing an increasingly important role in the tourism industry. Tourists are seeking wildlife viewing experiences in their natural environment, resulting in growing attendance at locations that offer such experiences (Tisdell and Wilson, 2002; Newsome et al., 2005; Rodger et al., 2007; Newsome and Roger, 2013). In 2022, the global wildlife tourism market was estimated to be worth US$ 135 billion, with an

anticipated compound annual growth rate of 5% from 2022-2023 (Future Market Insights, 2022). of wildlife tourism, however, is associated with direct and indirect environmental, social, and economic impacts on humans and wildlife (Boyle and Samson, 1985; Green and Higginbottom, 2001; Reynolds and Braithwaite, 2001).

Black bears, grizzly bears, and polar bears are among the charismatic species in North America that attract tourists seeking wildlife viewing opportunities (Skibins et al., 2012; Nevin et al., 2014). In North America, bear viewing is found in both protected and non-protected areas and occurs at permanent and temporary viewing sites. Permanent viewing sites offer vantage points where bear sightings are predictable, such as salmon-bearing streams where bears feed, whereas temporary viewing sites offer more opportunistic viewing experiences where bears are known to frequent (Penteriani et al., 2017). Many temporary viewing sites include roadways that intersect bear habitats, and are often found in protected areas (Gunther and Biel, 1999; Haroldson and Gunther, 2013). Despite some roadside wildlife viewing opportunities being predictable, these viewing opportunities are not always spatially or temporally precise. Sows (females) with cubs are more common than boars (males) at road-accessible viewing areas, as sows are typically less transient and more active during the day (Ordiz et al., 2007; Penteriani et al., 2017).

In the front ranges of the Canadian Rockies, bear viewing— often roadside—is a common occurrence (Garshelis et al., 2005; Harding, 2014; Alberta Jobs, Economy and Innovation, 2017; Elmeligi et al., 2021). Wildlife viewing is a known draw for international and regional tourists. In 2017, wildlife viewing ranked as one of the top five activities for domestic tourism in the Rocky Mountains of Alberta (Alberta Jobs, Economy and Innovation, 2017). The formation of "bear jams"—traffic congestion caused by people stopping or slowing down in a vehicle to view bears (Gunther and Biel, 1999; Hopkins III et al., 2010)—is a significant management challenge throughout parks in the Canadian Rockies, including Peter Lougheed Provincial Park (PLPP).

Elements that influence bear viewing tourism include geographic location, park access, visitor demographics, presence of information centres or facilities, accessibility to online or in-person messaging, park history/culture, budgetary constraints, management strategies, the protected status of species, and the presence of enforcement (Reynolds & Braithwaite, 2001; Richardson et al., 2014; Taylor et al., 2014). This complex list of factors highlights the need for tailored approaches to planning and managing human-wildlife interactions in protected areas. While each park faces its own unique challenges when it comes to bear viewing, there are also issues related to human-bear management that are common across organizations.

Understanding human perceptions of wildlife management can provide park managers with insights into how particular management approaches are perceived. Integrating such knowledge into management can increase implementation success (Reynolds and Braithwaite, 2001). This research stems from Pumphrey's experience working for Alberta Parks in PLPP and her observations of challenges relating to roadside bear viewing,

including inconsistencies in public messaging and staff burnout due to the amount of time and resources spent responding to roadside bear viewing. Since the COVID-19 pandemic, Kananaskis Country has experienced record visitation numbers, with over 5.3 million visitors in 2020 (CBC, 2021). Visitor demands for bear viewing experiences in PLPP are placing increasing pressures on park staff to find a balance in managing human-bear coexistence in the park. The goal of this study was to gather human dimensions data on roadside bear viewing and related impacts to offer practical management approaches for PLPP and other parks facing similar challenges.

2 Materials and methods

2.1 Study site

The Bow Valley corridor, including Kananaskis Country, has been described as an area with one of the highest levels of human activity in Alberta where grizzly bears still live on the landscape (Alberta Environment and Parks, 2018). Alberta is separated into seven Bear Management Areas (BMAs), each of which has been identified as a unique social and ecological region for bear conservation. PLPP lies within BMA 5 in the region of Kananaskis, a provincially managed area home to 51 parks with various land-use designations and protected statuses (Alberta Parks, 2020). There are approximately 50–75 grizzly bears in Kananaskis Country—the number fluctuates due to the range and movement of the species (Alberta Environment and Parks, 2006).

Since gaining protected status in the late 1970s, there have been identified shifts in bear management approaches in the Kananaskis region. In the 1990s, park management shifted from an emphasis on recreation to a greater focus on conservation. This was followed by a shift in the 2000s from a bear-centered focus to one with a broader human-wildlife-conflict approach (Carruthers Den Hoed et al., 2020). Not surprisingly, the growing grizzly population in Kananaskis has correlated with a growing number of human-bear interactions, many of which occur roadside (Garshelis et al., 2005; Alberta Environment and Parks, 2022). In 2019, 66% of 420 aversive conditioning actions directed at bears occurred along roadsides, and 76% of the overall occurrences involved the same six collared bears (Alberta Environment and Parks, 2020a). In 2020, there were 12 known grizzly bear mortalities in BMA 5 (five or 42% of them were highway mortalities and four involved young-of-the-year cubs), which is the highest mortality rate in this management area since 2009 (Alberta Environment and Parks, 2022). The high prevalence of highway bear collisions in the region emphasizes the need to improve roadside bear management strategies.

When it comes to bear management, Alberta Parks employs an aversive conditioning program in PLPP, uses pain or noise stimuli such as non-lethal projectiles to move bears away from high human-use locations such as campgrounds and residences (Alberta Environment and Parks, 2020b). Bear technicians and Conservation Officers carry out aversive conditioning actions and alongside trained volunteers, are also responsible for bear monitoring and public communications at bear jams. Roadsides

are considered to be lower human-use locations (as are trail systems), and so bear aversion tactics are typically only used roadside when the potential for human-bear conflict is heightened. In addition, temporary no-stopping zones are occasionally used in the park to discourage the formation of bear jams. These no-stopping zones are set up by park staff members/volunteers when a roadside bear is present and consist of temporary signage and a combination of education/enforcement in attempt to gain visitor compliance.

Bear safety and education in the Kananaskis region is developed and carried out by government and non-government groups and a network of volunteers. These volunteers assist with wildlife monitoring and engage the public in bear safety outreach at events, on trails, and at bear jams. Alberta Parks also employs environmental educators and nature interpreters to develop and deliver a breadth of in-person programming throughout Kananaskis. This includes bear ecology and safety programs for various age groups and bear safety workshops for private operators in the park. Alberta Parks also offers bear safety messaging through brochures and online content[1], but most messaging focuses solely on attractant management and safety while hiking/biking (Alberta Sustainable Resource Development, 2011). The Alberta Parks website has a section on wildlife viewing that provides information to visitors[2], but this information is not presently represented on printed materials. Furthermore, there is no dedicated signage in visitor centres or on the landscape relating to roadside bear viewing expectations.

2.2 Methods

This project used semi-structured interviews with a sample of experts to offer suggestions about how park staff and local experts experience, perceive, and understand roadside bear viewing and related risks in PLPP. The use of interviews is a prevalent social science method for studying human-wildlife interactions, as they provide first-hand narratives that can reveal the social and cultural elements of natural resource challenges (Bixler, 2013; Hughes and Nielsen, 2019). Narratives derived from interviews explain how stakeholders make sense of their surroundings, and through the analysis of these narratives, researchers can better understand connections and causes linked to larger discourses (Gergen, 1994; Adger et al., 2001; Bixler, 2013).

We used a combination of purposive sampling and snowball sampling to generate a group of different actors with related expertise. Each sampling method brings strengths and limitations

with respect to the resulting sample, potential biases, and researcher ability to generalize from results (Sharma, 2017). Purposive sampling involves the "deliberate choice of an informant due to the qualities the informant possesses" (Tongco, 2007, p. 147). The intended result is a sample group composed of people with particular characteristics or experiences relevant to the research questions (Palys, 2008; Etikan, 2016). Potential limitations of purposive sampling include limited generalizability (the sample may not be representative of the population as a whole), and potential for bias (researcher biases and preconceptions can influence the selection of participants) (Palys, 2008; Etikan, 2016).

As part of this project, the sample was intended to represent expert perspectives on management strategies and observed human behaviors relating to roadside bear viewing. The lead author's connection to the park generated an initial list of participants, including park staff, volunteers, and non-profit organizers. This was used to as the starting basis for a purposive sample of experts with ties to wildlife viewing and bear management. We purposefully aimed for a diversity of roles and connections to the topics at hand (Noy, 2008; Saumure and Given, 2008a; Saumure and Given, 2008b). Our sample was carefully selected to represent a variety of expert types; however it is possible that some experts might have been overlooked. Our original list of experts from across different categories of expertise and connections to the topic was expanded via snowball sampling during interviews with participating experts.

Our combined sampling strategy allowed us to select for known expertise and connections and to refine this based on participant referrals. These techniques also brought limitations and biases (Tongco, 2007; Sharma, 2017). The original list of interview participants was influenced by Pumphrey's familiarity with the park and its staff. Subsequent peer referrals were also biased in that they were subjective referrals. Repeat referrals also suggested peer group validation of suggested experts. It is also worth noting that the particular timing of the project, the place-based location, and the specific topics at hand meant a limited overall number of relevant experts from the start. We also acknowledge the absence of Indigenous experts and call for attention to this in the immediate future as Indigenous actors and perspectives *must* be included for improved conservation, management, and relations. In recognition of the sampling strategies employed, we temper our generalizations. We present project data here in context, and in discussion with related scholarship. We make suggestions about broader implications, but we also acknowledge the study's sampling biases and limitations.

Final interview participants included conservation officers, bear technicians, ecologists, communicators, and members of local non-profit organizations. Participants chosen for interviews met at least two of the following guidelines to qualify for this project's understanding of "expert":

- Education/training (either professional training or academic education) in a field relating to parks and protected areas, bear management, bear ecology, or bear aversion;
- Over five years of experience either working for a park organization (either Alberta Parks or Parks Canada) in

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1   Alberta Parks "Be Bear Smart" webpage shares links to bear safety brochures and bear safety tips: https://www.albertaparks.ca/parks/kananaskis/kananaskis-country/advisories-public-safety/wildlife/be-bear-smart/

2   Alberta Parks "Wildlife Viewing" webpage offers wildlife viewing guidelines for visitors: https://www.albertaparks.ca/parks/kananaskis/kananaskis-country/advisories-public-safety/wildlife/wildlife-viewing/

PLPP or a park bordering PLPP or volunteering for a non-profit group operating in Kananaskis; and

• Work or volunteer-related experience associated with roadside bear viewing (i.e., enforcement, visitor relations, bear aversion, bear monitoring, management planning).

Expert knowledge in this project is seen as including both scientific and local expertise (Fazey et al., 2006; Knapp et al., 2013). An example of a local expert is one that has observational expertise and personal/relational experience that can lead to the co-production of knowledge with other locals (Berkes, 2004; Fazey et al., 2006). Other human dimensions of wildlife studies have used similar definitions of experts in interview participant selection (Lemelin, 2006; Knapp et al., 2013; Buchholtz et al., 2020).

A semi-structured interview guide was used. The semi-structured interview guide was developed and piloted collaboratively with Alberta Parks and WildSmart (a non-profit organization), to include applied knowledge and local research needs. Interviews (22) were conducted between July and November 2021. The interviews in this study were conducted online *via* Zoom or by telephone, and they lasted on average 20 minutes. Online interviews were beneficial for this project, as they allowed for easy access and flexibility for both participants and the researcher during the COVID-19 era. Requiring access to the internet and a device and being familiar with technology are limitations to online interviews (Janghorban et al., 2014; Government of Alberta, 2022b). Furthermore, body language and non-verbal cues such as eye contact are experienced differently in online interviews, which can impact rapport with the interviewer (Bargh et al., 2002; Labinjo et al., 2021). Alphanumeric codes were assigned to participants to ensure anonymity, and the project received approval from the UNBC Research Ethics Board (E2021.0420.014.01). A semi-structured interview guide was used in administering online interviews (see Appendix for interview guide), and included thirteen questions organized into five sections:

1. Demographics and sample characteristics;
2. Factors contributing to roadside bear viewing (e.g., landscape, humans, wildlife);
3. Risks of roadside bear viewing (to both humans and wildlife);
4. Experiences and perceptions of roadside bear viewing; and
5. Perceptions and suggestions of management approaches.

Interviews followed an open-ended pyramid structure, with more general questions at the end (Dunn, 2016). Participants were encouraged to revisit prior answers and to expand on previous topics discussed to provide clarification and increase depth of answers (Dunn, 2016). Notes and memos were recorded post-interview and during the transcription process to augment transcripts of the interviews and to aid in analysis. The interview data were collected to examine patterns within expert framings of roadside bear viewing to provide insights into existing and potential interventions. During analysis, themes and patterns were examined within and between interviews, and ended once data saturation was determined (Bulawa, 2014; Fusch and Ness, 2015).

2.3 Data analysis and interpretation

Thematic coding and interpretive qualitative analysis were used to organize and interpret the 22 interviews. Thematic analysis is a qualitative approach helpful in identifying patterns and expressions of themes (Riessman, 2008; Guest et al., 2012). This process was inductive and deductive, as knowledge of pre-existing themes likely to emerge was integrated with a reflexive process that allowed patterns to emerge from the data. The lead author's prior knowledge and experience working in PLPP contributed to developing the initial themes. During the coding and analysis process, the identified themes were continually revised with the research questions in mind to reveal meaning and practical significance of the interview data and patterns within it (Braun and Clarke, 2006). During analysis, themes that did not fit within standard themes or that offered new or adapted versions of such themes were recorded and added as the analysis progressed. The analysis was conducted using QSR International's NVivo software. A potential bias is that the lead author's preconceived notions constrained topics and perspectives explored in interviews and interpretation. To mitigate this, a constant comparative technique was applied while coding to reflexively examine researcher assumptions, and to limit impacts of preconceived ideas on analysis (Glaser and Strauss, 1967; Bulawa, 2014). Constant comparisons between new data with previously analyzed data allowed us to identify discrepancies, inconsistencies, and alternative interpretations (Bulawa, 2014). This process helped in identifying and considering preconceived notions and assumptions that might have emerged with Pumphrey's familiarity with participants and setting. While Pumphrey's familiarity with the context and park added additional insights in some cases, Meletis' distance from park operations allowed for a more distanced perspective. This combination enhanced the validity and reliability of the interpretation as potential biases were identified, and alternative viewpoints considered. As mentioned in the methods section, bias likely remains, and care must be taken in generalizing beyond this case study.

3 Results

3.1 Sample demographic of interview participants

After contacting an initial 42 experts, Pumphrey interviewed 22 participants from July to November 2021, resulting in 22 completed interviews (52% participation rate). Non-participation was caused primarily by scheduling conflicts. The interview participants included Alberta Parks Conservation Officers (32%, 7), members of non-profit groups (18%, 4), ecologists or biologists (14%, 3), Alberta Parks bear technicians (14%, 3), Parks Canada staff (14%, 3), and Alberta Parks education/outreach staff (9%, 2). Participants had an average of 10.5 years spent working in the field of human-bear interactions. The non-profit groups represented included Bow Valley WildSmart and Friends of Kananaskis. Parks Canada staff were from Kootenay National Park, Jasper National Park, and Banff National Park.

3.2 Perceived causes of bear jams

Interview questions were designed to explore each expert's understanding of roadside bear viewing. We were interested in how experts explain the nature of contributing factors to roadside bear viewing and bear jams. In our analysis, we divided potential causes of bear jams into three categories (not mutually exclusive): humans, habitat, and infrastructure (Table 1). These three categories are interrelated both in terms of how they present and how they are addressed. The most prevalent cause of bear jams suggested by participants, was people acting without common sense, or what one participant referred to as "*bear blindness*"—when people see bears and "*everything else goes out the window*" (B13). "Acting without common sense" includes respondent observations and perceptions of visitors acting without caution or judgement in their interactions with bears. Specifically, they characterized such behavior as careless or reckless, as it disregards the inherent dangers associated with observing wildlife in close proximity. Respondent explanations of visitors acting without common sense included visitors approaching bears too closely, disturbing the natural behavior of bears, or attempting to feed or touch bears.

3.2.1 Human-related causes

When asked, "what do you think causes bear jams," more than half of respondents (59%, 13) identified human-related causes. The following quote highlights a lack of common sense that experts associated with bear jams and related risks to human safety:

I have observed in both my work here with Alberta Parks and in my work with Banff National Park that when people see

charismatic megafauna, something clicks off in their brain, and they're overcome with the desire to get a good picture, or to get a good viewing experience, and that can override their desire for personal safety. I think often in those cases, people forget that bears are wild animals who have their own need for space and their own personal bubble, which can cause people to get too close or to forget that these animals are real animals—real wild animals—and not just a viewing opportunity or a perfect Instagram moment (B13).

Experts also emphasized wildlife photographers as a particular kind of actor that can be involved with roadside bear viewing. Participants suggested that the behavior of some wildlife photographers may be caused by a sense of exceptionalism, they may think park guidelines or certain behaviors do not apply to them. An anecdote shared by a participating park staff member highlight some of the challenges associated with some wildlife photographers and this apparent sense of exceptionalism:

…a photographer comes out, and he's like, "oh, I only spent three hours with one bear, and I got a couple of great photos," but he didn't see that the rest of the day there were other people that were also photographing and spending lots of time near that bear. They're ultimately habituating those individual animals and not recognizing what kind of a contribution they're having to the larger picture (B04).

The notion of visitors being influenced by actions of others—terms like "herd mentality" (B01) or "follower mentality" (B08) came up in the interview responses (43%, 9). Participating experts

TABLE 1 Perceived causes of bear jams in Peter Lougheed Provincial Park (Alberta, Canada) by interview participants (n=22), separated into three categories: human-related, habitat-related, and infrastructure-related causes.

		Participants
Human-related	Visitors acting without common sense	71% (n=15)
	Visitors being driven by exceptionalism (wildlife photographers)	43% (n=9)
	Visitors acting upon herd mentality	43% (n=9)
	Visitors seeking an intimate wildlife encounter	38% (n=8)
	Visitors acting without knowledge of appropriate behaviors	29% (n=6)
Habitat-related	Bears using roads as a wildlife corridor	24% (n=5)
	Sows protecting cubs from boars	10% (n=2)
	Park allowing the presence of natural roadside attractants	67% (n=14)
Infrastructure-related	Visitors utilizing roads for sightlines to see bears	43% (n=9)
	Visitors compensating for lack of pull-outs	10% (n=2)

explained some visitors as being more likely to exhibit undesirable behaviors when they see others doing the same. Visitors seeking wildlife experiences was another common suggested cause for bear jams (38%, 8). The concept of "seeking a wildlife experience" was coded into: visitors wanting to capture and share the experience with others; visitors seeking a novel/unique experience; the feelings of excitement and intensity of seeing bears; and, as the following participant described, connecting with nature:

These animals exist in documentaries and storybooks. And to see them in real life … I mean, it's an amazing opportunity. …when we see these animals, it's an opportunity to feel connected with other beings, with something larger than ourselves, to be able to feel closer to these ecological connections we have with the larger biosphere (B13).

One participant discussed how viewing bears can foster stewardship:

… [seeing a bear] creates this sense of awe … a certain connection is formed … there is certainly value to witnessing a grizzly bear on the landscape and then suddenly becoming more of its champion (B17).

Another highlighted human cause of bear jams was visitors acting without knowledge of appropriate behaviors associated with roadside bear viewing (29%, 6) due to either lack of access/exposure to park messaging or communication with staff.

3.2.2 Habitat-related causes

Participating experts acknowledged bear behavior and foraging patterns as a contributing factor to bear jams. The frequent presence of roadside bears is one of the reasons why PLPP is a destination for bear viewing. For instance, some sows are known to use roadside corridors in PLPP as a method of protecting cubs from being predated on by boars. Participants (24%, 5) explained how roadsides in PLPP can be attractive spaces for females with cubs:

These sows with cubs are on the human landscape because they want to be around people because it's safer for them than being around boars. They're on the human landscape and they're making use of the foods here. We know they're going to be there. We know that they're going to come and use these resources (B22).

Participants (10%, 2) discussed one of the reasons why bears frequent roadsides is because roads offer a desirable travel corridor:

[Roads] are a good wildlife corridor, they're an easy way for bears to move around. So that's what brings the bears in. (B03)

Landscape or habitat features were also cited as contributing to bear jams. While roadside forage are typically native species, the presence and abundance of forage increases with roadside vegetation management. A participant echoed habitat and infrastructure characteristics as creating attractants for bears that can lead to viewing opportunities for humans:

The infrastructure that we create creates these lovely spots where there's good bear food, so that draws [bears] into areas where bears and humans end up meeting (B13).

Over half of participants (67%, 14) said the presence of roadside forage is a contributor to why bears have become habituated to roadsides in PLPP.

3.2.3 Infrastructure-related causes

Infrastructure deficits were also suggested as contributing to bear jams. Participants (10%, 2) brought up the existence or non-existence of highway infrastructure (i.e., shoulders, pullouts) as contributing to traffic congestion during bear viewing:

There's no shoulder on the road whatsoever, right? And so, we have vehicles parked on both sides, lining the road, and it is very difficult because there is essentially no room. Not even one-way traffic can get through. You're really restricted with how you can move (B01).

Furthermore, infrastructure and landscape features such as tight corridors and highly vegetated sections of roadways were seen as rendering bear viewing particularly unsafe (43%, 9):

In Kananaskis Country, it's a two-lane highway with barely any shoulders with a lot of blind corners and no real pull-outs…. a lot of the time, the trees are right against the road or close enough that a bear can't be a good distance away from the road where people can safely view it from the highway. A lot of the time, the bears are within 10 to 20 meters of the highway. So, the landscape provides challenges (B07).

Participants pointed out the lack of pullouts and passing lanes in some areas as essentially forcing visitors to participate in bear jams when they are blocked in by an existing jam or lacking a safe way to move around it.

3.3 Risks associated with roadside bear viewing

Interviewees suggested that risks to bears were more likely than risks to humans at roadside bear jams. Potential bear-related impacts of concern included the disturbance of their natural feeding processes, increased bear mortality or injury caused by vehicle strikes, the potential for bear family groups to be broken up, bears being pushed away from natural habitat, bear habituation to humans, and the disturbance of bear movement patterns and their travel through natural corridors. Reported consequences for bears included both direct and indirect impacts. This participant explained how roadside bear viewing can impact natural movement patterns:

Bear jams can very often block a travel route for a bear. So, if a bear has the intention to go from point A to point B, a bear jam can prevent that from happening and then actually impact their movement patterns around the landscape. And many times, that can mean pushing the bear into less desirable places, so [if] the bear was just about to exit a facility zone, whether it's a day use area, campground, or busy area, and then a bear jam can block that bear from leaving that spot (B11).

In PLPP, roadsides provide a food source for bears in the form of berries, and other forage (Alberta Environment and Parks, 2018). Therefore, the presence of bear jams in conjunction with the hazing bears away from such areas is problematic, as explained by some participants:

They are just out there trying to get enough food into their systems. [We are] interfering with bear's feeding habits—or if a mother with cubs—with her ability to teach her cubs about the safe places to feed. Often roadsides are where there's the best food. The way we cut down trees along roadsides or day-use areas allows sunlight in, and that allows for the growth of good bear food sources: shepherdia bushes, dandelions, ground cover … that's going to provide a decent caloric intake. So, it creates a real challenge for bears (B13).

Though most participants focused on the risks to bears rather than humans, some chose to highlight human-related risks. These included possibilities of human-vehicle accidents (while people are inside and outside of vehicles during bear jams) and secondary risks from emergency response vehicles getting stuck at bear jams:

…I remember talking to some of the Conservation Officers and Kananaskis Emergency Services last summer when they couldn't get to an emergency because of a bear jam (B06).

Additional risks to humans included risks to staff members, such as compounding stress brought on by the continual beratement by visitors trying to see bears, and emotional distress over witnessing or having to take part in the relocation or destruction of a bear.

3.4 Challenges relating to increasing park visitation and limited resources

When asked about concerns, almost half of the experts (41%, 9) pointed to insufficient staffing and resources as a challenge for effective management of roadside bear viewing in PLPP. Participants suggested that in PLPP, bear jams demanded repetitive and constant attention in the form of people management, and at times, aversion actions directed at bears. Aversive conditioning actions often involve the same individual bears in similar locations throughout the day/week/season (Alberta Environment and Parks, 2022). This participant emphasized how some individual bears demanded a lot of staff time and resources:

…given our current budgetary financial situation—it doesn't really make sense to just fully commit [staff] to one bear for the entire day,

because [the bear] continually moves in and out of the trees (B15).

Currently, bear technicians and Conservation Officers are the employees who conduct bear aversion and respond to roadside bear incidents. Conservation Officers are responsible for various duties in the park, including ensuring public safety, conducting backcountry patrols, and carrying out enforcement. Participants (33%, 7) mentioned that responding to roadside bear incidents can pose a challenge for staff members and the park in terms of prioritizing daily duties, and suggested that bear jams can be disruptive to work shifts in that they can draw disproportionate resources:

…[staff] are being pulled in so many directions that they're really not efficient … because they can't invest enough time into doing everything they need to do (B18).

On an average weekend day during the summer, there are an average of 2 to 5 staff (Conservation Officers) working in PLPP who are responsible for public safety incidents, visitor compliance/enforcement, and patrols in addition to responding to bear reports and bear jams. Experts suggested that the visitor-to-park-staff-member ratio was insufficient and that the staff time allotted to roadside bear incidents was challenging to manage in terms of competing with other priorities.

3.5 Suggested strategies

Participants discussed a diversity of management strategies for roadside bear viewing to improve human-bear coexistence in PLPP. We also asked expert participants semi-structured questions about Alberta Park's past and current management strategies to elicit their perceptions of these and suggestions for improvement. Recommended strategies were coded into four categories: human management, bear management, habitat management, and infrastructure management.

3.5.1 Human management

Experts were frustrated by inappropriate behaviors from visitors viewing bears roadside. The vast majority (81%, 18) of participants stated that they had witnessed visitors getting out of vehicles while roadside bear viewing, indicating unsafe behavior as common practice. Furthermore, 76% (17) of participants said they had seen visitors approaching bears at distances that were unsafe[3]. The following participant shared a story about responding to a bear jam in PLPP:

There was a bear jam … right by a guardrail. And [the bears] were feeding down the slope, so, you [couldn't] really see them from the highway. There were probably 30 to 40 vehicles stopped on both sides of the highway and probably 15 to 20 people out of their vehicle at the guardrail, 5 to 10 meters from a grizzly bear with cubs, taking photos … thinking it was a good idea. I was

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3   Note: Alberta Parks recommends a 100m distance from wildlife (including while in a vehicle) (Government of Alberta, 2019).

According to participants, effective messaging:	Participants
Manages and describes expectations of desired behaviors	81% (n=17)
Provides reasoning behind desired behaviors	62% (n=13)
Is consistent in delivery and wording	52% (n=11)
Explains consequences of undesired behaviors	52% (n=11)
Is proactive and designed to prevent future unwanted interactions (emphasizes risks to humans and bears, messaging should reach visitors in multiple formats).	24% (n=5)

Survey participants were given a list of messaging approaches and asked what they considered to be most effective in reducing risks associated with roadside bear viewing in PLPP.

kind of expecting somebody to get mauled (B14).

Participants also reported seeing people feeding bears, approaching bears with children, failing to obey the rules of the road, disobeying regulations and enforcement officers/park staff, and luring/provoking bears to react for a photo. One option to potentially mitigate these undesirable visitor behaviors roadside, as suggested by participants, is to have alternative and managed locations for visitors to view bears. One possible managed bear viewing opportunity exists in the back meadow of the Peter Lougheed Discovery Centre. Of those interviewed, 38% (8) spoke of the viewing deck as an opportunity for managed bear viewing:

I think the back of the visitor center is a great thing to have. It's a great tool to be able to say, 'well, you know what, if you go to the back of the visitor center, you can safely view a bear from there.' And then they still get that experience. It is helpful for staff to be able to provide alternatives at certain times of the year where visitors can still get what they want (B12).

Only one participant contributed an answer about positive visitor behaviors at bear jams. Participants generally framed roadside bear viewing in a negative way. This might have been influenced by interview questions focusing on challenges and concerns, but it also fits with informal expert views of bear jams that Pumphrey had encountered prior to the starting this project.

3.5.1.1 Education, outreach, and communications

Participants recommended augmenting education and outreach in addition to current approaches (Table 2). A concern advanced by 11 (52%) participants was the challenging in conveying desired behaviors to visitors on site, at bear jams. However, interview participants (52%, 11) also emphasized the effectiveness of in person face-to-face conversation and education in the moment with visitors at bear jams. Participants highlighted how difficult it can be to connect with and communicate effectively with visitors:

It can be very challenging because it feels like herding cats when you're just one individual and there's a never-ending supply of members of the public (B04).

It's difficult because different people respond to different kinds of education in different ways (B15).

Many staff and volunteers deliver public messaging in Kananaskis, including Conservation Officers, bear technicians, park interpreters, and visitor center staff. However, each of these roles receive separate and sometimes inconsistent training. Participants highlighted the need for consistent delivery of park messaging and suggested that having different types of park staff involved can also complicate delivery:

Some Conservation Officers don't react when there are people pulled over on the side of the road. Other Conservation Officers play quite a heavy hand and don't allow anybody to stop. I think there needs to be some consistency in how that situation will be managed, and I think there needs to be better communication to what the expected behaviors are (B08).

The importance of including specific education about roadside bear viewing was pointed out by 11 (52%) participants. The following quote illustrates the necessity of addressing visitor behavior *via* educational messaging and mentions key challenges:

We're seeing a lot of new people on the landscape who aren't necessarily coming with a basis of understanding or education in how to safely conduct themselves in a wilderness area. That creates a challenge for park staff to get that messaging across to people, to help them take steps to protect themselves, and also cultivate the understanding that when they take these steps to protect themselves, they're also by association protecting wildlife (B13).

The last part of the above quote bridges conservation with human safety, suggesting that strategic education can be employed to reconceptualize human-bear interactions (i.e., steps to protect humans might also protect bears, and vice versa, emphasizing the potential for messaging about mutual or multi-species benefits).

3.5.1.2 Support for enforcement

Interview participants (62%, 13) supported issuing violation tickets to visitors exhibiting unacceptable/undesirable behaviors viewing (i.e., approaching/feeding/harassing bears, vehicle-related violations) while roadside bear viewing. In addition, 23% (5) of participants raised concerns about the limitations of provincial park regulations concerning roadside bear viewing infractions. One participant, for example, called for clarification of what defines "harassment," suggesting that broader definitions would allow for more effective enforcement:

…we need to have changes to our Parks Act … there's nothing about harassing wildlife. Not even under The Wildlife Act. We've had people flying drones over top of bears, we've had people

tracking and following bears non-stop. There needs to be something that we can get them with for harassment of wildlife (B03).

Participants called for regulations to delineate appropriate/inappropriate bear viewing in terms of length of time to view, suggesting that Alberta Parks could clarify maximum viewing distances:

Wildlife harassment needs to be defined more appropriately … spending 30 minutes roadside photographing a bear—even if you're pulled off safely and you think it's a safe distance—that's too long of a time period, therefore it's considered harassment and you could be issued a violation ticket (B04).

Five participants recommended higher fine amounts and a more consistent enforcement approach for violations while roadside bear viewing. Participants also suggested that enforcing violations could be combined with corresponding media outreach to highlight potential consequences of undesirable behaviors.

3.5.2 Habitat management

Strategies for habitat management included removing desirable roadside forage for bears. For example, in the Kananaskis region, natural attractants such as buffaloberry (*Shepherdia canadensis*) are controlled or removed around facilities of human use and in some cases encouraged to grow outside of human-use areas (Alberta Environment and Parks, 2004). Participants coupled this suggestion with calls to enhance bear habitat away from the road and other human-use areas in order to encourage bears to use habitats further away from human presence:

[Alberta Parks] have done a pretty good job of habitat removal—so removing shepherdia from campgrounds or roadside areas that are problematic—but basically all you're doing is taking food away from bears and you're not actually replacing it anywhere else. And so that habitat enhancement needs to be a part of the management actions in Peter Lougheed (B08).

This participant explained how the presence of roadside forage along the roadside in PLPP remains a perpetual management challenge for the park:

We do a lot of aversive conditioning where we chase bears off the road. But they're just going to come back because that's where the forage is. So, you can chase bears off the road, but that's just a management action that never ends, it just goes on and on and on forever (B08).

Participants (19%, 4) suggested removing or controlling roadside attractants such as buffaloberry as a management option. Participants also shared perspectives on bear-directed management approaches. Two participants supported the current approach of concentrating bear aversion actions on females with cubs. Resident female bears with cubs are prominent in PLPP facility areas, as some female bears seek protection in spaces that

also happen to be human-populated areas of parks, such as roadsides (Schwartz et al., 2010; Taylor et al., 2014). A former park ecologist further highlighted the benefits of sow-and-cub-focused management:

I would like to see a little more focus on female reproducing grizzly bears and try to get that particular cohort to stop utilizing roads and other developments with the hope that that group of bears sticks around and is able to reproduce and help the population grow. So basically, from a management perspective, try to strategically work on a certain cohort of bears that are important to the population as a whole (B10).

Such quotes illustrate potential benefits of re-examining management components that are standard practice, as changes to bear management/conservation could contribute to reducing bear jams and their negative impacts.

3.5.3 Infrastructure management

Suggested strategies about road infrastructure modifications included altering, removing, or constructing physical elements within the park to reduce the risks and impacts of roadside bear viewing in PLPP. Roadside mitigation structures such as fencing were one option suggested by 2 (10%) interview participants. Another infrastructure recommendation was creating spaces such as pull-outs or lanes to allow for more responsible roadside bear viewing:

You could create a slow-down lane where you're giving the best of both worlds—where the bear is safe, the people are safe, and everybody is getting to enjoy the experience (B07).

This suggestion allows for improved bear conservation while encouraging enhanced or at least less detrimental viewing opportunities. Better/safer viewing opportunities could benefit both bears and humans and could contribute to visitor satisfaction. No-stopping zones were one of the potential interventions favored by participants. Almost three quarters or 71% (15) of interviewees supported the efficacy of temporary no-stopping zones in PLPP. One of them explained it this way:

I like the new method now of putting up the no-stopping signs. In the past it's very difficult to actually enforce and tell people to get back in their vehicle and they need to move along. So having that no-stopping zone I think helps quite a lot … providing that barrier (B15).

Another participant commented that no-stopping zones are only effective when accompanied by park staff, such as an enforcement officer:

In terms of how well [no-stopping zones] are working, it's difficult to say because there needs to be the enforcement side of things. What do people do when there isn't a Conservation Officer nearby? Chances are, they're probably still stopping (B04).

Interview participants also supported using electric signage to inform and direct visitors. In recent years, Alberta Parks has installed large electric signboards, which rotate through different locations. In addition, they capture visitor attention by providing dynamic seasonal messaging.

The expert perceptions of and suggestions for roadside bear management in PLPP recorded in this project have wide-ranging applicability. A combined approach incorporating the bear, human, habitat, and infrastructure elements suggested by the participating experts offers opportunities for adaptive, integrated management.

4 Discussion

4.1 The need for a multi-pronged approach

The findings from this research have highlighted the need for an updated and more diverse management approach to roadside bear viewing in PLPP. Respondents stressed the need for more clarity and consistency in the type and delivery of messages regarding respectful behaviors while bear viewing. While many of the suggestions and strategies for managing roadside bear viewing are presently in use in PLPP, respondent perceptions and insights into their efficacy are valuable resources for park managers.

4.2 Messaging needs to be clear and consistent

Messages related to human behaviors around bears are subject to many variables, thereby complicating their design and delivery. For example, PLPP lies within a corridor of overlapping land-use jurisdictions, including municipalities, provincial, and federal parks (Alberta Parks, BC Parks, Parks Canada, Town of Canmore, Town of Banff). Each of these jurisdictions employs different methods and content in communications and roadside bear viewing management. Improving consistency across these jurisdictions may improve visitor compliance and reduce uncertainty for park visitors (Ballantyne et al., 2009; Abrams et al., 2020).

The nature of roadside bear viewing incidents differs, which presents challenges in communicating with the public. Variations in location, time of season/day, foraging conditions, bears (gender, number/sex of individuals, presence of cubs, history of aversion actions), and number/behavior of humans are some of the many factors that can contribute to a bear jam (Taylor et al., 2014; Penteriani et al., 2017), complicating messaging design and content. Further challenges to developing effective park messaging include the influence of social media promoting undesired visitor behaviors towards wildlife (Pagel et al., 2020), and the oversaturation of information and signage in parks (Hughes and Morrison-Saunders, 2002).

The complex nature of human behavior and psyches must be considered in messaging efforts. Understanding visitor demographics and behaviors is invaluable for effective tailoring of outreach and messaging (Bright et al., 2000; Miller et al., 2018). Research on the efficacy of wildlife safety messaging (Slagle et al.,

2013; Marley et al., 2017) and evaluating visitor behavior as a result of messaging approaches (Cherry et al., 2018; Abrams et al., 2020) has highlighted the importance of tailoring messaging campaigns to visitation profiles. Furthermore, incorporating the concept of collective action (Triezenberg et al., 2011) can be a useful strategy for developing clear and consistent bear-related messaging in regions with overlapping land-use jurisdictions, such the Bow Valley. Collaboration between stakeholders from different organizations and jurisdictions can lead to the development of a unified messaging strategy that promotes visitor compliance.

Decades of studies suggest that information alone is insufficient to prevent undesirable behaviours and to communicate desirable behaviours (Gore and Knuth, 2009; Rickard et al., 2011; Slagle et al., 2013; Lu et al., 2018). Such efforts must include information about the benefits of desired behaviours as well. There may be benefit in using shared conservation goals as unifying rallying points in park communications when dealing with diverse visitor groups (Mariyam et al., 2022). Studies have also found that injunctive-prescriptive messaging (explaining the desired behavior in conjunction with outlining the negative consequences of transgressions) in addition to emotional affect (Nettles et al., 2021) can be an effective to designing messaging for signage and outreach (Winter et al., 1998; Winter, 2008). Strategically developing tailored tone and content could provide opportunities for Alberta Parks and partner organizations to target critical concerns and different visitor groups while emphasizing safety for humans and bears while roadside bear viewing. It is important to note that effecting changes in visitor behaviors through messaging, education, and outreach is not a catch-all solution. To be effective, such elements must be paired with supplementary approaches (i.e., enforcement; policy).

Relational organizing is another potential strategy that could be used to mitigate human-bear conflict. Relational organizing is used in conservation that recognizes how people are more likely to adopt new behaviors and engage in conservation efforts when they feel a sense of community and shared purpose (Burn, 1991; Abrahamse and Steg, 2013). It involves intentionally building connections with people who have a shared interest and using these connections to encourage others to engage in conservation behaviors (Jones and Niemiec, 2023). In the Bow Valley, the WildSmart Trusted Messengers project is an example of relational organizing. This campaign involves selecting representatives from various networks, such as mountain bikers or climbers, and training them to become ambassadors for promoting human-wildlife coexistence (Biosphere Institute, 2021). Such efforts could be further expanded upon to include desired behaviors for respectful roadside wildlife viewing in Kananaskis.

Developing and promoting the Peter Lougheed Discovery Centre deck as a venue for educational, informed, and sanctioned bear viewing is another outreach strategy proposed by this study. By redirecting bear-seekers to this location, the deck may be a valuable tool for park staff, to reduce some of the pressures associated with roadside bear jams. While the presence of bears in the Discovery Centre meadow may not be predictable or consistent, the location presents opportunities for educating the public through interpretive signage and engaging displays on bears and bear viewing (Skibins

and Sharp, 2017; Skibins and Sharp, 2019). To ensure positive encounters with bears and minimize risks including habituation, stress, and changes in distribution and foraging behavior, a bear viewing area such as the Peter Lougheed Discovery Centre would require careful management and education (Aumiller and Matt, 1994; Herrero et al., 2005; Rode et al., 2006; Penteriani et al., 2017).

4.3 Creative ways must be found to bolster enforcement

As indicated in interview responses, enforcement plays an integral role in gaining the compliance of visitors while roadside bear viewing. This strategy is well supported in the literature (Gunther et al., 2018; Carruthers Den Hoed et al., 2020). In practice, there are limitations to enforcement capacity due to funding and labor. For example, in PLPP, Conservation Officers are the only Alberta Parks staff with authority to issue violation tickets (at the time of this study). There are a limited number of staff members available for direct enforcement (approximately 2–5 staff per day in the summer).

For Conservation Officers, regulatory challenges limit available enforcement options for managing undesirable visitor behaviors at roadside bear viewing incidents. Under the Provincial Parks Act, the definition of harassment of wildlife is ambiguous, complicating judgement on when intervention and enforcement should occur. For example, Section 17(1) of the Provincial Parks Act states that a Conservation Officer can:

…order a person to cease or refrain from any activity that the officer considers is, or is potentially, dangerous to human life or health or public safety or detrimental to the environment or property in a park or recreation area or the use and enjoyment of the park or recreation area by others (Government of Alberta, 2022a).

This section applies to people getting out of their vehicle and approaching bears, but such an application could be challenging to prove in court if those ticketed should decide to contest their ticket.

Including specific guidelines for roadside bear viewing in The Parks Act could assist with enforcement judgements and actions and defenses of appealed charges. An example is present in the Canadian federal Marine Mammal Regulations under the Fisheries Act, which legally defines minimum distances for whale watching and enforceable limits to approaching marine mammals (Government of Canada, 2018). Introducing legally defined viewing distances could be beneficial for visitor compliance and conservation while offering less opportunity for park users to challenge enforcement actions.

4.4 Clarifying Alberta Park's position on bear viewing

This project's expert interviews and literature review indicate a need for greater clarity on whether Alberta Parks supports or discourages roadside bear viewing, and how visitors should behave while viewing roadside bears. The guidelines for wildlife viewing on Alberta Park's website suggest they support roadside bear viewing if visitors respect the bears and follow guidelines (Alberta Parks, 2019). However, the expert responses suggest a lack of consistency in communications about roadside bear viewing, and in on-the-ground enforcement of roadside bear viewing. These gaps can generate or exacerbate confusion about desired behaviors.

Alberta Parks could also identify and support bear viewing in certain areas, while discouraging it in others. The Peter Lougheed Discovery Center in PLPP is one option for a managed bear viewing area in the park. The building serves as a visitor center, lounge, interpretive theatre, and museum. A large, elevated deck behind the building looks out to a meadow where grizzlies commonly forage on silverweed (Argentina anserina). While the Discovery Center deck is informally recommended to visitors as a bear viewing area by some park staff, participants suggested formalizing and encouraging this space as a sanctioned viewing area. Such a move would support ongoing bear viewing and related visitor satisfaction while potentially alleviating bear viewing pressures in other parts of the park.

4.5 Managing roadside habitat and providing alternatives

Habitat security is necessary for improving human-wildlife coexistence in the Bow Valley, including Banff National Park, the towns of Banff and Canmore, and Kananaskis (Alberta Environment and Parks, 2018). Open-canopy forest (prime grizzly habitat) has been reduced by fire suppression in the area leading to increased forest density and abundance (Hamer and Herrero, 1987; Souliere et al., 2020). As discussed by participants, increased forest density, in combination with roadside attractants, encourages bears to habituate road corridors. Creating desirable bear habitats away from human-use areas to reduce human-bear interactions is an option being implemented near Lake Louise, as explained by this participant:

There is a project out in Lake Louise where they're foresting some habitat patches with the idea of creating good wildlife habitat immediately adjacent to the community … in the montane, in the valley bottom, but further afield from townsites.

It could be a kilometer away, but it gives interfaces where there's alternatives. So, if you do have to haze a bear, it might discover another place in which to go to feed where it doesn't get bothered or disturbed by people (B16).

In their 2018 report, The Human-Wildlife Coexistence Technical Working Group provided the following habitat-related recommendations to reduce human-wildlife conflict (including human-bear conflict) in the Bow Valley and Kananaskis area:

- Improving habitat security (reducing human use) and habitat quality (burning or vegetation enhancement) in areas away from roads where we do want bears;
- [Excluding] wildlife from urban areas and reducing attractive roadside vegetation so bears spend less time in close proximity to people; and

- [Hazing] wildlife (carnivores and elk) …out of urban areas to reduce close interactions with people (Alberta Environment and Parks, 2018, 37).

In PLPP, some of the above habitat management recommendations already exist (excluding wildlife from human-use areas *via* hazing). However, improving habitat security and quality away from roadsides, and reducing attractive roadside vegetation could supplement these practices.

4.6 Infrastructure management

The construction and adaptation of highway infrastructure, including fencing, wildlife overpasses, pull-outs, and passing lanes, can be practical tools for mitigating roadside human-bear encounters and collisions. The combination of wildlife overpasses/underpasses and fencing reduces wildlife-vehicle collisions with multiple species, and limits the presence of bears foraging roadside in Banff National Park (Gilhooly et al., 2019). However, there are concerns that wildlife fencing along sections of the Trans-Canada highway in Banff National Park may impact habitat use and distribution of bears (Herrero et al., 2001; Gilhooly et al., 2019).

Just as bears can be kept away from humans *via* alternative corridor provision or fencing, humans can be kept further from bears by offering them alternative vantage points from which to view bears. In "hot spots" known for roadside bear viewing, infrastructure modifications such as slow-down lanes or pull-outs would allow for viewing while alleviating some of the risks of bear jams (Richardson et al., 2015). In Yellowstone National Park, visitors are encouraged to use roadside pullouts to view bears to prevent the formation of bear jams (National Park Service, 2019). Experts in this study highlighted the lack of highway pullouts or shoulders in PLPP, suggesting this is a potential area for improvement.

No-stopping zones (either temporary, seasonal, or permanent) presently used in PLPP, in addition to Yellowstone National Park and Kootenay National Park, have been proven effective at reducing bear jams (Gunther and Biel, 1999; Parks Canada, 2022). Alberta Parks began using temporary no-stopping zones in 2019 to allow roadside bears to forage without disturbance from visitors in PLPP (Biosphere Institute, 2019). An additional benefit of these zones is that the temporary signage gives enforcement officers more substantial grounds for issuing violation tickets to drivers who stop. Wildlife fencing, overpasses, pullouts, and no-stopping zones are all infrastructure options that may be of benefit in PLPP to reduce roadside bear jams.

4.7 Incorporate human-wildlife conflict management into park policy

Incorporating human dimensions (desires, attitudes, behaviors, demographics) into park policy in the Kananaskis region can improve management practices and inform education and communications efforts (Decker et al., 2004). Human-wildlife conflict is dynamic, which requires a learning-through-experience approach to park management and policy (Clark and Rutherford, 2014). In Alberta, Hughes and Nielsen (2019) call for the establishment of multi-stakeholder groups to engage people in decision-making on provincial bear management to better incorporate a diversity of perspectives, values, and demands into decision-making processes (Hughes and Nielsen, 2019).

In effect, multiple kinds of actors already contribute to bear viewing education and management in PLPP, as demonstrated by this project's participating experts. Integrating multi-actor collaboration through perspectives from visitors, staff, residents, local NGOs, and Indigenous groups on bear management practices can deepen knowledge and improve support and tolerance for management approaches. In large carnivore conservation, integrating diverse knowledge and experiences can facilitate collaboration, as emphasized by Clark and Rutherford (2014):

Inherent differences of perspective lead to conflict because people fail to adopt and use integrative tools to improve decision making and find common ground. (Clark and Rutherford, 2014, p. 19).

Integrating human perspectives into PLPP is important for understanding human-wildlife interactions. Incorporating citizen science programs, conducting surveys and interviews, and conducting pilot projects that include repeated evaluations can all be used to ensure goals are being met. Ongoing follow-up and communication with staff and the public on management or regulatory changes as well as contentious issues could also be appropriate practice for better including the human side of bear management in PLPP.

The Peter Lougheed & Spray Valley Provincial Parks Management Plan is a key policy document guiding human-bear conflict management in PLPP. At the time of publication, the current (2006) management plan is seventeen years old and does not adequately reflect or address heightened visitation and resulting challenges in the park. Improvements to the Peter Lougheed & Spray Valley Management Plan might include more specific delineation and emphasis on the types of human-bear conflict in the region (i.e., roadside bear viewing) and include actionable items to mitigate impacts (such as recommendations in this study).

4.8 Limitations

This study offers valuable insights into human-bear conflict management despite possible limitations related to project timeline, sampling strategy, and sample composition. Conducting this research during the COVID-19 era limited when and where interviews could be conducted. Project timeline, additional impacts, and stressors during the COVID-19 era (i.e., additional work-related stress and limited time availability for park staff) likely influenced the resulting sample size and composition. Snowball sampling, a common recruitment strategy, was used to recruit interviewees. This can lead to a like-minded sample group, as experienced individuals tend to nominate others from their communities with similar perspectives (Noy, 2008). We worked to ensure that various types of experts were included in the sample, but we also respected the additional constraints brought by the pandemic era.

The combined research team allowed for both closeness to the topic and issues at hand, *via* Pumphrey. Meletis brought more distance

and an internationally-informed conservation background to the work. As social scientists of conservation, we acknowledge that Pumphrey brought preconceived notions of what constitutes effective human-wildlife management strategies in Kananaskis. Particularly, Pumphrey's background shapes their viewpoint that wildlife conservation should be balanced with meaningful and educational experiences for park visitors. This perspective may have influenced the exploration of certain themes related to visitor management and communication. Pumphrey's bias included familiarity with interviewees, pre-existing knowledge of challenges relating to roadside bear viewing management, and previous work experience. For Pumphrey's insider perspectives and prior relations with some participants led to some interviewees answering questions in a way that excluded detail and assumed prior knowledge, resulting in some data lacking context or detail. Given that this study is one grounded in social science of conservation, such biases are stated but they are not particularly problematic, especially given that the study was informed by park experience and meant to return data of use to the park. We adopted methodological transparency in order to acknowledge potential biases and contextual factors of influence. Question design and data analysis were conducted in conversation between both authors. Informed by project data and the literature, we triangulated on issues at hand rather than letting preconceived notions dominate.

The initial research design included interviewing 3–4 individuals from seven defined categories of 'expert': Conservation Officers, bear technicians, biologists, park planners, park managers, local non-profit groups, and community volunteers. Two categories of experts, park planners and park managers, are missing from the interview data due to their lack of availability during the research field season. Consequently, the presented data lacks perspectives and insights from higher-level decision makers in Alberta Parks. The insights of upper-level staff of the Alberta government could be incorporated into future research. As part of a larger project, some of these limitations were mitigated by triangulating roadside bear viewing with expert interviews, visitor surveys, and comprehensive reviews of applied and academic literature (Pumphrey, 2023).

Furthermore, the interview data does not reflect Indigenous perspectives, which should be taken into account in future studies. In 2016, the Stoney Nakoda Nation conducted a comprehensive assessment of grizzly bear management in Kananaskis to provide traditional insight into the region's grizzly populations, management, and cultural values (Stoney Tribal Administration, 2016). Indigenous experts associated with the 2016 assessment were included in the initial participant list in our study. This project's fieldwork season coincided with the COVID-19 pandemic, and the need for emergency response in Indigenous communities took precedence over the collection of interview data. Indigenous representatives and communities can face "consultation burnout" when there are too many requests and initiatives for consultation on research and projects (Nelitz et al., 2008). Out of respect for these individuals' priorities during the pandemic, we chose not to persist with multiple interview requests. Future human dimensions research on bear management and human-bear conflict should include Indigenous knowledge and management perspectives (Stoney Tribal Administration, 2016; Artelle et al., 2021).

5 Closing statement and management implications

This study offers insights into challenges and approaches to park communications and management that may be useful for park managers in PLPP and other parks facing similar issues. PLPP staff have highlighted the importance of including human dimensions perspectives in human-bear conflict management to improve coexistence between bears and humans. This project provides a case study of how experts understand, experience, and perceive roadside bear viewing. Data collected and analyzed provide new insights into how roadside bear viewing is experienced and perceived, as well as recommendations for improvements in existing management strategies. We propose the following suggestions for Alberta Parks to consider in improving the management of roadside bear viewing in PLPP:

- Acknowledge, seek, and integrate human perspectives into bear management;
- Establish roadside bear viewing guidelines and policies for Alberta Parks;
- Improve regulatory definitions to assist enforcement officers;
- Increase the presence of consistent and clear messaging for responsible roadside bear viewing; and
- Develop and promote the viewing deck at the Peter Lougheed Discovery Centre as a sanctioned alternative for informed bear viewing;

Challenges to managing roadside bear viewing are not unique to PLPP. Findings and recommendations from this research apply to other organizations, agencies, and protected area managers in Canada and the USA. As discussed in this paper, bear viewing is a significant component of tourism in North American parks. As the number of visitors to many parks in Canada and the United States continues to grow, an understanding of effective roadside bear viewing management strategies is crucial in reducing human-wildlife conflicts and maintaining conservation goals.

Author's Note

This article is based on a portion of Pumphrey's master thesis (MNRES, 2023). The complete thesis can be found here: https://unbc.arcabc.ca/islandora/object/unbc%3A59379.

Data availability statement

The semi-structured interview guide used has been included as Supplementary Material. The entirety of the interview data gathered and analyzed for this research is not available due to ethical restrictions, as participants did not agree for all data to be shared publicly. Further inquiries can be directed to the corresponding author.

Ethics statement

Author contributions

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Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fcosc.2023.1165314/full#supplementary-material

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