Indigenous Knowledge of Human–Polar Bear Coexistence in Churchill, Manitoba

by

KATHARINA MILLER

A Thesis Submitted to the College of Interdisciplinary Studies
in Partial Fulfilment of the Requirements for the Degree of

MASTER OF ARTS IN INTERDISCIPLINARY STUDIES

Royal Roads University
Victoria, British Columbia, Canada

Supervisor: Dr. Michael Lickers, DocSocSci
November, 2023

Committee Approval

The members of Katharina Miller's Thesis Committee certify that they have read the thesis titled *Indigenous Knowledge of Human–Polar Bear Coexistence in Churchill, Manitoba* and recommend that it be accepted as fulfilling the thesis requirements for the Degree of Master of Arts in Interdisciplinary Studies:

Dr. Michael Lickers, DocSocSci [signature on file]

Dr. Dominique Henri, PhD [signature on file]

Final approval and acceptance of this thesis is contingent upon submission of the final copy of the thesis to Royal Roads University. The thesis supervisor confirms to have read this thesis and recommends that it be accepted as fulfilling the thesis requirements:

Dr. Michael Lickers, DocSocSci [signature on file]

Abstract

Polar bears (wapusk; nanuq; sas; loor blaan; *Ursus maritimus*) and people have shared northern coastlines for time immemorial, yet concerns about polar bears coming into communities is increasing. As the Arctic warms and sea ice habitat declines due to climate warming, coexistence strategies between people and polar bears have become increasingly important. This study uses community-based participatory research; coproduction of knowledge; hands back, hands forward; and storytelling to documents Indigenous knowledge of human–polar bear coexistence with Swampy Cree, Sayisi Dene, Caribou Inuit, and Métis people of Churchill, Manitoba, Canada. By coupling deductive time-based themes with inductive thematic analysis, this research documents Indigenous knowledge and provides recommendations as future visions for human–polar bear coexistence in Churchill, Manitoba: protect tourism as an important industry and economy, support proactive management and less invasive research, elevate Indigenous knowledge, improve education and safety awareness, and cultivate a culture of coexistence.

Acknowledgements

I respectfully acknowledge this research was conducted on Treaty 5 territory, the traditional, unceded, and ancestral Lands of the Swampy Cree, Sayisi Dene, Métis, and Inuit peoples. I am grateful to and honour the people who stewarded these lands for centuries prior to allow me the opportunity to visit, collaborate, and research here.

This study began with a cup of tea in Helen McEwan's kitchen, and for that time, friendship, and conversation I am deeply grateful. It was through Helen that I met Georgina Berg who became my coresearcher, adventure companion, and lifelong friend. Together we have laughed, cried, picked wild strawberries, bounced through rapids in a jet boat, walked on a glacier, collected sea glass and countless rocks, sat in silence, watched geysers erupt, and found her father's name carved in stone. We had hard and beautiful conversations and she has been my greatest support through this journey. My gratitude is immeasurable.

This study would not have been possible without the guidance and support of the Indigenous Knowledge Keepers of Churchill: Katherine de Muelles, Florence Hamilton, Patricia Kandiurin, Georgina Oman, and Verna Flett. I am so grateful for the many hours of bannock, jam, cheese and crackers, banana bread, sewing, crafting, ribbon skirt making, event preparations, laughter, hard conversations, and so much more. I am especially grateful to each of the Indigenous Knowledge Keepers for the gift of their friendship, trust, and vulnerability. I do not take that responsibility lightly. I am additionally grateful to Mayor Michael Spence for his blessing to conduct this research project and for his unwavering support throughout to help gather Elders for coffee and share important critiques and perspectives. I am joyfully grateful to Nickia McIvor for their contributions as a graphic designer in addition to their participation in

the study. Not only is Nickia incredibly talented, but their contributions embed their intergenerational knowledge into the place-based maps and timelines created, adding depth and knowledge to the visuals that would not otherwise be possible. To each participant, thank you for taking the risk to participate, trusting me, sharing your knowledge, and staying engaged throughout the process: Georgina Berg, Nikki Clace, Dave Daley, Wyatt Daley, Brian Gulick, Florence Hamilton, Jill Larkin, Antonina Kandiurin, Patricia Kandiurin, Nickia McIvor, Katherine de Muelles, Georgina Oman, Heather Spence-Botelho, Michael Spence, Morris Spence, "Saulie" Norman Spence, Leroy Whitmore, and Eva Yasse.

Thank you to my supervisor Dr. Michael Lickers who inspired me to use the Indigenous method of storytelling, which embedded healing and research as reconciliation into the entirety of the research process. Thank you to my colleague, Dr. Evan Richardson, who introduced me to my committee member, Dr. Dominique Henri, whose guidance, and support laid the foundation for my academic success. Her encouragement, patience, and belief in me got me through my imposter syndrome and across the academic finish line with feminine leadership, empowerment, and grace. Thank you to Doreen Mike for sharing your energy and worldview with me at Arctic Net. Time spent with you had a subtle but poignant impact on me as an early career researcher. Thank you to David Borish for the inspiration, encouragement, and groundwork for my audio-based analysis method.

Thank you to Justin Milton, Shelly Elverum, and Eric Solomon of Ikaarvik for journeying down my first thesis proposal with me, only to put it on a digital shelf due to the coronavirus pandemic. The things I learned in our conversations shaped my thinking and influenced me as a researcher immensely.

Thank you to my dear friends Christopher J. Carter and Madison Stevens for your endless encouragement and support and for being my master's cohort to talk theory and methods with when I didn't have one. Thank you to my friend family—Kelly, Sam, Dani, Michaela, Maya, Adam, and Sarah—for feeding me, holding me when I needed to cry, and the endless emotional support during this, the biggest project of my life so far.

Thank you to Hilde Fålun Strøm and Christian Zøelly for housing me during a thesis sabbatical after fieldwork in Svalbard, Norway, and for your friendship and support when I was far away from home. You are unicorns.

Last, but certainly not least, thank you to all of my colleagues at Polar Bears International whose shared experiences and support laid the groundwork for my understanding of polar bears and conservation. Thank you for encouraging me to follow my hunch, and patiently supporting my thesis journey while I was working full time. Thank you to BJ Kirschhoffer, Alysa McCall, Marissa Krouse, Emily Ringer, Joanna Sulich, Cassandra Debets, Kieran McIver, Sonya Faria, and Melanie Kehler for your friendship, camaraderie, and emotional support. Thank you to Geoff York, Amy Cutting, Megan Owen, and Barbara Nielsen for your guidance and encouragement, and, finally, thank you to Krista Wright for believing in me and my project and helping secure funding to make it possible.

This somewhat unconventional, interdisciplinary, mixed-methods, academic and creative endeavour has been a wild and fulfilling journey. My gratitude to those who made it possible is without limit. *Matna. Marrci. Masi cho. Ekosi. Thank you.*

Table of Contents

Abstract 3

Acknowledgements 4

List of Figures 10

List of Abbreviations 11

Chapter 1: Focus and Framing 12

Self-Location 15

Research Question 16

Chapter 2: Literature Review 17

Worldviews and Ways of Knowing 18

Story and Culture, People, and Bears 19

Colonization and Carnivores 25

Coexistence: Coming Full Circle 27

Human–Polar Bear Coexistence 29

Colonial Impacts on Coexistence 30

Chapter 3: Research Design 32

Churchill's Unique Story of Human–Polar Bear Coexistence 32

Theoretical Frameworks 39

Methods 43

Ethical Considerations 49

Chapter 4: Analysis 52

Thematic Analysis 52

Audio-Based Qualitative Analysis....53
Validation....56
Chapter 5: Discussion of the Research Findings....58
Theme 1: "Every Tom, Dick, and Harry's Out Looking For a Bear": Industry and Economy....61
Theme 2: "Why Don't They Fly Them South?": Management and Research....66
Theme 3: "Their Entire Existence Relies On Being Sneaky": About the Bears....79
Theme 4: "Don't Walk on the Pipeline!": Bear Aware....86
Theme 5: "It's Just a Way of Life": Culture of Coexistence....96
Chapter 6: Conclusion....103
Key Findings....103
Recommendations....106
Arts-Based Dissemination of Results....109
Potential Limitations of the Research....109
Summary....110
References....111
Appendix A: Map – A Wide Perspective of Churchill....133
Appendix B: Map – A Medium Perspective of the Hudson Bay Coastline....134
Appendix C: Map – A Close-Up Perspective of the Town of Churchill....135
Appendix D: Churchill Timeline....136
Appendix E: Storytelling Prompts....138
Appendix F: Research Information Letter....139

Appendix G: Email Invitation.....141

Appendix H: Participant Consent Form.....142

Appendix I: Coexistence Study Codebook.....145

Appendix J: Mind Maps by Theme 150

Appendix K: Project Case List 153

List of Figures

Figure 1 A Chronological Framework Developed by Weaving the Inductive and Deductive Thematic Analysis Into Storylines 55

Figure 2 Breakdown of Participant (n=18) Self-Identification by Indigenous Group.....58

Figure 3 Codes per Chronological Deductive Theme.....59

Figure 4 Breakdown of Codes Per Theme and Subtheme 60

Figure 5 Future Visions Research Results for Human–Polar Bear Coexistence in Churchill, Canada as Articulated by Research Participants 107

List of Abbreviations

CBPR	Community-based participatory research
CPK	Coproduction of knowledge
CWMA	Churchill Wildlife Management Area
HBHF	Hands back, hands forward
IKK	Indigenous Knowledge Keepers
IQ	Inuit Qaujimajatuqangit
SHB	Southern Hudson Bay
US	United States
WHB	Western Hudson Bay

Chapter 1: Focus and Framing

Polar bears (wapusk; nanuq; sas; loor blaan; *Ursus maritimus*) have been a part of daily life for Indigenous peoples across different regions and cultures of the Arctic for thousands of years, if not time immemorial (Dowsley & Wenzel, 2008; Polar Bear Range States, n.d.). How people live with polar bears has been studied by the scientific community for decades, but Indigenous and traditional ecological knowledge provides more comprehensive information about people in the Arctic and how they relate to and live with polar bears (Wenzel, 1999, 2004). Colonization, among other factors, has influenced how Indigenous peoples live with polar bears over the last three centuries, and continues to influence coexistence (how people live alongside polar bears) today (Brandson, 2012; Lemelin, 2007; McDonald et al., 1997; Nelson, 1969; Schmidt, 2017). Through dominant Eurocentric sciences and the pervasiveness of anthropocentrism, with less emphasis on Indigenous knowledge and ways of knowing, decision making, and management regarding polar bears has lacked local and Indigenous knowledge and become highly political (Aikenhead & Ogawa, 2007; Dowsley & Wenzel, 2008; Henri, 2012). Additionally, through colonization and the spread of Eurocentric paradigms and practices of exterminating carnivores, the dominant western cultural story surrounding bears is often fear-based and infused with ideals of oppression and control (i.e., manage the wild animal) embedded with inherent conflict between carnivores (bears) and people (Bergstrom, 2017; Elswick, 2005; Leopold, 1989). Concurrently, Eurocentric cultural stories about bears include a deep love and reverence for the species, with overarching themes of awe and admiration (Caldas-Coulthard & van Leeuwen, 2003; Marseille et al., 2012). Communications studies that look at framing, the connotation of words and how they shape how people think, has changed the discourse in recent

years away from conflict, which dualistically places humans and bears in opposition, towards interaction as a more neutral descriptor (Facsione et al., 2004; Lakoff, 2010). In this work, I aim to question how furthering the research and discourse of human-polar bear coexistence as it relates to the conservation and management of polar bears, examined from Indigenous worldviews and epistemologies, by working with Indigenous knowledge holders, is a necessary framing shift (Gross et al., 2021; Kapyrka & Dockstator, 2012; Lemelin, 2007; Orr, 2004; Pezzullo & Cox, 2018).

Respectfully cocreating, gathering, and documenting Indigenous knowledge is critical to working toward a cross-cultural, "wholistic" (Abolson, 2010, para. 1),[1] and inclusive understanding of polar bears across the Arctic. The ongoing existence and transmission of Indigenous knowledge is threatened by globalization, colonization, and loss of language and culture (Fernández-Llamazares et al., 2021; Simpson, 2004). It is critical to document Indigenous knowledge over time and promote the ongoing transmission of knowledge to future generations. By documenting and elevating the importance of Indigenous knowledge in polar bear research scientists acknowledge there are multiple ways of knowing, and by recognizing and utilizing different types of knowledge in research the scientific community moves toward greater consensus and deeper understanding (Alexander et al., 2019; Clark, Lee, et al., 2008; Henri, 2012; Pedersen et al., 2020; Simpson, 2004; Tengö et al., 2014; Wenzel, 1999, 2004).

The community of Churchill, Manitoba, Canada, has experienced significant colonial influence over time due to the historic presence of the Hudson Bay Company during the height

[1] The term *wholistic,* with a 'w' is intended to decolonize and Indigenize the language presented in this resource.

of the fur trade and the community's role as a trading post and meeting place of multiple Indigenous groups (Brandson, 2012). Due to this, a unique mixture of cultures and Indigenous knowledge exists primarily among four unique Indigenous peoples: Swampy Cree, Sayisi Dene, Métis, and Caribou Inuit (Brandson, 2012). From an Indigenous science perspective, Churchill is unique because of the strong colonial history (including the location of a former residential school), strong influence of community members who are descendants of settlers, and present-day absence of subsistence hunting of polar bears in the region (Brandson, 2012; Government of Manitoba, n.d.; Lemelin, 2007; Schmidt, 2017). Although many community members involved in ecotourism have unique and modern local ecological knowledge of polar bears, detailed traditional ecological knowledge and Indigenous knowledge of polar bears in Churchill is not as well documented (McDonald et al., 1997; Schmidt, 2017). Given the concentration of academic literature available on polar bears in the Western Hudson Bay subpopulation and the importance of gathering and documenting Indigenous science of polar bears Arctic wide, it is important to document Indigenous knowledge in and around the community of Churchill, especially given the recorded rapid ecosystem changes as a result of climate warming (Lunn et al., 2016; Parkinson & Cavalieri, 2008; Regehr et al., 2007; Stirling & Parkinson, 2006). Gathering Indigenous knowledge of polar bears near Churchill promotes cultural preservation, supports the archive and transfer of Indigenous and traditional knowledge, and helps document historic and baseline knowledge of the ecology and biology of polar bears, which may promote a more comprehensive understanding of changes over time.

Since people have lived with polar bears in Churchill and along the western coast of Hudson Bay for thousands of years, and the community emphasizes and values polar bears for

their economy and way of life, it is a unique place to study human–polar bear coexistence among a diverse group of Indigenous cultures and histories (Brandson, 2012; Heemskerk et al., 2020; Lemelin, 2007; Schmidt, 2017).

Self-Location

> I don't trust a theologian who dismisses the beauty of science, or a scientist who doesn't believe in the power of mystery.
>
> — Brené Brown, *Rising Strong*

As a southern, white settler, it is important for me to ground and locate myself within this inquiry and research. The topic of this thesis has been a curiosity of mine, grown into a hunch, that developed in nuance and complexity over a lifetime living and recreating with bears on the Lands of the Crow, Salish Kootenai, Cheyenne, Blackfoot, Sioux, and Shoshone Bannock, in the valley of the flowers, known as present day as Bozeman, Montana. Through extensive excursions travelling through the wilderness, particularly on skis, I developed an intimate relationship and sense of knowing through ecological, experience-based observations and time spent on the "Land" (Tuck et al., 2014, p. 9).[2] This piqued my interest in experiential and place-based knowledge and ultimately led me to Indigenous ways of knowing. The intersection of this interest with over a decade of work with the nonprofit, Polar Bears International, spending 3 to 5 months each year in the community of Churchill, Manitoba, Canada, and developing deep friendships and personal investment in the community, has culminated in this interdisciplinary research inquiry.

---

[2] The word *Land* is intentionally capitalized throughout this report as it "refers not just to the materiality of land, but also its 'spiritual, emotional, and intellectual aspects'" (Tuck et al., 2014, p. 9).

Examining one's own worldview as a reader of this thesis, and the basic tenets of anthropocentric, ecocentric, Eurocentric and Indigenous worldviews are key to grasping the theory, methods, and results of this research. As a western researcher of settler descent and with the anticipation that most readers of this thesis will be embedded in a Eurocentric worldview (inherent to academia), it is important to acknowledge that there is knowledge within the data of this thesis that individuals with a Eurocentric worldview (myself as the author included) will never fully understand because of their bias and culture. The best one can do is remain aware of this fact and be open to the understanding that knowledge takes many forms.

Research Question

Through the methodology of community-based participatory research, I examined the following question: What historical and modern knowledge of human–polar bear coexistence can be documented among Knowledge Keepers and Elders of the Swampy Cree, Sayisi Dene, Métis, and Caribou Inuit people living in Churchill, Manitoba, Canada, and what are their visions for the future of human–polar bear coexistence in their community? The following objectives guided the creation of this thesis: synthesize the existing literature of human–polar bear coexistence, engage with the community of Churchill to document the Indigenous knowledge of human–polar bear coexistence in the past, present, and future, and build relationships and understanding through engaged acclimatization. Through this process, I sought to practise coproduction of knowledge, add documentation of important Indigenous knowledge to the existing body of scientific literature on the Western Hudson Bay polar bear subpopulation, and gather science-based recommendations and future visions for human–polar bear coexistence in and around the community of Churchill.

Chapter 2: Literature Review

The literature reviewed includes (a) an overview of Eurocentric worldviews and Indigenous ways of knowing and how these may shape the way people relate to bears (Aikenhead & Ogawa, 2007; Barker, 2009; Caldas-Coulthard & van Leeuwen, 2003; Can et al., 2014; Frideres, 2019; Kellert, 1994; Marseille et al., 2012); (b) literature from the environmental sciences and communications exploring framing and the impact of conflict and coexistence and how these relate to Eurocentric worldviews and Indigenous ways of knowing and consequently influence the relational epistemology between people and bears—and nature and the environment more broadly (Bai & Scutt, 2009; Bonnett, 2007; Facsione et al., 2004; Frank et al., 2019; Lakoff, 2010; McKeon, 2012; Treves & Santiago-Ávila, 2020); (c) available literature on human–polar bear interaction spanning the frames of conflict, interaction, and coexistence, and how different worldviews create different relational epistemologies about how people coexist with polar bears (Atwood et al., 2017; Atwood & Wilder, 2021; Cocksedge, 2020; Dowsley & Wenzel, 2008; Gillin et al., 1997; Gross et al., 2021; Heemskerk et al., 2020; Higham & Lück, 2008; Laforge et al., 2017; McDonald et al., 1997; Schmidt, 2017); and, lastly, (d) an exploration of how colonization of Indigenous peoples in the north and the resulting trauma may have impacted these worldviews in present-day Arctic life (CBC Docs POV, n.d.; Hessami et al., 2021). By taking an interdisciplinary approach, this literature review explores the relational epistemology between people and bears across different worldviews, and how these ways of knowing inform future perspectives on human–polar bear coexistence.

Worldviews and Ways of Knowing

Human knowledge is intricately interwoven into people's cultures and worldviews and knowledge production is inherently biased by seemingly invisible influences of culture, affecting what questions are asked, how, by whom, and more. Scholars and authors argued that in order to address the world's greatest ecological challenges people must shift their epistemology from an anthropocentric or egocentric worldview to one that is more wholistic and ecocentric (Capra, 1997; de Quincey, 2010; Frideres, 2019; Kohak, 2011; Lynn White, 1967; Vijayakumar & Seetal, 2020; Witt, 2015). Anthropocentric worldviews tend to separate the human from the natural world, placing humans above all other life, whereas ecocentric worldviews regard people as part of an interconnected ecosystem that equally values all life and the entirety of what surrounds individuals as interconnected and interrelated in all aspects (Aikenhead & Ogawa, 2007; Capra, 1997; de Quincey, 2010; Lynn White, 1967; Tucker & Grim, 2016; Vijayakumar & Seetal, 2020; Witt, 2015).

Similarly, how people view the world is intimately tied to what they know, or how they come to know, which is inherently rooted in culture and language. As Frideres (2019) noted,

> The English noun "knowledge" does not easily translate into a verb-based Indigenous language. The best we can come up with as a translation is that "knowledge" is similar to "ways of living" or "ways of being." So, we have a problem already. In English, "knowledge" is a noun and something that can be obtained, gained, quantified, stored, and assessed, and the known can be differentiated from the knower. This is not possible in Indigenous ways of knowing. As Aikenhead and Ogawa (2007) conclude, a translation for "knowledge" would seem to be "coming to know." But "coming to know" is different

> from "knowledge" which, as a noun, establishes a person, place, or thing. On the other hand, "coming to know" is a journey towards wisdom and a final destination. As you can see, some differences in worldview arise from the language itself. (p. 50)

According to scholars, Indigenous ways of knowing, or Indigenous worldviews, are often based in monism and wholism and are relational; there is no division of mind and matter—everything is connected, and everything in the universe is alive (Aikenhead & Ogawa, 2007; Abram, 2012; Frideres, 2019; Hessami et al., 2021; Hogan, 1996). The world is seen as animate and based in relationship; for example, "rather than calling something an object or idea, the important issue is one's relationship to the idea, concept, or object (Aikenhead & Ogawa, 2007). In summary, relationships are more important than reality" (Frideres, 2019, p. 51). Although Eurocentric sciences have attempted to address some of the world's greatest ecological challenges, such as climate warming, facts alone cannot shift human behaviour and how people relate to the environment (Cosentino, 2020; Öhman, 2016; Tilbury & Wortman, 2004). Ultimately, people must change how they view themselves in relation to each other and the environment—shifting the epistemology on which Eurocentric worldviews exist (Aikenhead & Ogawa, 2007; Capra, 1997; de Quincey, 2010; Frideres, 2019; Kohak, 2011; Lynn White, 1967; Witt, 2015).

Story and Culture, People, and Bears

People have coexisted with many species of bears for millennia across different cultures, worldviews and ways of knowing; from brown bears and coastal Indigenous peoples sharing salmon runs, to the plains Indians and grizzly bears sharing the banks of the Yellowstone river, to polar bears and Inuit sharing Arctic homelands, to Cree coexisting with brown, black, and

polar bears along the coast of Hudson Bay. Human–bear relationships are intricately intertwined and rooted in worldviews and culture. This section explores how people relate to and live in relationship with bears in North America (and polar bears specifically) from Indigenous ways of knowing, as well as from Eurocentric worldviews.

Story, folklore, art, and sculpture specifically in Indigenous cultures show close relationships between people and bears, with numerous stories that include people transforming into bears and back again, bears dancing, and references to bears as shamans (Barbeau, 1946; Seidelman & Turner, 1993). In fact, "many Inuit believe that once a bear enters its 'home' or den in the winter it removes its bearskin and acquires a human appearance" (Polar Life, n.d., para. 2). This Northern-specific folklore has similar elements as the well-known "Bear Mother" (Barbeau, 1946, p. 1) story. Other stories detail ceremonies and rituals, and are documented across cultures in North America and Scandinavia. Barbeau (1946) stated,

> Dénés of the Arctic circle, each time they kill a bear, dance, pray to the soul of the dead bear, and sing: 'Méni n'ayétri . . . who has lured you out of your den?' In a familiar ritual, they endeavor to atone for their deed and confess their shame and confusion, in order to keep the soul of the bear from avenging itself upon the murderers, or even from being able to recognize them. (p. 1)

Across the Americas and Siberia, anthropologists have documented numerous cultures in which the bear transcends solely being an animal but is "also a spirit: in this last quality, it stands above man: a semi-divinity, higher than all other spirits" (Barbeau, 1946, p. 1). One Dene Elder and research participant in this study shared,

> Growing up . . . the elders used to tell us . . . "Don't talk about eagles." . . . They didn't like people talking . . . about animals or being mean to them and stuff like that. Because they're spirits, eh? Like, yeah, native people used to be able to turn themselves into almost any animal they wanted to. And you know, back in the day, I'm not saying it's not like that now, but it was more powerful.

These stories demonstrate the interconnected nature and beliefs related to bears in Indigenous cultures and support ways of knowing that value beings more equally, wholistically, and always in relation. These stories document the fear, deep reverence, and respect some Indigenous cultures have for bears and offer a mere glimpse of some of the ways in which bears are viewed in Indigenous cultures, from which I now contrast these perspectives with those of Eurocentric worldviews.

Perceived with both adoration and fear, Eurocentric worldviews place bears in a juxtaposition:

> Bears are currently viewed by most North Americans as phylogenetically similar to people, highly intelligent, and very aesthetically appealing. . . . More negative perceptions of bears can be linked to the potential danger represented by this animal to people and livestock. (Kellert, 1994, p. 46)

In the 19th century, toy bears were often depicted on all fours, "looked mean and were designed to frighten children" (Caldas-Coulthard & van Leeuwen, 2003, p. 6). Ursos arctos horribilis, the scientific name for grizzly bear, suggests a negative perception of bears as dangerous and frightening: "One could speculate this response may stem from the capacity of a wild animal to challenge modern man's apparent dominance over nature, as well as perhaps

inspire an atavistic fear of being killed and even consumed" (Kellert, 1994, p. 47). This dominant perspective may have begun to shift as fairy tales and folklore began to include bears and influence culture. Published slightly after the first of the Brothers' Grimm collections, *The Three Bears* (which would morph into *Goldilocks and the Three Bears*) was published in 1837 (Southey, 1837). Initially, the woman in the story was an old lady, shifting over time to a young woman, and eventually to who is now known as Goldilocks. This story placed bears in a more neutral context.

The creation of the teddy bear following a hunting expedition in 1902 in which the United States (US) President Theodore (Teddy) Roosevelt decided not to shoot a bear cub, was illustrated and published as a cartoon by Clifford Berryman, and within a year transformed into a toy for children (Caldas-Coulthard & van Leeuwen, 2003, p. 7). This toy depicted a bear sitting up on its hind legs looking far less scary, and, over time, toy iterations became increasingly cute. As the toy became mainstream the teddy bear's features became more exaggerated (e.g., large eyes and soft fur), which, scholars suggested, "seek to enhance an image's sensory appeal or emotive impact" (Caldas-Coulthard & van Leeuwen, 2003, p. 9). As Caldas-Coulthard and van Leeuwen (2003) stated, teddy bears have become "semiotic objects of great cultural significance" (p. 9).

These cultural stories, myths, and fairy tales began to shift North Americans' perceptions of bears in a positive manner, further illustrated by Smokey the Bear, Paddington Bear, Yogi the Bear, Winnie the Pooh, and more (Caldas-Coulthard & van Leeuwen, 2003; Shepard & Sanders, 1992). Today, western cultures have *arctophiles,* originating from the Greek arctos (bear) and philos (friend), which are people who collect teddy bears, have collectors' societies, specialized

artists, conventions, clubs, events, and museums, illustrating the deep love within this culture for bears (Caldas-Coulthard & van Leeuwen, 2003). Interestingly, despite the strong cultural connection and emotional ties to bears in North America, Europe, and Australia, bears, and teddy bears in particular, are less prominent in Latin American cultures and other parts of the world (Caldas-Coulthard & van Leeuwen, 2003).

In modern times, this abiding love of bears continues to be juxtaposed with a deep fear of bears in Eurocentric cultures, which influences bear conservation and management as values intersect with science and politics (Kellert, 1994). Kellert (1994) stated,

> Perceptions of individual species such as bears typically derive from the influence of such factors as the phylogenetic relationship of the animal to people, the animal's presumed aesthetic value, its size, assumed intelligence, cultural and historic relationship, perceived dangerousness, likelihood of inflicting property damage, morphology, and mode of locomotion (Kellert 1985a, Burghardt and Herzog 1980). (p. 44)

Due to the perceived dangerousness, people's negative feelings toward wild polar bears are often related to concerns about safety, which is further fueled by media sensationalizing attacks and negative encounters (Marseille et al., 2012). This fear-based response aligns with anthropocentrism in which humans have dominion over the Land and are separate from and above all other beings, enacting control over the perceived "wild." Resource dependent groups, ranging from those managing livestock to those living a subsistence lifestyle, "often view bears as a direct, indirect, and even *symbolic* threat to their livelihoods and traditional Land prerogatives" (Kellert, 1994, p. 48; see also Rust & Taylor, 2016). These utilitarian and dominionistic values of these groups further the negative perception of bears, which may be

exacerbated by the capacity of bears to inflict human injury and cause property damage (S. Dubois et al., 2017; Garshelis et al., 2020; Johansson et al., 2016; Kellert, 1994; Rust & Taylor, 2016).

Feelings of fear and fascination regarding bears in western cultures exist in dissonance. For some, polar bears in particular symbolize a sense of freedom combined with awe for the way they survive in the remote Arctic (Marseille et al., 2012). Feelings of sympathy and support for conservation also arise due to the rarity of bears and how infrequently people encounter them (Kellert, 1994). This combination of rarity, awe, and symbols of freedom, benefiting further from the wilderness movement, causes many to view the bear as a symbol of pristine America (Kellert, 1994), which leads to the question, is the polar bear also a symbol of the pristine Arctic according to Eurocentric worldviews, and what are the cultural consequences of that?

Indigenous ways of knowing and Eurocentric worldviews each relate to bears in unique and nuanced ways. Stories present an interesting thread across both epistemologies, from the "Bear Mother" (Barbeau, 1946, p. 1) to the teddy bear, showing the power of narrative in shaping culture and values. The content, creation, and restorying over time shift the discourse and recreate culture in both reinforcing and reimagined ways—"as Grossman (1990:6) somewhat overstates: 'It isn't food or cover that limits bears. It's human attitudes'" (Kellert, 1994, p. 44). Perhaps even more than attitudes, human values determine how people perceive and live with bears, and if or how individuals act based on those values for the bear's benefit (biocentric), their own benefit (anthropocentric), or the benefit of the collective whole (ecocentric). A biocentric worldview related to polar bears might align with an environmental nongovernmental organization that seeks to advocate on the bear's behalf, an anthropocentric worldview might

align with a bear-viewing tourism operator or a hunter that seeks to feed his family either from the meat harvested or from the sale of the pelt, whereas an ecocentric worldview might suggest a consideration of both bio and anthropocentric perspectives and consider the bear in context of the ecosystem and sociocultural environment at large.

Colonization and Carnivores

For over a century, the colonial project exercised control over carnivores and Indigenous peoples: "The historical oppression of certain humans and nonhumans is based on anthropocentric and binary paradigms that lead to the normalization of oppression through a process of 'othering'" (Rust & Taylor, 2016, p. 654). European colonists in both North America and other colonized regions, such as Africa, endeavoured to adapt the environment to their own habits and ideals (Elswick, 2005; Rust & Taylor, 2016). Elswick (2005) noted,

> Europeans were importers of ideas, value systems, and strategies for effective settlement and subsistence. . . . For the colonial experiment to succeed, certain environmental characteristics required alteration. Active predator management policies were one component of these endeavors. (p. viii)

Both in North America and Africa, bounties and other incentives for exterminating and controlling carnivores were implemented as part of the colonial project (Bergstrom, 2017; J. Dubois & Saunders, 2017; Elswick, 2005; Leopold, 1989; Rust & Taylor, 2016). Simultaneously, the cultures, languages, lifestyles, and foods of Indigenous peoples were being exterminated by the Western analytic project, attacking ways of knowing or being that Eurocentric people perceived as impeding progress. The process of colonization evolved in Africa and North America by first attempting more nuanced settlement, eventually devolving

into more lethal and traumatic means of coercion; controlling carnivores and Indigenous peoples through bounties, Christianity, residential schools, and more, imparting anthropocentric and binary ideals as the dominant culture (Barker, 2009; Bergstrom, 2017; Canadian Charter of Rights and Freedoms`, 1982; Cooper, 2022; Elswick, 2005; Frideres, 2019; Rust & Taylor, 2016). Elswick (2005) stated,

> Some of the more extreme colonial perceptions created a world in which the Indigenous humans and the local wildlife were two sides of the same coin. Governor Spotswood (lieutenant governor of Virginia from 1710-1722) once described the Native people as "more like Wild Bears than men." In 1703, a prominent Puritan in Massachusetts wrote that the Indians "act like wolves and are to be dealt with as wolves," demonstrating a deep contempt for the "non-civilized" American landscape. (pp. 87–88)

Wild foods were considered uncivilized by the English elite and removing carnivores aided in the transition to livestock and agriculture, which were key components to "civilization," without which the colonial project would have failed (Elswick, 2005).

By the late 19th and early 20th century, a conservation movement, led by ecologists and thought leaders such as Aldo Leopold, Theodore Roosevelt, Gifford Pinchot, Rachel Carson, and others, began to question the role of carnivores in ecosystems (Gross et al., 2021; Hessami et al., 2021). Bergstrom (2017) asserted,

> Lethal control of large carnivores, particularly in the Western United States, was driven by politics rather than science and was excessive in its direct effects on targeted as well as nontargeted species of native mammals. These concerns by early 20th century mammologists were well founded, given that, first, grizzly bears (Ursus arctos horribilis),

> and then, the 1930s gray wolves (Canis lupus) were extirpated from the western contiguous states by private and government agents (Robinson 2005). (p. 1)

It was this movement that began to shift perspectives on the value of carnivores, introducing the ideas of conservation, occurring near the same time that the teddy bear came into vogue and public values of wildlife, and bears specifically, began to shift (Caldas-Coulthard & van Leeuwen, 2003; S. Dubois et al., 2017; Leopold, 1989).

Coexistence: Coming Full Circle

Coexistence is arguably a value of Indigenous ways of knowing and has been since time immemorial. By decolonizing their minds people can begin to ask what Indigenous ways of knowing have to teach the western world about how to coexist with bears, as Indigenous peoples have coexisted with bears since long before firearms and other modern tools and machinery were in existence. Yet the terms human–wildlife conflict and human–bear conflict continue to be used across western conservation fields. Johansson et al. (2016) defined conflict as "any undesired interaction, direct or indirect, between human and large carnivore [bear]" (p. 262). Scholars agreed it is time to shift the human-centred approach from a conflict frame to a preventative ethic, controlling human behaviour instead of wildlife (S. Dubois et al., 2017; Facsione et al., 2004; Garshelis et al., 2020; Gross et al., 2021; Hessami et al., 2021; Lakoff, 2010; Lemelin, 2007). S. Dubois et al. (2017) noted,

> Human–wildlife conflicts are commonly addressed by excluding, relocating, or lethally controlling animals with the goal of preserving public health and safety, protecting property, or conserving other valued wildlife. However, declining wildlife populations, a lack of efficacy of control methods in achieving desired outcomes, and changes in how

> people value animals have triggered widespread acknowledgement of the need for ethical and evidence-based approaches to managing such conflicts. (p. 735)

The new standard approach urges efforts to control wildlife to, first, alter human behaviour whenever possible, second, avoid negative conflicts and encounters, and, third, develop a culture of coexistence (Dubois et al., 2017; Facsione et al., 2004; Garshelis et al., 2020; Hessami et al., 2021; Lemelin, 2007). Using conflict as the dominant frame in this discourse proves problematic as it perpetuates Eurocentric and colonial worldviews that separate humans from nature and others the wildlife the conservationist seeks to protect (Facsione et al., 2004; Hessami et al., 2021; Lakoff, 2010). A coexistence frame centres the conservation action on the human actor, bringing people and wildlife into a more reciprocal relationship (Hessami et al., 2021). Scholars also recognized, "Where vulnerable human populations have limited resources, reducing conflicts may also require empowering and improving conditions for people" (S. Dubois et al., 2017, p.755; see also Gross et al., 2021; Hessami et al., 2021; Smith et al., 2022).

Although moving in a good direction, much of the language and discourse among scholars in the human–wildlife conflict realm remains Eurocentric and biocentric, limiting its application beyond western cultural contexts where more nuanced, ecocentric, and Indigenous ways of knowing are present. As Rust and Taylor (2016) noted, "Only by breaking down incorrect stereotypes and scapegoats, along with the physical and mental barriers, will both predators and people be regarded in a more positive and balanced light" (p. 663). As the Eurocentric conservation community and academic scholars shift toward a coexistence frame with regard to wildlife and further the academic field of coexistence research, people are

returning, full circle, to a perspective rooted in Indigenous ways of knowing and should look to Indigenous epistemologies for alternate paradigms, leadership, solutions, and ways forward (Hessami et al., 2021).

Human–Polar Bear Coexistence

Human–polar bear conflict literature is largely centred around research that shows polar bears are spending more time on Land in certain areas when sea ice is absent from the ecosystem for longer periods in the summer months. Scholars agreed this increase in time spent on Land has led and will continue to lead to polar bears encountering people more often (Clark et al., 2012; Derocher et al., 2013; Gross et al., 2021; Heemskerk et al., 2020; Laforge et al., 2017; Lemelin, 2007; Smith et al., 2022; Wilder et al., 2017). Various methods for decreasing conflict are discussed throughout the literature, with an emphasis on reducing attractants, securing waste more effectively, and carrying nonlethal deterrents (such as bear spray) when travelling in polar bear country (Clark et al., 2012; Derocher et al., 2013; Heemskerk et al., 2020; Lemelin, 2007; Risholt et al., 1998; Schmidt, 2017; Smith et al., 2022; Wilder et al., 2017, 2022).

To date, most of the literature regarding polar bears and human–wildlife conflict remains centred around the term conflict, with only a handful of articles and scholars using the coexistence frame (Can et al., 2014; Clark, 2003; Clark et al., 2012; Derocher et al., 2013; Gross et al., 2021; Heemskerk et al., 2020; Laforge et al., 2017; Lemelin, 2005, 2007; Risholt et al., 1998; Schmidt, 2017; Schmidt & Clark, 2018; Smith et al., 2022; Smith & Herrero, 2018; Stenhouse et al., 1988; Wilder et al., 2017, 2022). By shifting to and utilizing a coexistence frame with regard to polar bears, scholars shift to a more inclusive worldview that is centred around wholistic and nonbinary ways of thinking and knowing (Facsione et al., 2004; Hessami et

al., 2021; Lakoff, 2010). Given that the polar bear's range spans largely across Indigenous homelands with Indigenous governments and Indigenous-led conservation, shifting to a frame more aligned with Indigenous ways of knowing may assist with cross-cultural discourse and future solutions (Clark, Lee, et al., 2008; Clark, Tyrrell, et al., 2008; Clark et al., 2010; Dowsley, 2007, 2009; Dowsley et al., 2013; Henri, 2012; Kakekaspan et al., 2013; Lemelin et al., 2010; York et al., 2016).

Colonial Impacts on Coexistence

The movement for truth and reconciliation and the recognition of the rights and impacts of colonization on Indigenous peoples has been occurring for decades in Canada, yet progress has been slow, with the last residential school in Canada closing in 1998 (Cooper, 2022). Renewed attention to the movement of intersectional environmentalism was spurred in the US by the murder of George Floyd and the discovery of thousands of unmarked graves at residential school sites across Canada, reelevating these issues in the public conscious in recent years, and highlighting that colonial ideals, left unexamined, remain a strong undercurrent in Eurocentric cultures and consequently conservation and environmentalism today (Clark, Lee, et al., 2008; Clark, Tyrrell, et al., 2008; Cooper, 2022; Dowsley & Wenzel, 2008; Intersectional Environmentalist, n.d.; Thomas, 2020; Tyrrell, 2006; York et al., 2016).

If coexistence as a frame is used in polar bear and Arctic contexts with regard to wildlife, where the vast majority population is Indigenous, it is important to recognize some of the ways colonization and the resulting trauma may impact the human dimension of coexistence to develop a deeper and more nuanced understanding and to support trauma-informed research, methods, and methodologies (Facsione et al., 2004; Fernández-Llamazares et al., 2021; Goodwin

& Tiderington, 2020; Hessami et al., 2021; Lakoff, 2010; Windchief & San Pedro, 2019; Yua et al., 2022). National and international law and management have the ability to perpetuate colonization in negative ways. This is most evidently seen in the international ban of the sale of seal pelts, without Inuit input, which had devastating consequences for Inuit communities (Arnaquq-Baril, 2016). As Hessami et al. (2021) stated,

> A small, yet significant, number of Indigenous communities across Canada depend on wildlife as a critical part of their food security and sovereignty (Lambden et al. 2007). At times, wildlife harvest is not restricted to direct consumption. For example, Inuit have hunted and traded seals (Pinniped species) for over 3000 years (Jirova 2019). While the commercial sale of seal pelts is a culturally important practice providing much needed economic support, misplaced actions by animal rights activists have interrupted this commodity (Farquhar, 2020). (p. 1292)

Intergenerational trauma from colonization can make day-to-day life and the meeting of basic needs challenging for many people and communities. When basic human needs, such as food security, housing, and mental health, are met, people have increased capacity focus on other interests (such as wildlife stewardship). As such, efforts that support healing, commit to decolonizing research, commit to trauma-informed research, and seek to do no further harm, benefit the future of biocultural stewardship in the Arctic (Fernández-Llamazares et al., 2021; Goodwin & Tiderington, 2020; Held, 2019; Windchief & San Pedro, 2019). Future scholars should examine the polar bear as a western symbol of the pristine Arctic, how this complicates politics, conservation, and reconciliation, and what can be done to decolonize these perspectives moving forward (Lakoff, 2010).

Chapter 3: Research Design

This research was intentionally designed to braid Indigenous ways of knowing and western social sciences throughout the project, beginning with the ethical considerations all the way through theory, methods, analysis, and dissemination of results. Working with the Indigenous Knowledge Keepers (IKK), the mayor of Churchill (Cree Elder), the participants, the community, and a Cree Elder as my coresearcher has been an honour and a true joy.

Churchill's Unique Story of Human–Polar Bear Coexistence

Polar bears and people have coexisted along the Hudson Bay Coastline near present-day Churchill, Manitoba, for time immemorial (Brandson, 2012; Lemelin, 2007; Stirling, 1998). The region has a unique history as the homeland of a variety of Indigenous groups, a key geographic location during the fur trade, a historic and modern-day subarctic outpost with Canada's northernmost deep-water port, and a thriving tourist destination for wildlife and northern lights viewing (Brandson, 2012; Lemelin, 2005, 2007).

Present-day Churchill, Manitoba, is located on the western coastline of Hudson Bay approximately 1,000 km north of Winnipeg, Manitoba, on Treaty 5 territory, traditional homeland of the Caribou Inuit, Sayisi Dene, Métis, and Swampy Cree (Brandson, 2012). According to Environment Canada (2010), polar bears are protected through "a collaborative approach that is shared with provinces, territories, and regional wildlife management boards" (p. 1). Since there are no formal land claims agreements (yet) in and around Churchill, the polar bears in this region are managed by the provincial and federal government (Environment Canada, 2010). Arviat, the next community north, is located in Nunavut, and polar bears there are managed by both the Government of Canada and the Nunavut Wildlife Management Board

(n.d.) per the 1993 Nunavut Land Claims Agreement. There are a number of Inuit communities north of Arviat that share the waters and coastline of Hudson Bay, and subsequently the Western Hudson Bay (WHB) polar bear subpopulation. South of Churchill the Hudson Bay coastline is home to a number of Cree communities, including York Landing, Shamattawa, Fort Severn, Winisk, Peawanuck, Attawapiskat, and more, some of which share the WHB polar bear subpopulation, others the Southern Hudson Bay (SHB) polar bear subpopulation. The communities in northern Ontario fall under Treaty 9, also known as the James Bay Treaty (Native Land Digital, 2023). Additionally, the Dene community of Tadoule Lake remains connected to Churchill with residents travelling back and forth frequently (Yasse, personal communication, October 8, 2023).[3] Churchill falls within the boundaries of the WHB polar bear subpopulation, 1 of 19 subpopulations defined by the Polar Bear Range States (n.d.), which includes representatives to the parties (Canada, Greenland, Norway, Russia, and the United States) that signed the 1973 Agreement on the Conservation of Polar Bears. A research participant and I coproduced a map that overlays Churchill, regional communities, traditional territories, and polar bear subpopulations referenced in this study, as well as two maps with more detailed information about the town of Churchill and adjacent areas referenced in the research data (see Appendices A, B, and C).

According to the 2021 Census (Statistics Canada, 2021), the population of Churchill was 870 with 790 (91%) of residents identifying as Indigenous, which in a Canadian context includes First Nations, Inuit, and Métis. Of those 790 residents 44% identified as First Nations (includes

[3] All personal communications in this report are used with permission.

Cree and Dene), 10% as Métis, 3% as Inuk (Inuit), and 4% as multiple Aboriginal. Over half of the population was not a Registered or Treaty Indian (a person who is registered under the Indian Act of Canada or a person who belongs to a First Nation or Indian band that signed a treaty with the Crown, sometimes also called a Status Indian) as of 2021 (Statistics Canada, 2021). All participants spoke English and referenced the polar bear (*Ursus maritimus*) as such; however, they are also called wapusk (Swampy Cree dialect), nanuq (Inuktitut), sas (Sayisi Dene), and loor blaan (Michif).

Although no single culture called Churchill a permanent home, it was a meeting and gathering place for trade spanning centuries. Caribou Inuit would come from the north, Sayisi Dene from inland, and Swampy Cree from the south to trade and gather where the mouth of the Churchill River flows into the Hudson Bay (Brandson, 2012). In fact, archeological sites from pre-Dorset and Dorset cultures dating to 1700 BCE are located near the town (Lemelin, 2007). In 1670, the Hudson Bay Company was established, the first corporation in Canada based on the fur trade, and built a permanent trading post at York Factory in 1684, followed by Fort Churchill in 1717, formerly called the Churchill River Post (Brandson, 2012; Lemelin, 2007). This marked the official beginning of complex and nuanced relations between European fur traders and Indigenous peoples in the region, all the while living alongside polar bears who shared the coastline and marine ecosystem of this region of Hudson Bay (Brandson, 2012; Lemelin, 2007; Stirling, 1998).

Until the early 20th century, people in the region lived a largely subsistence lifestyle, subsidized by trade, where hunting and trapping were main components of culture and way of life. This culture began to shift around the turn of the century. In 1912, the Province of Manitoba

was formed, and in the 1920s construction began on a deep-water Port in Churchill, connecting Churchill to Southern Manitoba via the Hudson Bay Railway, completed in 1929 (Brandson, 2012; Lemelin, 2007). In the 1930s, an era of hunting polar bears began to shift with the *National Resources Agreement Act* (1938), followed by hunting being limited to Aboriginals in 1949, and polar bear hunting for trade banned altogether in 1954 (Stirling, 1998). Lemelin (2007) organized Churchill's coexistence with polar bears into four different eras: harvesting pre-1940, military from 1940–1960, research and management from 1960 to the present, and tourism from 1970 to present. The United States military built another Fort Churchill in 1946 a few kilometers outside present-day Churchill near the current airport, later abandoned in the 1960–1970s, with some buildings being temporarily used for the Churchill Vocational School (a residential school) from 1964–1973, and a few buildings being salvaged and repurposed for other uses such as D-20, which became the Polar Bear Holding Facility in the 1970s, and L-5, and then became the waste transfer facility (i.e., dump) in 2005 (Brandson, 2012; Lemelin, 2005; Smith et al., 2022). I add to this list an era of significant historic events with Indigenous peoples in the Churchill area in the 1950–1960s due in part to the closing of York Factory in 1957 with relocation of Swampy Cree families to the Flats, an area along the river adjacent to the town of Churchill (Beardy & Coutts, 1996), the forced relocation of Sayisi Dene to Churchill in 1956 along the coastline outside the town of Churchill, later moved to Dene village (Petch, 1998), and the opening of the Churchill Vocational School (a residential school) in 1964 at Fort Churchill "for Inuit students from the Eastern Arctic who were seeking post-secondary training" (National Centre for Truth and Reconciliation, n.d., para. 1). Most buildings from Fort Churchill were

demolished in the 1970s, minimizing what traces remained of the military presence and residential school ("Where Were Manitoba's Residential Schools," 2021).

Two attacks resulting in death by polar bears in the 1970s as well as changes in land-use patterns with the withdrawal of the military and demolition of Fort Churchill prompted the Manitoba Department of Natural Resources and Transportation Services to study polar bear–human conflicts (Lemelin, 2007; Stirling, 1998). In 1969, the province created the Polar Bear Control Program (Smith et al., 2022); renamed Polar Bear Alert in 1984, "the goal was to ensure the safety of people and protection of property damage by polar bears, and to ensure that bears are not unnecessarily harassed or killed (Bukowsky, 2002)" (Lemelin, 2007, p. 99). This was closely followed in 1973 by the International Agreement on the Conservation of Polar Bears, which was created and signed by the five nations (United States, Canada, Greenland, Norway, and Russia), now referred to as range states, that have polar bears in their jurisdictions (Polar Bear Range States, n.d.). In the 1970s, a community-based polar bear committee was established, and due to increasing conflict, the Polar Bear Holding Facility was created with capacity for 16 individual bears and four family groups, and is still in use today (Lemelin, 2007). This was followed by the creation of two protected areas, the Churchill Wildlife Management Area (CWMA), designated in 1978, and the creation of Wapusk National Park in 1996, both protecting important polar bear habitat and regulating tourism, research, and management (Lemelin, 2007).

The era of tourism, beginning in the 1970s, according to Lemelin (2007), included management guidelines for the CWMA in 1988, mostly visited by tundra vehicles hosting tourists, including coexistence measures of interest, such as tour operator permitting, designated

trails, the directive to "avoid pursuing or harassing polar bears" (p. 100), prohibition of feeding or baiting polar bears, waste and grey water management, and helicopter height restrictions. Since the establishment of the CWMA, the tourism industry has crept "outside of managed areas (also referred to as sacrifice areas) to new areas, where few, if any management guidelines exist" (Lemelin, 2007, p. 102).

The most recent management change recorded in academic literature is the closing of the open dump outside the Town of Churchill in 2005, replaced by the waste transfer facility, created to contain waste in a more secure manner, with the goal of decreasing conflict and food conditioning of polar bears in the area (Smith et al., 2022). Lemelin (2007) remarked, "The number of humans killed or injured by polar bears in this area has been low considering the proximity that large numbers of bears and humans share a good portion of the year (Stirling, 1998)" (p. 92).

Since the early 2000s, polar bear viewing tourism has become a significant economic driver in Churchill, particularly with photographers and filmmakers (Lemelin, 2006). According to D'Souza et al. (2023), "polar bear viewing, which occurs every October to November, attracts an average of 12,000 tourists annually and generates $7.2 million to Churchill's local economy" (p. 19). Current major economic drivers in Churchill include the railway, the deep water port, and research related to the Churchill Northern Studies Centre and Churchill Marine Observatory. More recently, Churchill has positioned itself as a year-round tourist destination, growing its northern lights and beluga whale viewing offerings (Everything Churchill, n.d.; McEwan, personal communication, July 25, 2023). The push and pull of economy and environment has been observed in Churchill, as the community advocates to protect the species that drive the

tourism industry, while simultaneously advocating for economic diversity and maintenance to the railway that serves as a vital corridor through muskeg and permafrost, providing resources and infrastructure from the south ("Railway to Churchill," 2018).

The community of Churchill provides a unique example of human–polar bear coexistence over the last century. The management strategies developed by the provincial government are commendable, and the inclusion of community members in management and decision making is an integral part of its success. Lemelin (2007) asserted,

> It would be easy to critique wildlife management in this region. However, these stakeholders should be commended for their dedication and foresight to the polar bears. The incorporation of provincial, national and international legislation, acts and wildlife management strategies (i.e. the Polar Bear Alert Programme), in addition with the inclusion of local stakeholders in decision-making processes (i.e. the Wapusk National Park Management Board), have promoted the protection of polar bears, and subsequent coexistence with polar bears. (p. 104)

Living alongside polar bears is a priority for the community of Churchill and is intimately tied to both its history, economy, and identity. As Lemelin (2007) noted,

> Others unaffiliated with the [tourism] industry also take pride in the polar bear. The polar bear is everywhere in the community – on the town's promotional material, on the welcome sign, on the jerseys of the local ice hockey team. Indeed, the positive impact from this polar bear icon reverberates deep within the social fabric of the community. (p. 103)

However, despite commendable community involvement in human–polar bear coexistence, and some traditional ecological knowledge research, little is available or recorded about Indigenous knowledge in Churchill, despite research including Cree kiskayndamowin/knowledge in SHB and Inuit Qaujimajatuqangit (IQ) to the north with other coastal communities of Hudson Bay that also coexist with polar bears (Dowsley et al., 2013; Kakekaspan et al., 2013; Lemelin, 2007; Lemelin & Dickson, 2012; Lemelin et al., 2010; McDonald et al., 1997; Schmidt, 2017; Schmidt & Clark, 2018; Tyrell, 2006, 2009).

This thesis sought to partially fill that gap in research and identify what is known through Indigenous knowledge, what Indigenous knowledge may not have been identified and/or recognized as such, and to use research as reconciliation to empower Indigenous knowledge holders (Windchief & San Pedro, 2019). In that spirit, a participant and I cocreated a timeline of events weaving significant events in Indigenous history in the region with significant events in polar bear conservation and management as a compliment to this section (see Appendix D). Since Indigenous ways of knowing are often more ecocentric in nature (Frideres, 2019), this thesis sought to identify human–polar bear coexistence strategies that come from and elevate an other-than-western worldview and also provide Indigenous knowledge to government and decision makers to be considered in future management and coexistence strategies.

Theoretical Frameworks

Community-based participatory research (CBPR), coproduction of knowledge (CPK), and hands back, hands forward provided the theoretical framework for this thesis (Archibald, 2008a; Grimwood et al., 2012; Yua et al., 2022). Originally developed in the health sciences, although applicable to other fields of study, CBPR is a collaborative approach that seeks to

engage and structure research to be cocreated by the participants of the communities who are affected by the issues being studied (Collins et al., 2018; Grimwood et al., 2012; Hacker, 2013). This knowledge approach encourages engagement of communities and participants in all aspects of the research process from creation to design, analysis, and dissemination of results. This form of participatory knowledge production emphasizes the relational nature of research and the importance of equitable partnerships. CBPR "aims to: 1) balance research power relations by sharing control of research processes and outcomes; 2) foster trust through transparent, reciprocal, and interactive relationships; and 3) support community ownership of research priorities, decision-making, and knowledge generation" (Grimwood et al., 2012, p. 215).

CPK brings together Indigenous peoples knowledge and science to develop understandings of complex issues that could not be attained through one knowledge system or worldview alone (Yua et al., 2022). Researchers have been calling for more CPK in the Arctic and around the globe to lead to more equitable and inclusive research that is useful and relevant to the communities participating in the research (Yua et al., 2022). For this project, I found a coresearcher and included the IKK in all phases of the project to ensure that the knowledge was coproduced. Using CPK provided active reengagement throughout the research project with my coresearcher and the IKK, embedding perspectives other than my own in each phase of the research.

Hands back, hands forward (HBHF) is an Indigenous framework and teaching from Musqueam First Nations Elder, Dr. Vincent Slogan, used in Indigenous storywork research (Windchief & San Pedro, 2019). HBHF was something Slogan would ask students to do at gatherings:

> [By forming a circle,] we extend our left palm upwards, to symbolize reaching back to receive teachings from the Ancestors and those who have travelled before us. We are given the challenge and opportunity to live these teachings. We also have a responsibility to pass those teachings to others who may also be the younger generation, which is shown when we put our right palm downwards. In the circle, we join hands in respect, reverence, and cooperation. (Windchief & San Pedro, 2019, p. viii)

As an Indigenous research methodology, HBHF embodies multiple Indigenous values, especially intergenerational learning, which is key to Indigenous ways of knowing and being (Frideres, 2019). In the CPK process of this research, I shared HBHF with the Elder who became my coresearcher to illustrate what this research could be to the community and to use an Indigenous framework that might have more resonance with other-than-western, nonacademic worldviews; this turned out to be an experience of relationship building and shared understanding that guided the research throughout the project.

After my second trip to the community of Churchill solely dedicated to this research project with the Elder who agreed to be the coresearcher on this project, and working with HBHF, CPK, and CBPR, I ultimately chose to include an additional theoretical framework of synchronicity that emerged throughout the research process and became a guiding and recurring principal throughout this work. Synchronicity, "loosely defined as a fortuitous intermeshing of events" (Cameron & Bryan, 1993, p. 64), first emerged through a shared experience of journaling that led me to meet and develop a deep relationship with the Elder and coresearcher I came to work with on the project. Synchronicity is alternatively defined as "the possibility of an intelligent and responsive universe, acting and reacting in our interests" (Cameron & Bryan,

1993, p. 65), which admittedly sounds very unscientific, but I think this notion or attitude created shared meaning and intention with the coresearcher, participants, and myself to continue to approach the community and the process with curiosity and let the experience of researching lead the unfolding of the CBPR (i.e., not forcing things, but instead asking a question and letting the answers and next steps unfold and continue to reveal themselves). A similar principle is referenced by Indigenous scholars and found in storywork described by the word synergy:

> I found that the synergy principle is the most difficult to articulate because in attempting to describe an Indigenous concept in the English language proves to be challenging. I speak of this concept as an exchange of life force energies that infuse the exchange between the story, the storyteller and the listener in that "space between the words" that Kukpi Ignace (2008) discusses (p. 100), which encodes the understanding of spirit. In Secwepumc understanding, the life force is your "soomik" that is your personal spiritual power (Ignace & Ignace, May 2014). An unspoken understanding with all of the knowledge keepers is that the energies are alive because Indigenous peoples believe all things are infused with spirit. (Christian, 2017, pp. 283–284)

Using the foundational elements of CBPR and CPK, both from a more academic social science framework, HBHF, along with the emerging theory of synchronicity that my coresearcher and I developed grounded in an Indigenous or spiritual framework, I applied theoretical approaches to the inquiry that embodied principles of both science and Indigenous knowledge.

In order to actualize CBPR and CPK, I spent 2 weeks in the community prior to beginning research to get the blessing of the IKK and the mayor who is a well-respected Cree

Elder in the community. The IKK are a group of female Elders across all four cultures that self-selected to organize after the discovery of the thousands of unmarked grave sites throughout Canada. Membership for the group is fluid and voluntary, with the goal of organizing to provide education, awareness, pride, and support for the Indigenous community, youth, and events in Churchill. The IKK agreed to participate at a larger capacity and assist with research design, participation, and validation of results. Following the advice of Windchief and San Pedro (2019), during the initial gathering, with coffee, tea, and snacks, the group talked about everything except polar bears for the first 2 hours. After a few hours of storytelling, the conversation came back around and the group reached a consensus that I could move forward with a human–polar bear coexistence study, through a past, present, future lens with guidance from the IKK and inclusion of one Elder as a coresearcher. Once again, this process followed methodologies discussed by Windchief and San Pedro (2019) as well as Yua et al. (2022). Both the IKK as a group and my coresearcher as an individual were provided honorariums for their time.

Methods

Engaged Acclimatization

Emphasizing the importance of relations and relationship building, engaged acclimatization, introduced by Grimwood et al. (2012), is a method that helps ground researchers within the culture and community. According to Grimwood et al. (2012), "responsible research relationships are those that are (re)established and nurtured over time; they do not simply terminate at the conclusion of a fieldwork season" (p. 214). Lasting kinship, learning, immersion, and action are cornerstones of engaged acclimatization and are suggested for researchers who seek to work with and in Indigenous communities (Grimwood et al., 2012).

My engaged acclimatization as a researcher, that formed the foundation of the CBPR and CPK for this project, began long before this research project started, with over a decade of time spent building relationships and spending 3–5 months each year in the community of Churchill working for a nongovernmental organization. The friendships and relationships I built in the community led me to the Elder that became my coresearcher.

As part of my engaged acclimatization and the CPK, my coresearcher and I did our research planning while on a trip to York Factory, backtracking the route her family walked when they were relocated to Churchill in 1957. Her family was among the last to leave York Factory, walking up the Nelson River in the winter and traveling by train to their new home on the Flats in Churchill. Due to its remoteness, accessible only by helicopter, plane, or by boat in the summertime, many Swampy Cree people have never returned to their home, which holds immense significance to families in the region. While travelling together, my coresearcher and I refined the research design, honing our methods and prompts.

I learned many things during the journey to York Factory that cannot be learned from literature or books. Most poignantly, I developed a deeper understanding of the cultural histories of Churchill's Indigenous peoples, that I have read nowhere throughout this research process; I learned that many of the Indigenous families that call Churchill home today were relocated there because the women in the families married men from the fur trade, revoking their Indian status, and making them ineligible for government benefits or relocation to a reserve (Joseph, 2018). As a result, they were not eligible for government programs or assistance; however, they were also spared from inclusion in the residential school program, for which multiple people I spoke to were grateful. Many regained their Indian status in 1985 after *Bill C-31* was passed, amending

Canada's *Indian Act* (1985) and regranting rights to Indigenous women (Joseph, 2018; Mason et al., 2018). This helped me understand more deeply the histories and intergenerational trauma of the Indigenous community in Churchill today, a sensitivity and awareness that informed and guided my approach throughout the research process.

Not only did this engaged acclimatization create a meaningful space for CPK to occur for the research design phase, but it also built trust and understanding between my coresearcher and me, which was foundational to the success of the research project (Grimwood et al., 2012; Kovach, 2009; Yua et al., 2022).

Sharing Circles

As part of the CBPR and CPK, I worked with the IKK to determine which method they felt would be most effective to gather knowledge (Yua et al., 2022). Semistructured interviews, focus groups, and sharing circles are all methods that allow the researcher to have some structure and core themes to explore while allowing for flexibility and unexpected topics and other information of interest to deepen the conversation and knowledge gathered (Adeoye-Olatunde & Olenik, 2021). All three of these methods are often used in qualitative research and in inquiries involved in gathering Indigenous knowledge and traditional ecological knowledge (DiCicco-Bloom & Crabtree, 2006; Henri et al., 2020; Laforest et al., 2018; McGrath et al., 2019). When done correctly, these methods build rapport between the researcher and the participants and promote a relational understanding (McGrath et al., 2019).

With the guidance of the IKK, I narrowed in on sharing circles, as opposed to interviews or focus groups, as the best method to gather knowledge for this study. Although perhaps more aligned with the method of focus groups, the IKK preferred the term sharing circles as they felt it

embodied Indigenous worldviews, which would be more culturally accessible to potential participants. The IKK felt that sharing circles would produce the best knowledge as people would feed off of one another's ideas; however, they did not want to exclude anyone if they were not comfortable in a group setting, so the IKK and I decided together that participants could choose to participate alone if preferred (Cunsolo Willox et al., 2013; DiCicco-Bloom & Crabtree, 2006; McGrath et al., 2019; Yua et al., 2022).

I worked with my coresearcher to draft prompts under the themes of past, present, and future coexistence for the sharing circles (see Appendix E). We then tested the prompts during an initial sharing circle with three members of the IKK, enabling them to experience the sharing circle method and provide guidance, input, and feedback.

After the initial sharing circle, the group spent time defining what Indigenous would mean in the context of this project and provided an initial list of community participants, in small groups, to invite to participate. The IKK recommended one non-Indigenous community member, due to his upbringing up North and lifelong residence in Churchill, as an exception; however, that community member declined participating in the study. Potential participants were suggested in groups that might have synergy based on relations, age, or shared life experiences that would stimulate conversation, memories, and stories. There was an effort to identify and include participants from all four Indigenous groups in Churchill, Swampy Cree, Sayisi Dene, Métis, and Caribou Inuit, as well as a range of ages to capture knowledge across generations.

My coresearcher and I contacted most participants by phone, Facebook messenger, or by stopping by their house or seeing them at community events. Email was not widely used by potential participants and, therefore, was not an effective tool for contacting them. Sharing

circles were conducted at a location of participants' choice and ranged from individuals' homes and businesses to Polar Bears International's public space. Sharing circles lasted from 30 minutes to 2 hours and light drinks and snacks were provided. My coresearcher and I conducted all but one sharing circle together, which I facilitated on my own due to scheduling constraints, and I provided each participant with an honorarium for their time.

Storytelling

Following the advice of Archibald (2008a), I proposed the idea of using storytelling instead of interview questions to the IKK and my coresearcher, which was well received. As a settler researcher raised in a western worldview, I hoped to take inspiration from the Indigenous method of storytelling and storywork to braid Indigenous ways of knowing and thinking into the framework of the data collection method (Archibald, 2008a; Cunsolo Willox et al., 2013). As a social science research method, storytelling is respectful and resonant of the oral storytelling traditions of Indigenous populations and allows the narrative power to be participant created (Archibald, 2008a, 2008b). This participant-led and participant-created story-based data gathering strategy "begins to address the limitations of interview-based narrative research, the issues of colonization of research, and the Western analytic project" (Cunsolo Willox et al., 2013, p. 130). As an Indigenous methodology, storytelling empowers an Indigenous oral tradition and is inherently inclusive of culture and identity (Lickers, 2018).

Once proposed, the IKK immediately started sharing names of who would work together as storytellers and who would remind others of stories from childhood, which created an immediate synergy in the room. As my coresearcher said during a sharing circle, "I think this storytelling is what our people used to use before, and I think there's a lot of healing in it."

Together, my coresearcher and I intentionally designed the sharing circle prompts with storytelling in mind (see Appendix E).

Arts-Based Dissemination of Results

As part of the CBPR it was important to me to create a nonacademic dissemination of results for the participants and community and make the information more easily accessible and culturally inclusive (Jimmy & Andreotti, 2019; Osei-Kofi, 2013). An arts-based research approach for dissemination using digital tools to craft the narratives shared and format the findings in a story-based manner is more relatable and inclusive of different ways of knowing (e.g., podcast, video; Osei-Kofi, 2013; Pezzullo & Cox, 2018). The decision to use an arts-based dissemination of results also served the purpose of braiding storytelling throughout the methods, analysis, and results, from the beginning of the research process all the way through to the end (Archibald, 2008a).

To do this I used an arts-based audio narrative podcast format, in the words of the participants themselves, to provide to the community with an approachable, engaging, and artistic way to interact with the research results. As Osei-Kofi (2013) and Pezzullo and Cox (2018) advised, I then published an overview of the research and the podcast episodes on a website to make them permanently accessible to the community and research participants. Digital storytelling provides a rich venue for knowledge creation and a variety of ways in which the storytellers can unite the stories together in a rich tapestry of localized narratives and collective experiences (Cunsolo Willox et al., 2013). At the conclusion of the research, I hosted a celebratory community event with country foods, including a presentation of the podcasts as well as photo portraits of the participants with accompanying quotes. All of the research content is

available to the Town of Churchill, IKK, and the community in perpetuity (https://churchillpolarbearcoexistence.com password: ekosi).

Ethical Considerations

To adhere to research ethics standards, I followed the First Nation principles of "ownership, control, access, and possession, OCAP®" (First Nations Information Governance Centre, 2019, p. 2) to ensure that the Indigenous, First Nations, and Inuit individuals and community groups that I work with in Churchill, Manitoba, own and control how the information can be stored, interpreted, used, and shared. I also followed the guidelines of the *Tri-Council Policy Statement,* particularly the portion discussing research involving the First Nations, Inuit, and Métis peoples of Canada (Canadian Institutes of Health Research et al., 2018). In regard to ethical research, Chapter 9 of the *Tri-Council Policy Statement* asserted,

> It accords respect to Indigenous peoples' knowledge systems by ensuring that the various and distinct world views of First Nations, Inuit and Métis peoples are represented in planning and decision making, from the earliest stages of conception and design of projects through to the analysis and dissemination of results. It affirms respect for community customs and codes of research practice to better ensure balance in the relationship between researchers and participants, and mutual benefit in researcher-community relations. (Canadian Institutes of Health Research et al., 2018, p. 108)

Ethics regarding polar bear research specifically must be carefully approached. Past researchers who failed to seek consent, permission, provide reports back to communities, and follow through on promises have created a tense and sensitive environment in which to work (Dowsley & Wenzel, 2008; Henri, 2012; Tyrrell, 2006; Wenzel, 1999; York et al., 2016). It was

my responsibility as a researcher to ensure my project presented minimal risk to participants. Minimal risk for harm is defined in the *Tri-Council Policy Statement* as "research in which the probability and magnitude of possible harms implied by participation in the research are no greater than those encountered by participants in those aspects of their everyday life that relate to the research" (Canadian Institutes of Health Research et al., 2018, p. 22). In order to minimize risk for harm, it was important that I, as a researcher, engage in well-informed, aware, and anticolonial and trauma-informed research practices and communication techniques (Goodwin & Tiderington, 2020). It was essential that I consulted with the community and participants throughout all stages of the research process to share results effectively and to obtain all the appropriate research licenses (Henri, 2012; Kutz & Tomaselli, 2019). Upon receiving approval of the inquiry proposal from my supervisory committee, I sought ethics approval from Royal Roads University and the mayor of Churchill, presented my objectives and proposed methods, and received their permission to proceed. I then reached out to the IKK and Elders in the community with whom I had built relationships with over the last decade to engage in the early phases of the research. I also worked closely with an Elder as a coresearcher for support, guidance, and coinquiry throughout the entirety of the research process. I created a research information letter (see Appendix F), invitation (see Appendix G), and consent form (see Appendix H) to ensure participants were well informed about the objectives and procedures of the study. I gave participants the option to be credited in the study or to remain anonymous. All participants chose to be credited, which I have done in the "Acknowledgements" section in this report; however, all quotes remain anonymous within the thesis to protect individuals from being identified in specific quotes, with sensitivity to the potential for participants to be contacted by

media and press visiting Churchill for tourism activities. In addition, I offered translators as an option for participants who preferred to take part in their native language, including Cree, Dene, and Inuktitut; however, all participants were comfortable speaking English. I received permission to record the sharing circles and ensured participants were informed on the consent form, and verbally in person, prior to starting any sharing circle. I informed participants that they may withdraw at any time without prejudice and with no repercussions. Participants could choose to not respond to the invitation or to withdraw before or during the sharing circle. As the researcher, I analyzed the data, and then engaged my coresearcher, the IKK and sharing circle participants to validate the results. I asked participants for their consent to include their knowledge in both the research itself and arts-based dissemination of results and offered them the choice to opt out of using their voices (or likenesses) in the arts-based dissemination of results. I offered participants the opportunity to review and approve the arts-based results prior to finalizing my thesis and sharing inquiry outputs with the community or any other audiences.

Chapter 4: Analysis

On my second visit to the community, my coresearcher and I were discussing the research process ahead. We had both been journaling over the summer, simultaneously, thousands of miles apart. Chapter 8 of the journaling book that we were following instructed us to go back to the beginning of our journals and circle the themes. When my coresearcher and I were together again in Churchill I exclaimed, "You're already a researcher! That is what we are doing, that is how we will analyze our research, we will essentially go back through everything and look for, or circle, themes." It was a moment of synchronicity and CPK that I will never forget.

In this chapter, I discuss thematic analysis and audio-based qualitative analysis. I also review how my coresearcher and I validated the data we gathered.

Thematic Analysis

I used deductive and inductive thematic analysis applied through an audio-based qualitative method, building upon the work of Borish et al. (2021), using audio instead of video for the narrative storywork and arts-based dissemination of results (Windchief & San Pedro, 2019; Osei-Kofi, 2013). Braun and Clarke (2006) noted thematic analysis has gained credibility in social sciences, describing it as "the first qualitative method of analysis that researchers should learn, as it provides core skills that will be useful for conducting many other forms of qualitative analysis" (p. 78). As an early career researcher working with emerging methods, such as storytelling, and emerging audio-based qualitative analysis methods, using deductive and inductive thematic analysis was well suited to the goals and methodologies of the project. In this research, thematic analysis is used as an "essentialist or realist method, which reports

experiences, meanings and the reality of participants" (Braun & Clarke, 2006, p. 81). Further, I used a combination of manual and software-based qualitative data analysis, which Vander Putten and Nolan (2010) advocated for as a method that strengthens thematic analysis.

Audio-Based Qualitative Analysis

My analysis began by transcoding each sharing circle using Descript (n.d.), an automated software that auto detected and keyworded speakers. I then cleaned each transcript in Descript and fixed any errors in the speaker detection. From there, I closely followed the video-based qualitative analysis method developed by Borish et al. (2021) with minor adjustments, such as using Adobe's (2003) Premier Pro instead of Apple's (2023) Final Cut Pro and developing an audio-narrative podcast format instead of video.

My initial thematic analysis began with keywording each sharing circle and generating an initial list of codes throughout the data (see Appendix I). Once all data were keyworded in Lumberjack builder (Lumberjack System, n.d.), a video- and audio-based keywording and story building software, I exported each transcript from Lumberjack builder into the social science coding software, NVivo as both a TXT transcript file with participant ID metadata as well as the audio recording. From there, I manually added the keywords into NVivo as codes, in addition to demographic and location information which was organized into cases (Braun & Clarke, 2006; DiCicco-Bloom & Crabtree, 2006; Vander Putten & Nolen, 2010; Welsh, 2002). By keywording in Lumberjack Builder, data analysis remained linked to specific timestamps on the sharing circle audio files, which allowed me to return to them later to sort stories for the arts-based dissemination of results informed by the more nuanced analysis done manually and in Nvivo. Next, I switched to manual thematic analysis, writing each code on a sticky note and sorting

them into subthemes and then themes. This resulted in five inductive themes across the data set in addition to the four deductive themes based on chronological markers that were predetermined in the research design, and honed during the thematic analysis and engaged acclimatization (see Appendix J).

I took these initial themes back to the community for validation, gathering their feedback and input to help shape and hone the inductive themes. I used the manual (sticky note) codes to validate the analysis with the participants, which worked well as it was both engaging and tangible, meaning the participants could literally pick up a sticky note, discuss it, and move it around.

From there, I overlaid the deductive and inductive thematic analysis to sort the results into chronological timelines with the inductive themes braided through the deductive time-based markers. I then returned to Lumberjack Builder (Lumberjack System, n.d.) and searched for keywords associated with specific themes to create audio narratives that matched each deductive and inductive intersection. To do this I searched for keywords (codes in NVivo) in Lumberjack Builder and then organized them into narratives that matched each inductive theme, which were then exported into Adobe (2023) Premiere Pro as storyline sequences via a master XML file. Once in Premiere Pro, I further honed the stories for theme and subtheme representation as well as demographic diversity across the participant sharing circles, where possible (see Figure 1). I then cleaned and polished deductive thematic sequences in Premier Pro, with introductions recorded for the beginning of each episode for added clarity and context.

Figure 1

A Chronological Framework Developed by Weaving the Inductive and Deductive Thematic Analysis Into Storylines

Validation

I returned to the community two times to validate the data and one final time to present the results to the community. On the first validation trip, I met with as many participants as I could and shared the inductive thematic analysis to ground truth the data and ensure the participants felt that their knowledge was accurately gathered and synthesized (Simpson, 2004; Viswanathan et al., 2004; Windchief & San Pedro, 2019; Yua et al., 2022). I made a few major and minor tweaks to specific wording of themes and subthemes. For example, I originally called the theme titled "About the Bears," "Indigenous Knowledge," which one participant very correctly pointed out did not make sense since all of the data related to Indigenous knowledge, not just the theme in which I grouped biology and ecology and colonial impacts on knowledge (illustrating inherent bias on my part as the researcher). The participants and I changed the theme title to "About the Bears" with an emphasis on biology and ecology and moved colonial impacts on Indigenous knowledge underneath the "Culture of Coexistence" theme. Other minor tweaks included removing inaccurate information about polar bear maternal denning and moving a few subthemes from "Culture of Coexistence" and "Bear Aware" over to "Industry and Economy," since they were closely related to tourism. These edits are still illustrated in the colour themes found in Appendix J.

On the second validation trip, I shared the podcast episodes and gathered edits, feedback, and input to inform the final audio outputs (Collins et al., 2018; Grimwood et al., 2012; Hacker, 2013; Viswanathan et al., 2004; Yua et al., 2022). Every participant had the opportunity to listen to all of the podcasts with my coresearcher and I or on their own and were encouraged to provide feedback and input. One participant included a few additions to the distant past as this individual

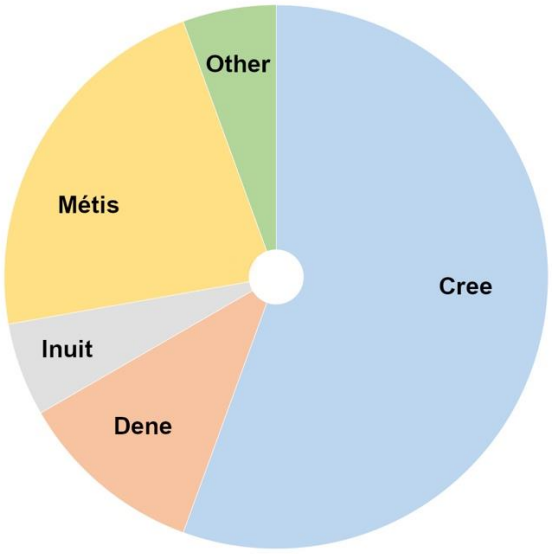
wanted to add contributions after considering for a few months; I omitted some of the data to protect and respect participants' privacy. By request of the IKK, I also gathered portraits of each research participant to include in the community presentation and final results. Additionally, I presented a draft website concept as an option for providing long-term community access to the research results and an easy way for the community to locate and share the podcast outputs (Yua et al., 2022). The participants indicated that they preferred the research results live on a standalone website for searchability, ease of finding and sharing, and to showcase the podcasts, data, graphics, and portraits. Together, the IKK, my coresearcher and I decided the best website domain would be http://churchillpolarbearcoexistence.com (password: ekosi). I shared the website with all research participants prior to completing the content and design, and, once finalized, made the website available to the public.

Chapter 5: Discussion of the Research Findings

I held 10 sharing circles with 18 Indigenous community members in small groups ranging from one to three participants. Over half of the participants identified as Cree (10); four identified as Métis, two as Dene, one as Inuit, and one as Souix (see Figure 2). Participants ranged in age from over 50 years old (10), 30–50 years old (5), and under 30 years old (3), with over half identifying as female (11), seven identifying as male (7), and one identifying as nonbinary. Participants identified as Elders, Knowledge Keepers, hunters, trappers, and as working in ecotourism in a variety of capacities, including guiding, hospitality, and other (e.g., cultural interpretation, dog mushing).

Figure 2

Breakdown of Participant (n=18) Self-Identification by Indigenous Group

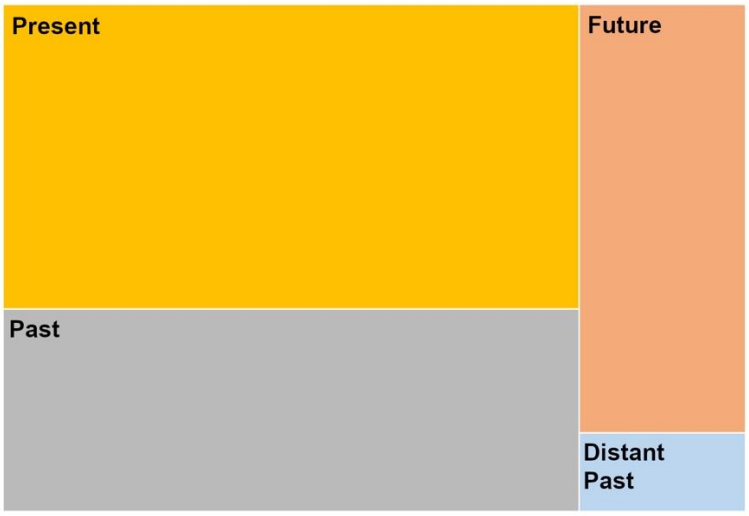


Knowledge shared by participants was deductively coded into four chronological time-based themes (see Figure 3). The distant past refers to the knowledge from parents and grandparents and was generally categorized as before 1957 prior to the closing of York Factory

when Swampy Cree families were relocated to present-day Churchill, Manitoba. The past refers to knowledge from childhood for participants over 30 years old and is generally categorized as the period between 1957–2005 before the closing of the open dump in Churchill and during the beginning of the tourism era. The present refers to knowledge from childhood for participants under 30 and knowledge from adulthood up to the time of this study (conducted in 2022 and submitted in 2023) for all other participants and is generally categorized as after the closing of the open dump and the modern tourism era. The future refers to visions for coexistence from the time of this study (2022) into the future.

Figure 3

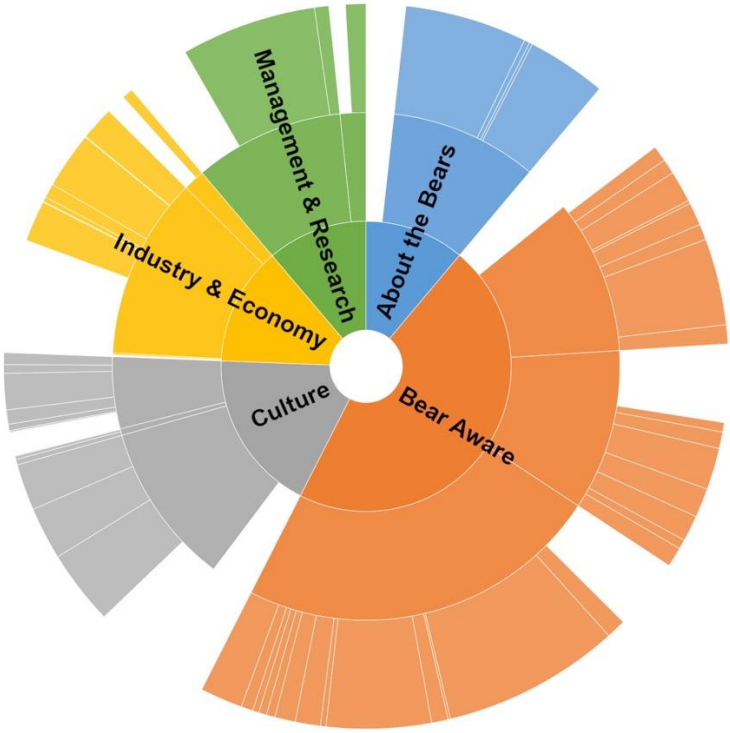
Codes per Chronological Deductive Theme



As depicted in Figure 4, I organized participants' responses to the distant past, past, present, and future prompts into five main themes: (a) "Every Tom, Dick, and Harry's out looking for a bear": Industry and Economy; (b) "Why don't they fly them South?": Management and Research; (c) "Their entire existence relies on being sneaky": About the Bears; (d) "Don't walk on the Pipeline!": Bear Aware; and (e) "It's just a way of life": Culture of Coexistence.

Figure 4

Breakdown of Codes Per Theme and Subtheme



A collection of maps were coproduced with the IKK, my coresearcher, and a Cree participant who I hired as the graphic designer (see Appendices A, B, and C). In order to fully grasp the research results, a visual representation of the Land and places referenced is helpful, particularly for future application of recommendations and future vision results. Further detail regarding place names can be found in the project case list (see Appendix K). Additionally, a few terms are used throughout the research results with place-based meanings. For the context of this thesis and the research results the term conservation with a lowercase *c* refers to the act of conservation from western worldviews and environmentalist paradigms, and the term Conservation with a capital *C* refers to the local Polar Bear Alert program, which was formerly managed by the provincial government department called Manitoba Conservation, now titled

Manitoba Sustainable Development and commonly referenced throughout the sharing circles as "Conservation."

Theme 1: "Every Tom, Dick, and Harry's Out Looking For a Bear": Industry and Economy

Through the analysis it became clear that a shift from an industry and economy based on the fur trade to tourism was a significant factor in how Indigenous peoples in Churchill coexisted with polar bears in the past, how they coexist today, and how they want to coexist into the future. This shift is tied to colonization and the transition from a subsistence Land-based lifestyle to a modern industrial one.

Distant Past

The fur trade was the primary economy on the shores of Hudson Bay for a few hundred years (from the 1600s to the 1960s). In addition to living a subsistence lifestyle, Swampy Cree, Sayisi Dene, Caribou Inuit, and Métis people would trade, mostly furs, with the Hudson Bay Company. Some Indigenous peoples also worked at the Hudson Bay Company posts, and many men of the Hudson Bay Company married Indigenous women. Polar bear hides, although not a primary fur that was traded, were sold when they were acquired. Polar bear meat was rarely eaten by Cree, Dene, or Métis people, but sometimes used for dog food. My coresearcher had the following conversation with a Cree Elder:

> Coresearcher: Yeah, and so when he [referring to his dad] shot the polar bear, it wasn't intended to eat it or anything. It was just for the fur?
>
> Cree Elder: I think it was a combination of both, and dog food. . . . and then providing for his family, eh? [referring to selling the hide]

Past

When York Factory was closed in 1957 many Cree families, particularly mixed families, relocated to Churchill. At that time the US military had a large base called Fort Churchill just beyond the present-day townsite. Polar bear hides still had some value in the fur trade, and killing polar bears was common. Three Cree Elders in a sharing circle recalled,

Cree Elder 1: Yeah, they killed lots that year.

Cree Elder 2: Oh, seventies.

Cree Elder 3: In the seventies?

Cree Elder 1: Yeah. They shot 38 that time.

Cree Elder 3: Yeah.

Cree Elder 2: Right.

Cree Elder 1: Yeah.

Cree Elder 3: Yeah. They were averaging I think about 20, 22, maybe 38. And then because old [community member] was skinning them and then he got my dad to help him.

Cree Elder 2: Yeah,

Cree Elder 3: . . . and then I went with my dad that time. He was getting $40 to skin one bear.

Cree Elder 2: Wow. Good day. Good money in those days.

Knowledge shared highlights a cultural shift over the course of a few decades, away from trapping, and killing bears, as both a cultural activity and economic incentive, toward a culture

that values bears more alive than dead, related to bear-viewing as tourism. Two Cree participants explained,

> Cree participant 1: So at the time, too, the fur price really dropped, eh? It wasn't that good. And Conservation [Manitoba government] said any buildings that you could use on the traplines, not just us, everybody, all the trapline holders, you could somehow use it to your advantage being whatever.
>
> Cree participant 2: And so, [we] got looking at the idea of taking people out there. So we just, I guess, transitioned it, right? So basically, you're transitioning a trapline to, in this case, viewing mothers [polar bears] and cubs in February and March. So, it's using the tool in the other way, right?

In the 1970s, 1980s, and 1990s, Churchill went through significant change with tourism becoming a top economic driver in the community. One family converted their trapline to an ecotourism lodge (Watchee Lodge) to take people out to see polar bear mothers and cubs emerging from their dens, and the first Tundra Buggy was built and began offering tours in the Churchill Wildlife Management Area (Frontiers North Adventures, n.d.; Lemelin, 2006, 2007; Wat'chee Expeditions, n.d.). A Métis Elder shared, "Well, I think when [people] started doing polar bear tours out west and then Len Smith started the Tundra Buggy and all that stuff, then conservation came to the forefront."

Present

Of the 18 research participants, 15 (83%) were connected to ecotourism through their job in some way; whether that was working in hospitality, guiding, providing tours with Parks Canada, bear guarding, dog mushing, or hosting educational presentations. "I'm surprised how

much money, like back in the day. I never thought the community would make a business out of polar bears. A lot of people are making lots of money off them," a Dene Elder said.

Participants felt very connected to the bears through their roles in ecotourism, and most talked about how ecotourism has grown to the point that it is almost becoming unmanageable. A Cree Elder shared,

> If you look for bears in fall time, you're sort of in the way, if you go cruising around now. You got all these new tour operators, and I understand they're trying to satisfy their customers. I don't do it [go for drives] as much in the fall anymore because everybody's out there—every Tom, Dick, and Harry's out looking for a bear.

Photographers and film crews were noted as a major aspect of the tourism industry. "I think professional photographers, sometimes they take too many risks to a point that, you know, just for a shot or they're doing something that's hazing the bear, you know? And I don't think that's right," said a Métis Elder. Social media also came up as a concern and an influence on the behaviour of tourists. One participant said,

> I think like a lot of times this day and age, I'm going to say it, some people are just out there for the 'gram [Instagram] and yeah, they could care less about their surroundings and what the implications of their actions could be.

Participants were genuinely concerned about the impacts of tourism on the well-being of bears. As one participant explained, "That bear's going to pay the price for somebody's stupidity of trying to get a picture, and I don't think it's fair."

Future

Participants felt that the value of tourism could not be overstated. A Cree Elder emphasized, "We know the value of polar bears to Churchill. We know it's significant." Another Cree participant noted more locals are engaging in tourism for employment:

> It was really cool. Today actually, I was starting to notice at work, like we'll be going across [the Churchill River] in our full crew, like the boat driver, the bear monitors, the tour guides, everyone is local. Like I've known them my whole life, and it's a really nice change.

Although more locals are employed in tourism than in the past, a Métis participant felt that better education would help: "Tourism needs to be looked at more as an opportunity for young people especially." He continued,

> I've always been asked by people, "When am I going to get a real job?" It's really important to show young people here that there is an opportunity to be successful and you don't have to leave home.

Participants expressed that tourism has the potential to support Indigenous values of storytelling and sharing, encouraging and celebrating Indigenous knowledge and cultures, and can be developed by Indigenous peoples and be Indigenous led. A Métis Elder said, "I'm trying to help other Indigenous peoples all across the country to recognize that tourism is big business, and it's part of reconciliation, that can bring us back, and be used as an economic driver for our communities."

Theme 2: "Why Don't They Fly Them South?": Management and Research

From a paradigm focused on exterminating carnivores to one that promotes protection and coexistence, knowledge shared shows that management of polar bears has shifted significantly over generations of Indigenous peoples in the region. A shift to include other-than-western worldviews in research has also been observed and is suggested by Indigenous participants in the future.

Distant Past

The sharing circles illustrated that in the first half of the 20th century, carnivores were primarily managed through lethal means and the concept of wildlife management or conservation did not come to the forefront until later in the 20th century. With the influence of the Hudson Bay Company, and consequently the economy and ideals of Europeans, Indigenous hunters and trappers killed polar bears when they came across them, although it was not very common. A Cree Elder recalled,

> Our dad used to talk about his experiences trapping. . . . He came across a mother and two cubs when he was checking his traps and, you know, as a hunter, as a trapper, he shot the mother and took the hide and the two cubs to the depot in York Factory, eh? He was talking about his experiences trapping. That's what they did.

It was also common to use poison to exterminate carnivores, which, as two Cree Elders shared, had other unintended consequences.

> Cree Elder 1: I guess you could poison wolves back then, eh?
>
> Cree Elder 2: Yeah,

> Cree Elder 1: So . . . he put poison on our caribou and he got some wolves, but he also got one bear that time. So, imagine with that poison going on, probably a few bears died.
>
> Cree Elder 2: Well let's see that animal died of poison, another animal eats it, and he'd get it and whatever. Stuff like that.

A lack of tolerance or value of carnivores, bears included, was a part of the adopted colonization culture at that time. "You could see where they put a gun there and they baited the bear and the gun goes off by itself. . . . But probably nobody knew about it," a Cree Elder shared. This was also a well-known and documented practice to kill polar bears in Svalbard, Norway (Lønø, 1970).

Past

Unofficial management of polar bears continued with the presence of the US military at Fort Churchill. Participants shared the following statements:

- "A lot of people say that the military would take polar bear hides home when they left here."
- "They had them on their walls."
- "When a big-shot from the army was time to move on, he'd take a hide with him."
- "Every major and every colonel went home with a polar bear rug."
- "That's probably why we don't remember a lot of bears."

> According to Lemelin (2007), in 1969, the provincial government stationed two officers, [and] a polar bear patrol was put into action in the fall. The goal was to ensure the safety of people and protection of property from damage by polar bears, and to ensure that bears are not unnecessarily harassed or killed (Bukowsky, 2002). This was accomplished by

> shooting problem bears, or clearing the area of bears by relocation (i.e. trapping and transporting). (p. 99)

In the stories shared by Indigenous participants, this picture is painted more vividly as "Conservation," referring to the Polar Bear Patrol killing lots of polar bears. A Métis Elder shared,

> Well, one of my first memories is, you know, they [polar bears] were always around town when we were growing up, and polar bear "Conservation" at the time was killing polar bears, because they used to say, I remember listening to the radio way back in the day, and they'd say, "That was the 21st polar bear shot in Churchill. And if you want to see it, go run down to the RCMP [Royal Canadian Mounted Police] garage." And the bear would be splayed out on the floor in there and you could go see a dead polar bear.

Concurrently, adjacent to Fort Churchill there was an open dump. "We had an actual pit of garbage that was constantly being burned, and if you wanted to see a bear, that's where you went," said a Métis participant. She continued,

> And it wasn't really good for pictures. When I was younger, I remember they were just black—almost looked like panda bears sometimes because they were just covered in charcoal, and numbers, and singed hair. That's when they used to actually, literally, paint a great big, huge number on their butts. And I think it was work with [a photographer] and that team when they started out that they wanted that stopped, that practice. He was saying, "You know, we're trying to bring guests here to view them, and it's not a pretty picture, right? The dump is not a pretty picture."

All of the participants recall seeing bears at the dump, and many fondly referenced drives to the dump to view polar bears. One participant said,

> Even going out with my friends as teenagers, like we all started driving and we had like different people's parents' vehicles and going out there and like having the bears just like come crawling up out of that dump with the fire going in the background. I was a teenager, so I'm like, "Oh man, that's like Scar from the Lion King."

Many of the stories caused laughter in the sharing circles and memories were portrayed with fondness. A Cree participant said, "I don't think I was ever really scared. I think just being that young, being exposed to bears, it was kind of just normal to go to the dump and see bears there. I didn't really know anything different." Many participants commented on the abundance of bears at the dump:

- "I think the most I've ever counted at the dump one time was about 33 bears."
- "I remember going for a ride at night and seeing anywhere from 10 to 15 bears on the road, no problem."
- "Sometimes there'd be 16 and sometimes somebody would say, 'Oh, there was like 40 out there.'"
- "Everybody would count and see who had the highest number of bears they seen."

Participants clearly explained that the dump created a habituation problem with polar bears: "Once they find that food, where it is, they're not going to forget. They'll come back to the same spot." Out of necessity, the provincial government's Polar Bear Patrol program evolved. A Cree Elder recalled,

> It [the abundance of bears] really slowed down after they shot 38. Because first you never had to control the bears. I guess that was the only thing to add, they didn't have the bear jail yet. So, you got this problem now, so what can you do? Cause they were really adapted to man, now they were coming in and I think that's when the Polar Bear Alert program came together.

In the 1970s, the military left Churchill and the provincial government refurbished D20, an abandoned military building, and created the Polar Bear Holding Facility, designed to temporarily hold up to 16 individual bears and four family groups (Lemelin, 2007). This milestone was followed by the creation of two protected areas, the Churchill Wildlife Management Area in 1978 and the creation of Wapusk National Park in 1996, which further facilitated, managed, and supported conservation and tourism in the region (Lemelin, 2007).

Present

In 2005, the open dump was closed and waste moved to an abandoned military building called L-5 near the airport. A Cree Elder recalled,

> I was at one of those meetings when they wanted to close it up [the dump] and put the garbage at L-5, and they said that someone had asked that question, "Will the bears come to town?" And they said, "No, we'll have more patrols." We have bears in town. I mean, the bear guys [Polar Bear Alert] are good, like they're quick. Yeah. But still, there's a lot of bears in town.

Participants further discussed changes in how attractants were managed in the community. A Dene Elder shared, "Living in a community where the bears come through, one thing that I can really appreciate is that I think our community has really learned how to keep our

community clean, and people don't have garbage around their houses." In recent years bear-proof or resistant garbage bins have been more widely distributed throughout the community. Three participants agreed, "Now we got those cool [bear proof] bins. So that fixed a lot of issues, especially on our street. I'm pretty sure it's on everybody's street now, those closed bins that they [bears] actually can't get into." A Cree Elder confirmed, "You know, it's really a community that has really come together and just really, you know, we live with the bears, so this is what we need to do."

Changes to wastewater management at the seasonal ecotourism lodges in the Churchill Wildlife Management Area also reduced attractants outside the community. A male participant said, "It was a huge difference too when the slushie tube [grey water drain] went away. Bears didn't stick around at camp as long. They kind of passed by, didn't camp out there for days at a time."

A colorful local, who frequently entertained film crews, had a few dog yards outside Churchill that were known to be attractants for polar bears (Botes, 2011; Kell et al., 2015). He passed away in 2018, with his dog yards disappearing shortly after, changing the dynamics of attractants outside the community. Participants commented that they were unsure how this would impact polar bear movements in the future. A Métis Elder shared,

> Well, his relationship with those bears was special, right? The same big bears came back every year and I remember, [the dog owner] and I were great friends, and we talked about this at length all the time, but that was his security system from the young bears, right? So, he had all those old bears that came there, and he fed them, and they stayed around there, and they kept the young bears away. And remember that one year that

> Conservation came in and took all those old bears out of there, and then all the young bears moved in and started killing his dogs. You know, so those bears had been seeing [him] for years and years and years, and so they never went and took those old bears again because it was a big controversy at the time. So, his relationship with those bears was special. I don't know if it should be allowed, but that's what he had with them, right?

Modern management of tourism is an emerging issue, particularly regarding their interference with the Polar Bear Alert staff when they are trying to move a bear. "We know to stay back from Conservation, but tourists will go drive around them, cut in front of them, park there, get out of their trucks and get their cameras and everything while they're trying to haze a bear," a Cree Elder said. The additional tourism pressure has resulted in more habituation, or conditioning of polar bears to people, compounding management challenges. According to a Cree participant,

> The bears are learning and like, how there's always buses out and people who want to go see the bears, so they're becoming desensitized to vehicles, and then they're becoming desensitized to the car horns, and so every single time, or not every [time], [but] more likely they [Polar Bear Alert] have to get out and bear banger than before, they could just honk their horn and chase it off.

Another young Cree participant shared a unique example of polar bear habituation and intelligence:

> One time she [our dog] was barking and we woke up and it [the polar bear] was actually at the front of the house, and it was trying to get into the dumpster at the apartment block. And we realized after that it was like an older experienced bear because we called Polar

> Bear Alert. They drove by and that bear hid from Polar Bear Alert. They recognized the truck, they like tucked back into the dark, and then once the truck passed by, they went to look for it somewhere else, he [the polar bear] came out, and we called them back. We were like, "It's hiding right there, like it was right in between the apartments and the dumpster." And it was just cool to see how smart they are in that way to just know, like recognize a vehicle, and be able to make that assumption and associate it with that and hide.

It was clear that the local Polar Bear Alert conservation officers are deeply valued, trusted, and looked up to by Indigenous community members. Individual names came up in 10 unique stories during the sharing circles. While participants expressed that the community values the Polar Bear Alert program immensely, they were simultaneously concerned about the well-being of the bears. As a Cree Elder said,

> They [Polar Bear Alert] do a good job of keeping us safe, . . . but I think sometimes it's the bears that are at risk now, you know, because they're being exposed to people and, well, there's a lot of people out trying to see them. Well, tourism has blown up so much. It's crazy.

Future

Although participants value the Polar Bear Alert program, they felt that sometimes the bears were hazed excessively, and more emphasis should be put on managing people instead of wildlife. A Cree Elder shared, "One of the things that we've noticed over time is that, you know, with Conservation, they just seem to be overly aggressive sometimes, you know, in terms of how

they're handling bears or steering bears out." Participants regularly came back to the value of respect. One Cree and Dene participant explained,

> Respect meaning that the bears were here before all of us, you know? They were here before Fort Churchill was here before this modernized version of Churchill that we sit on is here. So, we built in their way, right? So, there's no reason why we can't coexist, and I believe that it could be done respectfully, and that means that the bear always gets the right of way, you know, from one end of town to the other. Like, let it do its thing, let it cross its path, unless of course it's a juvenile bear looking for trouble, then, you know, then of course there needs to be some kind of management there.

Participants expressed that Indigenous values of interconnection and respecting all beings equally, meaning that bears and other animals have spirits and well-being, that should be considered as well. One participant was particularly concerned about stress:

> Knowing the way people personally react to stress: it can affect the way we sleep, the way we eat, the way, like our day-to-day life continues. I can only assume that it's probably the same for different types of animals and species around the world.

Mentioned 13 times in six unique sharing circles, participants asked why Polar Bear Alert relocates polar bears by helicopter to the north and why they would not consider flying them south? Two Cree Elders asked,

> Cree Elder 1: Why don't they fly the bears back to Wapusk Park?
>
> Cree Elder 2: Why? Yeah. Why are they flying them between here and Arviat?
>
> Cree Elder 1: Yeah. And they end up probably in Arviat.
>
> Cree Elder 2: In Arviat. Yeah. . . like fly them back to where they came from.

Participants were genuinely concerned about creating problems for Arviat, the next community north, and commented that they respect Inuit and their relationship to polar bears, which includes hunting as ceremony and a subsistence lifestyle, but they saw polar bears being habituated to garbage and people in Churchill and they did not want to intentionally create issues for their neighbors to the north. A Métis participant shared,

> How, the problem bears, when they take them out of jail and then they fly them north. I would like to know, like, is that really the best idea? Because I remember when Arviat didn't really have a bear problem, and now they have a bear problem. Is it because we're putting all of our bears there? Um, maybe there's a better spot to take them, like maybe into the National Park, because that's a big area where people don't live. I don't know what the rationale is for taking them north versus taking them east, southeast.

The town started the Churchill Bear Smart working group in 2019 to bring local stakeholders from business, government, and community together to address coexistence and management challenges. A Cree Elder shared,

> On the Polar Bear Smart Working Group, one of the recommendations is that if you're moving bears, move them south. Right? You move them north, you continue that, they're heading to Arviat, they know there's a dump there now. They know what's there, so it's just repeating what happened with the old dump that was here, right?

Participants were also concerned about the safety of the Polar Bear Alert team. A Cree participant said,

> Even though Conservation has been doing this for so many years, they're still like basically risking their life every time they go to chase a bear to keep the community safe, and it's important that we're able to give them the space to do their job safely.

Participants further suggested coming up with boundaries or recommended distance that is communicated to tourists through educational materials to help manage the road-based bear viewing near town and help keep the local Conservation Officers safe. Two participants were also concerned about the future of the Polar Bear Alert program and suggested a local apprenticeship program would benefit the community,

> Participant 1: I wonder what it's going to be like when [the local Conservation Officers] actually retire. It kind of makes me worried.
>
> Participant 2: Yeah, I was actually just talking with my coworkers that they should have like some sort of apprenticeship program, for the next [Conservation Officers], it should be young local people following in their footsteps, because realistically, we see conservation officers rotate through here like a revolving door, and out of everyone, they're the two that stayed, and realistically a local is probably someone who will stay like they have for so many years.

Participants expressed the benefits of having local conservation officers who have a nuanced understanding of place names and have relationships with community members. A Cree participant said,

> Sometimes I call Bear Alert and I'm like, "I'm at [insert local name]'s house." I don't say like [the street address], and . . . I can tell when it's not a local who answers the line, because then they're like, where? . . . I'm like, "they'll know. Just tell them!"

A common sentiment across participants was that tourists travelling on their own without a guide should be regulated to protect both people and polar bears. One participant said,

> Tourism's probably just only going to get bigger and bigger. I do see a lot more people from down south putting a group together, coming up, rent a van, go out and, you know, there's somebody I've never seen before carrying a shotgun or a group of photographers will get out there, and they get like super, super close, and then you're almost kind of watching them too. Or somebody sees you with a gun and they say, "Oh, this guy's got a gun. I'm going to keep going a little closer. But, I think they should try to regulate that a little more because someone's going to get hurt. But they just, you know, it's a free for all out there. . . . [We need] some sort of regulation.

One participant was concerned with the tourism at lodges outside Churchill that "walk with the bears" and expressed concern and hoped the community would be notified if any encounters with negative outcomes occurred. This was not mentioned by other participants, despite a subtheme of habituation concerns throughout the sharing circles.

Both related to the Polar Bear Alert program and scientists researching polar bears using helicopters, participants expressed concerns about the impacts of the tranquilizing drugs used to immobilize animals. A Métis participant shared,

> A lot of my friends eat polar bear meat, like I've eaten it too, and it's very important for people up north, like as part of their diet. So, I do recognize that some bears do have to be drugged, but I think that it should be minimized.

A Métis Elder agreed,

> There are a few advocates out there that say, okay, my people still eat polar bear. That's our culture, you know? Not for you to discriminate about it, but what you're putting into those is also being transferred to us.

Indigenous community members also expressed a lack of understanding about what the research was accomplishing and why it was worth the stress to the bears. One participant said,

> My background's all in science, right? So, I think that [tagging] probably is important work, and collaring can give you a lot of information, but does it actually have to be done every year, or could it be done every 5 years instead? Because that's a lot of bears being drugged.

A Métis participant asked, "What haven't they found out in 1970? That they're still trying to find out today? I don't understand that." Through the sharing circles it was clear that a general lack of understanding or communication between Indigenous community members and scientists exists, perpetuated by a lack of understanding of worldviews and cultures. A participant was additionally concerned about the polar bear's experience of trauma during research activities: "And of that trauma, what actually did you get from it? What information was so vital?" Two Elders suggested that smaller, less invasive tracking devices would be better:

> Elder 1: So, when you do see collars, it stands out. It's not natural. You think that nowadays with all the technology, right? Like, they tag their ears, why can't that tracker be in its ear?
>
> Elder 2: Yeah. Well, you can track a dragonfly. They can put a tracker on a dragonfly that small. Why can't a tracker go on a polar bear that small?

The divide between Indigenous community members and scientists was further exemplified by one participant: “I find that the researchers aren’t really approachable.”

Orphan cubs being taken out of the wild and put in zoos, particularly the zoo in Winnipeg, was also a common concern expressed in sharing circles regarding future visions. Participants did not want orphan cubs going to zoos and preferred that nature be allowed to “take its course.” One Elder shared concerns about traumatizing cubs and related it to trauma from residential school:

> It’s just basic, if you think about it. It’s just like taking a child from their home, and basically here, this is your new home. This is where you’re going to stay, and everything’s foreign. Nothing’s going to be the same. You can relate to, you know, residential school. Here’s a piece of wildlife, that was free, and you know, everybody’s saying, “Oh yeah, but they’re giving those bears a fighting chance.” Well, I would rather nature take its course.

One Elder suggested a local solution for orphan cubs in the future: “You know what my dream problem solver would be is to have a sanctuary in Churchill where orphan cubs can go,” which the other two Elders in the sharing circle agreed with.

Theme 3: “Their Entire Existence Relies On Being Sneaky”: About the Bears

Indigenous knowledge of polar bear biology and ecology was gathered through the research process, although it was the theme with the least amount of codes throughout the data. Much of the intergenerational knowledge of polar bears in the region was lost due to colonization during the relocation of Indigenous peoples to Churchill; however, Indigenous

knowledge of polar bear biology and ecology remains with Land-based activities, many of which are related to modern ecotourism and future visions for coexistence.

Distant Past

It was difficult to gather intergenerational knowledge about polar bears prior to the relocation of Cree and Dene people to the Churchill area, as much of the knowledge was lost through colonization. The common thread shared was that polar bears were not seen often and if seen they were shot and the hide (i.e., fur) was brought to a trading post to sell. Two Cree Elders shared,

> Cree Elder 1: So, your question was about bears back then. So, they would've shot a bear. Hey, that was common.
>
> Cree Elder 2: Yeah. Well, in those days, I used to see, or your dad and them tell us, you'd be travelling like that, the bears come across close to your track, he's gone.

Past

Indigenous knowledge from the past showed that polar bears are highly intelligent and are susceptible to habituation, particularly when garbage is accessible. However, despite alternate available food sources, participants agreed when there is sea ice available as a hunting platform, polar bears do not remain near the community. Two Cree Elders explained,

> Cree Elder 1: There's one thing about those bears, like all those years they go to the dump. They went to the dump here. As soon as that ice freezes from the . . . youngest bear to the oldest bear, there's no garbage bag that will hold them.
>
> Cree Elder 2: Once the ice freezes they're gone.

> Cree Elder 1: They must do well out there [because when] that time of year comes they're gone!

Two Cree elders continued,

> Cree Elder 1: They just, they know what it's all about out there. Yeah. It must be easy for them I mean. I don't know, it must be. Because they go right away.
>
> Cree Elder 2:"Look our restaurants open, let's go!"
>
> Cree Elder 1: Yeah. When you think about it, they get one seal that's lots.
>
> Cree Elder 2: Little ones [cubs], they have a good time with that one [seal]. Yeah. And the foxes chase them around, eat their scraps and that.
>
> Cree Elder 1: So they do well out there, that's for sure.

Throughout the sharing circles, participants emphasized the importance of seals to the polar bear's diet, with specific mention of how calorie-rich seals must be to keep polar bears away from the community. Second-hand observations of polar bears sneaking up on breathing holes of seals was shared by a Dene Elder,

> I think they come here more for the seals, you know? In the spring, because that's what they live on, eh? . . . I've never ever seen a bear [doing this], . . . but [someone] was saying that he'd seen one sneaking up to a seal hole.

One Métis Elder shared knowledge of polar bear denning areas, particularly inland along river corridors and established travel routes:

> I know where there's dens all the way up the river. I know where there's at least five dens over the years. When you drive up there, when the bank erodes after those forest fires and stuff, you can see those holes, eh? Wild where they are. So, you always got to be aware,

> even I've seen bears 60 miles up the river, you know? They're all over this country and I've seen them in every month of the year.

Present

In a more modern context, participants shared Indigenous knowledge of polar bear ecology, biology, behaviour and abundance, often in relation to observations through engagement with tourism. Two Elders expressed the data that researchers get do not always align with observations made during polar bear maternal den emergence:

> Then after our season is done and their season is done, because everybody banks on their information right? . . . There's times we come across more bears than them, and that shouldn't be, because they got the advantage flying with a helicopter right? And they cover a lot of area . . .

One Elder continued, "But the bears are out there for sure. Because we've been doing it for a long time, and the little area we work, the bears are still pumping out the cubs."

A participant shared understandings of polar bear maternity denning ecology and biology:

> So now you look at the female, now she comes off the same time as every other bear this time of the year [summer]. Now she's got to go in [to a den] and that's the experience we have, that people don't see, don't even know about. Now she goes in, now she's not going to eat until July, August, September, October, November, December, January, February, March, and she's pregnant and she's giving birth. And then in mid-December, probably around Christmas time, I say, that they give birth. The only reason why I say around Christmas time, because, around that time you'd track a female leaving, going

> out, that means she lost her cubs. So that tells you they're born around that time, right? So anyway, she didn't eat for eight, nine months. And they say the bears are starving? I don't think they're starving you know, some of the females we've seen they don't look to be in that bad of shape, eh?

Another Elder said, "Those ones with three [cubs]. I wonder how far . . . how many [cubs] make it out there? . . . [All] three cubs? Probably not too often. Pretty hard [for them to survive] something will happen to one of them." Participants expressed concern about increasing polar bear encounters. One participant shared,

> So, there's a lot of bears. It's safe to say there's a lot of bears when we got Churchill problem bears, and you've got Arviat problem bears, so the numbers are not decreasing. They have to be increasing to have . . . a problem in two communities.

Through the sharing circles and knowledge shared, it is clear that more polar bears are traveling through the community of Churchill than in the past, which this study shows may be caused by a number of reasons, including a cultural shift away from hunting, an economic shift away from the fur trade, the absence of the military, and the closing of the open dump. Western science shows that increased polar bear sightings in or near communities may also be tied to polar bears spending more time on Land due to earlier sea ice break up and later freeze up in some regions (Molnár et al., 2011, 2020).

Outside the town of Churchill, in the Wildlife Management Area, one participant observed fewer polar bears than in the past,

> Well, I have a picture that was on camp [the Tundra Buggy Lodge] before of like 30 bears in one picture, in the kelp bed beside camp, and you don't see that anymore. You're

> lucky to catch a picture of three in there now. That's usually a mother and two, well, what are they? COY [cubs of the year].

Although this knowledge directly speaks to polar bear abundance, it must be considered within the context of industry and management, and in relation to changes to wastewater systems on the remote lodges in the CWMA and past habituation. The participant continued,

> As much as I don't like to say it, I don't think there's going to be too many bears here. The numbers have declined here for what we see all the time. I don't know what science is saying, but guaranteed for what we see here all the time, just driving around and that, I don't see anything like I used to.

Further knowledge highlighted the unique use of coastline by specific bears,

> When we got to the Cape [Cape Churchill], the big bears were at the Cape. The big ones, like we're talking dinosaurs. I remember them sticking their heads in the windows of the [Tundra] Buggies and their heads so big that they could only get their snout in. And yeah, they are the big guys, I've never seen a bear like that anywhere this way [near town].

These observations, although nuanced, show the diversity of use of the coastline near Churchill by polar bears and the intersection of Indigenous knowledge, western science, and management and how people are not just observers but also play an active role shaping polar bear behaviours and landscapes (Barker, 2009; Frideres, 2019; Windchief & San Pedro, 2019).

Habituation and intelligence of polar bears surfaced as subthemes throughout the sharing circles. One Cree Elder joked, "We're lucky they like the seal, or we'd be in trouble. That's their main meal." Another Cree participant explained, "When you think about it, their entire existence

relies on them being sneaky." The intelligence and ability to habituate polar bears was exemplified in many stories, as two participants shared:

> Participant 1: It's like their [the bears] young curiosity that gets the better of them. . . . I just think like the younger guys [bears] are a little more curious of like, what the heck is that over there? What's that smell coming from over there? Where like maybe an older, more battled bear isn't interested in what might happen in town. He's like, "been there, done that."
>
> Participant 2: Yeah, "You guys are not even cool. I'm leaving. You [Polar Bear Alert] chase me away. I'm just going to go over there [into town] just to go run [get chased] away, I don't think so." But then the young bears need to come towards town to learn not to.

In relation to habituation, a Cree Elder warned, "You've got to be careful in terms of how you're handling bears, because you're going to change behaviours, and that's what's happening now."

Summer bear behaviour was noted throughout sharing circles, with specific subthemes of polar bear energy preservation. One participant said, "Just like people, they [bears] want to find a cool place to chill out in the summer. Who likes being hot?" Another participant shared, "They're reserving their energy for when the ice actually gets here, so most of the time they're relaxing." One participant shared,

> During that summer period where we would just go jumping on the rocks, this is where I learned that bears find these crevices nice and cool and they sometimes seek shelter in there just for a nice cool nap on a hot day, and there was a big giant crevice and it was

> small where we had jumped over, but when you stopped and you looked at the bottom of it, it actually got really open towards the bottom, and there was a bear just resting in there.

Participants often related to the bears through their own lived experience, an example of inherent Indigenous worldviews that consider people and animals more equally and always in relation (Hogan, 1996; Jimmy & Andreotti, 2019; Windchief & San Pedro, 2019). These worldviews were present in stories like this one from a Cree participant,

> They [bears] like to get a cool breeze off the water or the beach or just kind of laze around and enjoy it, and that's kind of what they're trying to do, just laze around and enjoy life and stay cool where they can.

Future

Despite a general theme that there are more bears around town than there were in the past, all participants were concerned about the well-being of polar bears into the future. "Well, with global warming, like they're always talking about on radio, don't look good for anybody. Not just the polar bears, you know, a lot of other animals," a Dene Elder shared. Similarly, a Métis participant said, "I'd like to see that they're still here, and we're still, you know, seeing their beauty."

Theme 4: "Don't Walk on the Pipeline!": Bear Aware

The concept of being bear aware is embedded into the fabric of the community's culture and begins when children are young, simply through day-to-day life coexisting with polar bears. Participants noted there could be improvements to bear awareness and education for locals but were most concerned about the safety of seasonal workers and tourists.

Distant Past

In the distant past it was rare for Indigenous peoples to see polar bears and, if they did see them, it was usually while trapping or hunting and they were shot. People carried guns for hunting and self-protection and avoided travelling in stormy or foggy weather. A Dene Elder reflected, "Like I said, we never worried about bears . . . you'll have to talk to, maybe someone a little bit older than me to know that part, because as far as I can remember, we never worried about polar bears."

Past

In the past, children used to play outside on the rocks all the time without worrying about polar bears. Concerns about polar bears in the past are only mentioned in relation to walking or running home at night in the dark between the town of Churchill and the Flats, and especially through the willows or tall bushes. "Because we used to go all over the place, everywhere, in those bushes, up on the rocks, everywhere," a Cree Elder said. Many participants stated that they did not worry about polar bears in town when the military was in Churchill and during the era of the open dump, noting that once the dump closed polar bears were seen in town more frequently. Three Cree Elders shared,

> Cree Elder 1: We weren't told about bears from the town, but lucky I guess our parents, they knew to watch, be careful. Parents always said that.
>
> Cree Elder 2: Well, even in the 50s in that school holidays, four or five of us went way down there, all the way almost to camp along the rocks, no bears or nothing. Nothing. We'd eat caplin, find a little pair, clean them as much as we could, boil them up a little

bit there, on a nice flat rock, fry 'em on there. Oh yeah, . . . a whole bunch of us. All day long we'd be gone.

Cree Elder 3: Yeah, that's the way it was. You ran around and played all over the place. That's right. I don't remember being . . . there wasn't that many bears then.

Cree Elder 1: No, because I think it was the military that was keeping them at bay, eh?

Cree Elder 3: Could be, you know?

Cree Elder 1: Yes. And then, all of a sudden, when the military starts leaving, all of a sudden that fence goes down and then the bears were coming through.

Participants remarked that it was surprising that beluga whales were not more of an attraction in the past, and, despite an active whale harvesting industry, they rarely recalled that as an attractant for polar bears, although it did happen occasionally. Participants said their parents warned them to stay away from the whaling plant, and they recalled it being smelly. A Cree Elder shared,

After we moved to town, my mom would say, "Don't go to the whaling plant." And we'd always say, "Okay, no, we won't, we won't." And we'd go there and we'd go home and she says, "You were at the whaling plant eh?" "No, we weren't there. We didn't go there." And then we finally caught on because she would smell our clothes. It had a very strong smell. So, if she can smell it after we, you know, make our way home playing and everything, then a bear can smell it from probably across the river.

Participants also observed, historically, families living on the Flats were diligent with waste management, keeping clean houses, and burning their garbage in barrels. Two Cree Elders said,

> Cree Elder 1: Cause we used to burn our scraps and garbage in a bin.
>
> Cree Elder 2: That was a thing down the Flats. Say we had a big metal bin, and we just put all of our garbage in there and burned it. We always grew up with the idea that you cannot have garbage around.

Most participants' first memory of seeing a polar bear was an encounter, often at the Flats, outside of a cabin or walking. Participants said they were afraid to be near the windows of cabins when a polar bear was outside, and they remember their parents hiding them. A Dene Elder recalled,

> We were still quite young, but we lived down the Flats, and we lived in a very small house. The windows were like, you know, the [thin] panes? So, there was six panes, and the beds were right here [motions below the window], and the window was right here [motions above], and a bear came and was on the window just right above our beds. And so, our dad, he just went to the porch and the only thing that he had was pots and pans, you know, to scare the bear away . . . and it worked. Yeah. Just loud noises.

The open dump was the most frequent location noted for bear sightings and encounters in the past, and participants shared both fond and negative memories of these. Many of the younger participants experienced their first polar bear encounter at the dump.

Nearly all encounters with negative associations or fears and all attacks involved people walking or on foot and either included an element of surprise or an attractant. Two Cree Elders remembered a polar bear attack,

> Cree Elder 1: What happened with [that man]? He was in a bush or something?

> Cree Elder 2: Yeah, they were out setting [fish] nets across the river. Probably . . . they [the polar bear and the man] startled each other because he [the man] was in the bushes.

Most attacks were associated with attractants such as rotting meat, fish, or garbage. Another Cree Elder shared, "When the hotel burnt down and [a community member] dug in the freezer and put the meat in his pockets and then the bear followed him." Attractants are a common thread throughout the data both from an individual concern and management perspective.

Present

Participants warned "Don't walk on the Pipeline" 12 times in six different sharing circles; this statement represents their concern related to walking on a trail that shortcuts between many of the houses and the backdoor to the school, a route that is seldom travelled by vehicles, with poor visibility, and along the coast in an area where polar bears are commonly sighted. Kids are taught from a young age to be bear aware, avoid the Pipeline, and stay off the rocks. These lessons are taught through folklore, illustrated by multiple participants sharing, "One thing a kid in Churchill is always told, don't wear your shoes on the wrong feet because you're going to meet up with the bear if you do." Another piece of knowledge shared through folklore was "Polar bear weather," described as fog, as polar bears are more likely to be on the move in cool temperatures with low visibility.

Avoidance strategies are utilized consciously and subconsciously by participants to coexist with polar bears. A Métis participant shared,

> See in bear season, I'm not where the bears are most of the time, like not in the touristy areas. Like, I'm out at Goose Creek walking and in bear season I'll carry a gun. So, I guess you could say, I spend most of my time avoiding bears.

Outside of encounters and attacks, participants repeatedly noted that they are not afraid of living alongside polar bears and that it is just a "part of life." Participants are diligent and take care to avoid encounters in the fall, but also noted summer is a concern, and even at other times of year they can never fully let their guard down. A Métis Elder warned, "But that's how they can surprise you, right? Yeah. You let your guard down in this country for one second." The unforgiving nature of the environment, polar bear concerns aside, was repeatedly emphasized. One participant said, "More general, like not only just about polar bears, but about this entire place. There are so many dangerous things about it that we unknowingly have just adapted to living with."

Many people either avoid the areas where polar bears are more likely to be encountered or utilize buildings and various forms of vehicles to create a barrier or safety from polar bears, including cars, trucks, buses, four wheelers, skidoos, Tundra Buggies, zodiacs, and even taxis in town, especially in the dark when visibility is lower and bears can more easily enter the community undetected. People repeatedly reference having an "exit plan" when walking around town and taking corners wide. A Cree participant shared,

> In my plan, I was going to like, you know how they say drop mitts and hats? That was my plan, and I was like, I need enough clothing to go from that four-way to get to, in my head I was like, [this] house, I'll go to [this house]. . . . I just need enough clothing, and I've been mentally preparing this for years now, for when I run into a bear at that four-way.

Two other participants elaborated,

Participant 1: Yeah. I've also thought about it before, like what would be the smelliest thing that would maybe hold them off the longest? Like would it be your hat? Maybe a shoe?

Participant 2: Maybe a neck warmer?

Participant 1: Yeah, you're breathing on it!

Participants said this awareness is inherent to growing up in Churchill and coexisting with polar bears, "You know what I mean? So, this is our culture and who we are, and everyone's raised with that understanding," a Métis Elder shared.

Participants noted having a good line of sight, avoiding surprise encounters, and giving polar bears lots of space are good strategies for avoiding encounters. Participants stressed the importance of having someone designated as a bear guard or monitor for Land-based activities, and carrying a shotgun was the main method of deterrence and protection. Historically, lethal ammunition was primarily used in firearms; however, today it is common to use cracker shells (a loud explosive, similar to a firework, that explodes approximately 30 m away a few seconds after exiting the shotgun barrel) as a method of mitigation to scare or haze a polar bear away. Additionally, people make noise, historically banging pots and pans, in modern times using air horns. Two participants noted making noise (singing) or using whistles to warn a polar bear that you are in the area as a form of mitigating surprise encounters. Many stories of actual encounters (as opposed to avoidance strategies) include hitting a bear on the nose if you do in fact encounter one at close range. A Cree Elder shared,

They were going this way to daycare and the bear was coming this way from the church. . . . [A student] was like 5, he was in kindergarten, and every morning I'd say, "Good

> morning . . . , How are you?" And he'd say, "I'm good, but we just about got eaten by a bear!" Because he is always had these stories, I said, "Oh yeah?" And . . . he said, "Yeah, my mom had to hit him in the nose with the backpack, and then he took off," and I'm thinking, okay, I'm going to have to check with his mom on this one. Sure enough, she comes at lunch, I said, "[the student] said you guys met up with a bear?" And she goes, "Yeah, I had to hit him in the nose with the backpack," she said. "It was just an automatic thing. Grab the backpack and whack him over the nose, and then he took off, spun around, and took off towards the church again." But lucky thing, eh?

Participants recommended a bear guard course and emphasized the importance of learning how to read polar bear behaviour and use avoidance strategies.

Unlike their parents and grandparents, playing on the rocks is no longer common for kids, and participants warned that playing on the rocks or walking on the rocks is very dangerous and should be avoided. Two Métis participants said,

> Participant 1: Well, if you see a bear run to the nearest house, you know, most people's houses are unlocked in Churchill, I think. I know that mine always was, and I never locked my vehicle.
>
> Participant 2: Don't play on the rocks. When you're biking home, if it's dark outside, check every alley.
>
> Participant 1: Yeah.
>
> Participant 2: Every opening.
>
> Participant 1: Get home as quick as you can.
>
> Participant 2: Yeah. Don't be stupid.

Participant 1: Yeah.

Participant 2: He went [gestures to the other participant], “You play stupid games, you win stupid prizes.”

Some parents now drive their kids everywhere while others are less concerned. Some parents only drive their kids around town at night. A few participants noted that social media is used as a tool to notify people when bears are near town, which can assist with safety and awareness but also can cause challenges for bear viewing near the community.

Future

Future visions for being bear aware largely centre around education and building upon the awareness that already exists. Many participants suggested increased education and information in school before summer starts. Polar Bear Alert comes into the school to do educational programming with local kids, but participants feel it should be done not just in the fall but also at the end of the school year before summer starts, as many parents are concerned about polar bears when kids spend a lot of time playing outside. Some participants suggested more regular programming throughout the year, including in the winter, to provide polar bear knowledge beyond just safety concerns, and expressed that this would assist with more inclusion of local and Indigenous youth in careers related to polar bears such as tourism, government, or research in the future.

Participants also recommended more polar bear safety talks open to the public and earlier in the year (including summer). Participants like the talks that Parks Canada does and think there should be more of them. Two Cree Elders agreed,

Cree Elder 1: I think that tourists need to be educated more.

Cree Elder 2: They do.

Cree Elder 1: They need to learn.

Cree Elder 2: Well, they used to have those bear talks for newcomers, and I haven't heard of any since before Covid—for tourists, for construction workers that come into town, for anybody really.

Cree Elder 1: Yeah.

Cree Elder 2: Yeah. I mean, even if we just wanted to go have a refresher, maybe there's some new information that they could share with us? But I haven't heard of any of those in a long time.

Better signs around town were also recommended, that provide more context. A Dene Elder said, "Those signs have become a souvenir . . . nobody's taking it serious anymore." Participants felt that the existing signs are more of a photo opportunity for tourists, rather than doing their job of educating the public.

Most participants recommended a safety video and better information for tourists. The general sentiment is that locals are bear aware and educated and the polar bear safety concern largely relates to visitors who are less aware or educated, and particularly visitors travelling without a guide. Participants suggested this information be disseminated at entry points into the community such as on the plane, at the airport, on the train, and at the train station. Participants also recommended using social media as a tool to disseminate safety information. An Inuit participant said, "Well, this day and age, you can do a little video—TikTok, social media—you know? Pump out a 1-, 2-minute video and play it all the time." As noted earlier, participants

indicated social media is widely used to notify others of bear viewing opportunities around town both by locals and visitors.

Theme 5: "It's Just a Way of Life": Culture of Coexistence

Coexistence is embedded into the fabric of the culture of Indigenous peoples in Churchill. In fact, it is so enmeshed that people exhibit culturally rooted coexistence behaviours even when they visit other places. This culture of coexistence is reinforced over time and knowledge is passed on, mostly through oral forms, from generation to generation, often without conscious awareness.

Distant Past

The influence of the trapping culture over the last three centuries cannot be emphasized enough. Trapping was a way of life, and Land-based skills and knowledge of animals and landscapes were passed along through oral histories and intergenerational knowledge. A Cree Elder emphasized this: "It's nice that trapping in springtime and all that. . . . Not only for travel, just to live it. That was their lifestyle, and that's in them."

When the Cree were relocated to Churchill from York Factory in 1957, and the Sayisi Dene the year prior, the culture and transfer of intergenerational knowledge was cut off. A Cree Elder shared,

> The relocation, like closing the depot [at York Factory] in 57 . . . that was pretty much the loss of the culture when you think about it, because you were relocated here, so now it's different, eh? Instead of trapping for a living, you're employed now. . . . We lost all of that when we came here. It was all about a new life.

One participant shared,

> I come from a generation where, my mom, my granny, they experienced the traumas of forced relocation off York Factory, so I lost out on a lot of traditional knowledge, but so did they. So right now, I'm just reclaiming that research and grasping at anything I can.

The loss of culture occurred through the traumas of colonization, as demonstrated in this conversation that I had with a Dene Elder:

> Researcher: How many brothers and sisters do you have?
>
> Dene Elder: Oh, there used to be nine of us.
>
> Researcher: Oh wow.
>
> Dene Elder: Now there's only three. . . Yeah.
>
> Researcher: Did you all grow up in the same little cabin on the flats?
>
> Dene Elder: No, we're all separated. Residential school, which I hate. Foster homes. Adoption.

This trauma had a devastating impact on intergenerational transfer of knowledge as well as imparting deep shame for identifying as Indigenous, the consequences of which are still apparent today. Despite the impacts of colonization, some of the worldview, culture, and Indigenous knowledge from generations past remains, as illustrated by a Dene Elder:

> [We] Hardly ever talked about polar bear, and then growing up, the Elders used to tell us we can't talk about, like, don't talk about eagles, don't talk with, like, they didn't like people talking like about animals, or being mean to them and stuff like that. Because they're spirits, eh?

These interview excerpts illustrate that Indigenous worldviews still remain and often embody Indigenous principles, such as that of respect.

Past

Polar bear encounters were much less common in the past, and participants spoke fondly of spending time on the Land fishing, hunting, berry picking, and visiting traplines and cabins. These Land-based activities were an important part of the culture and transfer of Indigenous knowledge. Most participants first polar bear memory occurred in the past, such as this memory from a Métis Elder:

> In Churchill, when the wind's blowing from the north, you always walk with your head down, eh? So, she [my sister] was walking with her head down with her hood up, . . . looking at her feet, and then all of a sudden this polar bear came up from behind the shed where the garbage was . . . and she actually bumped into the bear, and then she looked up and saw the bear, and the bear looked at her and she screamed, and she turned around and ran back in the house.

Even though all participants had encountered polar bears, many times, they did not speak of bears fearfully, but rather with respect and sometimes even humor and joy. A Métis participant said, "I think the only people that are really terrified of bears are the ones that have been in close contact, like have had trauma with them." She continued, "Especially, we see how many bears? Thousands of bears in our lifetime."

Present

"It's funny, you know, the bears are almost like our family . . . They're here, we just live with them, and we just know how to respect them and stay away from them," my coresearcher explained. Participants generally expressed that living with polar bears was just a normal part of life: "We just all adapted to living with them. " Another participant stated, "When you grow up

here, it's just what you know, right?" Yet another said, "We're right smack dab on this little peninsula . . . and I mean, you have seals and whales along our beach that we swim in when it's plus thirty [degrees]. You know? That's just the way it is." Participants emphasized that if the bears are respected, they will reciprocate that respect. One participant said, "I find that really amazing that, as long as the bear knows you're not bothering him, he won't bother you. Which is like that total respect, eh? Between animal and human." Another Cree participant said, "They're exciting, to see their activities and stuff like that, but you know, when they're just lounging, just like respect, leave me alone when I'm lounging at home too."

A Métis Elder best articulated how foreigners can relate to the present-day culture in Churchill:

> I meet people from New York City and that and they go, "Oh, you grew up here? How did you stay safe?" Or whatever, and I said, "Well, because it's our culture. We're raised from this big [gesture] to adulthood about how we live around here." I said, "If I went to New York City, I'd be in trouble. You know where to go and where not to go, and you know all the rules to living in New York City that you teach your kids. Well, it's the same way with us here in Churchill. It's not like it's a formal education kind of thing, it's just a way of life."

One participant said, "I just kind of find 'em [bears] more of a nuisance than anything now, just so many years with them trying to work around them." Many participants engage in traditional cultural activities such as hunting, fishing, trapping, canoeing, and berry picking, along with more modern Land-based activities such as paddle boarding and scuba diving. A Métis participant shared,

> I just feel like I have to go outside and I'm not going to stay inside being worried about bears. I feel like there are times when it's more dangerous to have a firearm around. Like sometimes the firearm risk is greater than the bear risk.

Participants shared that even when they are not in Churchill, they take precautions that are almost automatic, such as worrying about the smell of food, or looking around when arriving on a beach. "It's kind of funny because saying all this stuff out loud, it doesn't sound normal, but in your everyday life it feels normal, almost like second nature. And I've noticed that a lot living in Winnipeg," a Cree participant shared. "We have this built in us, you know? And we don't even notice it. We don't even know that it's not normal," my coresearcher reiterated.

The Cree, Dene, and Métis participants expressed that they have the utmost respect for Inuit culture related to polar bears, and specifically Inuit rights to harvest polar bears for both cultural practices, economic prosperity, and subsistence lifestyle. Unlike Cree, Inuit people historically ate polar bear, and it remains an important part of their diet and culture today. A Métis participant who lived farther north for a period shared, "A lot of my friends eat polar bear meat . . . and it's very important for people up north, as part of their diet." She continued to explain the culture and worldview in more detail:

> With my Inuit friends, they said you should never say anything bad about bears, because then you'll have problems with the bears, and don't say anything outside because the bears will hear it. And if somebody killed a bear, it's because they did it with respect, and if they didn't respect the bear and they went out for a bear hunt, they would never be successful hunting, so it was like a mutual respect kind of thing, and the bears, I heard them say that, if the bear didn't think that the hunter was a good hunter and didn't respect

> . . . like the bear would let itself get killed. You know what I mean? It wouldn't like kind of give itself to anybody, like it had to be a respected hunter. . . . I don't know if I made sense explaining that.

This highlights the difference in worldviews between Eurocentric cultures and Indigenous cultures and the nuance between different Indigenous cultures even in close geographic proximity.

Future

The Indigenous participants in this study emphasized the importance of including local and Indigenous knowledge in future visions for coexistence between people and polar bears. A Cree participant said,

> I think we are kind of [going] in a good direction now, better than before, but definitely incorporating more locals and local knowledge is key. I think a big emphasis is not only local, but Indigenous knowledge. Especially the people who have lived here for years and years and different generations of families and even people, like the Inuit who have a totally different relationship with polar bears than say like the Cree might have, and just like learning from the different perspectives, and that really ties into knowing what's dangerous and what's not around town.

Another subtheme throughout coexistence culture included the understanding that animals have spirits too and can experience trauma; as such, respect is an important Indigenous principle and way of life that must remain at the forefront of coexistence into the future. A Métis Elder explained,

> I believe all animals need to be treated with love and respect, you know? Even though we eat them, right? Like we harvest them. But we harvest our animals as quickly as we can and we share, because Indigenous culture is sharing . . . but with polar bears, I think that they're a real spiritual animal, you know? And they're part of our ecosystem, and I think . . . Indigenous people, the connection to the Land is through the animals, right? And we've watched these animals and we watched the polar bear rise and we're all concerned about their future.

Participants expressed local pride for polar bear coexistence and general community pride throughout the sharing circles by participants of all ages, genders, and cultural backgrounds. A Cree Elder said,

> So, the coexistence thing is pretty critical, and it's quite unique. So, I think the Community is pretty proud of being dubbed, you know, the Polar Bear Capital of the World. Again, we've got to do our part to make sure that we're improving on it, eh?

Chapter 6: Conclusion

The Indigenous peoples of Churchill, Manitoba, Canada, have a unique story of human–polar bear coexistence that continues to unfold today. This study adds Indigenous knowledge from Churchill to the existing documentation of Cree and Inuit IQ of human-polar bear interaction and coexistence in WHB and SHB (Dowsley et al., 2013; Lemelin, 2010; Kakekaspan et al., 2013; Tyrell, 2006, 2009).

This study aimed to embody research as reconciliation, braiding knowledge and taking inspiration from Indigenous methods and methodologies. By using storytelling and sharing circles instead of interviews, this study celebrated the oral transmission of knowledge and empowered the research narrative to be participant driven (Archibald, 2008a, 2008b; Windchief & San Pedro, 2019; Yua et al., 2022).

With increasing concerns about human–polar bear interaction and coexistence strategies across the Arctic, this research offers a case study for other northern communities living alongside polar bears. This study provides formal documentation of Indigenous knowledge in the Churchill region and demonstrates that Indigenous knowledge and worldviews are relevant, reemerging, and continue to be recreated (Windchief & San Pedro, 2019; Yua et al., 2022).

Key Findings

In the distant past, defined by this project as intergenerational knowledge prior to 1957, when the Cree and Dene were relocated to present-day Churchill, the fur trade was the primary economy on the shores of Hudson Bay. Polar bears were not often seen, and when spotted they were killed, with the meat primarily used for dog food and the hide sold to a trading post. Much

intergenerational knowledge was lost when people were relocated to Churchill, where it was, to quote an Elder, "all about a new life."

From 1957–2005, defined by this project as the past, the era of the fur trade came to an end and a new era of tourism began. Participants recalled the military shot a lot of polar bears and kept the hides, hanging them on their walls or using them as rugs. They also recalled seeing large numbers of bears eating burning garbage at the open dump. Concurrently, tourism began and polar bears started to become more valuable alive than dead. In 2005, the open dump was closed and moved inside an old military warehouse (L5). Once the military left and the open dump closed, people started to see a lot more polar bears coming through town. Participants noted polar bears are highly intelligent and habituate to human food and garbage. However, despite alternative food sources, people agree when Hudson Bay is frozen and sea ice is available, polar bears do not remain near the community. People who grew up during this time played all over the rocks and never worried about polar bears. Indigenous families on the Flats did not have garbage collection from the town, and instead burned their garbage in barrels and remembered growing up with the idea that people cannot have any garbage around. All polar bear attacks involved people walking and had an element of surprise (such as getting between a mother and cub) or an attractant (rotting meat or fish in nets). People used guns or other loud noises, like banging pots and pans, to scare bears away. Most participants' first memory of a polar bear occurred during this time period, outside of a cabin at the Flats or a house in town, or at the dump. Even though all participants had encountered polar bears, many times, they did not speak of polar bears fearfully, but rather with respect and sometimes even humour and joy.

In the present, defined as 2005–2022 for this study, most people's knowledge of polar bears came through tourism and Land-based activities (boating, fishing, snowmobiling, hunting species other than polar bears). Of research participants, 83% were connected to tourism through their job in some way. Participants value the Polar Bear Alert program and are grateful it is there to keep the community safe. Participants noted how intelligent polar bears are, how they recognize the Polar Bear Alert trucks, and how they quickly they can become habituated. People spoke with pride about how there is an ethic to keep the community clean and avoid attractants. The community recently installed bear-proof garbage bins, which participants have found solve a lot of problems. Participants highlighted how amazing female polar bears are at fasting, that they see lots of successful family groups in the denning area, and they do not see "starving" polar bears like the media sometimes portrays. Participants who have worked in the CWMA, where the Tundra Buggies operate, noted seeing fewer polar bears than in the past. Unlike their parents, children are now told not to play in the rocks or walk on the Pipeline (a shortcut from a residential area to the community complex). Many parents now drive their kids around town, especially at night, and raise their kids to always be bear aware, including having an exit plan when they are walking around town and utilizing buildings and vehicles to stay safe, demonstrating that avoidance is clearly a strategy and a way of life. Participants stressed the importance of having someone designated as a bear guard and use shotguns with cracker shells as the main method of deterrence. People use social media as a tool to notify others when polar bears are near town, which can assist with safety and awareness but also can cause challenges for bear viewing near the community. Participants generally shared that living with polar bears is a normal part of life and emphasized that if the bears are respected, they will reciprocate that

respect. Some participants who work on the ground feel the bears are more of a nuisance than anything. Participants shared, even when they are not in Churchill, they take precautions that are almost automatic, such as worrying about the smell of food, or looking around when arriving on a beach. The Cree, Dene, and Métis participants expressed they have the utmost respect for Inuit culture related to polar bears, and specifically Inuit rights to harvest polar bears for cultural, economic, and subsistence purposes.

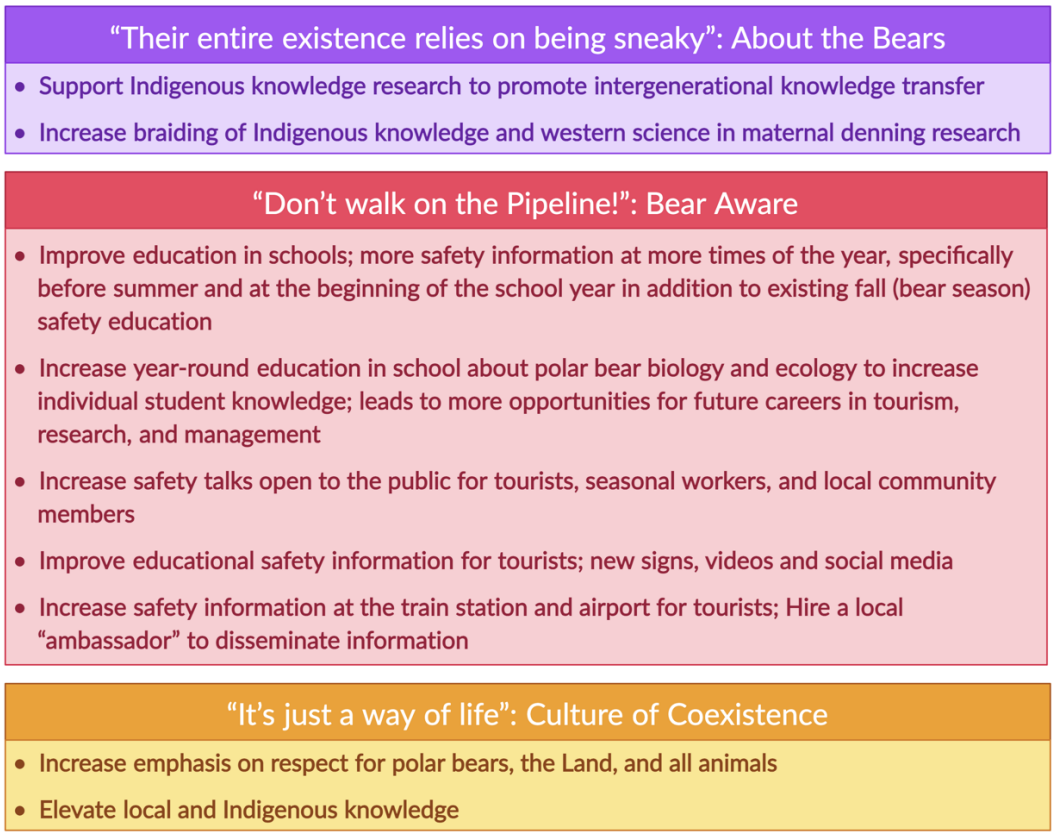
Participants had many visions for the future of human–polar bear coexistence in Churchill, which synthesized into five themes: (a) protect tourism as an important industry and economy, (b) support proactive management and less invasive research, (c) elevate Indigenous knowledge in research and management, (d) improve bear safety education and awareness, and (e) cultivate a culture of coexistence. More detail regarding future visions articulated by research participants can be found in Podcast 4 and Figure 5.

Recommendations

Scholars suggested research involving Indigenous knowledge should have real-world implications. In alignment with the literature reviewed (Berkes & Berkes, 2009; Yua et al., 2022), this applied research project presents the following recommendations as future visions for human–polar bear coexistence in Churchill as articulated by sharing circle participants. Whether these visions could be applicable to other regions or communities requires further analysis (see Figure 5).

Figure 5

Future Visions Research Results for Human–Polar Bear Coexistence in Churchill, Canada as Articulated by Research Participants



Collaborative efforts across provincial and federal governments, the Town of Churchill, nongovernmental organizations, local and regional businesses, and community groups and members should consider how these visions can be included in human–polar bear coexistence efforts moving forward.

Future studies should consider Indigenous knowledge of polar bear maternal denning habitat and behaviour working with knowledge holders in Churchill. Additionally, increased knowledge sharing and cross-cultural relationship building between communities along the coast of Hudson Bay that coexist with polar bears should be considered by regional governments and managers.

Arts-Based Dissemination of Results

Four podcast episodes weave the deductive and inductive thematic analysis of this data into a time-based chronological arts-based research output. The podcasts are available to the community and participants in perpetuity on a website (https://churchillpolarbearcoexistence.com password: ekosi). The website password will be removed upon final approval of this thesis, and the site will be available to the public.

Potential Limitations of the Research

Loss of intergenerational knowledge due to colonization limits the capacity for this study to offer rich oral narrative knowledge prior to 1957. Additionally, this study was limited in geographic and subsequently cultural scope, a broader scope would include more Inuit and Cree perspectives and ultimately provide a different Indigenous perspective on coexistence. Although attempts were made to include multiple Inuit perspectives from the community, only one Inuit participant elected to take part in this study. Potential participants for this study, who formerly lived in Churchill, may have relocated to a nearby community such as Tadoule Lake, Arviat, or York Landing and not have been considered or available to participate as a result.

Since polar bears have not been hunted by Indigenous peoples for subsistence in this region of the north for decades, observations of polar bears primarily through tourism instead of hunting, provides different knowledge than other Indigenous knowledge, traditional ecological knowledge or IQ studies that have been published about polar bears to date (Dowsley, 2007; Dowsley & Wenzel, 2008; Kotierk, 2010; Laforest et al., 2018; Lemelin, 2007; Tomaselli et al., 2022; Rode et al., 2021; Voorhees et al., 2014). Previous studies have documented local ecological knowledge among community members in Churchill; however, Indigenous

knowledge of polar bears in Churchill has not been looked at independently prior to this research project (Lemelin, 2005, 2007; Schmidt, 2017; Schmidt & Clark, 2018).

As a staff member of Polar Bears International, some community members may have opted not to participate due to my affiliation and how the organization may be perceived in the community. This may have posed a conflict of interest for some participants, particularly the mayor who has a professional working relationship with Polar Bears International. I did my best to mitigate this by acting as a researcher first and Polar Bears International second, conducting each sharing circle and validation together with my coresearcher, discussing research ethics with each participant, and engaging in community events unrelated to polar bears as often as possible.

Summary

I undertook this research to document the historical and modern knowledge of human–polar bear coexistence among Knowledge Keepers and Elders of the Swampy Cree, Sayisi-Dene, Métis, and Caribou Inuit people living in and near Churchill, Manitoba, Canada, and sought to gather their visions for the future of human-polar bear coexistence in their community and region. It is my hope that the findings and recommendations on this report will expand the academic knowledge of human-polar bear coexistence, inform management and research in Churchill, Manitoba, and serve as a case study for other northern communities interested in coexistence between people and polar bears.

References

Abolson, K. (2010). Indigenous wholistic theory: A knowledge set for practice. *First Peoples Child & Family Review, 5*(2), 74–87. https://fpcfr.com/index.php/FPCFR/article/view/95

Abram, D. (2012). *The spell of the sensuous: Perception and language in a more-than-human world*. Knopf Doubleday.

Adeoye-Olatunde, O. A., & Olenik, N. L. (2021). Research and scholarly methods: Semi-structured interviews. *Journal of the American College of Clinical Pharmacy, 4*(10), 1358–1367. https://doi.org/10.1002/jac5.1441

Adobe. (2023). Premier pro [Video editing software]. https://www.adobe.com/ca/products/premiere/free-trial-download.html

Aikenhead, G. S., & Ogawa, M. (2007). Indigenous knowledge and science revisited. *Cultural Studies of Science Education, 2,* 539–620. https://doi.org/10.1007/s11422-007-9067-8

Alexander, S. M., Provencher, J. F., Henri, D. A., Taylor, J. J., & Cooke, S. J. (2019). Bridging Indigenous and science-based knowledge in coastal-marine research, monitoring, and management in Canada: A systematic map protocol. *Environmental Evidence, 8*(1), Article 15. https://doi.org/10.1186/s13750-019-0159-1

Apple. (2023). Final cut pro [Video editing software]. https://www.apple.com/ca/final-cut-pro/trial/

Archibald, J.-A. (2008a). An Indigenous storywork methodology. In A. Cole & J. Knowles (Eds.), *Handbook of the arts in qualitative research: Perspectives, methodologies, examples and issues* (pp. 371–393). SAGE.

Archibald, J.-A. (2008b). *Indigenous storywork: Educating the heart, mind, body, and spirit*. UBC Press.

Arnaquq-Baril, A. (Director). (2016). *Angry Inuk* [Documentary film]. Apple TV. https://tv.apple.com/ca/movie/angry-inuk/umc.cmc.5tergpaoo9314xiq5jrjnu4wi

Atwood, T. C., Simac, K., Breck, S. W., York, G., & Wilder, J. (2017). Human–polar bear interactions in a changing arctic: Existing and emerging concerns. In A. Butterworth (Ed.), *Marine mammal welfare: Human induced change in the marine environment and its impacts on marine mammal welfare* (pp. 397–418). Springer. https://doi.org/10.1007/978-3-319-46994-2_22

Atwood, T. C., & Wilder, J. M. (2021). Human-polar bear interactions. In R. W. Davis & A. M. Pagano (Eds.), *Ethology and behavioral ecology of sea otters and polar bears* (pp. 325–353). Springer. https://doi.org/10.1007/978-3-030-66796-2_17

Bai, H., & Scutt, G. (2009). Touching the Earth with the heart of enlightened mind: The Buddhist practice of mindfulness for environmental education. *Canadian Journal of Environmental Education*, *14*, 92–106.

Barbeau, M. (1946). Bear mother. *The Journal of American Folklore*, *59*(231), 1–12. https://doi.org/10.2307/536553

Barker, A. (2009). The contemporary reality of Canadian imperialism: Settler colonialism and the hybrid colonial state. *The American Indian Quarterly*, *33*(3), 325–351.

Beardy, F., & Coutts, R. (1996). *Voices from Hudson Bay: Cree stories from York factory* (Vol. 5). McGill-Queen's Press.

Bergstrom, B. J. (2017). Carnivore conservation: Shifting the paradigm from control to coexistence. *Journal of Mammalogy*, *98*(1), 1–6. https://doi.org/10.1093/jmammal/gyw185

Berkes, F., & Berkes, M. K. (2009). Ecological complexity, fuzzy logic, and holism in indigenous knowledge. *Futures*, *41*(1), 6–12. https://doi.org/10.1016/j.futures.2008.07.003

Bill C-31: An Act to amend the Indian Act. (1985). 33rd Parliament, 1st Session, 1985. https://library.law.utoronto.ca/sites/default/files/media/Bill%20C-31%20%281985%29_1.pdf

Bonnett, M. (2007). Environmental education and the issue of nature. *Journal of Curriculum Studies*, *39*(6), 707–721. https://doi.org/10.1080/00220270701447149

Borish, D., Cunsolo, A., Mauro, I., Dewey, C., & Harper, S. L. (2021). Moving images, moving methods: Advancing documentary film for qualitative research. *International Journal of Qualitative Methods*, *20*. https://dx.doi.org/10.1177/16094069211013646

Botes, C. (2011). *The Last Dogs of Winter* [Film]. Lone Pine Films.

Brandson, L. E. (2012). *Churchill Hudson Bay: A guide to natural and cultural heritage*. The Churchill Eskimo Museum.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://dx.doi.org/10.1191/1478088706qp063oa

Caldas-Coulthard, C. R., & van Leeuwen, T. (2003). Teddy bear stories. *Social Semiotics*, *13*(1), 5–27. https://doi.org/10.1080/1035033022000133490

Cameron, J., & Bryan, M. (1993). *The artist's way*. Sounds True Recordings.

Can, Ö. E., D'Cruze, N., Garshelis, D. L., Beecham, J., & Macdonald, D. W. (2014). Resolving human-bear conflict: A global survey of countries, experts, and key factors. *Conservation Letters, 7*(6), 501–513. https://doi.org/10.1111/conl.12117

Canadian Charter of Rights and Freedoms, s 7, Part 1 of the Constitution Act, 1982, being Schedule B to the Canada Act 1982 (UK), 1982, c 11. https://laws-lois.justice.gc.ca/eng/Const/page-15.html

Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council. (2018). *Tri-Council policy statement: Ethical conduct for research involving humans*. https://ethics.gc.ca/eng/documents/tcps2-2018-en-interactive-final.pdf

Capra, F. (1997). *The web of life: A new scientific understanding of living systems*. Anchor Books.

Christian, D. (2017). *Gathering knowledge: Indigenous methodologies of land/place-based visual storytelling/filmmaking and visual sovereignty* [University of British Columbia]. https://doi.org/10.14288/1.0343529

Clark, D. (2003). Polar bear-human interactions in Canadian national parks, 1986–2000. *Ursus, 14*(1), 65–71.

Clark, D. A., Clark, S. G., Dowsley, M., Foote, L., Jung, T. S., & Lemelin, R. H. (2010). It's not just about bears: A problem-solving workshop on Aboriginal peoples, polar bears, and human dignity. *Arctic, 63*(1), Article 1. https://doi.org/10.14430/arctic660

Clark, D. A., Lee, D. S., Freeman, M. M. R., & Clark, S. G. (2008). Polar bear conservation in Canada: Defining the policy problems. *Arctic, 61*(4), 347–360.

Clark, D., Tyrrell, M., Dowsley, M., Foote, L., Freeman, M., & Clark, S. (2008). *Polar bears, climate change, and human dignity: Disentangling symbolic politics and seeking integrative conservation policies*. Meridian (Canadian Polar Commission). https://www.researchgate.net/publication/273381454_Polar_bears_climate_change_and_human_dignity_disentangling_symbolic_politics_and_seeking_integrative_conservation_policies

Clark, D. A., van Beest, F. M., & Brook, R. K. (2012). Polar bear-human conflicts: State of knowledge and research needs. *Canadian Wildlife Biology and Management, 1*(1), 21–29.

Cocksedge, A. G. (2020, December). *The use of compact surveillance radar to study polar bears (Ursus maritimus) near Churchill, Manitoba, Canada* [Master's thesis, York University]. https://yorkspace.library.yorku.ca/xmlui/handle/10315/38223

Collins, S. E., Clifasefi, S. L., Stanton, J., The LEAP Advisory Board, Straits, K. J. E., Gil-Kashiwabara, E., Rodriguez Espinosa, P., Nicasio, A. V., Andrasik, M. P., Hawes, S. M., Miller, K. A., Nelson, L. A., Orfaly, V. E., Duran, B. M., & Wallerstein, N. (2018). Community-based participatory research (CBPR): Towards equitable involvement of community in psychology research. *American Psychologist, 73*(7), 884–898. https://doi.org/10.1037/amp0000167

Cooper, A. (2022, February 6). *Canada's unmarked graves: How residential schools carried out "cultural genocide" against indigenous children*. CBS News. https://www.cbsnews.com/news/canada-residential-schools-unmarked-graves-indigenous-children-60-minutes-2022-02-06/

Cosentino, G. (2020). The post-truth world order. In G. Cosentino (Ed.), *Social media and the post-truth world order: The global dynamics of disinformation* (pp. 1–31). Springer. https://doi.org/10.1007/978-3-030-43005-4_1

Cunsolo Willox, A., Harper, S. L., & Edge, V. L. (2013). Storytelling in a digital age: Digital storytelling as an emerging narrative method for preserving and promoting indigenous oral wisdom. *Qualitative Research, 13*(2), 127–147. https://doi.org/10.1177/1468794112446105

de Quincey, C. (2010). *Radical nature: The soul of matter*. Simon and Schuster.

Derocher, A. E., Aars, J., Amstrup, S. C., Cutting, A., Lunn, N. J., Molnár, P. K., Obbard, M. E., Stirling, I., Thiemann, G. W., Vongraven, D., Wiig, Ø., & York, G. (2013). Rapid ecosystem change and polar bear conservation. *Conservation Letters*, *6*(5), 368–375. https://doi.org/10.1111/conl.12009

Descript. (n.d.). Descript [Video and podcast software]. https://www.descript.com/

DiCicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical Education*, *40*(4), 314–321. https://doi.org/10.1111/j.1365-2929.2006.02418.x

Dowsley, M. (2007). Inuit perspectives on polar bears (Ursus maritimus) and climate change in Baffin Bay, Nunavut, Canada. *Research and Practice in Social Sciences Dowsley*, *2*(2), 53–74.

Dowsley, M. (2009). Community clusters in wildlife and environmental management: Using TEK and community involvement to improve co-management in an era of rapid environmental change. *Polar Research*, *28*(1), 43–59. https://doi.org/10.1111/j.1751-8369.2008.00093.x

Dowsley, M., Lemelin, R. H., & Washaho First Nation at Fort Severn. (2013). Developing community capacities through scenario planning for natural resource management: A case study of polar bears. *Society & Natural Resources*, *26*(8), 977–986. https://doi.org/10.1080/08941920.2012.724522

Dowsley, M., & Wenzel, G. (2008). "The time of the most polar bears": A co-management conflict in Nunavut. *Arctic*, *61*(2), 177–189. https://doi.org/10.14430/arctic56

D'Souza, J., Dawson, J., & Groulx, M. (2023). Last chance tourism: A decade review of a case study on Churchill, Manitoba's polar bear viewing industry. *Journal of Sustainable Tourism*, *31*(1), 14–31. https://doi.org/10.1080/09669582.2021.1910828

Dubois, J., & Saunders, K. (2017). Explaining the resurgence of Métis rights: Making the most of "windows of opportunity." *Canadian Public Administration*, *60*(1), 48–67. https://doi.org/10.1111/capa.12196

Dubois, S., Fenwick, N., Ryan, E. A., Baker, L., Baker, S. E., Beausoleil, N. J., Carter, S., Cartwright, B., Costa, F., Draper, C., Griffin, J., Grogan, A., Howald, G., Jones, B., Littin, K. E., Lombard, A. T., Mellor, D. J., Ramp, D., Schuppli, C. A., & Fraser, D. (2017). International consensus principles for ethical wildlife control. *Conservation Biology*, *31*(4), 753–760. https://doi.org/10.1111/cobi.12896

Elswick, S. (2005). *Predator management and colonial culture, 1600–1741: A study in historical ecology* [Master's thesis, College of William & Mary]. https://doi.org/10.21220/S2-2N8C-FT97

Environment Canada. (2010). *Conservation of polar bears in Canada.* (Cat. No.: En4-125/1-2010E-PDF). https://publications.gc.ca/collections/collection_2011/ec/En4-125-1-2010-eng.pdf

Everything Churchill. (n.d.). *Experience Churchill*. https://www.travelmanitoba.com/churchill/experiences/

Facsione, N., Delach, A., & Smith, M. (2004). *People and predators: From conflict to coexistence*. Island Press.

Fernández-Llamazares, Á., Lepofsky, D., Lertzman, K., Armstrong, C. G., Brondizio, E. S., Gavin, M. C., Lyver, P. O., Nicholas, G. P., Pascua, P., Reo, N. J., Reyes-García, V., Turner, N. J., Yletyinen, J., Anderson, E. N., Balée, W., Cariño, J., David-Chavez, D. M., Dunn, C. P., Garnett, S. C., . . . Vaughan, M. B. (2021). Scientists' warning to humanity on threats to Indigenous and local knowledge systems. *Journal of Ethnobiology, 41*(2), 144–169. https://doi.org/10.2993/0278-0771-41.2.144

First Nations Information Governance Centre. (2019). *The First Nations principles of OCAP®*. The First Nations Information Governance Centre. https://fnigc.ca/wp-content/uploads/2021/08/OCAP-Brochure-2019.pdf

Frank, B., Glikman, J. A., & Marchini, S. (2019). *Human–wildlife interactions: Turning conflict into coexistence*. Cambridge University Press.

Frideres, J. S. (2019). *Indigenous peoples in the twenty-first century*. Oxford University Press.

Frontiers North Adventures. (n.d.). *Our story*. https://frontiersnorth.com/our-story

Garshelis, D. L., Noyce, K. V., & St-Louis, V. (2020). Population reduction by hunting helps control human–wildlife conflicts for a species that is a conservation success story. *PLOS One*, *15*(8), e0237274. https://doi.org/10.1371/journal.pone.0237274

Gillin, C. M., Chestin, I., Semchenkov, P., & Claar, J. (1997). Management of bear-human conflicts using Laika dogs. *Bears: Their Biology and Management*, *9*, 133–137. https://doi.org/10.2307/3872673

Goodwin, J., & Tiderington, E. (2020). Building trauma-informed research competencies in social work education. *Social Work Education*. Advance online publication https://doi.org/10.1080/02615479.2020.1820977

Government of Manitoba. (n.d.). *Polar bear*. https://www.gov.mb.ca/fish-wildlife/polar_bears/index.html

Grimwood, B. S. R., Doubleday, N. C., Ljubicic, G. J., Donaldson, S. G., & Blangy, S. (2012). Engaged acclimatization: Towards responsible community-based participatory research in Nunavut. *Canadian Geographer*, *56*(2), 211–230. https://doi.org/10.1111/j.1541-0064.2012.00416.x

Gross, E., Jayasinghe, N., Brooks, A., Polet, G., Wadhwa, R., & Hilderink-Koopmans, F. (2021). *A future for all: The need for human-wildlife coexistence*. World Wildlife Fund & United Nations Environment Programme. https://www.wwf.nl/globalassets/pdf/nieuws/a-future-for-all-the-need-for-human-willdife-coexistence.pdf

Hacker, K. (2013). *Community-based participatory research*. SAGE.

Heemskerk, S., Johnson, A. C., Hedman, D., Trim, V., Lunn, N. J., McGeachy, D., & Derocher, A. E. (2020). Temporal dynamics of human-polar bear conflicts in Churchill, Manitoba. *Global Ecology and Conservation*, *24*, e01320. https://doi.org/10.1016/j.gecco.2020.e01320

Held, M. B. E. (2019). Decolonizing research paradigms in the context of settler colonialism: An unsettling, mutual, and collaborative effort. *International Journal of Qualitative Methods*, *18*. https://doi.org/10.1177/1609406918821574

Henri, D. (2012). *Managing nature, producing cultures: Inuit participation, science and policy in wildlife governance in the Nunavut Territory, Canada* [Doctoral dissertation, University of Oxford]. https://ora.ox.ac.uk/objects/uuid:2cde7bcb-4818-4f61-9562-179b4ee74fee/download_file?file_format=pdf&safe_filename=dhenri.dphil.thesis.2012.bodlean_Redacted.pdf&type_of_work=Thesis

Henri, D. A., Martinez-Levasseur, L. M., Weetaltuk, S., Mallory, M. L., Gilchrist, H. G., & Jean-Gagnon, F. (2020). Inuit knowledge of Arctic Terns (Sterna paradisaea) and perspectives on declining abundance in Southeastern Hudson Bay, Canada. *PLOS One*, *15*(11), e0242193. https://doi.org/10.1371/journal.pone.0242193

Hessami, M. A., Bowles, E., Popp, J. N., & Ford, A. T. (2021). Indigenizing the North American model of wildlife conservation. *FACETS*, *6*, 1285–1306. https://doi.org/10.1139/facets-2020-0088

Higham, J. E. S., & Lück, M. (2008). *Marine wildlife and tourism management: Insights from the natural and social sciences*. CABI Digital Library.

Hogan, L. (1996). *Dwellings: A spiritual history of the living world*. Simon and Schuster.

Indian Act, RSC 1985, c I-5 [Canada]. https://www.canlii.org/en/ca/laws/stat/rsc-1985-c-i-5/latest/rsc-1985-c-i-5.html

Intersectional Environmentalist. (n.d.). *Intersectional environmentalist.* https://www.intersectionalenvironmentalist.com

Jimmy, E., & Andreotti, V. (with Stein, S.). (2019). *Towards braiding*. https://musagetes.ca/wp-content/uploads/2019/07/Braiding_ReaderWeb.pdf

Johansson, M., Ferreira, I. A., Støen, O.-G., Frank, J., & Flykt, A. (2016). Targeting human fear of large carnivores—many ideas but few known effects. *Biological Conservation, 201*, 261–269. https://doi.org/10.1016/j.biocon.2016.07.010

Joseph, R. P. (2018). *21 Things you may not know about the Indian act*. Indigenous Relations Press.

Kakekaspan, M., Walmark, B., Lemelin, R., Dowsley, M., & Mowbray, D. (2013). Developing a polar bear co-management strategy in Ontario through the indigenous stewardship model. *Polar Record, 49*(3), 230–236. https://doi.org/10.1017/S0032247412000575

Kapyrka, J., & Dockstator, M. (2012). Indigenous knowledges and western knowledges in environmental education: Acknowledging the tensions for the benefits of a "two-worlds" approach. *Canadian Journal of Environmental Education, 17*, 97–112.

Kell, P., Newman, J., & Bodnarchuk, M. (Directors). (2015). Polar Bear Town [TV Series]. Merit Motion Pictures.

Kellert, S. R. (1994). Public attitudes toward bears and their conservation. *Bears: Their Biology and Management, 9*, 43–50. https://doi.org/10.2307/3872683

Kohak, E. (2011). *The green halo: A bird's-eye view of ecological ethics*. Open Court.

Kotierk, M. (2010). *The documentation of Inuit and public knowledge of Davis Strait polar bears, climate change, Inuit knowledge and environmental management using public opinion polls*. Department of Environment, Government of Nunavut. https://www.gov.nu.ca/sites/default/files/davis_strait_public_opinion_report_2010.pdf

Kovach, M. (2009). *Indigenous methodologies: Characteristics, conversations, and contexts* (2nd ed.). University of Toronto Press.

Kutz, S., & Tomaselli, M. (2019). "Two-eyed seeing" supports wildlife health. *Science*, *364*(6446), 1135–1137. https://doi.org/10.1126/science.aau6170

Laforest, B. J., Hébert, J. S., Obbard, M. E., & Thiemann, G. W. (2018). Traditional ecological knowledge of polar bears in the Northern Eeyou Marine Region, Québec, Canada. *ARCTIC*, *71*(1), Article 1. https://doi.org/10.14430/arctic4696

Laforge, M. P., Clark, D. A., Schmidt, A. L., Lankshear, J. L., Kowalchuk, S., & Brook, R. K. (2017). Temporal aspects of polar bear (Ursus maritimus) occurrences at field camps in Wapusk National Park, Canada. *Polar Biology*, *40*(8), 1661–1670. https://doi.org/10.1007/s00300-017-2091-6

Lakoff, G. (2010). Why it matters how we frame the environment. *Environmental Communication*, *4*(1), 70–81. https://doi.org/10.1080/17524030903529749

Lemelin, R. H. (2005). Wildlife tourism at the edge of chaos: Complex interactions between humans and polar bears in Churchill, Manitoba. In F. Berkes, R. Huebert, H. Fast, M. Manseau, & A. Diduck (Eds.), *Breaking ice: Renewable resource and ocean management in the Canadian North* (pp. 183–202). University of Calgary Press.

Lemelin, R. H. (2006). The gawk, the glance, and the gaze: Ocular consumption and polar bear tourism in Churchill, Manitoba, Canada. *Current Issues in Tourism*, *9*(6), 516–534. https://doi.org/10.2167/cit294.0

Lemelin, R. H. (2007). Human-polar bear interactions in Churchill, Manitoba: The socio-ecological perspective. In J. Higham & M. Lück (Eds.), *Marine wildlife and tourism management: Insights from the natural and social sciences* (pp. 91–108). CAB International.

Lemelin, R. H., & Dickson, G. (2012). Provide great and unique experiences and they will come: Examining the potentials of polar bear tourism in Eeyou Istchee, Northern Quebec, Canada. *The Northern Review*, *35*, 176–192.

Lemelin, R. H., Dowsley, M., Walmark, B., Siebel, F., Bird, L., Hunter, G., Myles, T., Mack, M., Gull, M., Kakekaspan, M., The Washaho First Nation at Fort Severn, & Weenusk First Nation at Peawanuck. (2010). Wabusk of the Omushkegouk: Cree-polar bear (Ursus maritimus) interactions in northern Ontario. *Human Ecology*, *38*, 803–815.

Leopold, A. (1989). *A Sand County almanac, and sketches here and there*. Oxford University Press.

Lickers, M. (2018). Your still not listening to us: What First Nations youth are saying. *Journal of Indigenous Research*, *6*(1), Article 1. https://doi.org/10.26077/2arq-0216

Lønø, O. (1970). *The polar bear (Ursus maritimus Phipps) in the Svalbard area*. https://brage.npolar.no/npolar-xmlui/handle/11250/173883

Lumberjack System. (n.d.). Lumberjack builder [Video editing software]. https://www.lumberjacksystem.com/

Lunn, N. J., Servanty, S., Regehr, E. V., Converse, S. J., Richardson, E., & Stirling, I. (2016). Demography of an apex predator at the edge of its range: Impacts of changing sea ice on polar bears in Hudson Bay. *Ecological Applications*, *26*(5), 1302–1320. https://doi.org/10.1890/15-1256

Lynn White, J. (1967). The historical roots of our ecologic crisis. *Science*, *155*(3767), 1203–1207. https://doi.org/10.1126/science.155.3767.1203

Marseille, M. M., Elands, B. H. M., & van den Brink, M. L. (2012). Experiencing polar bears in the zoo: Feelings and cognitions in relation to a visitor's conservation attitude. *Human Dimensions of Wildlife*, *17*(1), 29–43. https://doi.org/10.1080/10871209.2012.631208

Mason, R., Mason, R., Palahicky, S., & Rodriguez de France, C. (2018). *Pulling together: A guide for curriculum developers*. BCcampus.

McDonald, M., Arragutainaq, L., & Novalinga, Z. (1997). *Voices from the bay: Traditional ecological knowledge of Inuit and Cree in the Hudson Bay bioregion*. Canadian Arctic Resources Committee, Environmental Committee of Municipality of Sanikiluaq.

McGrath, C., Palmgren, P. J., & Liljedahl, M. (2019). Twelve tips for conducting qualitative research interviews. *Medical Teacher*, *41*(9), 1002–1006. https://doi.org/10.1080/0142159X.2018.1497149

McKeon, M. (2012). Two-eyed seeing into environmental education: Revealing its "Natural" Readiness to indigenize. *Canadian Journal of Environmental Education*, *17*, 131–147.

Molnár, P. K., Bitz, C. M., Holland, M. M., Kay, J. E., Penk, S. R., & Amstrup, S. C. (2020). Fasting season length sets temporal limits for global polar bear persistence. *Nature Climate Change*, *10*, 732–738. https://doi.org/10.1038/s41558-020-0818-9

Molnár, P. K., Derocher, A. E., Klanjscek, T., & Lewis, M. A. (2011). Predicting climate change impacts on polar bear litter size. *Nature Communications*, *2*, Article 186. https://doi.org/10.1038/ncomms1183

National Centre for Truth and Reconciliation. (n.d.). *Churchill.* https://nctr.ca/residential-schools/manitoba/churchill/

Native Land Digital [map]. (2023, October 17). *Native Land Digital.* https://native-land.ca

Natural Resources Agreement Act, 1938, CCSM c N40 [Manitoba]. https://www.canlii.org/en/mb/laws/stat/ccsm-c-n40/latest/ccsm-c-n40.html

Nelson, R. K. (1969). *Hunters of the northern ice*. University of Chicago Press.

Nunavut Wildlife Management Board. (n.d.). *Nunavut wildlife management board*. https://www.nwmb.com/

Öhman, J. (2016). New ethical challenges within environmental and sustainability education. *Environmental Education Research*, *22*(6), 765–770. https://doi.org/10.1080/13504622.2016.1165800

Orr, D. (2004). *Earth in mind*. Island Press.

Osei-Kofi, N. (2013). The emancipatory potential of arts-based research for social justice. *Equity & Excellence in Education*, *46*(1), 135–149. https://doi.org/10.1080/10665684.2013.750202

Parkinson, C. L., & Cavalieri, D. J. (2008). Arctic sea ice variability and trends, 1979–2006. *Journal of Geophysical Research: Oceans*, *113*(C7), 1–28. https://doi.org/10.1029/2007JC004558

Pedersen, C., Otokiak, M., Koonoo, I., Milton, J., Maktar, E., Anaviapik, A., Milton, M., Porter, G., Scott, A., Newman, C., Porter, C., Aaluk, T., Tiriraniaq, B., Pedersen, A., Riffi, M., Solomon, E., & Elverum, S. (2020). ScIQ: An invitation and recommendations to combine science and Inuit Qaujimajatuqangit for meaningful engagement of Inuit communities in research. *Arctic Science*, *6*(3), 326–339. https://doi.org/10.1139/as-2020-0015

Petch, V. P. (1998). *Relocation and loss of homeland: The story of the Sayisi Dene if Northern Manitoba* [Doctoral dissertation, University of Manitoba]. http://hdl.handle.net/1993/1342

Pezzullo, P. C., & Cox, J. R. (2018). *Environmental communication and the public sphere* (5th ed.). SAGE.

Polar Bear Range States. (n.d.). *The 1973 agreement on the conservation of polar bears*. https://polarbearagreement.org/about-us/1973-agreement

Polar Bear Range States. (2015, September). *Circumpolar action plan: Conservation strategy for polar bears*. https://polarbearagreement.org/index.php/resources/circumpolar-action-plan/cap-2015-2025-docs/circumpolar-action-plan

Polar Life. (n.d.). *Nanuq-polar bear*. http://www.polarlife.ca/traditional/traditional/animals/polar_bear.htm

Railway to Churchill, Man., sold — repairs to begin 'immediately.' (2018, August 31). *CBC News*. https://www.cbc.ca/news/canada/manitoba/churchill-raiway-sale-omnitrax-1.4807450

Regehr, E. V., Lunn, N. J., Amstrup, S. C., & Stirling, I. (2007). Effects of earlier sea ice breakup on survival and population size of polar bears in Western Hudson Bay. *The Journal of Wildlife Management, 71*(8), 2673–2683. https://doi.org/10.2193/2006-180

Risholt, T., Persen, E., & Solem, O. I. (1998). Man and polar bear in Svalbard: A solvable ecological conflict? *International Journal of Circumpolar Health, 57*, 532–536.

Rode, K. D., Voorhees, H., Huntington, H. P., Durner, G. M., & Giguère, N. (2021). Iñupiaq Knowledge of Polar Bears (Ursus maritimus) in the Southern Beaufort Sea, Alaska. *Arctic, 74*(3), 239–257.

Rust, N. A., & Taylor, N. (2016). Carnivores, colonization, and conflict: A qualitative case study on the intersectional persecution of predators and people in Namibia. *Anthrozoös, 29*(4), 653–667. https://doi.org/10.1080/08927936.2016.1228758

Schmidt, A. L. (2017). *Retelling the polar bear story: Human responses to polar bear-human interactions in Churchill, Manitoba* [Doctoral dissertation, University of Saskatchewan]. https://harvest.usask.ca/handle/10388/8278

Schmidt, A. L., & Clark, D. A. (2018). "It's just a matter of time": Lessons from agency and community responses to polar bear-inflicted human injury. *Conservation and Society, 16*(1), 64–75.

Seidelman, H., & Turner, J. (1993). *The Inuit imagination*. Douglas & McIntyre.

Shepard, P., & Sanders, B. (1992). *The sacred paw: The bear in nature, myth, and literature*. Arkana.

Simpson, L. R. (2004). Anticolonial strategies for the recovery and maintenance of Indigenous knowledge. *American Indian Quarterly, 28*(3–4), 373–384.

Smith, T. S., Derocher, A. E., Mazur, R. L., York, G., Owen, M. A., Obbard, M., Richardson, E. S., & Amstrup, S. C. (2022). Anthropogenic food: An emerging threat to polar bears. *Oryx*, *57*(4), 425–434. https://doi.org/10.1017/S0030605322000278

Smith, T. S., & Herrero, S. (2018). Human–bear conflict in Alaska: 1880–2015. *Wildlife Society Bulletin*, *42*(2), 254–263. https://doi.org/10.1002/wsb.870

Southey, R. (1837). The three bears. In *The doctor* (pp. 1–29). Osborne Collection of Early Children's Books. https://digitalarchive.tpl.ca/objects/357255/the-story-of-the-three-bears

Statistics Canada. (2021). Census Profile, 2021 Census: Churchill, Town [Census subdivision], Manitoba and Manitoba [Province]. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm

Stenhouse, G. B., Lee, L. J., & Poole, K. G. (1988). Some characteristics of polar bears killed during conflicts with humans in the Northwest Territories, 1976–86. *Arctic*, *41*(4), 275–278.

Stirling, I. (1998). *Polar bears*. University of Michigan Press.

Stirling, I., & Parkinson, C. L. (2006). Possible effects of climate warming on selected populations of polar bears (Ursus maritimus) in the Canadian Arctic. *Arctic*, *59*(3), 261–275.

Tengö, M., Brondizio, E. S., Elmqvist, T., Malmer, P., & Spierenburg, M. (2014). Connecting diverse knowledge systems for enhanced ecosystem governance: The multiple evidence base approach. *AMBIO*, *43*(5), 579–591. https://doi.org/10.1007/s13280-014-0501-3

Thomas, L. (2020, September 3). “I can’t breathe” and the inextricable link between climate and racial justice. *Elle*. https://www.elle.com/culture/career-politics/a33905037/i-cant-breathe-police-brutality-covid-19-climate-crisis/

Tilbury, D., & Wortman, D. (2004). *Engaging people in sustainability*. IUCN.

Tomaselli, M., Henri, D.A., Pangnirtung Hunters and Trappers Organization, Mayukalik Hunters and Trappers Organization, Akavak, N., Kanayuk, D., Kanayuk, R., Pitsiulak, P., Wong, P., Richardson, E. S., & Dyck, M. (2022). *Nunavut Inuit Qaujimajatuqangit on the health of the Davis Strait polar bear population: Final project report*. https://www.nwmb.com/en/conservation-education/list-all-documents/docs-for-articles/inuit-qaujimajatuqangit-documents/9383-nunavut-iq-polar-bear-report-davis-strait-june-2022-eng/file

Treves, A., & Santiago-Ávila, F. J. (2020). Myths and assumptions about human-wildlife conflict and coexistence. *Conservation Biology*, *34*(4), 811–818. https://doi.org/10.1111/cobi.13472

Tuck, E., McKenzie, M., & McCoy, K. (2014). Land education: Indigenous, post-colonial, and decolonizing perspectives on place and environmental education research. *Environmental Education Research*, *20*(1), 1–23. https://doi.org/10.1080/13504622.2013.877708

Tucker, M. E., & Grim, J. (2016). The movement of religion and ecology: Emerging field and dynamic force. In W. Jenkins, M. E. Tucker, & J. Grim (Eds.), *Routledge handbook of religion and ecology* (pp. 3–12). Routledge. https://dx.doi.org/10.4324/9781315764788-1

Tyrrell, M. (2006). More bears, less bears: Inuit and scientific perceptions of polar bear populations on the west coast of Hudson Bay. *Études/Inuit/Studies*, *30*(2), 191–208. https://doi.org/10.7202/017571ar

Tyrrell, M. (2009). West Hudson Bay polar bears: The Inuit perspective. In M. M. R. Freeman & L. Foote (Eds.), *Inuit, polar bears, and sustainable use* (pp. 95–110). University of Alberta Press.

United Nations. (2008). *United Nations declaration on the rights of Indigenous Peoples*. United Nations. https://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf

Vander Putten, J., & Nolen, A. L. (2010). Comparing results from constant comparative and computer software methods: A reflection about qualitative data analysis. *Journal of Ethnographic & Qualitative Research*, *5*(2), 99–112.

Vijayakumar, S., & Seetal, R. (2020, January 17). *We must move from egocentric to ecocentric leadership to safeguard our planet*. World Economic Forum. https://www.weforum.org/agenda/2020/01/egocentric-to-ecocentric-leadership/

Viswanathan, M., Ammerman, A., Eng, E., Garlehner, G., Lohr, K. N., Griffith, D., Rhodes, S., Samuel-Hodge, C., Maty, S., Lux, L., Webb, L., Sutton, S. F., Swinson, T., Jackman, A., & Whitener, L. (2004). Community-based participatory research: Assessing the evidence: Summary. In *AHRQ Evidence Report Summaries* (Report Summary 99). Agency for Healthcare Research and Quality. https://www.ncbi.nlm.nih.gov/sites/books/NBK11852/

Voorhees, H., Sparks, R., Huntington, H. P., & Rode, K. D. (2014). Traditional knowledge about polar bears (Ursus maritimus) in Northwestern Alaska. *Arctic*, *67*(4), 523–536.

Wat'chee Expeditions. (n.d.). *Explore the wild north.* https://www.watchee.com/

Welsh, E. (2002). Dealing with data: Using NVivo in the qualitative data analysis process. *Forum: Qualitative Social Research*, *3*(2), Article 2. https://doi.org/10.17169/fqs-3.2.865

Wenzel, G. W. (1999). Traditional ecological knowledge and Inuit: Reflections on TEK research and ethics. *Arctic, 52*(2), 113–124.

Wenzel, G. W. (2004). From TEK to IQ: Inuit Qaujimajatuqangit and Inuit cultural ecology. *Arctic Anthropology*, *41*(2), 238–250.

Where were Manitoba's residential schools—and what stands there now? (2021, June 6). *CBC News*. https://www.cbc.ca/news/canada/manitoba/residential-schools-list-1.6053586

Wilder, J. M., Mangipane, L. S., Atwood, T., Kochnev, A., Smith, T., & Vongraven, D. (2022). Efficacy of bear spray as a deterrent against polar bears. *Wildlife Society Bulletin, 47*(1), e1403. https://doi.org/10.1002/wsb.1403

Wilder, J. M., Vongraven, D., Atwood, T., Hansen, B., Jessen, A., Kochnev, A., York, G., Vallender, R., Hedman, D., & Gibbons, M. (2017). Polar bear attacks on humans: Implications of a changing climate. *Wildlife Society Bulletin, 41*(3), 537–547. https://doi.org/10.1002/wsb.783

Windchief, S., & San Pedro, T. (2019). *Applying Indigenous research methods: Storying with peoples and communities*. Routledge.

Witt, A. (2015). Climate change and the clash of worldviews: An exploration of how to move forward in a polarized debate. *Zygon: Journal of Religion & Science*, *50*(4), 906–921. https://doi.org/10.1111/zygo.12226

Yoder, K. (2023, August 2). Why the climate movement doesn't talk about polar bears anymore. *Grist.* https://grist.org/culture/climate-change-polar-bears-symbol-history/

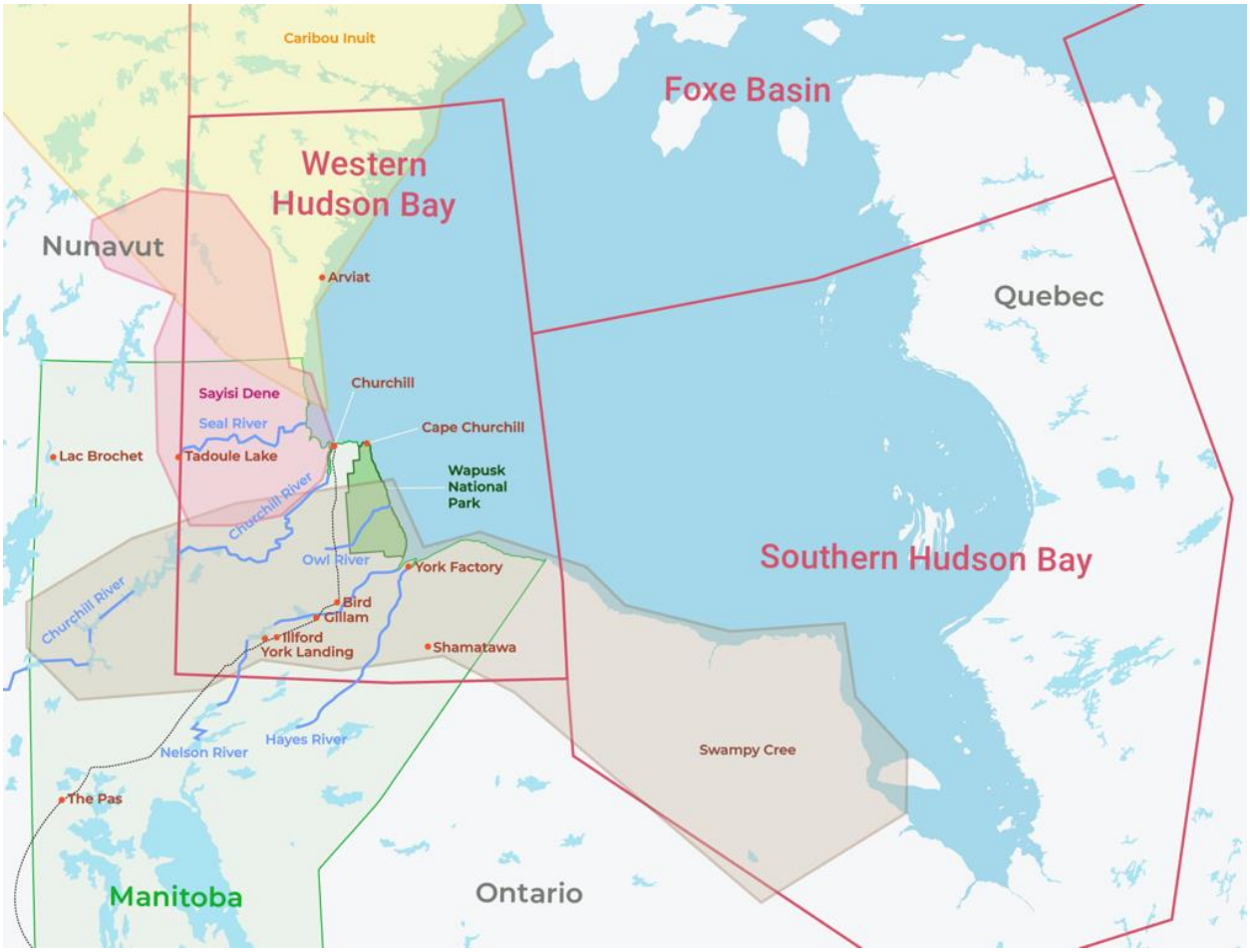
York, J., Dowsley, M., Cornwell, A., Kuc, M., & Taylor, M. (2016). Demographic and traditional knowledge perspectives on the current status of Canadian polar bear subpopulations. *Ecology and Evolution, 6*(9), 2897–2924. https://doi.org/10.1002/ece3.2030

Yua, E., Raymond-Yakoubian, J., Daniel, R., & Behe, C. (2022). A framework for co-production of knowledge in the context of Arctic research. *Ecology and Society*, *27*(1). https://doi.org/10.5751/ES-12960-270134

Zhang, M. (2018, July 28). Nat geo: We went "too far" in linking starving polar bear to climate change. *PetaPixel.* https://petapixel.com/2018/07/28/nat-geo-we-went-too-far-in-linking-starving-polar-bear-to-climate-change/

Appendix A: Map — A Wide Perspective of Churchill

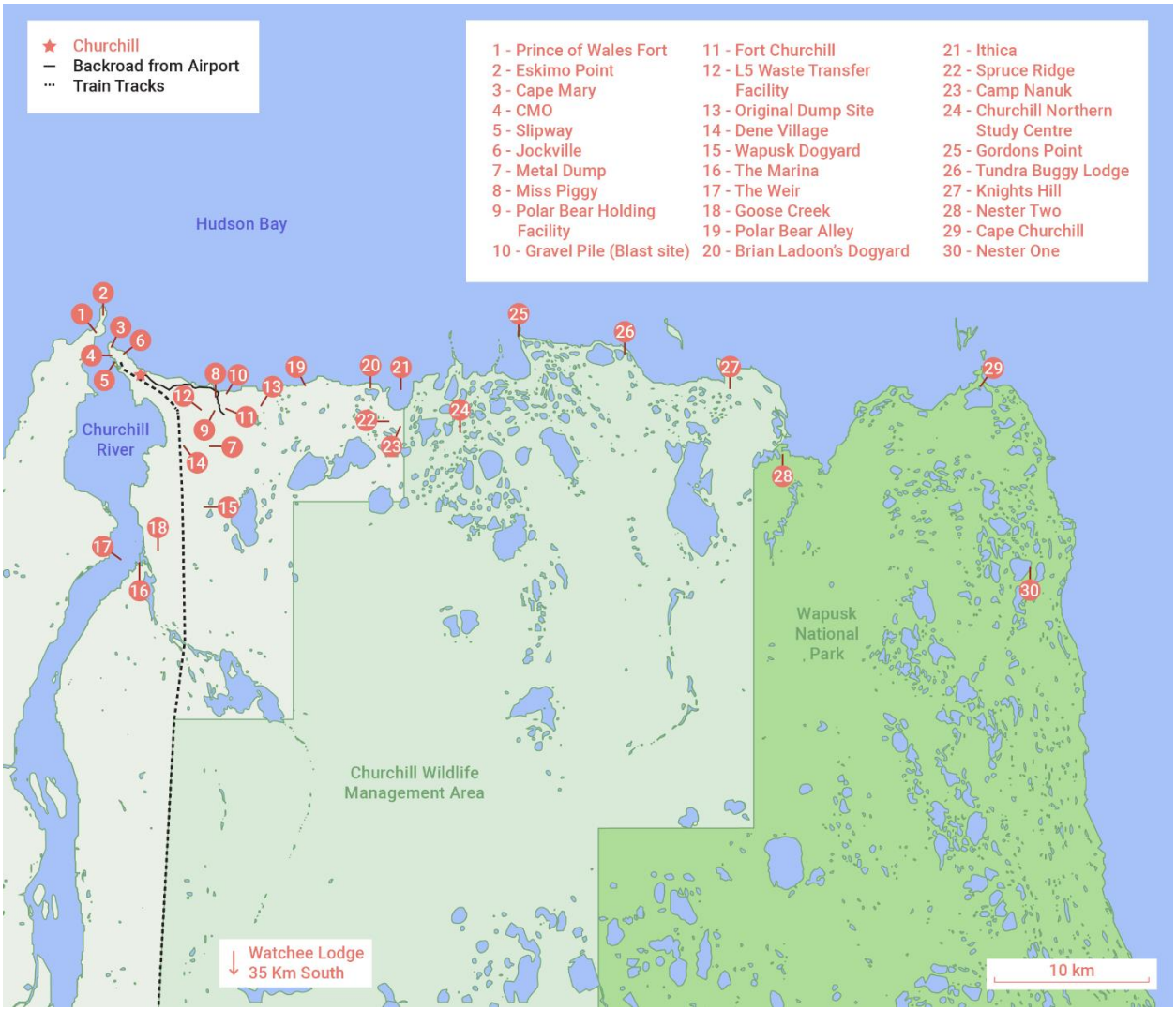
This map provides a wide perspective of Churchill overlaid with the traditional territories of the four Indigenous cultures that call Churchill Home, along with modern and historic landmarks and polar bear subpopulations.



Note. Graphic design © Nickia McIvor.

Appendix B: Map — A Medium Perspective of the Hudson Bay Coastline

This map depicts a medium perspective of the Hudson Bay Coastline from the Town of Churchill to Cape Churchill in Wapusk National Park.



Note. Graphic design © Nickia McIvor.

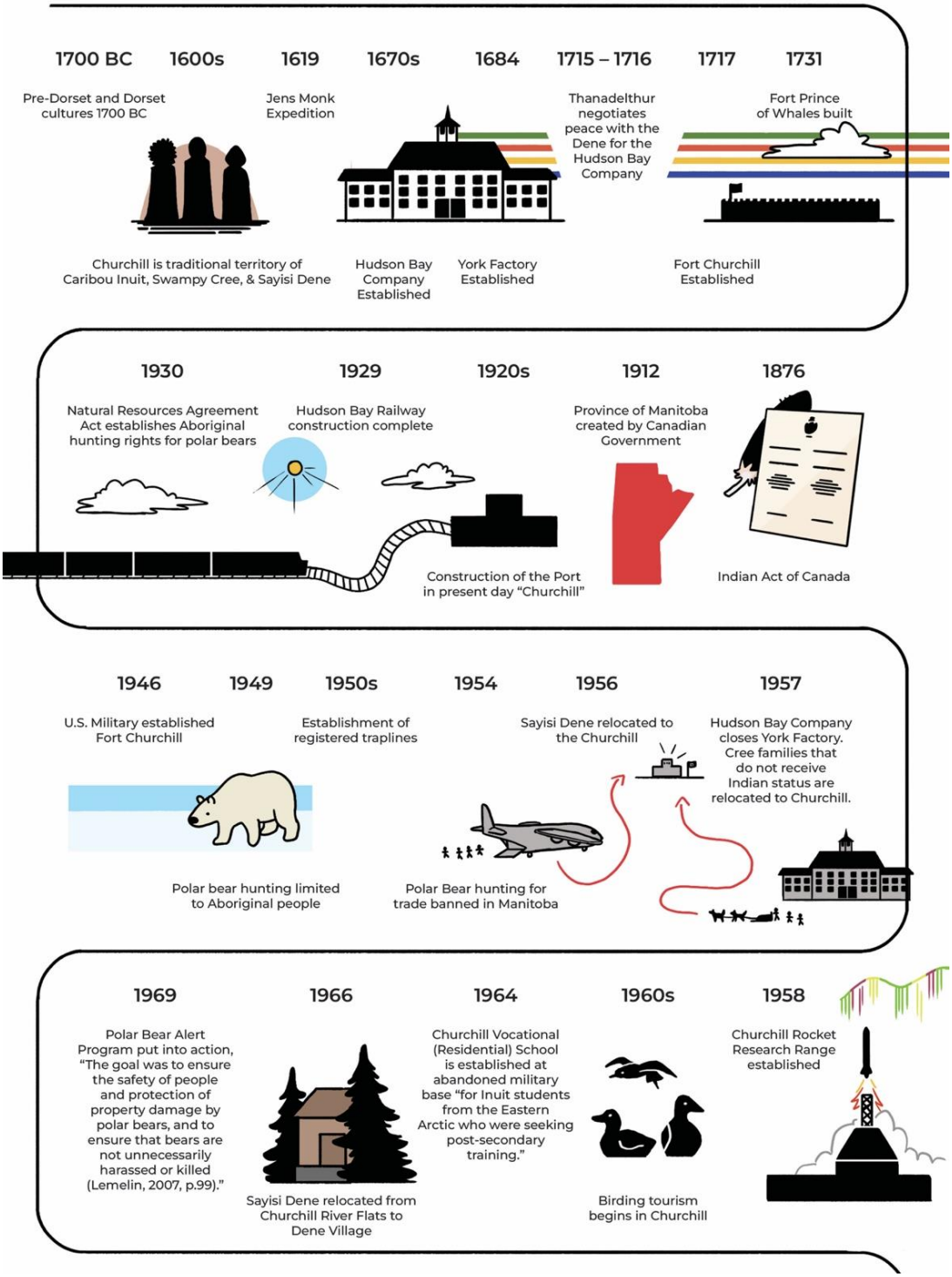
Appendix C: Map — A Close-Up Perspective of the Town of Churchill.

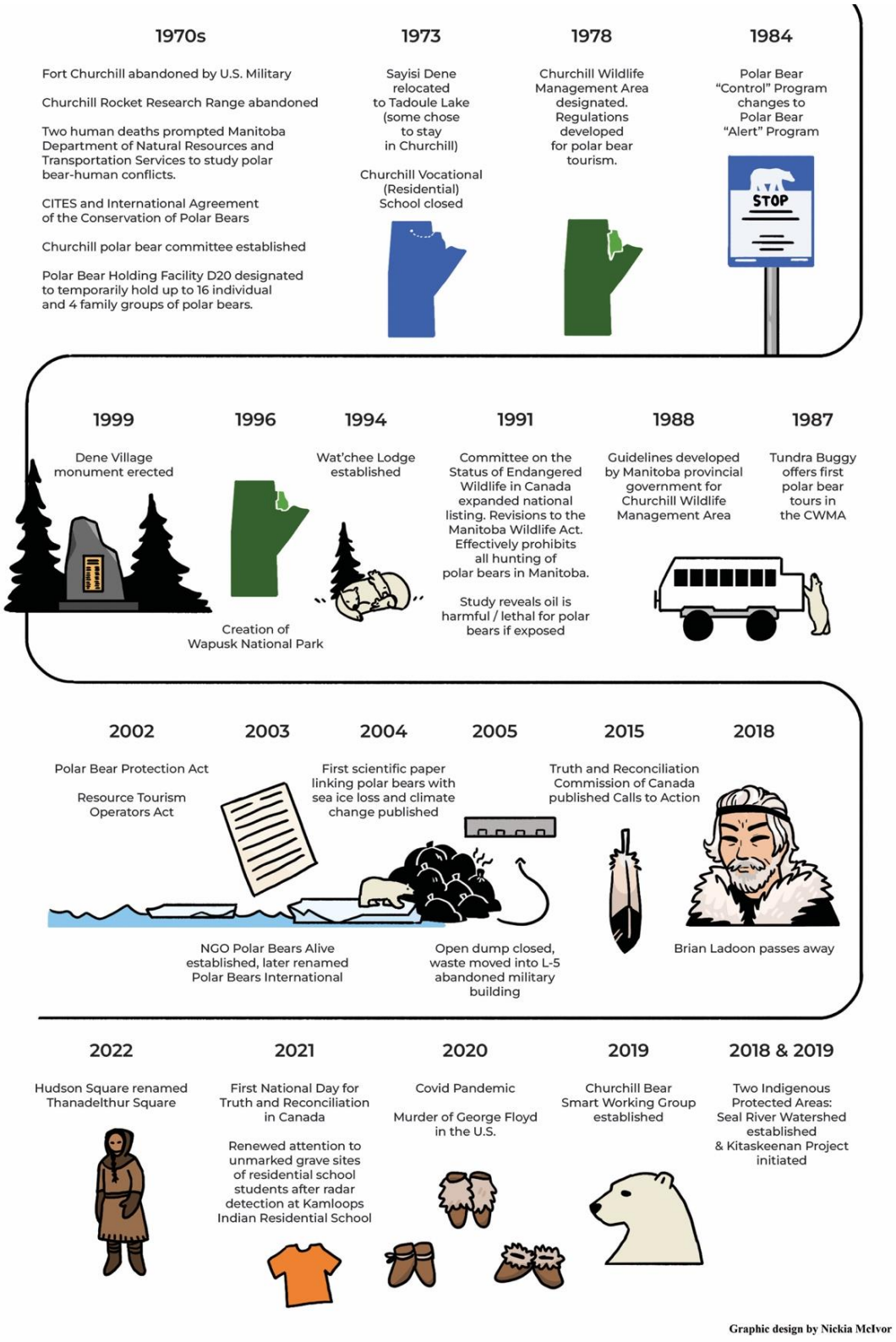
This close-up perspective of the Town of Churchill includes project-relevant locations.

Note. Graphic design © Nickia McIvor.

Appendix D: Churchill Timeline

A timeline of significant Indigenous events and significant events related to polar bears in Churchill, Manitoba, Canada. Cocreated with research participant, Nickia McIver.





Note. Graphic design © Nickia McIvor.

Appendix E: Storytelling Prompts

My coresearcher, the Indigenous Knowledge Keepers, and I edited the original interview questions to the following prompts, which I then used in each sharing circle:

1. Do you remember the first time you saw a polar bear?
2. What was it like growing up here and living with polar bears?
3. Can you think of any stories from your parents or grandparents about how they lived with polar bears?
4. What are the do's and don'ts for living with polar bears? What are the tips and tricks?
5. What do you envision for the future living with polar bears? Is there anything you think should change?

Appendix F: Research Information Letter

Working Title: Indigenous and traditional ecological knowledge of human-polar bear coexistence in Churchill, Manitoba

WHO

- **Who will be doing the research?**
  - Researcher: Kt Miller, Royal Roads University ***You may know or recognize Kt as a staff member of Polar Bears International who has been spending time in Churchill seasonally since 2011, Polar Bears International is supporting this project, however the research is conducted by Kt independently for her University studies***
- **Who will be the research participants?**
  - Indigenous Elders and knowledge keepers from the community of Churchill

WHAT

- **Interviews, focus groups or sharing circles (to be determined by the community)— inspired by storytelling** recorded on an audio recorder. Participants may choose to be acknowledged or remain anonymous.
- **Written paper + Arts-based presentation of results—** an edit of the audio recordings illustrating the findings so that the participants, community members, and others can listen in an approachable, non-scientific way.

WHEN

July/August 2022	Conduct research with Elders and knowledge keepers in Churchill
Aug-Jan 2023	Kt analyzes results
Feb 2023	Present findings to participants for validation
May 2023	Community presentation of results
May 2023	Finalize research

WHERE

- Churchill, Manitoba, Canada

WHY

- To document and share Indigenous and traditional ecological knowledge of human-polar bear coexistence with Elders and knowledge keepers in Churchill, Manitoba.
- To contribute specific Indigenous knowledge in Churchill to the vast amount of scientific knowledge of polar bears in the region.
- To create more culturally inclusive research in the North.

To contact Kt:

Phone: [telephone number]
Facebook: [handle]
Email: [email address]

Appendix G: Email Invitation

This invitation has been simplified to be in lay language and comprehensible by a non-academic audience. Please see the consent form and interview guide for further information. More detailed ethical conversations will be done at the beginning of the interview, in person, to confirm that the participant understands (in English) and minimizes the technical language in the initial invitation.

EMAIL

Hi [Prospective Participant],

This is Kt Miller. You likely know me through my work with Polar Bears International. I'm going to be in town working on a research project that PBI is supporting, but it is for my university studies.

I would like to invite you to be part of the research that I am conducting. This project has been approved by the ethics board of Royal Roads University. I've also worked with Erika at the Town on an initial list of participants to invite.

My research project aims to document the Indigenous and traditional ecological knowledge of polar bears with Elders and knowledge keepers in the community.

I will be in town in late April to conduct interviews. I will also have maps available for any information that might be better communicated that way. I hope to record the audio from these interviews to help me analyze the information after. The interviews should last around an hour but might go a little longer.

Please do not feel obligated to participate just because you know me through Polar Bears International. It is entirely up to you. If you choose to participate and decide later that you would rather not be included, you can withdraw from the study at any time, and I will delete all the information you shared.

Let me know if you have any interest and availability to participate. I am happy to answer any questions you might have by email or over the phone. I can also send you a list of questions in advance so you can think about them before deciding.

Sincerely,
Kt Miller

[email address]
[telephone number]

Candidate, Master of Interdisciplinary Studies, Royal Roads University
Senior manager of conservation communications and outreach, Polar Bears International

Appendix H: Participant Consent Form

Katharina Miller

Royal Roads University

You are being asked to participate in a research study titled "Indigenous and traditional knowledge of polar bears in Churchill, Manitoba." I will describe this study to you and answer any of your questions. This study is led by Katharina Miller, a Master of Arts in Interdisciplinary Studies candidate at Royal Roads University. The faculty Supervisor for this study is Dr. Michael Lickers of Royal Roads University, and the second committee member is Dr. Dominique Henri of Environment Climate Change Canada.

What the study is about

The purpose of this research is to document Indigenous and traditional ecological knowledge of polar bears in the region near Churchill, Manitoba.

What we will ask you to do

I will ask you questions in a conversational format about polar bears. You can choose to answer or not answer any of the questions. If you are comfortable, I will ask you to share any stories you might have or know of. You may choose to point out places on maps that are relevant or significant to the topics that come up.

I will ask your permission to record the conversation. I will put together an artistic audio file (like a podcast or radio show) to illustrate the results of the research.

I will return to the community and share the research results with you before they are finalized. I will ask you to confirm that the information I gathered from you is accurate, and that you feel the information you shared is represented correctly.

Risks and discomforts

I do not anticipate any significant risks from participating in this research.

Benefits

Information from this research will benefit Indigenous peoples by documenting and adding their knowledge to the scientific information about polar bears in the region. Gathering this information in Churchill is important because this region has lots of Western scientific data on polar bears, but much less Indigenous knowledge is documented. Adding more Indigenous knowledge to our understanding of polar bears in the region contributes to a more well-rounded understanding of polar bears from multiple worldviews and ways of knowing.

Compensation for participation

No compensation will be provided.

Arts-based presentation of results

I request your permission to record the interviews on a digital audio recorder.

☐ YES, I agree to have this interview recorded.

☐ NO, I do not agree to have this interview recorded.

I request to use the audio for an artistic edit of the results (like a podcast or radio show)

☐ YES, I agree to have the recording used for the presentation of results

☐ NO, I do not agree to have the recording used for the presentation of results

I request to take a portrait of you for the artistic presentation of results. You will have a chance to review and approve the picture.

☐ YES, I agree to have a photograph of me included

☐ NO, I do not agree to have a photograph of me included

Video and audio content can only be used in relation to the research project and presentations, publications, or information regarding the findings. Once the final arts-based presentation is complete and approved by the participants no additional changes will be made.

Upon completion of the research the interviews will be archived on a hard drive and stored in the Polar Bears International office located at 810 N Wallace Ave Ste. E Bozeman, MT 59715 USA, with explicit information stating that permissions are required from participants for any future research or use.

Privacy/Confidentiality/Data Security

Participants will have the option of remaining anonymous or being credited. Participant names and agreements to various components of this consent form will be stated at the beginning of the recording; therefore, the identifying information will be kept with the data.

The interviews and map data recordings will be kept on two matching hard drives with the lead researcher, Katharina Miller. Katharina Miller, and Katharina's supervisors will be the only people allowed access to the data.

Sharing De-identified Data Collected in this Research

De-identified data from this study may be shared with the research community at large to advance science and health. We will remove or code any personal information that could identify you before files are shared with other researchers to ensure that, by current scientific standards and known methods, no one will be able to identify you from the information we share. Despite these measures, we cannot guarantee anonymity of your personal data.

Future use of Identifiable Data or Specimens Collected in this Research

Identifiable information might be used for future research with obtaining your consent.

Taking Part is Voluntary

You may refuse to participate before the study begins, discontinue participation at any time, or skip any questions or procedures that make you uncomfortable.

Follow-Up Studies

We may contact you again to request your participation in a follow up study. As always, your participation will be voluntary, and we will ask for your explicit consent to participate in any of the follow up studies.

If You Have Questions

The main researcher conducting this study is Katharina Miller, a graduate student at Royal Roads University. Please ask any questions you have now. If you have questions later, you may contact Katharina Miller at [email address] or at [telephone number]. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Royal Roads University Research Ethics Board (RRU REB) at [telephone number] or access their website at https://research.royalroads.ca/ethics.

Participants will be read this form in its entirety and agree verbally.

This consent form will be kept by the researcher for ten years beyond the end of the study.

☐ YES, I agree to participate in this study

☐ If no, DO NOT SIGN AND DISCARD

Signature: _____

Name: _____

Date: _____

Appendix I: Coexistence Study Codebook

Name	Description	Files	References
About the Bears		7	50
IK of Bears		0	0
Bear behavior		10	92
Habituation		10	36
Predictability		7	14
Smart		3	11
Sneaky		2	2
Black bears		2	7
Climate change		3	4
Ecology or biology		10	55
Abundance		5	12
Bear noise		1	1
Denning		2	4
Migration route		3	4
Mom and cub(s)		5	23
Starvation		1	2
Bear Aware		10	87
Avoidance		5	14
Bear guard or monitor		7	20
Give a bear distance or space		7	19
Go inside a building or house		9	40
Line of sight		3	4
Night		8	29
Not afraid		8	20
playing or walking on the rocks		10	24
Vehicle		8	55
Boat		3	11
Bus		1	1
Car		3	14
Four-wheeler		4	8

Name	Description	Files	References
Skido, snowmachine, or snowmobile		1	2
Taxi		1	3
Tundra Buggy		3	15
Zodiac		1	1
Education		9	99
Don’t go on the Pipeline		6	12
Folklore		5	13
Polar Bear Weather		3	4
Fog		3	4
Kids playing outside		10	53
Maternal instinct or influence		7	37
School		8	24
Winter		5	9
Summer		7	12
Technology		7	16
Social media		4	8
Snapchat		1	1
Encounter		10	91
Attack		6	20
Fatality		1	2
Tent		2	3
Attractant		10	69
Beluga whale		6	9
Caribou		5	5
Dogs		6	28
Dump		9	37
Fish		3	9
Garbage		9	47
Moose		3	3
Seals		2	3
Smell		7	16
Bushes		1	3

Name	Description	Files	References
Cabins		6	12
Hide under the bed		2	2
Windows		3	7
Deterrent		10	56
Cracker shells		4	6
Guns		10	53
Hit the bear on the nose		4	9
Noise		5	8
Whistle		1	1
Fall		5	7
Fear		8	32
First polar bear memory	Response to the question, do you remember the first time you ever saw a polar bear?	9	26
Frequency		6	11
Run		7	10
Surprise		5	8
Uncommon or rare		5	15
Walking		10	54
Culture		9	79
Coexistence		9	74
Community		3	29
Local		2	19
Pride		3	10
Safety		3	28
Siren		1	1
Trust		2	8
Growing up in Churchill		5	54
Nuisance		1	2
Working on the ground		3	11
Land-based Activities		0	0
Berry picking		4	5
Camping		4	6
Fishing		4	10

Name	Description	Files	References
Hunting		8	35
Scuba diving		1	1
Snowshoes		1	2
Colonial impacts on IK		0	0
Relocation		5	7
Researcher bias		2	4
Residential school		1	1
Indigenous worldview		6	29
Ceremony		1	1
Healing		1	2
Interconnectedness		1	8
Reconciliation		6	18
Respect		9	35
Inuit		5	5
Eating bear		5	6
Spiritual or spirit		5	11
Trauma		4	15
For Editing - prompts and cues		0	0
Best stories and moments		4	5
Change		9	63
Laughter or funny		6	16
Prompt		10	183
Industry and Economy		2	4
Career or job		1	3
Tourism		10	137
Bear viewing		8	52
cameras filming photography		8	43
Disturbance		1	1
Guide		4	6
Independent traveler		5	18
Polar bear safety		10	72
Walking with the bears		1	1
Trapping		3	25

Name	Description	Files	References
Hide, skin, pelt, or fur		4	14
Management and Research		0	0
Management		8	82
[Local legend's] Dogyard		0	0
Human bear interaction		0	0
Killing bears		9	37
Military		4	7
Poison		1	4
Polar Bear Alert		10	80
Hazing a polar bear		8	14
Helicopter		6	7
[Conservation Officers]		2	10
Why don’t they fly them South		6	13
Orphan cub(s)		2	2
Zoo		7	15
Sanctuary		1	1
Waste Management		0	0
Dump closing		0	0
Waste water in WMA		0	0
Researching Polar Bears		7	21
Western science		2	4
Tracking and tagging		4	14
Tranquilizing bears		4	8
Thematic timing - past, present, future		0	0
Distant Past	Memories and stories from parents and grandparents	4	23
Future	Visions and hopes for the future	8	121
Past	Memories and stories from Childhood. Approximately 1957 - 2005.	9	199
Present	Memories and stories from recent times to present. 2005 - present (2022).	10	299

Appendix J: Mind Maps by Theme

I presented these mind maps of inductive thematic analysis, which I had originally done on sticky notes, to participants, and then further refined the themes.

Theme 1: "Every Tom, Dick, and Harry's Out Looking For a Bear":

Industry and Economy

Theme 2: "Why Don't They Fly Them South?": Management and Research

Theme 3: "Their Entire Existence Relies On Being Sneaky": About the Bears

Theme 4: "Don't Walk on the Pipeline!": Bear Aware

Appendix K: Project Case List

Location, Place, Organization, or Business	Files	References
York Factory	4	24
Willow Park	1	1
Wavy Creek	1	1
Watchee Lodge	2	10
Wapusk National Park	3	6
Wapusk Dogyard	1	6
Tundra Buggy Lodge	1	7
Town of Churchill	10	103
Thompson Creek	1	1
The Weir	1	2
The Castle	3	5
Slipway	1	1
Seal River Lodge	1	2
Seal River	1	2
Salmon Creek	1	1
Rankin Inlet	1	1
Prince of Whales Fort	2	12
Port of Churchill	1	1
Port Nelson	1	4
Polar Bear Holding Facility	6	8
Polar Bear Alley	2	8
Owl River	1	4
Norton Lake	1	1
Nestor One	1	3
Nelson River	1	1
Marsh Point	1	2
Marina	1	1
Landing Lake	1	1
L-5 Waste Transfer Facility	2	2
Knight’s Hill	1	1
Kaskatamagun	1	1

Location, Place, Organization, or Business	Files	References
Jockville	1	1
Inukshuk, Town Beach, Behind the Complex	8	17
Hudson Bay	4	8
Gordon Point	1	1
Goose Creek	5	12
Fort Churchill	5	8
Flats	7	33
Eskimo point	1	5
Diamond Lake	2	2
Dene Village	1	2
Coral Harbour	1	4
Churchill Wildlife Management Area	3	5
Churchill River	5	15
Churchill Northern Studies Centre	3	6
Cape Merry	4	12
Cape Churchill	2	4
[Local legend] Dogyard at Mile Five	5	12
Beluga Motel	1	3
Back road - from airport to town along the coast	2	2
Arviat	6	15
PBI - Polar Bears International	2	4
Parks Canada	6	18
Natural Habitat	1	1
Manitoba Hydro	1	3
Greenpeace	1	1
Great White Bear	2	2
FNA – Frontiers North Tundra Buggy Adventures	1	10
Churchill Marine Observatory	1	1