Exploring Indigenous Community-Based Monitoring Programs in Alberta: Key Factors in Advancing Community Capacity-Building and Sovereignty

by

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Abstract

Indigenous community-based monitoring (ICBM) has the potential to act as a vehicle for building capacity in the community - particularly amongst youth, creating culturally oriented jobs to strengthen intergenerational learning, and contributing information to environmental governance and decision-making processes. Despite the potential benefits, ICBM programs face many challenges to their sustainable and long-term conduct. This study explores the challenges and potential of Indigenous Community-Based Monitoring (ICBM) in Alberta, focusing on its role in developing local capacity and advancing Indigenous sovereignty. Using a modified expert elicitation methodology and thematic analysis, this research engaged fifteen expert practitioners involved in ICBM or closely related work through qualitative interviews to assess key obstacles and opportunities influencing the success of these initiatives. Thematic analysis reveals that enduring inequities, resulting from colonial legacies and reinforced by modern structural constraints, substantially affect the effectiveness of ICBM. The sustainability of funding, regulatory frameworks, and the role of the private sector were all identified as key factors influencing the success of these programs. The results of this research can be used to further explore how these challenges can be overcome in the future, advancing ICBM initiatives and related community benefits.

Preface

This thesis is an original work by Carter Gorzitza. The research project, which this thesis is a part of, received research ethics approval from the University of Alberta Research Ethics Board, Project Name “Decolonizing Natural Resource Management in Alberta", Pro00112291, February 4th, 2022.

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1. Introduction

1.1. Introduction

The state of Canada, and particularly the province of Alberta, exists at a nexus of historical and contemporary geopolitical phenomena, existing as a global hotspot for natural resource extraction containing some of the most carbon-intensive and biologically destructive extraction on earth (Gosselin et al., 2010; Rosa et al., 2017), occurring in a settler-colonial project on the stolen land of Indigenous communities with a violent history resulting in severe inequality between Indigenous and settler communities (Truth and Reconciliation Commission of Canada, 2015). Both this history of colonialism and resource extraction have contributed to the ongoing natural disasters such as wildfires and record temperature events, which continue to disproportionally affect Indigenous communities (Cuerrier et al., 2015; McGee, 2021). In our attempts to pursue solutions to the crises, it has become increasingly critical that these solutions are multifaceted in their outcomes, thus affirming the rights of Indigenous communities and contributing to more healthy and resilient ecosystems.

Underpinning the fields of environmental sociology and rural sociology is the study of the intersection between society and the natural environment, mainly focusing on how human activities interact with the ecosystems they are a part of and vice versa. Research in this field has expanded to include a critical examination of the interactions and conflicts involving Indigenous communities throughout contemporary settler-colonial states (Norgaard & Fenelon, 2021). Indigenous communities have typically been at the forefront of both colonial and industrial expansion, are often experiencing disasters and higher risks because of climate change (Turner &

Clifton, 2009; Turner & Spalding, 2013) and are at the forefront of resistance to those expansions (Coulthard, 2014; Estes, 2019).

Alberta aptly exemplifies this dynamic between the industrial expansion of settler-colonial states and Indigenous communities. This is exemplified when looking at oil sands extraction and processing in central northern Alberta. In the case of oil sands development, extraction processes, as well as the ongoing expansion of mined areas, have led to significant local environmental degradation affecting land, water, and air quality (Westman & Joly, 2019), which in turn impacts the health of nearby Indigenous communities including their ability to access and practice their legally enshrined rights to traditional harvesting (Parson & Ray, 2018; Vannini & Vannini, 2019; Westman & Joly 2019). In response to these issues and the legal battles that preceded them, there has been a growing recognition of the need to incorporate Indigenous communities and their knowledge systems into environmental management practices (Reed et al., 2020).

Indigenous community-based monitoring (ICBM) programs are one of several emergent solutions that have been conducted by or with Indigenous communities in Alberta. ICBM, understood here as environmental monitoring programs that are guided by Indigenous communities in their purpose, planning, and/or practice, have been shown to have a wide range of potential benefits to the communities they are conducted in, ranging from intergenerational cultural transmission (Johnson et al., 2015), to job creation, and greater opportunities to mobilize Indigenous knowledge in environmental management (Wiseman & Bardsley, 2016). Research in the oil sands region of Alberta has shown that Indigenous community-based monitoring programs can support Indigenous communities in their efforts toward practicing self-determination but continue to face many institutional barriers in doing so (Reed et al., 2020).

ICBM can be understood in contrast to the history of environmental management as a colonial tool of oppression and land theft, instead being a tool for reasserting Indigenous sovereignty through the collection and ownership of information and through the actions of subsequent ecological stewardship and management.

Despite these potential benefits of ICBM, numerous challenges have been documented that can hinder an ICBM program's success. These challenges tend to stem from historical and ongoing colonial legacies and contemporary structural constraints such as funding instability (Conrad & Hilchey, 2011) and regulatory barriers (Reed et al., 2020; Wilson et al., 2018). Additionally, the interplay between Indigenous knowledge and more hegemonic Western scientific paradigms and decision-making structures can create ontological conflicts and impasses, affecting the conduct and impact of Indigenous-led environmental monitoring on environmental management decisions (Nadasdy, 2005). In their work regarding the oil sands regions, Reed et al. (2020) found the non-binding nature of ICBM agreements between Indigenous nations and the supporting partner or funder (typically settler governments or industry), as well as the lack of alteration or flexibility on behalf of the federal and provincial authorities, to be the most significant of the barriers to the function of programs. Instead, Reed et al. suggest that Indigenous nations should create monitoring programs outside of state-led parameters to work towards greater self-determination.

When approaching research such as the work here, it is crucial to understand the positioning of how we are studying the subject, notably "who" we are studying. Traditional academic research has often been critiqued for its tendency to "study down," focusing disproportionately on marginalized communities from an external, frequently intrusive perspective. In contrast,

inspired by Laura Nader's advocacy for "studying up" (1972), as highlighted by Kim Tallbear in her writing on her “feminist-indigenous approach to inquiry” (2014), this research endeavours to examine the structures and individuals in positions of power within the systems of Indigenous community-based monitoring pertaining to western Canada, specifically Alberta and the territories (the Northwest Territories and Yukon). This aspiration to study up is in line with other theoretical groundings of this research, specifically that of knowledge systems theory and nested theories such as Harding’s Standpoint Theory (1991) and other theories of positionality and the subjectivity of knowledge, which are covered in more depth in the literature review.

Given the pressing environmental and social issues facing communities in Alberta and beyond, there is an urgent need for multifaceted solutions that both improve environmental monitoring and repeat the same oppressive or unjust actions that have plagued environmental management in the past. By examining and exploring the experiences of experts associated with ICBM activities, this study seeks to identify key factors for successful ICBM programs, potentially contributing to the development of environmental monitoring programs that align with the aspirations of Indigenous communities and promote healthier, more resilient ecosystems.

1.2. Research Objectives & Questions

The objective of this thesis is to investigate the challenges and opportunities for the successful and effective conduct of Indigenous Community-Based Monitoring (ICBM) programs. This exploration was conducted with qualitative research methods and included interviews with expert professionals actively engaged in ICBM programs or related projects, focusing primarily on central and northern Alberta. The research seeks to explore these challenges and opportunities

for ICBM with the goal of communicating these findings back to practitioners and partners in the pursuit of advancing Indigenous and environmental justice.

To pursue this objective, this research takes a qualitative approach focused on exploring the perspectives and experiences of actors with proximity to institutional and financial power related to ICBM programs. Inspired by expert elicitation methods, fifteen semi-structured interviews were conducted with expert ICBM practitioners and related and adjacent professionals.

These interviews focused on exploring these experts' experiences with successful and unsuccessful CBM programs or the challenges of engaging with ICBM programs or related collaborative research efforts. To best explore these experiences, three guiding questions were developed to structure the interviews: (1) How do different actors conceptualize community-based monitoring, (2) What are the challenges and aspirations these actors associate with this monitoring work, and (3) What do these actors see as the future of ICBM in western Canada?

1.3. Research Significance

The unique research position taken in this study has the potential to contribute to several areas of study. It offers a unique research perspective on the complex relationships between the settler-colonial state, academic institutions, and Indigenous Nations and communities through a lens of knowledge studies, decolonial research, and socioeconomic discourse. The research's significance lies in its potential to inform and improve ICBM practices in a practical fashion for the folks managing and conducting ICBM programs on the ground, as well as in a more recommendatory fashion for folks in ICBM-related settings potentially funding programs, partnering with communities, or using the information generated from these programs in their work.

1.4. Author Positionality

I am a non-Indigenous settler of primarily Eastern European ancestry. I was born and raised in the central-western portion of the settler-colonial province of Alberta, between the towns of Fox Creek and Hinton, in Treaty 8 and 6, respectively. Since finishing high school, I have been living in Amiskwacîwâskahikan or Edmonton, AB, in Treaty 6. I was raised in a working-class family, with my father working in oil and gas and my mother working smaller jobs while mostly staying home with me and my siblings. My interest in environmental science and environmental sociology was stimulated by the socioeconomic reality of growing up in the "boom towns," which were a nexus of "protected areas" such as parks and crown land, along with sites of major industrial extraction.

This research interest in the variation and difference of perspective amongst those with proximity to power was relevant and top-of-mind because of the kind of work I had been doing outside of academia as an employee with the federal government and as an organizer in the youth climate movement. Prior to my time in graduate school (and in the final semester of finishing this thesis), I was employed by Environment and Climate Change Canada, assisting with work on the Mackenzie River Basin Board's State Of the Aquatic Ecosystem Report (SOAER), a report which attempts to employ concepts of "knowledge braiding" (Gonzalez, 2001; Kimmerer, 2002), "to guide the consideration of science and Indigenous Knowledge in this [their] report" (Mackenzie River Basin Board, 2021). It sparked my curiosity regarding how knowledge is valued and transmitted in these more bureaucratic systems and how varying degrees of power are associated with that knowledge. This interest in power was also fostered through my experiences in the youth climate movement with organizations such as Climate Justice Edmonton and 350

Canada. This engagement in justice-focused work at various political scales developed a passion for learning about strategies for change-making in pursuit of collective liberation.

1.5. Organization of Thesis

In Chapter 1, the rationale, the background, and the objectives of the research are articulated. Followed by Chapter 2, the literature review, which explores the topics of interest and background to a further degree, including the different definitions for contemporary participatory environmental monitoring practices, related existing typologies for understanding the differences amongst these practices, a review of the literature around Indigenous knowledge and related theories of situated knowledge systems, understandings of "power" and how it is used in this research, and the existing literature that documents challenges to Indigenous community-based monitoring programs.

Chapter 3 is a description of the methods employed to conduct this study, including a reflection on my positionality and personal relation to the research and an additional description of the Expert Elicitation methods used in this research, followed by summaries of the project scoping, participant selection, development of questions, interviewing process, coding and analysis, and writing and verification.

Chapter 4 presents the research results, and is structured around the key themes that emerged from the expert interviews. Based on the themes, the chapter is divided into four sections, being community capacity, policy and regulation, knowledge and knowledge mobilization, and funding and financing. Each section explores the specific challenges and opportunities identified by the participants, providing an overview of the key factors influencing ICBM in Alberta.

In Chapter 5, the findings of the study are discussed in relation to the existing literature. The implications of the research findings for policy, practice, and gaps in the literature are explored, highlighting the identified challenges to ICBM and exploring change.

Lastly, Chapter 6 concludes the thesis by reviewing the study's key findings and contributions. This chapter also addresses the research's limitations and outlines potential directions for future studies.

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2. Literature Review

2.1. Introduction

This research pulls together concepts, theories, and frameworks from environmental sociology and adjacent research fields pertinent to the practice of Indigenous Community-Based Monitoring in Alberta. This chapter is a review and a synthesis of a range of areas of literature, including sustainability and environmental management, knowledge studies, socio-political and historical research, and other studies relevant to environmental monitoring and Indigenous studies. Through this literature review, a foundation is laid to further explore how the findings and concepts already in the literature are reflected or contended in subsequent chapters, providing a critical context for the research findings.

2.2. Settler-Colonialism & the Sustainability of Lands & Resources

Historically, Western worldviews have maintained a dichotomous distinction between "man and nature," with the distinction between the two categories fluctuating over time, often providing an ideological rationale for many forms of oppression, such as colonialism, racism, sexism, and homophobia. Colonialism and its intersections with other forms of oppression form the material and social foundation for settler-colonial states such as Canada. The imperialist and colonial rhetoric of the past is often not as overtly present in modern public discourse, exemplified by nations such as Canada pursuing reconciliation processes and institutions such as the Catholic church recently renouncing the Doctrine of Discovery (Winfield, 2023; Holy See Press Secretary, 2023) – a historical and legal basis for the theft and occupation of Indigenous lands. Despite the progressive perceptions of these actions, they are largely symbolic gestures that often do little to change the systems underpinning the inequalities institutions such as the Vatican

claim to be reconciling. These symbolic gestures are exemplified in how, while purporting ideas such as reconciliation or Indigenous self-determination, settler-state governments continue to marginalize Indigenous communities and undermine the sustainability of ecosystems – often the ecosystems which those communities rely on and which they have stewarded for generations (Coulthard, 2014; Parlee, 2015; Parlee et al., 2018).

Indigenous Sovereignty & Self-Determination

Self-determination, described in the United Nations Declaration on the Rights of Indigenous Peoples, represents an Indigenous right to "...freely determine their political status and freely pursue their economic, social and cultural development," (United Nations (General Assembly), 2007, art. 3) to "...have the right to autonomy or self-government in matters relating to their internal and local affairs, as well as ways and means for financing their autonomous functions," (art. 4) and to " maintain and strengthen their distinct political, legal, economic, social and cultural institutions, while retaining their right to participate fully, if they so choose, in the political, economic, social and cultural life of the State" (art. 5).

The right to self-determination has gained global attention and was given international legal grounding through the United Nations General Assembly's adoption of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) in 2007. The declaration pointedly affirms the rights of Indigenous peoples to self-determination, cultural continuity, and control over their lands and resources (UN General Assembly, 2007). The declaration calls for the inclusion of Indigenous knowledge and practices into broader management strategies. It sets an international precedent for Indigenous rights and inclusion, having significant implications for Indigenous environmental management and monitoring.

Social-Ecological Systems

The study of these relationships between colonialism and environmental sustainability has laid the groundwork for conceptualizing "social-ecological systems," a concept that provides a holistic framework for understanding the intricate, dynamic relationships between humans and the environmental systems in which they are a part. The concept requires an objection to the human-nature dichotomy and instead the employment of an understanding of humans and their communities and cultures as something that is co-produced and in constant interaction with the environment (Berkes & Berkes, 2009). This ontological grounding is explored and corroborated in numerous studies examining the relationships between humans and the environments they inhabit (Davidson-Hunt & Berkes, 2003; Trosper, 2003). By recognizing the embeddedness of human systems in ecological systems and their function, we can better investigate activities such as environmental monitoring or management and the role of their socio-historical context in their practice.

Indigenous Communities & Environmental Health

Studies have shown that there is often a positive relationship between the health and well-being of Indigenous communities and the health of the ecosystems within their territories. A study conducted by Garnett et al. (2018) demonstrated the role of Indigenous communities in protecting biodiversity and asserted the importance of their role in a changing global climate going forward. Garnett et al. approach the research from a global scale and found a strong correlation between the areas with the highest levels of biodiversity and the geographies of Indigenous-protected territories, with those territories having a greater variety of species compared to non-Indigenous protected areas – substantiating the crucial role Indigenous

communities play in environmental management. Other studies on Indigenous management methods, such as community forestry programs, have found that these approaches often lead to better environmental outcomes and improved community well-being (Kanel & Kandel, 2004; Moller et al., 2004). Works such as those above highlight the importance of research with the purpose of contributing to the advancement of ICBM and management efforts.

2.3. Citizen Science, Community-Based Monitoring, & Indigenous Community-Based Monitoring

The theory and practices of citizen science, community-based monitoring (CBM), and Indigenous community-based monitoring (ICBM) have unique characteristics and theoretical underpinnings that can be distinctive to their practice. Ignoring these distinctions risks misunderstanding the unique roles each can play in contemporary environmental monitoring and management.

Citizen Science

At its core, citizen science is an approach to research that strives to actively involve the public in scientific processes, primarily through data collection and occasionally in the analysis or reporting of that scientific information (Conrad & Hilchey, 2011). The concept is rooted in the democratization of science, emphasizing the involvement of non-professionals or "lay people" in the scientific process, building up a more robust understanding of – and engagement in – science amongst the public (Conrad & Hilchey, 2011). However, citizen science has been critiqued for its potential to "oversimplify" the scientific process, reducing the complexity and nuance of research and increasing inaccuracies (Riesch & Potter, 2013). Additionally, there are concerns regarding the variability in the quality and consistency of data collected due to the range of

training and experience among "citizens," potentially impacting the "reliability" and "validity" of the data (Kosmala et al., 2016). Despite these critiques, the power dynamics within citizen science projects can often remain skewed towards professional scientists, as these scientists still typically control a significant portion of the programs, including the research questions, methods, and use of data (Eitzel et al., 2017).

Community-Based Monitoring

Community-based monitoring (CBM) advances the involvement described in citizen science, focusing more on the role of local communities in observing, tracking, and understanding changes in the environments around them and often doing so to inform local decision-making and management (Conrad & Hilchey, 2011). Arguably, CBM moves from the involvement of the "citizen" to the involvement of the "stakeholder," placing a higher value on local knowledge and community engagement when seeking to research and address environmental challenges. CBM often involves – or aspires to undertake – long-term monitoring, which can provide the participating community with data and information to understand environmental changes over time at a local scale – which can then be utilized in attempts to contribute to or influence environmental governance in the programs' local region (Danielsen et al., 2009). However, issues have arisen with CBM, particularly in how data and information from Indigenous communities are utilized in, or contributing to, broader decision-making processes, often due to issues with the standardization and interpolation of the CBM with other professional data sets (Danielsen et al., 2009).

Indigenous Community-Based Monitoring

Indigenous community-based monitoring (ICBM) has had similar challenges to those described above for CBM, such as skepticism regarding rigour and quality and the utilization of information generated from the programs (Conrad & Hichley, 2011; Wilson et al., 2018). Beyond these shared challenges, ICBM operates with the additional challenges imposed by the ongoing effects of centuries of colonialism and state violence toward Indigenous communities, manifesting in conditions such as a lack of clean drinking water, a lack of access to healthcare, and food insecurity (Coulthard, 2014). In the context of the legal structure and history of Canada, ICBM differentiates itself from citizen science and other forms of CBM due to the role that Indigenous peoples, communities, and Nations play in the monitoring program and the legally recognized Indigenous rights and cultural practices that accompany their participation, guidance, or ownership of said monitoring (Wilson et al., 2018). It should also be noted that throughout the literature, the terms ICBM and CBM are often used interchangeably and somewhat inconsistently – especially across geographic boundaries, with the inclusion of Indigenous communities in "community-based monitoring" sometimes being implied and at other times being absent. Beyond settler-state-recognized rights, ICBM can involve specific sets of cultural responsibilities, systems of knowledge, or unique histories of resistance, all of which can affect a program's praxis and output (Wilson et al., 2018).

ICBM programs have the potential to present opportunities to community members to build skills in more conventional environmental fields while also existing as a space for them to practice traditional stewardship and cultural practices as well as the transference of intergenerational knowledge within the community, allowing the community to create opportunities that (Johnson et al., 2015). Indigenous community-based monitoring can thus

contribute to both environmental sustainability and the recognition and revitalization of Indigenous rights and cultures. However, these monitoring programs still exist within our broader environmental monitoring landscape, which is dominated by Western scientific paradigms and colonial governance systems and thus results in barriers to communities asserting their rights.

2.4. Typologies of Community-Based Monitoring

Several prominent typologies of community-based monitoring are present in the literature. The literature review of this research focuses on two typologies: the first is the typologies of monitoring developed by Conrad and Hichley (2011), followed by that of Danielsen et al. (2009).

Conrad and Hichley's (2011) typologically scale CBM monitoring efforts using a governance framing based on the involvement of the community and the role they have in the conception, planning, and execution of the monitoring process, ranking them from "Consultative/Functional" to "Collaborative" to "Transformative." Based on definitions of ICBM and then legally enshrined rights associated with the practice, the logical assumption is that ICBM efforts would fall into the "Transformative" category. Nonetheless, as will be explored in this research and is identified in the literature, ICBM programs are often confronted with obstacles which limit their ability to achieve these "transformative" outcomes due to a range of systematic and arguably nefarious variables, contexts, and histories (Wilson et al., 2018). Thus, for this research, the qualifying attribute of Indigenous Community-Based Monitoring programs is the involvement and at least partial leadership of Indigenous communities or institutions and the inherent rights

and cultural context accompanying that involvement, be they “transformational” in Conrad and Hichley’s typology or not.

Similar to the typology presented by Conrad and Hichley (2011), Danielsen et al. (2009) present a typology of environmental monitoring programs, focusing on the relative participation between “professional” researchers and “local people.” Danielsen et al. present five monitoring program categories, which range from the first category, “Externally driver, professionally executed,” to the fifth category, “autonomous local monitoring.”

Kouril et al. (2016), in their systematic literature review of 86 community-based monitoring publications, produced a revised version of Danielsen et al.’s (2008) categorization, with adjustments made to the qualifiers and removing the category that contained most conventional monitoring efforts not pursued with a community-based approached.

The table below contains all three of the typologies, and transposing them together. In the table, the typologies have been aligned to best relate to the similar categories in the other typology. This transposition is imperfect in that the variables themselves are different, with Conrad and Hichley (2011) focused on governance structures, Danielsen et al. (2008) focused on the primary “data gathers” and “primary data users”, and as mentioned prior, Kouril et al.’s (2016) is a revised version of Danielsen et al.’s with the addition of a traditional language and ecological knowledge inclusion variable.

Table 2.1. Prominent Community-Based Monitoring Typologies in the Literature

Conrad & Hichley, 2011 Variable: CBM governance structures		Danielsen et al., 2008 Variable: Data gathers and data users		Kouril et al., 2016	
		Externally driven, professionally executed	"Design of the scheme, analysis of the results, and management decisions derived from these analyses are all undertaken by professional scientists funded by external agencies"		
Consultative/ Functional	"Gov. led, community run; gov. recognizes problem and uses CBM group to monitor"	**Externally Driven Monitoring with Local Data Collectors**	"involves local stakeholders only in data collection. The design, analysis, and interpretation of the monitoring results are undertaken by professional researchers – generally far from the site."	**Externally driven monitoring with data collectors**	"Community residents or volunteers are involved only in data collection, or as research assistants; Community data collectors have no influence over design and implementation of program; No TLEK is incorporated into the monitoring scheme."
Collaborative	"Involves as many stakeholders, individuals, etc. as possible; often based on politically demarked area (i.e. waterhed)."	**Collaborative Monitoring with External Data Interpretation**	"involves local people in data collection and management-oriented decision making, but the design of the scheme and the data analysis are undertaken by external scientists."	**Collaborative monitoring with external data analysis and interpretation**	"Involves community in data collection and (or) some degree of management-orientated decision-making; May incorporate TLEK into monitoring design and activities;l Data analysis, and interpretation are undertaken by external expertise (i.e., scientists, researchers); Community serves as volunteers and (or) paid trainees."
Transformative	"Community led, run and funded; community recognizes problem-trying to get gov. attention"	**Collaborative Monitoring with Local Data Interpretation**	"involve local stakeholders in data collection, interpretation or analysis, and management decision making, although external scientists may provide advice and training."	**Collaborative monitoring with local data analysis and interpretation**	"Involves community in data collection, analysis, and (or) interpretation, as well as management decision-making; TLEK is incorporated into monitoring design and activities; External support may assist in facilitation and training."
		Autonomous Local Monitoring	"the whole monitoring process—from design, to data collection, to analysis, and finally to use of data for management decisions—is carried out autonomously by local stakeholders."	**Autonomous Local Monitoring**	"Community involved in whole process (from design to use of data); No direct involvement of external agencies; May exist informally."

2.5. Indigenous Knowledge, Standpoint Theory, & Situated Knowledge

Terminology such as Indigenous knowledge, Traditional Ecological Knowledge (TEK), Traditional Knowledge (TK), or other more territory-specific terminologies represent systems of knowledge that are unique to the cultural histories and practices of Indigenous peoples (Battiste, 2005; Berkes et al., 2000). While subtly distinct, these terms broadly refer to knowledge originating from Indigenous knowledge systems and forms of inquiry rooted in Indigenous cultures and ontologies. For instance, TEK often denotes a cumulative body of knowledge, including associated practices and beliefs, about the relationships and interactions between humans, non-human beings, and the environments they inhabit, passed down across generations, often orally and through experiences and observations (Berkes, 2017). In contrast, TK might encompass a broader range of knowledge types, including not just ecological but also medicinal, astronomical, or agricultural knowledge, among others. As explored in the work of Dudgeon and Berkes (2003), Indigenous Knowledge (IK) has become a common term in the literature in recent years. It is rationalized as a more holistic umbrella term including cultural, spiritual, and environmental elements, lacking other terms' specific ecological or technical components, particularly TEK. Thus, IK theoretically encompasses a broad range of understanding, including social norms, spiritual beliefs, and practices that connect ecological knowledge with cultural identity and community well-being, such as practices within Indigenous community-based monitoring.

This research primarily uses the term Indigenous Knowledge (IK) because of its commonality in the literature and because – informed by the work of Kim TallBear (2014) – it can provide a more open definition in its distinctions (or lack thereof) between IK and knowledge produced from more commonly “western” epistemologies by Indigenous people and communities. This

lack of clear distinction makes it an appropriate fit for the study of monitoring programs, which often include a range of knowledge production methods and practices. This approach to knowledge also creates space for knowledge emerging from outside the conventional TEK and Western science definitions, such as the organizational structure of a community-led monitoring program or guiding praxis of one of these programs. While such knowledge might not be traditionally classified as either "traditional ecological" or "traditional" knowledge, it nonetheless represents an approach emerging from an Indigenous worldview and lived experience – hence, it would be a form of Indigenous knowledge under this definition.

This conceptualization of "knowledge," which focuses on the value of the positionality or sociocultural context of the observer, aligns with feminist Standpoint Theory - a theory focused on the situational variables and factors that create "knowledge" (Hekman, 1990; Harding, 1991). Standpoint Theory emphasizes the importance of the position or perspective from which knowledge is generated. This theory, also reflected in theories of "situated knowledges," broadly posits that marginalized or "subjugated" groups have novel and distinct insights into social, cultural, and ecological dynamics that may be overlooked from dominant or mainstream perspectives (Haraway, 1988; Harding, 1991; Hekman, 1990). Accordingly, acknowledging and valuing Indigenous communities' unique standpoints and systems of knowledge opens up possibilities for more diverse, rich, and holistic understandings of our socio-ecological systems and the world more generally.

Research indicates that environmental management practices that include Indigenous Knowledge and traditional stewardship practices have contributed to sustainable and equitable environmental and sociocultural outcomes in both historical (Agrawal & Ashwini, 2006; Berkes, 2017) and contemporary research (Gavin et al., 2015). For instance, the employment of *Inuit*

Qaujimajatuqangit – a culturally specific term from the Inuit describing both their knowledge and a "code of behaviour" – in climate change adaptation planning has been crucial for Inuit people in Arctic Bay, Nunavut, where such knowledge has aided in predicting weather changes and ensuring community safety (Ford et al., 2006).

2.6. Power

Many definitions and understandings of power exist throughout the literature on ICBM, each research based on the context, subject, and scale. In the field of this work, researchers have often focused on exploring how information and knowledge collected in CBM and ICBM programs can contribute to higher-scale environmental management and decision-making (Danielsen et al., 2009; Gearheard et al., 2010; Johnson et al., 2015, Wilson et al. 2018), implying that power is associated with the "mobility" or "actionability" of information collected in the programs. Given the goals of this research and the managerial roles of many of the expert participants, two forms of power emerged as particularly relevant to this study: structural power and participatory power.

Within environmental management and governance, *structural power* can be characterized as the control exerted by a group over resources and their access to environmental decision-making or governance processes. This control is influenced and shaped by institutional, social, and material factors and forces, such as societal norms or governance institutions (Foucault, 1991). This understanding of power acknowledges that influential societal structures can create imbalances in power distribution, affecting access to resources and the ability to participate in decision-making processes. In the context of Indigenous Community-Based Monitoring (ICBM), structural power shapes the ways in which Indigenous communities can engage in environmental governance, influence decision-making, manage their traditional lands, and the practices

included in this management. Studies focused on structural power have focused on its role in both facilitating and hindering the mobilization of Indigenous knowledge, the assertion of Indigenous rights, or the stewardship of traditional lands – as seen with co-management structures in the Canadian Artic (Armitage et al., 2011) and as observed in co-management regimes in the Yukon (Nadasdy, 2005), respectively. Lastly, a systematic review of 79 pieces of literature on Indigenous environmental monitoring found that the key challenge to operating effective monitoring programs, including Western science and Indigenous knowledge, was power imbalances leading to Indigenous monitoring efforts not contributing to environmental management outcomes (Thompson et al., 2020).

For this research, to describe participatory power, we have employed Reed's (2008) description of power as the ability of stakeholders to participate in environmental monitoring and management in ways that influence governance and decision-making. This understanding of power is closely related to the theory of "access" described by Ribot and Peluso (2003), which delves into the myriad ways by which individuals and groups gain, control, and maintain "access" to resources, power, or information, rather than narrowly focusing on a groups rights or legal ability to have that power, resources, or information. This view of power emphasizes the complex interplay of factors that can enable or hinder participation or access, including but not limited to social structures, institutions, knowledge, and capacity. It underscores that mere invitations to decision-making spaces - or the legality of participation - are not indicators of power or influence; instead, the only indicator of power and influence is the wielding of power and the influence of influence. This critical understanding allows for more material and arguably realist quantification of the "power" that communities possess.

Paul Nadasdy's work adds an additional layer to our understanding of power and power dynamics in Indigenous environmental monitoring and management. Nadasdy's writings in his book "Hunters and Bureaucrats" (2003) and his research on the Ruby Range Sheep Steering Committee investigate the complex power relationships in Indigenous co-management agreements and practices in Kluane First Nation in Burwash Landing, Yukon. Through his analysis of the discourse and praxis of the co-managed steering committee, he argues that contrary to the assumption that these agreements are inclusive and cooperative, they often reinforce Western notions of power and governance – through the language and processes of Western science and bureaucracy – subverting the power and agency of Indigenous communities in these decision-making structures. The mechanisms of this subversion, as focused on by Nadasdy, involve the translation and transmission of Indigenous knowledge through colonial governance systems, requiring the transposition of IK into Western scientific language and categorizations – stripping the knowledge of its unique insights and values. Nadasdy's work highlights the material behaviours of systems of structural settler-colonial power and the resulting antagonistic relationship these systems have with Indigenous communities and their knowledge that continues to persist. His insights demonstrate the necessity of critically examining structures of "Indigenous inclusion," such as co-management regimes, to ensure they authentically empower Indigenous communities, including respect for their knowledge systems, sovereignty, and self-determination. Nadasdy's methods of investigation exemplify the need for critical examination to extend beyond the study of policy, legal rights, or jurisdiction to the study of the actual operations and interactions occurring within systems of structural power.

2.7. Challenges to Indigenous Community-Based Monitoring & Environmental Management

Western Monitoring Paradigms & Indigenous Knowledge

As mentioned in Nadasdy's (2003) work, Indigenous Knowledge (IK) is frequently dismissed or discredited in environmental monitoring and management spaces, a phenomenon deeply rooted in historical and ongoing inequities stemming from legacies of colonialization and the continued efforts of Western industrial expansion. These colonial legacies have systematically devalued Indigenous cultures, languages, and knowledge systems in favour of Western scientific paradigms (Coulthard, 2014). This devaluation perpetuates structures of unjust distributions of power and inequality, inhibiting the recognition and inclusion of IK in environmental decision-making processes (Agrawal, 1995).

Beyond just brute forms of violence and suppression, the devaluing and dehumanization of Indigenous peoples and their knowledge by settler-colonial society can also be traced to the ontological differences between Western and Indigenous knowledge systems. From a somewhat reductive position – but one that is not dissimilar to the assumptions made throughout plenty of literature on "knowledge systems" – Western knowledge systems tend to emphasize objectivity, repeatability, and quantifiable data, whereas Indigenous knowledge systems often tend to be more context-dependent, relational, and qualitative (Berkes, 2017). Additionally, Western and Indigenous knowledge systems generally also differ in terms of cosmology, spirituality, and even in the distinction of a "knowledge system," with some forms of IK being grounded in more than a knowledge-producing method but also values and codes of conduct, as exemplified by Inuit Qaujimajatuqangit (IQ), the broad and holistic system of knowledge of the Inuit, where

distinctions between practical knowledge and spiritual understanding are not as sharply delineated as in Western knowledge systems (Tagalik et al., 2018). These differences can lead to misunderstandings and the perceived incompatibility of IK within Western frameworks, despite research often demonstrating the richness and value of IK for more effectively understanding and managing ecosystems alongside more hegemonic Western approaches (Berkes et al., 2000; Garnett et al., 2018).

Some academics have suggested that IK and Western science may be more compatible than is typically assumed, finding that, more often than not, the systems of knowledge complement one another (Agrawal, 1995) and are arguably quite "scientific" in their nature (Berkes et al., 2000). Despite what the research says on the compatibility of these knowledge systems, the voices of Indigenous people and communities continue to be excluded and dismissed from environmental management decisions (Whyte, 2013). Such dismissal threatens to undermine the rights and responsibilities of Indigenous communities and hinder the effectiveness of ICBM initiatives (Whyte, 2013).

Adaptive Capacity, Capacity, & Access

A significant body of literature has examined capacity, and more specifically, community capacity, in relation to Indigenous Community-Based Monitoring (ICBM), albeit often using a variety of terminology. While closely related and overlapping in nature, the terms Adaptive Capacity and Capacity vary slightly in their application and definition. A research paper by Beausoleil et al. (2022) on the oil sands monitoring network uses a definition of capacity from a consultant report by Nicolas Applied Management Inc. (1996) for the Northern River Basins Study, which states that capacity - in a community-based monitoring context – is the available

resources for, and ability of, that community to pursue the monitoring activities that it wishes to pursue. Armitage et al. (2011) considered how the adaptive capacity of Indigenous communities – the capacity of their knowledge systems, governance systems and resources to function and react to change effectively – has shaped the effectiveness of ICBM initiatives, finding that co-management arrangements integrating Indigenous and scientific knowledge significantly enhanced decision-making and adaptation to environmental changes. Tengö et al. (2014) also discuss the importance of capacity in enabling Indigenous communities to do their work of integrating different knowledge systems and technologies into their monitoring and management practices, a practice that settler-state government officials often take on and is typically ineffective.

The concept of capacity, as it was discussed and used in this research process, is arguably more focused on the "ability" of actors (particularly communities and Nations) to "do" monitoring work or labour which they wish to pursue. This conceptualization differs from the definitions of adaptive capacity, which are generally broader in scope and represent the ability of systems to respond and adapt to disruptions of that system (Berkes & Ross, 2013). Capacity, in regard to Indigenous community-based monitoring or management, can be defined as the ability of Indigenous communities to assert their rights and responsibilities, apply their own knowledge systems, and conduct the stewardship of their traditional lands while reacting to changing social, political, and environmental contexts (Armitage et al., 2011).

Within the literature on Indigenous Community-Based Monitoring (ICBM), the concept of community champions is somewhat common (Brook et al., 2009; Conrad and Hichley, 2011; Kouril et al., 2016; Tremblay et al., 2008; Whitelaw et al., 2003). These "champions" are normally individuals deeply rooted within their communities and play a key role in bridging the

monitoring programs often coordinated with external partners with the local community. Community champions are vital, often communicating scientific processes and data to community members, rallying community support, and sometimes translating in their community's language (Tremblay et al., 2008).

External support and collaboration – from government, academia, NGOs, and others – is often identified as a critical factor in building and strengthening capacity in ICBM. This support can be offered through financial resources, technical training, or policy frameworks affirming and upholding Indigenous rights and governance (Trimble & Berkes, 2013). However, the literature also identifies that this support must be provided in ways that respect Indigenous self-determination and avoid perpetuating colonial power dynamics (Reo & Whyte, 2012).

Policy & Regulatory Structures

The role of colonialism in shaping the contemporary policy and regulatory context of ICBM is significant and plays a serious role in the development and expansion of programs in Canada. In Canada, and generally in a large proportion of the world, environmental and resource management policies and regulations have been developed based on Western paradigms, prioritizing Western systems and powers and often excluding or further marginalizing Indigenous knowledge systems and governance systems (Nadasdy, 2005). Because of this exclusion, ICBM programs struggle to integrate with existing policy frameworks, potentially limiting their influence on decision-making processes and reducing their effectiveness, significantly impacting Indigenous communities' ability to manage their resources and ecosystems traditionally (Coulthard, 2014). Policies shaped by colonial legacies have been

shown to perpetuate those power structures, hindering Indigenous communities' efforts to assert their rights and responsibilities in environmental management (Nadasdy, 2005).

Regulatory frameworks can impose rigid and prescriptive requirements on environmental monitoring programs that may not align with the flexible and adaptive approaches often used in ICBM (Reed et al., 2020). For example, regulations may stipulate specific monitoring methods or data formats or limit the ability for testing done in the community to be considered valid or reliable, making it difficult for ICBM programs to incorporate traditional knowledge or innovative monitoring techniques. Efforts to reconcile these conflicts and promote more inclusive regulatory environments that recognize and respect Indigenous rights and knowledge are ongoing, as seen in the vast array of co-management schemes throughout northern Canada, while significant challenges do still remain (Berkes, 2009).

Socio-Economic Context

A common theme in research on ICBM programs is the chronic underfunding or unstable funding, of ICBM programs (Kouril et al., 2016), leading to a lack of security for the leading communities and adding additional stress to already low levels of capacity. This underfunding and limited access to resources can hinder communities' abilities to initiate and maintain social programs despite their recognized value and importance to the community (Coulthard, 2014). These precarious and capacity-deficit scenarios can lead to a reliance on external support, such as funding sources, which can risk undermining community control and self-determination (Cohen et al., 2021; Coulthard, 2014).

Neoliberalism, often associated with the appointment of US President Ronald Reagan and UK Prime Minister Margaret Thatcher, is an economic paradigm as defined by the goal of treating

national economies like businesses - producing profit, avoiding debt, and offloading "risk" when possible to other private entities. Over time, this has resulted in a reduction of "government participation" in the economy through mechanisms such as crown corporations or the breaking up of monopolies. The influence and effects of neoliberalism are pervasive throughout society, and they are particularly visible in the function of programs and activities that are within the public interest and do not directly produce financial revenue (efforts requiring funding). Thus, as with most funded programs, neoliberalism is apparent when observing the state of environmental monitoring practices such as ICBM. Neoliberal policies often prioritize market-based solutions and private sector involvement and overshadow or undermine community-led initiatives (Cohen et al., 2021). The concept of neoliberalism is important to this research and any research looking into monitoring programs, as the imposition of market forces on government-funded programs adds an additional layer of complexity to the socio-economic landscape.

Companies in the private sector, coequally referred to as "consultants," play an active and pervasive role in government and governance activity throughout Canada, including the conduct or coordination of ICBM programs throughout the study area of this research. These companies, with their expertise and resources, have the potential to fill capacity deficits in communities, seemingly reducing barriers to starting these programs.

A study by Fernandez-Gimenez et al. (2008) investigated 18 community-based monitoring or assessment projects in the Western USA and found that 17 of the 18 projects did not include community members in the data analysis and instead had private consultants, researchers, or agencies filling that role. The participants in that study also had varying experiences with, and opinions of, consultants, with some participants finding the consultants' contributions to their work helpful, while others found that they sometimes had "impractical" suggestions and felt that

contracting the analysis out to consultants reduced the community members' understanding and ownership of their monitoring efforts (2008).

2.8. Conclusion

This literature review focused on the interplay between Indigenous communities and environmental practices, shaped significantly by historical and ongoing colonial dynamics. The literature underscores the critical role of Indigenous knowledge in environmental sustainability, challenging the prevalent Western dichotomy of human versus nature. It also highlights the importance of Indigenous sovereignty and self-determination in environmental health and management. As demonstrated by Indigenous communities for time immemorial, the functions of social-ecological systems have been shown to offer holistic and more effective approaches to environmental stewardship (Garnett et al., 2018). Additionally, the challenges faced by ICBM, particularly within regulatory and academic environments dominated by Western paradigms, have been thoroughly examined.

The insights garnered from this literature review lay a foundation for the upcoming chapters. The Methods chapter will benefit from understanding the complex socio-political context within which ICBM operates, informing the selection of appropriate research methods for approaching the topics of focus for this research. The Results chapter will be positioned to interpret findings in light of the intricate relationship between Indigenous communities, colonial legacies, and environmental practices. This contextual background will be crucial in analyzing and discussing the research findings and positioning them in the broader research field.

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3. Methods

3.1. Introduction

This research is the product of the Taking Care project led by Dr. Brenda Parlee and funded by the Government of Alberta. The project broadly focused on exploring the decolonization of natural resource management in Alberta and included several other projects. The project was comprised of researchers and students at the University of Alberta, the provincial government workers associated with the research funding, and representatives for the sub-projects taking place in various Indigenous communities throughout Alberta. Through attending the Taking Care project meetings, I took note of the various and divergent ways members talked about and envisioned ICBM. This divergence of understanding was apparent during discussions of research interests, gaps in the current research on ICBM, and common challenges to the effective conduct of ICBM programs. These observations spurred a strong interest in investigating these potentially divergent perspectives on ICBM and would go on to partially guide my methodological approach to this research.

When considering what variables might contribute to this divergence of understanding, what initially seemed clear was the varied level of proximity the different members had to knowledge and power. “Proximity” in this circumstance can be described as the proximity of the participants to the ICBM work itself (ex., federal public workers compared to program leads living in the community) or, conversely, the participants’ proximity to “power,” which can be understood in this case, as their proximity to both the funding of these programs and their role in transmitting or mobilizing the information and knowledge produced in these programs to “decision-makers” (Peluso & Ribot, 2020).

The research used qualitative research methods to document, investigate, and analyze the potentially diverse understandings and vision of ICBM, as observed in member meetings and throughout my experience in the field. The research was focused on investigating the viewpoints of different actors engaged in or adjacent to ICBM in western Canada – primarily within the networks of the Taking Care and precursory Tracking Change projects (Parlee et al., 2014) – with varying proximity to power (access to resources and decision-makers). As the participants were still "professionals" in their fields, and they were selected to be interviewed because of their expertise and experience in their specific roles, our methods align with that of Expert Elicitation (Hagerman et al., 2010; Knol et al., 2010; Roy et al., 2020).

The supervisor for this research, Dr. Brenda Parlee, is well known for her contributions to the methodological practice of Community-Based Participatory Research (CBPR) (Parlee et al., 2005; Parlee et al., 2014; Parlee et al., 2005). Furthermore, This is reflected in the Taking Care project and its strong focus on conducting CBPR and in the work of many within her lab (Dokis-Jansen et al., 2021; Parlee et al., 2014; Wray & Parlee, 2013). Upon starting my graduate studies at the University of Alberta in the Department of Resources Economics and Environmental Sociology, I intended to pursue research following a CBPR methodology within Dr. Parlee's lab. With the onset of the COVID-19 pandemic, there were many complications associated with conducting community-based participatory research, particularly in the case of working with racialized and marginalized communities (Salma & Giri, 2021). Concurrently with working through these methodological challenges, I took graduate classes for my degree in environmental sociology, risk studies, and public health. Through these classes, I garnered a keen interest in the study of knowledge and power, the processes in which knowledge and information become "truth," and the decision-making power that is sometimes a product of these processes. These

interests were further spurred and encouraged through readings and discussions in an informal Science and Technology Studies (STS) and "knowledge" reading group chaired by Dr. Kevin Jones and Kristine Wray. As a result of these complications surrounding the conduct of CBPR and my interest in studying pathways of information and knowledge into power – and indeed as a reflexive reaction to the circumstances of the times – the research conducted did not align with CBPR methodologies. While this was a deviation from the methodological traditions that I intended to pursue, positions and sentiments of CMPR are still present in the methodological grounding of this research.

3.2. Research Methodology

A primary position present in CBPR that was carried over into this research was a critical reaction to the role that academia and academic research have historically played in the processes of colonization and the establishment of contemporary settler-colonial societies (Held, 2019). This reaction can be found in the critical methodological distinctions that CBPR employs, primarily in the way it approaches and interprets historical power dynamics, such as the over-studying of Indigenous communities by academics, where research on these communities contributes to academic accomplishments and benefits for the researcher, but has little benefits to the communities being studied (Young, 2003). Instead, CBPR methodologies suggest that the research intentions should come from communities first, and the research projects should be methodized that avoid the extractive practices common in conventional research methods (Held, 2019).

This research seeks to identify the challenges and opportunities for ICBM by investigating the structures and processes that occur at a level that is akin to a managerial or bureaucratic level and

not from a position that is particularly “community-based.” This is a distinct deviation from the sentiments of CBPR methods, which typically have a “ground-up” approach. While the community-based approach to guiding this research was not presented, this work contends with this deviation by approaching the research from a position of solidarity with Indigenous justice efforts, in line with UNDRIP (2007) and activist efforts such as the Landback movement.

Drawing from Eve Tuck and K. Wayne Yang’s seminal work, "Decolonization is Not a Metaphor" (2012) , this research recognizes the complexities inherent in attempting to decolonize through academic and research-oriented pursuits. Still, this work aspires to align with and support the decolonial efforts of Nations and advocates on the ground by critically examining the actions and structures of the settler-colonial state and its economic underpinnings that perpetuate Indigenous oppression.

This position is present in how the research is approached, in that this research seeks to identify barriers and challenges to ICBM programs as a starting place to having those barriers and challenges reduced and removed – supporting efforts for self-determination and aspiring to contribute to efforts to increase the power and rights of Indigenous Nations and communities.

3.2.1. Expert Elicitation

Laura Nader, in her influential writing, “Up the anthropologist: Perspectives gained from studying up”, advocates for a paradigmatic shift in her research field, anthropological studies. She urges researchers to move beyond solely examining individuals “at the bottom” and to focus instead on the institutions wielding power “from above” (Nader, 1972). This approach allows for a deeper understanding of the mechanisms and processes through which power is held and exercised and how these patterns of power influence and shape cultural and social realities.

In developing the research methodology, this study takes inspiration from two strong examples of expert elicitation in the literature. The first is the structured approach by Knol et al. (2010), which outlines a seven-step method for expert elicitation: Characterization of uncertainties, Scope and format of elicitation, Selection of experts, Design of the elicitation protocol, Preparation of the elicitation session, Elicitation of expert judgements, and Possible aggregation and reporting. Their method exemplifies a systematic approach to expert elicitation, providing a robust model for this research. However, it's important to note that Knol et al.'s work, with its distinct research paradigm, diverges ontologically and epistemologically from typical research in environmental sociology (Dunlap, 2002).

The second influence comes from Hagerman et al. (2010), who describes a "modified qualitative expert elicitation." This approach is particularly suitable for the qualitative nature of this study, as it allows experts to not only share their expertise but also delve into the values and emotions associated with their knowledge. Hagerman et al.'s method includes open-ended questions and semi-structured interviews, which contrasts with more conventional structured questionnaires and focus groups. Drawing on Morgan and Keith's application of expert elicitation in the research of expert opinion amongst climate scientists (1995), Hagerman et al. emphasize exploring the subjective aspects of their participants' technical perspectives through probing questions and allowing space for understanding the "why" behind their initial responses.

By combining the structured model laid out by Knol et al. with the qualitative depth added with Hagerman et al.'s modifications, this research adopts a framework that captures a portion of the systematic rigour of expert elicitation while still approaching the research from a more sociological position – valuing the nuanced understandings, experiences, and value of the

participants. This blended approach forms the methodological grounding of this study, enabling a comprehensive exploration of environmental sociology themes within the context of power structures and social influences.

3.3. Developing Research Questions

As identified above, the impetus for this research arose by identifying various divergent perspectives on ICBM and its future from professionals within the ICBM field. To best distinguish the differences between these perspectives, it was important that this research attempted to identify some of the common and divergent themes amongst different individuals' perspectives. To best achieve the depth of conversation and breadth of topic likely needed to distinguish these perspectives, guiding questions for the semi-structured interview process had to be developed – which were broad enough to elicit a range of responses but specific enough to analyze some of the responses comparatively. Three guiding questions for this research were developed by analyzing the existing literature on the topic and the discourse occurring among the Taking Care project members. The three questions were: (1) How do different actors conceptualize community-based monitoring, (2) What are the challenges and aspirations these actors associate with this monitoring work, and (3) What do these actors see as the future of ICBM in western Canada?

Following this Expert Elicitation model (Knol et al., 2010; Hagerman et al., 2010), the research focused on the method of expert interviews, employing the practice of semi-structured interviews. In order to understand the complex perspectives of different actors within ICBM programs and contexts in which these perspectives have been formed, semi-structured qualitative interviews were deemed an appropriate research tactic. Semi-structured interviews are the

preferred option for studying the unique perspectives of the individual interviewees, allowing the interviewer to probe further into the participants' responses, intending to dive deeper into the unique context and perspectives of the interviewees (McGrath et al., 2019). This research method was also chosen because of the dynamic and changing constraints of the COVID-19 pandemic, which was particularly challenging throughout the research period (2021 and 2022), and through the use of semi-structured interviews, conducting them either in-person or online was an option.

Based on the research questions identified in Chapter 1, the interview guide used three guiding lines of questioning for structure: (1) the participants' experiences with, and understanding of, community-based monitoring; (2) the challenges and opportunities they perceive in this field; and (3) their vision for the future of ICBM. Following the responses from the participants, probing questions were utilized to explore the “why” and the context of each of the participants’ responses.

3.4. Ethics

Ethics approval for this project was submitted in conjunction with two other graduate student projects within the Taking Care project. All three projects used similar research methods and were grounded in investigating the social dimensions of resource management and monitoring associated with Indigenous communities in Alberta. The University of Alberta's Research Ethics office reviewed this larger project, "Decolonizing Natural Resource Management in Alberta," including the interview guide, interview information sheet, and consent forms.

3.5. Participants

Participants for the semi-structured interviews were procured through the assistance and guidance of my supervisor, Dr. Brenda Parlee, because of her extensive network of CBM professionals amassed through decades of experience in the field, recently as the principal investigator of the Taking Care and Tracking Change research projects, and currently a principal investigator on the Arramat project (Arramat, 2022). Twenty-three potential participants were contacted, which resulted in correspondence and interviews with 15 participants. We intentionally reached out to participants with a range of expert backgrounds, resulting in a close-to-even distribution of interviews with four interviews from monitoring program leads, four with federal or provincial public servants, five with academics, and an additional two interviews with prominent consultants in the field of ICBM in Western Canada.

Thirteen participants were actively associated with CBM work in western Canada through funding, conduct, reporting, or interpretation capacities, and five were directly involved in the Taking Care project. The remaining two interviewees were prominent academics conducting scientific research in Central and Northern Alberta areas with high proportions of Indigenous populations and whose research is often highly connected to the health of wildlife populations and, thus, the food security of Indigenous communities in these regions. While they are not directly involved with ICBM programs, the rationale for including these academics is due to the proximity to power they have in their roles in data and information collection and their roles in providing research and information to decision-makers, both of which are connected to the well-being of Indigenous communities in their research areas. These outlier interviews also provided

insight into more conventional “Western science” worldviews common amongst environmental scientists more broadly.

Table 3.1. Participant occupation and name table

Occupation	Code Name
Government Workers	Gov1
	Gov2
	Gov3
	Gov4
Community Program Leads	PL1
	PL2
	PL3
	PL4
Academics	AC1
	AC2
	AC3
Academics (Adjacent)	AdAC1
	AdAC2
Consultants	CN1
	CN2

3.6. Semi-Structured Interviews

The interviews conducted for this research followed conventional methods of semi-structured interviewing as described, theorized, and practiced by social scientists such as Anne Oakley (1981) and Henry Huntington (1998). Oakley's contributions have been significant in developing

qualitative research methodologies, particularly in the field of sociology through applying her critical feminist perspective on the structured interview, which contributed greatly to the modification of the conventional structured interview methods of that time. Henry Huntington built on Oakley's contributions by emphasizing the importance of Traditional Ecological Knowledge (TEK) in producing more accurate environmental research and the methodological adjustments required to best facilitate this inclusion of TEK. His approach to semi-structured interviews, particularly in Arctic studies, highlighted the need for greater flexibility and sensitivity to cultural contexts, enabling both the participants and the researcher to "guide" the interview and for researchers to capture a richer, more nuanced understanding of the environmental issues, that was inclusive to and facilitated the communication of TEK (Huntington, 1998). The combination of both Oakley's and Huntington's deconstruction/reconstruction of interview methods provided a strong foundation for the interviewing approach used in this study, providing a structured framework for gathering information while still being flexible and responsive to the experiences, perspectives, and intentions of participants.

The opportunities for in-person interviews were limited because of the COVID-19 pandemic, as in-person interviews and travelling became complicated, risky, and discouraged endeavours. This resulted in fourteen out of the fifteen interviews being conducted using the video conferencing platform, Zoom. The remaining interview was conducted in person on the University of Alberta campus. Thankfully, at this point in the pandemic, video conferencing platforms such as Zoom had become quite ubiquitous, easing the technical coordination of the interviews (Saarijärvi & Bratt, 2021), which would have likely proved to be more challenging in

years prior. The interviews were recorded and saved on the computer hard drives and duplicated on a secure external hard drive to ensure data integrity and confidentiality.

The interviews were structured around three primary questions focused on the participants' experiences with community-based monitoring, their perceived successes and challenges for ICBM programs, and the futures they envisioned for the practice of ICBM. These questions functioned as a starting point for a dialogue, enabling the participants and the interviewer to dive deeper into the different examples provided by the interviewees. The intention was to uncover why specific examples or experiences were relevant to the participant and to understand the negative or positive connotations associated with their responses. The preceding questions focused on the interviewees' perceptions of the future of ICBM in their professional field and more broadly.

Once the interviews were completed, the audio files were sent to a secure third-party transcription service, Transcript Heroes, out of Dalhousie University. After receiving the transcriptions, they were compiled with the audio files and interview notes and uploaded to NVIVO software for analysis. In NVIVO, a secondary review of the transcriptions was conducted to ensure accuracy and make necessary corrections. This process of transcription and review helped ensure the integrity and reliability of the data.

3.7. Coding & Analysis

Following the transcription process, the interview text underwent multiple phases of analysis, including several rounds of coding. The approach to coding closely adhered to the seminal guidance provided in the "Sage Handbook of Qualitative Research" (Denzin & Lincoln, 2011), incorporating perspectives on coding offered in the community-based participatory research

(CBPR) literature and integrating some critical perspectives on the practice of coding and thematic analysis. This research primarily applied an inductive coding process, with some deductive influence, in order to focus on the primary questions guiding this research.

Several technical methodological decisions were intentionally made in the coding process in an effort to cultivate a greater degree of rigour and reliability. One such decision was to code the text in larger portions to capture the whole "thought" from the interviewee. The length of the coded segments varied depending on the content, and in instances where coding themes overlapped, all relevant codes were still applied, a technique that was facilitated by the use of NVIVO. This qualitative analytical software enabled the application of multiple layers of coding and identification of the complex overlapping natures of different codes, aligning with the recommendations for qualitative data analysis software by social scientists Deterding and Waters (2021). The coding process was iterative and reflective, allowing for an emergent understanding of the data informed by the participants' perspectives and experiences. This approach ensured that the research remained grounded in the lived experiences of the community members involved in the ICBM programs.

Following a preliminary review of the interviews and their transcripts, deductive "index" codes based on the research questions were applied. These codes included: "success," "challenges," "opportunities," "aspirations," and "definitions." Referring again to Deterding and Water's (2021) work, they make a compelling argument for the use of "indexing codes" as a means of initially sorting information, both to assist with analysis and as a means of proactively preparing the information for uses outside of what might be initially assumed by the research, such as

emergent questions or findings in the research process, or the future interpolation of that information with future qualitative information.

The third coding round included the analysis of the emerging themes and connections amongst the index codes, building out several substantive thematic codes. In this phase of analysis, special attention was paid to when different codes thematically overlapped, as those spaces of overlap built the larger narrative of this research as they represented overarching themes in the research. After each round of coding, there was a reorganization phase, where redundant codes were combined, and any inconsistencies within thematic codes were resolved.

3.8. Writing

The writing of this thesis began with a literature review and situating the study within the existing ICBM literature. Following the data collection and analysis phases, the writing shifted focus to articulating the findings derived from the interviews and coding process and additional literature review as gaps appeared based on the results. This phase involved translating the complex interview codes into a coherent narrative that highlighted the key findings and provided a critical analysis of these findings in relation to the existing literature and theories. Throughout this process, emphasis was placed on ensuring that the voices and perspectives of the participants were represented accurately and justly. In line with the individual commitments made with the participants, a draft of the research thesis (and in a few circumstances, the participant's interview transcript) was sent off to the participants for review and feedback prior to any publication of the research. This process, referred to as "member-checking" or "participation validation," ensured that the interpretations and representations of their contributions were accurate and resonated

with their intended meanings, and the feedback from the participants was instrumental in validating the research results (Brook et al., 2009).

3.9. Conclusion

The chapter outlines the approach used to explore the diverse perspectives on Indigenous Community-Based Monitoring (ICBM), adapted to the challenges imposed by the COVID-19 pandemic. Shifting from a community-based participatory research methodology to a semi-structured interview format guided by expert elicitation allowed for the inclusion of a broad range of expert insights, despite the constraints. The methodologies applied here constructed a strong foundation for a nuanced exploration of ICBM, providing valuable insights into environmental sociology and Indigenous rights in natural resource management.

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4. Results

4.1. Introduction

The results of this study emerged through a thematic analysis of the 15 semi-structured interviews with professionals working in or adjacent to Indigenous Community-Based Monitoring (ICBM) in Alberta. These results, organized into four overarching themes, represent the most salient factors important for the success of ICBM programs identified by the interviewees. The four themes were Community Capacity, Policy and Regulation, Knowledge and Knowledge Mobilization, and Funding and Financing. The following sections review the interview process and outcomes and describe the four individual themes in detail, focusing on key findings and insights for each, and provide examples from the interview data to illustrate these findings.

4.2. Community Capacity

Most common among the emergent themes from the thematic analysis was the concept of "capacity." While the term capacity is not explicitly defined in this research, several participants elaborated on what they meant when they referred to "capacity" or "building capacity". These explanations of capacity further exemplify the many interconnected ways capacity affects most parts of ICBM.

> Capacity within the citizens, within the indigenous governments, or leadership, to be able to engage and allocate time to prioritize [ICBM efforts], over all of the other things that are going on, including some really challenging social issues. (AC2)

The interviews suggest that, typically, the level (deficit or excess) of community capacity identified by the participants was not an isolated variable but rather the result of other intersecting variables such as the community's access to training, the applicability of that training, access to funding, the effects of colonial history, etc. and how they are ultimately impacting the operation of ICBM. Thus, so as not to veer too far into other thematic territories, this section is primarily focused on the 'foundational' components of an ICBM program.

> Capacity building I think is massive. And that's a long-term conversation, right? So, there's always that concern that this becomes a priority for certain organizations or interests in the world and they want to do stuff now. But capacity needs to be built; it needs to be enabled; it needs to be supported. That's – with a clear message over and over and over again. (Gov1)

Through coding and analysis, "community capacity" was the largest of the themes, and had the highest amount of overlap with the other themes. As the theme was investigated individually, two thematic categories arose, "Administration and Ownership" and "Capacity Building: Trust, Training, & Youth Participation."

4.2.1. Administration and Ownership

The topic of administrative capacity was highlighted as a critical challenge that many ICBM programs face. When discussing barriers to successful ICBM, administrative capacity – particularly in reference to community and program administration – was directly referred to in 7 of the 15 interviews conducted. When considering these direct quotations collectively, administrative capacity was described as the administrative ability (from both a human resources and a skills perspective) to complete a wide array of tasks, namely; coordinate applications for

funding and collaborations, hiring and retaining workers for the monitoring program; and/or the ability to successfully report on project outcomes and finances. It is important to note that the funding and financing of these programs are inarguably tied to the administrative capacity. While it is touched on here, the Funding and Finance section (4.5) does a more comprehensive and appropriate summary of that results component.

The primary administrative capacity challenges mentioned by the interviewees were a lack of organizational infrastructure, such as human resource skills, project management, and report writing amongst program "administration" – as the result of limited and thinly spread labour capacity from an administrative and community level. Several participants described the importance of this infrastructure to ICBM projects.

> ...some of the partners we work with, again, are wearing maybe multiple hats in some cases. They may be responsible for consultation as well as, you know, if they're looking to establish and maintain monitoring programs. So I think, you know, time is definitely a limiting factor, or can be. (Gov2)

> ...it's not just about projects; it's about foundational administrative supports, even within the community like the ability to have an organization that is dedicated to doing community stuff.

> ...there is a foundational piece; there's a structural, organizational piece that – I know a lot of – there's other communities I'm aware of and they don't have a dedicated department within their own administration to do this. And so, you know, their ability to do these things is extremely limited. Right? So you need to be able to, get money in and, account for it and have checks go out to the community. You know what I

> mean? All of those organizational supports are just not possible just with one person. (PL2)

These quotes illustrate the importance of focusing on expanding administrative capacity as a foundation for building and strengthening ICBM programs. Gov2 emphasizes the challenge of limited capacity, particularly in cases where individuals are responsible for multiple roles within a monitoring program, which can limit the amount of time and resources available to invest in administrative tasks. PL2 highlights the need for foundational administrative support within communities, such as dedicated organizations that can provide support and coordination for community initiatives, later on in the interview, he mentions the potential role of non-profit organizations (internal or external to the community) in aiding with administrative capacity.

Another participant brought up how capacity posed a challenge at an administrative and political level, focusing on the workload and extensive duties taken on by folks in leadership on his Nations' Council.

> Because my dad's been in leadership for 20 years and he's still a leader of our community, and I get how busy they are. So, to take time out of their hands to start, you know, creating and developing a policy for that is just a little bit too much for them. That would be one of the barriers that I would see – would be policy, and we've already moved it into the next phase of, you know, turning it out to be a fully functional community-based program for the people by the people. (PL3)

Partnerships and collaborations between Indigenous nations and external organizations such as university researchers or government monitoring programs are common throughout ICBM projects in Alberta. These collaborations represent an opportunity for communities to reduce an

ICBM program's administrative and labour costs. Two participants mentioned collaborative projects occurring in Treaty 7 territory between nations in the Blackfoot Confederacy. CN2 explains this in the example below and highlights the prospect of more Indigenous nation-to-nation collaborations on environmental monitoring programs and the potential benefits.

> ...it would be awesome if more communities would work together. I think sometimes the funding that's linked to a community being able to get that program is somewhat competitive and so you end up with a bunch of individual programs doing their own thing, which doesn't necessarily allow for the best use of that information that gets generated from those programs.
>
> ...that's where I think the beauty was in the Blackfoot confederacy working together in Treaty 7 with Stoney and Tsuut'ina because they sort of could collaborate and share resources and people and each of those communities had their own strengths that they'd brought to running a company, kind of thing.
>
> ...in the Blackfoot example that I gave you before in terms of sharing, like, capacity and administrative dollars and things like that, that's also a good example. And they're the – one of the only ones that are, like, they still are long term, right? They're still going. So they haven't, sort of, burnt out. (CN2)

This example portrays a potentially beneficial administrative opportunity for monitoring programs, as it reduces redundant administrative work – a major obstacle to establishing and maintaining programs in individual communities, and thus an obstacle to building long-term capacity in the community. An important aspect of this conversation that arose in several other interviews was the role that consulting companies – specifically private corporations from

outside of the community – play in the complex challenge of establishing monitoring programs and building up community capacity. One participant shared a story of the relationship between consulting companies and capacity in their community.

> When I first started at the lands department, we had a core group of consultants. And they really would basically propose projects, go get funding, but really they were the primary beneficiaries, right? … The funding is basically entirely going to that consultant group, and they're doing things for the community but not developing any kind of capacity within the community... And so that was one of the big shifts I think, when I proposed to kind of break away the lands department into its own thing, and we would be building our own capacity.
>
> ... this consultancy group was, you know, was the organization where these things were happening instead of it being our own. So, you know, that shift there was fundamental early on and since then, you know, really has been, at [community name], the, you know, kind of the principles of OCAP[...] So, we are basically in charge. We're in charge of it; we're doing it. We have our own free, prior and informed consent in, you know, in the work we do. (PL2)

PL2 discussed how the consultancy group was the organization where capacity was being developed, and how the community changed its approach to begin cultivating more capacity internal to the community. Since then, the community has been following the principles of OCAP and is in charge of the monitoring program. PL2 stated:

We're doing it. We have our own free, prior and informed consent in the work we do.

4.2.2. Capacity Building: Trust, Training, & Youth Participation

Trust and good communication were thematically prominent among twelve of the fifteen participants, with most of the participants identifying them as important factors for effective collaboration amongst actors establishing or operating ICBM programs. There were several stories of external researchers either presuming trust or breaking trust with communities they were supposedly trying to pursue research with. One of the participants spoke about one of these experiences in some detail.

> In this one particular case, I remember [assisting a researcher in obtaining] information that was maps and stories and pictures, [and] once the researcher was done with the community research, [they] took all of those and wouldn't give them back. They said 'No. This is my stuff. I came to – I made these. These are mine.' And, you know, the author – once the book got published, you know, we were given [an] offer of a discount – if we wanted to purchase the book we would get a small discount. (PL2)

PL2 highlights an experience where a researcher extracted information from his community for research to their benefit and refused to acknowledge the community's role in that research. Experiences like the one above, are sources of distrust and do not foster good relationships between collaborators on ICBM projects. As Gov4 mentions below, a good relationship is an underlying requirement for a successful monitoring partnership, allowing community capacity to grow.

> Even if the data is valid, that relationship is not there. So I think investing in building that capacity and that relationship, so community-based organizations can begin to move forward is the way to go. And that is happening in a way on the ground…

Throughout the literature on community-based monitoring programs and their effective delivery, "local champions" are a common concept (Kouril et al., 2016). These individuals are the backbone of specific community projects and are often critical to their success. This concept of local champions came up directly in 6 interviews, with several expert interviewees discussing the role of local champions role successful community programs. AC1 specifically emphasized the importance of "local champions" when facilitating youth programs, stating that certain classroom teachers, who are passionate and willing to go above and beyond, are often crucial to the success of the projects they work on.

> ...one of the things we talk a lot about is our local champions. And we wrote a paper quite a long time ago talking about this: the four legs of a stool that are needed for these kinds of things to work. And certainly, local champions are one of those legs. With the youth stuff, local people, especially teachers, have been major facilitators.

After discussing the four pillars necessary for successful community-based programs (Brook et al., 2009), AC1 further elaborated on the pivotal role of these local champions, specifically teachers. He highlights their enthusiasm and dedication as key factors that motivate students and effectively bridge the gap between theoretical knowledge and practical, real-world experiences.

> …finding those magic teachers, the ones that are super passionate and are willing to go above and beyond and do all the extra work that's required to do, you know, take a group out together out onto the land for the day with some scientists or going on a full-blown 10-day caribou hunt in the north. I've been on many, many caribou hunts with communities and most of them have been initiated by the school.

Similarly, CN2 noted the importance of having a community member who can coordinate and champion the program, while noting that those expectations might be "unrealistic" in situations with already limited community capacity.

> I think what is sort of important, I think, especially for new programs that are getting off the ground, is that that there's sort of someone within the community that's a bit of a champion for the program and can do a lot of the on work, on the ground sort of coordination type stuff. But it is unrealistic in many cases, especially with small communities, to expect that a graduate that's just finished university can go in and run a program or have all of the equipment [...] needed to run a program or the data management skills or infrastructure to house all of that information and pull out, you know, summary reports and graphs or just even be able to store it and retrieve it efficiently over time. (CN2)

Like CN2 above, CN1 noted that the lack of administrative capacity in many communities can actually hinder the development of local champions and lead to a small number of people doing more work than is sustainable.

> Where there's not a big department, where there's not enough people, where people are just starting to scrape it together. There's tiny little investments. People that are over-leveraged are trying to build things. It's really hard. I'm being contacted by one nation all the time. They've got funding to implement a program but they don't have the staff or people. And it's being managed by the administrator. You know? The nation administrator. It's not being managed through a department where there's lots of people allocated just to implement the programming. So the capacity issue is hugely at play. (CN1)

These excerpts provide insight into the benefits of having a local champion. When taken in concert with the challenge of a lack of capacity, the shortfalls of having an overreliance on and "overleveraging" these champions become apparent. To ensure the long-term success of community-based monitoring initiatives, addressing capacity challenges outside of cultivating a "local champion" may be essential, allowing more folks to gain more of the necessary skills that make community champions so important to program success.

Addressing these capacity challenges requires increasing the involvement and training of the community members on the frontline of environmental monitoring efforts. Two participants explained the benefits of training opportunities associated with their ICBM programs, resulting in community employment and skill-building while also strengthening the programs.

> So a training program to ensure that we have the workforce to do the monitoring. So we had that; the funding has run out, though, for that training program. But it's a success. We have had how many graduates and all of – pretty much all of the

> graduates from [Nation] are employed now and many of them work for us in our CBM program. So training is a really critical piece. (PL1)

> …on our wetland monitoring program we sort of track each year, like, against our objectives. Like, did we train more community members and provide mentorship opportunities? Did we provide space for elders to work with youth out on the land? Are we helping these people get jobs? And, like, over the – we're in the third year. And now for [Nation name] are doing enough monitoring work through our community-based monitoring program but also, you know, spending a couple of days working at the [Oil Sands Project Name] or working with consultants XYZ that they have a full-time staff. So that's a big success for them. (CN2)

Often paired tightly with dialogue around training was the topic of youth participation in ICBM programs and research. The participants often stressed the importance of youth involvement and training for the long-term sustainability of these programs and skill building, with 9 of the 15 interviews directly stressing this importance.

> ...so with that vision I was left with one thing, you know – two things, actually – you know, to carry this on, but also to pass it down to the generations to come. And that's what we've been doing. We've been getting our youth involved so they can, you know, this, you know, you know that a program like this will carry on and for future generations because what we're finding is we're finding, you know, everybody has a place and purpose in the community. (PL3)

> ...one of the decisions I made when I got this job was sort of big skying and saying, you know, 'what am I going to do with the rest of my life here?' and one of the things

> that I immediately put down was youth engagement. And that's been something that, you know, different projects we see communities have different levels of enthusiasm from, you know, some ideas we have, a notion of, like, we'd really like to get some jaws from you to look at something around caribou health to them coming to me, saying, yeah, we're interested in seeing what is in the stomachs of these wolves… (AC1)

Several participants described the breadth of benefits that have come out of youth participation in ICBM efforts. Barriers such as safety concerns, a lack of funding, and inadequate knowledge transfer between generations are still challenges to youth involvement.

> But they also really see community-based monitoring as almost like a forum or a mechanism for getting elders and youth and, like, younger people out into the field, and sort of to create space for knowledge sharing but also transferring of knowledge about the land. You know? Indigenous knowledge as sort of – but also basic field skills. Like, how to pick the trails and how to drive through the muskeg and how to build the fire. (CN2)

> I think the opportunity for youth to reconnect with their culture is a big one. And knowledge. So, yeah, I think where I see the opportunities is more around, I suppose, the social outcomes, if I could call it that. Social cultural outcomes related to, you know, yeah, connection or reconnection to culture, to landscapes, to knowledge, strengthening of community connections in that process. Whether that be, you know, between youth and elders or, you know, inability to engage the broad community at large. (Gov2)

However, the path to high levels of youth participation in these programs still has its challenges, as noted by several participants. Participants like PL3 and PL1 point out barriers such as safety concerns, lack of funding, and inadequate knowledge transfer between generations. These issues highlight the need for well-structured policies and support systems that can facilitate youth participation effectively and safely.

> And I guess you don't know what that is until you've tried some things and a lot of the youth have tried and want to try hunting and then that's – and one of the only setbacks that I have is safety. We don't have a safety policy in place in my community. Like, say, for example, I was trying to take a couple youth hunting which they really want to do, and but there's nothing in place that protects me from taking them out. (PL3)

> I would say funding for, you know, knowledge translation between elders and youth so that we're maintaining the ability to collect and transfer knowledge because it's going to be so essential and integrated into everything. But if we're not supporting the ability to transfer that knowledge from, you know, we're just losing our elders so quickly. And with it goes all of their knowledge. So programs and support for the youth to have those opportunities to receive a lot of that land use knowledge. (PL1)

Building on what PL1 mentions above about the requirement of funding for youth participation, AC1 discusses how a lack of shared understanding from academic and government funding administration has acted as a barrier to youth participation.

> Academics don't necessarily see their audience and their goal, their target, their primary effort to be a youth. There seems to be a real strong bias and focus on adults,

> which I don't always understand. So it's really bizarre being in, you know, you spend your morning in a community discussion and everybody's, yeah, youth, youth, we got to engage youth, oh my god, youth, youth. And then you sit down with government and they're, like, well, no. What do you – why would we talk – we're not baby– And I've heard this saying and I've really wanted to reach the screen and grab somebody and pull them over and have a chat with them because, you know, they say, 'We're not babysitters.' That line probably is one of the most insulting things I've ever heard on a call and I've heard it many times.

AC1's interview covered this lack of understanding in more detail, focusing on the training and knowledge deficits in more "conventional Western science" spaces amongst non-Indigenous academics and government scientists.

> I mean, I think that part of the reason is I think that a lot of government people are just poorly trained. As government scientists they do an undergraduate and a masters and they collar animals or they do – increasingly now of course trail camera are just really conventional science. They're trained in conventional science. And so it's not that they – well, I mean, certainly racism is a is arguably the cornerstone challenge of all of this in Canada and it's whether it's overt or more covert, a lot of government people are smart enough now these days, I think, to not say the absolutely outrageously ridiculous racist stuff we saw earlier in my career. But racism is a big part of that. But I think more so a lack of training.
>
> ... a certain amount of arrogance I think comes in there as well in academia where people fill themselves up with the notion that their research on the conventional

> approaches to toxicology or as the expert person who's collared caribou and understands making those which we see at the caribou conference about every second presenter is presenting a habitat-type model of caribou and while that's all useful I think that a certain amount of arrogance and a certain amount of close mindedness to new approaches is – I've run into that an awful lot in academia, never mind trying to talk to government. But there are some parallels there too that I think we haven't trained them properly. I think everybody needs to take some interdisciplinary training and understanding of how to work with this. And understanding, like, what is, you know, taking I think a few steps back and understanding what is the goal here. Like, you know, what are we trying to achieve?

AC1's insights shed light on a prevalent disconnect between the priorities of these institutions and the needs of community-based monitoring programs. This disconnect, often exacerbated by a lack of interdisciplinary training and underlying bias amongst academics, poses significant challenges to the cultivation of effective ICBM programs throughout Western Canada.

4.3. Policy & Regulation

Policy and regulation also emerged as a significant theme in the interview data. This section provides insight into the interview participants' experiences of the effects of policy regimes and regulatory actions on ICBM efforts.

4.3.1. Jurisdiction & Access

The legal context underlying communities (Treaty, land claims, Indigenous rights, the Canadian constitution, etc.) was shown to have a role in the way that relationships and trust were

established between potential collaborators on ICBM programs or research. One ICBM program lead described how Treaty 6, signed between the crown and their nation, influenced the community members' comfort with collaborating or building relationships with provincial entities, as they are not treaty signatories.

> Well, I think if you look at, like, indigenous people, like, from a perspective of treaty, I think you will find that, you know, our relationship was signed with the federal government. So a lot of my community members are a little bit I wouldn't say iffy or skeptical, maybe, about, you know, creating a relationship with the province. You know? Because that's really not the jurisdiction of our treaty. (PL3)

Another interviewee from an academic and provincial background directly corroborated this relationship dynamic.

> ...whether it's, you know, provincial departments or federal departments. And there's also the federal-provincial interplay about, you know, how the Indigenous communities are engaging with the various levels of government and whom. They have, just based on experience, different levels of trust, often, depending on who they're talking to and involved with indigenous, you know, on the indigenous side. And I think what we also forget on a lot of this is that involving and working with – whether it's indigenous communities or many other communities – that that relationship's built on trust and relationships. It's not built on, 'hi, I'm [name] from the government of blah, blah, blah, I'm here to help you.' You know? And they don't know me from 'Adam,' and they don't whatever. It takes a while, you know, to build those relationships up and with there's other interplays on that or interfaces that are

> dealing with other issues, you know, between the indigenous communities and governments or whatever, that makes it complex. (Gov4)

The numbered Treaties also influenced monitoring and research aspirations through the legal rights that they enshrine for Indigenous communities. In the example below provided by PL1 Lepine, she explains how the harvesting and navigability rights outlined in Treaty 8, shape the way she and her community can influence and exercise power in environmental monitoring and management.

> But then, when you add in what we say is important, how much water do we need to navigate to use the river? Great that you want to protect fish and fish habitat, and you've got a pretty strong piece of legislation to do that. But we got constitutionally protected rights but say under Treaty, you know, we can exercise our rights, and industrial use of water out of a very important water system is impacting our right, and you're developing a framework to manage that without considering thresholds and information that we think is relevant and important to exercise our rights. (PL1)

While land claims and legal enshrinement of rights have provided power and rationale for ICBM programs associated with some of the quotes above, Gov4, an academic and former provincial employee associated with the Northern River Basin Study (NRBS), brought up how land claims (or similar negotiations) still in the process of negotiations, have resulted in hesitance from settler state governments to engage in the relationship building and collaborations with these still-in-negotiations Nations, citing the complex legal interplay between governments. Interestingly, he also brought up the benefit of his colleagues and his "simple naivety" when

approaching the NRBS in the early 1990s, allowing them to unintentionally avoid this complex legal hesitance and to focus on the "best way to deal with stuff."

> They're dealing with everything from lands claims point of view; they're dealing with legal issues that often are still in courts. And that actually, from a science point of view, has inhibited at times the type of engagement that you could do because governments say, well, you can't just go in and work with communities necessarily because we have legal issues that are still unresolved. And there's, you know, a bit of a dance that's being done in terms of the scope of work that can or could not be done by departments because of this interplay now – that it's not – you know, back in the back in the Northern River Basin Days maybe it was a simple naïve, you know? No one was thinking of legalities. You know? That wasn't an issue. Like we weren't thinking about any of that stuff. We were just thinking about how to – it was a study and we were just thinking how the best way to deal with this stuff. The world has evolved. [Laughter] You know? Since then. (Gov4)

Settled land claims and Treaties can provide collaborative ICBM and management efforts with clear parameters and legal justification. One Program Lead participant described how conservation enforcement continued to be a challenge to their ICBM program, even in circumstances where those rights had been settled and mutually agreed upon.

> Well, yeah. Yes. You know, definitely. I'm thinking more like, in terms of some of the issues that we've had in dealing with fish and wildlife. You know? I think there needs to be an understanding of what it means to, you know, to be Treaty and to have that right as a treaty hunter. Because I think the misconception out there is that, you

> know, the fish and wildlife feel like they're mandated to check on every Indigenous hunter when we're out there and if we don't have our FAC card it's almost seemed as if we're not able to be out there. You know what I mean? (PL3)

When asked what kinds of changes he would like to see in the future to reduce some of these challenges to ICBM, PL3 stated what he would like to see in terms of training and relationship building.

> So some sensitivity training, you know, on both sides, you know, to understand each other a little bit better. I know when I – through our consultation department we were we were to meet with our local fish and wildlife just so we can, you know, start this dialogue. And that didn't happen yet but I imagine, you know, in the future it will. And it'll just, you know, it'll help both sides understand each other. Some cultural sensitivity training, and – because it's just reciprocal, right? It works both ways. And I believe, you know, and I've seen it, like, how, you know, our people can be very defensive. But at the same time, you know, it's getting – it's just trying to understand each other on a different level. That way we could move forward in a good relationship. (PL3)

In two of the interviews, a common topic arose which demonstrated how policy has had direct effects on ICBM efforts, which was identified as the laws and policy regarding Chronic Wasting Disease (CWD) detection in Alberta. Below, both a prion scientist focused on CWD, and a Community Lead of a CWD monitoring program, discuss how the jurisdiction regarding testing presents a challenge for community involvement.

> ...with testing for CWD is that the jurisdiction for testing is held by – in Canada – by the provincial governments, and the US is by the state governments. And so – and the testing has to be done by validated laboratories. So the primary test, for example, that's used in Alberta, I can't buy as a researcher. So if I need it, sometimes I can get one kit from the province. Other times we just have the province run our samples for us. So, you know, that can be a rate-limiting step… (AdAC2)

> I can't change anything from my end, but I would have to ask for a structural change from the top and the only change that I could say would be the change of the testing method. This was the problem, was the heads. This was another thing that was tough to get from hunters was heads because they have every use for that head. The brain. Like, the brain was what they needed for the testing and the glands. So if they need the brain for the [hardware? 00:22:37], that – you can't get them to give up their heads. Like, that was – and that was – and I knew right away that was going to be an issue. And that was kind of a something that I tried to keep focus on – that, hey, you can't – you can't force, even as a researcher, you can't talk the hunter into giving up his head if he needs it for traditional purposes. […] There are so many testing methods out there now as opposed to testing out the heads. But the place that we – the lab that we test at only has the basically the brain stem and the – they prefer the head, so. (PL4)

The workings of legal frameworks and historical treaties play a pivotal role in shaping the conduct of Indigenous Community-Based Monitoring (ICBM) programs. This complexity is not just a backdrop but actively informs the trust, willingness, and manner in which Indigenous communities engage with various government levels and institutions. It's evident that these legal

ties, whether through the numbered Treaties, settled claims, or ongoing negotiations, play a significant role in the collaborative processes and the evolution of these relationships. Moreover, the real-world implications of these legal contexts, such as the challenges around conservation enforcement and challenges to Chronic Wasting Disease testing, highlight the need for a more nuanced, culturally sensitive approach, and a critical investigation of barriers to moniotirng and testing regarding public health in communities. A revised approach, particularly from governance and regulatory institutions, grounded in acknowledging and respecting the legal and historical contexts, and the rights carried with them, could not only enhance the effectiveness of ICBM programs but also contribute to the broader goal of building sustainable, equitable partnerships between Indigenous communities and research partners.

4.3.2. Political Change

Through the interview process, the participants were prompted to identify what they would like to see changed and how that change might be pursued. This next portion focuses on some of the avenues for change-making that the interviewees discussed.

When discussing the challenges and successes of ICBM in Alberta, politics came up several times. Primarily, interviewees focused on the role of international commitments in how specific programs are funded; the role of public opinion in how ICBM programs are funded, and advocacy and media campaigns can be used to apply pressure to these government institutions. Below, PL2 explains how these political commitments influenced government support for ICBM programs.

> ...for example, with Environment Canada in the past five, six years now, a high focus on, you know, protected areas. So international commitments like Pathway to Canada

> Target One, which is conserving, like, percentages of the terrestrial and aquatic land base.
>
> [...] And those international commitments turning into commitments for – or, sorry. Priorities for government departments. So through the – there's a big fund called The Nature Fund. And I think there was, like, I can't remember how many billion dollars were in there. But through that fund there were programs developed. One of them was the Indigenous Guardian Program; another one was the Indigenous, Protected and Conserved Area Program. And then there's other – there's always kind of more funding tied to, you know, those are kind of political commitments that turn into things. (PL2)

Furthermore, three participants including PL2 directly described the role of public opinion in instigating change to benefit ICBM initiatives.

> And then, you know, the other part I think is public support. So, as you know, with government, governments are always, you know, trying to – you know, they need – the political system is, you know, public opinion driven. The more information in the public realm about the benefits that can accrue to everybody from Indigenous community-led monitoring, that's what's going to keep this thing going. And that's what's going to survive this, you know, from whoever is, you know, whatever party is elected in at that time. You know? We need to mainstream this. It's not a NDP thing; it's not a liberal government thing; it's not a – you know what I mean? It has to be more well understood in the general public at large.

> Because right now I would say there's too much expected of government, and government does not have the public support to fund these things. (PL2)

One participant brought up direct action, such as occupation, as a means of creating pressure for change.

> I would say about 15 years ago, they were really upset about timber industry and oil and gas just sort of running slipshod all over their territory where they hunted and fished and so forth. [...] And so they put up a roadblock and they charged all the oil and gas guys and the timber guys 25 bucks to go past their roadblock. And so the, you know, the oil and gas companies came back to the provincial government and said, look, you've got to stop this, you know? And the response by the provincial government was, 25 bucks, suck it up. It's a small price to pay. Rather than upsetting the apple cart and having to deal with contentions of oil and gas versus dealing with the First Nations issues they just said let them have their way. And they got tired of doing it after a while and they just sort of went away as the their roadblocks were in place for a few months and then they kind of decided, well, that's not – this isn't getting us very far. (AdAC1)

Another successful pathway for change, discussed by PL1 and mentioned by a few other participants, involves raising public awareness and utilizing international media and was of particular interest as it offers a recent example of effective change.

> Yeah. Mainly because we've been raising water levels for over 34 years, mid-delta, and so we're finally getting a response. It triggered the federal government to saying, OK, we need to do – I mean, we had to really force them through the action plan and,

> you know, going all the way to the world heritage committee and all of that. So we had to almost embarrass them first.
>
> So, yeah, but that, I would say, did they want to do it? They didn't come to us and say, hey, we want to restore water to the delta. Can you work with us? It would be great if we have a lot of those examples but they – I can't really think of any, to be honest, where there's that proactive approach from government.
>
> Yeah. Why this stands out as a success, well, it's because it's a fundamental issue. Water levels are declining. And the federal government through the UNESCO action plan has to do something about it. So to me that could be considered success if it is done right. And so far the working relationship with Parks Canada through the agreement we have with them and our participation in the action plan is looking positive. (PL1)

In the above excerpt, PL1 is referring to a petition that Mikisew Cree First Nation (MCFN) submitted to the United Nations Educational, Scientific and Cultural Organization (UNESCO) advocating for Wood Buffalo Nation Park, a UNESCO World Heritage site, to be added to the "World Heritage at Risk" category due to cumulative industrial impacts to the area, ongoing approval of industrial projects connected to the site via the Peace Athabasca Delta (PAD), threats from ongoing and increasing climate change, and a lack of inclusion of Indigenous communities in the monitoring and management activities and programs for the region (Wheatley & Westman, 2023). This petition was followed up with action plans for government collaboration and the potential to be listed as "at risk" by UNESCO following future assessments – the situation is still ongoing today.

4.4. Knowledge & Knowledge Mobilization

The third emergent theme from the interviews was "Knowledge and Mobilization." This categorization of the interview coding encapsulates codes that provide insight into the relationship between knowledge produced and the "power" – the use or credibility – associated with that knowledge as it is transmitted and translated through institutions and systems.

4.4.1. Dismissal & Ignorance of Indigenous Knowledge & Concern

Continuing with the example of Wood Buffalo National Park and MCFN, PL1 describes the federal framework being produced for the aforementioned action plan, and the ways in which it reflects a wider trend of dismissal and ignorance of Indigenous knowldge and expertise.

> Yeah. Yeah. And just observing declining water levels every year. And, you know what the question – OK. What's causing this? and then you're looking at Alberta that's, you know, looking at developing a water management framework to maintain certain levels of water in the river to support, for example, fish and fish habitat. And again, now that's the federal government gets triggered to be involved in developing that framework and management of water levels because now it's a there's a federal trigger to the Fisheries Act. And so but they're looking at it purely from an ecological and biophysical view as, you know, fish and fish habitat, how much water does fish need?
>
> But then when you add in what we say is important, how much water do we need to navigate to use the river. Great that you want to protect fish and fish habitat and you've got a pretty strong piece of legislation to do that. But we got constitutionally

> protected rights but say under treaty, you know, we can exercise our rights and industrial use of water out of a very important water system is impacting our right and you're developing a framework to manage that without considering thresholds and information that we think is relevant and important to exercise our rights. (PL1)

The quote above highlights events of Indigenous rights and voices being excluded from regulatory processes and not proactively included in good faith or through legislation. AC1 brought up some important examples of these dismissals of concern occurring outside of just policy but also in the relationships between researchers and communities.

> So, you know, addressing those concerns and not just running roughshod over those. And there are terrible examples of where communities have raised legitimate concerns about monitoring projects, like, polar bears being probably one of the most, caribou being close second in a lot of ways – where those concerns are ignored completely. So in terms of methods, and then really in terms of using their knowledge to help understand this and not the old model of where you ship up seven coolers and say we need this sample from these fish or these jaws from these caribou or whatever that tissue is or we need an ear from a polar bear and there's such a long history of that. Here's the cooler, send them to us, and then they never hear back.

The two conflicts that AC1 is referencing are the debate on polar bear numbers that has occurred between local communities and academic scientists (Dawsley & Wenzel, 2008) and a conflict regarding caribou tracking methods conflicting with community norms and values (Kofinas, 2005). These are two very clear examples of the knowledge and expertise of Indigenous communities being undervalued and dismissed. According to many of the interviews, this

continues to occur throughout academic and settler state government perspectives on knowledge and science.

> ...the academic push is to keep publishing, which means, you know, you're going to be I guess more biased towards doing that. And I think part of the publishing too is that there's, I think, a bias with some journals in particular about how they view, you know, indigenous knowledge. And so if you want to publish in, you know, high-impact journals, you know, not to say that I believe this but I think there is a bias about what gets accepted and what doesn't. So that also may influence how academics want to interact with communities, you know, and the value that they see in that. (AC3)

Here, AC3 points out the prominent issue of timelines for deliverables, expanding it as an issue relevant to more than just community practitioners and government funding institutions but also between academics and their fun institutions such as the tri-council, or publishing entities.

> And, you know, I teach this field course and it costs about fifty thousand dollars a year to operate a university field course and it engages a number of indigenous collaborators: dog sled person, some elders. And, you know, in that budget we have, like, $18,000 for helicopter time. And the one thing they called me on in 2019 was why are you paying so much to these indigenous people? And it was, like, 1.8% of the budget. And I controlled my rage. I waited 24 hours and then I wrote a detailed response but, I mean, that that just spoke to me. It's like, you're questioning me paying an elder $1500 bucks for a day? I mean, that's what they're worth.

> And anyway, that's certainly been an ongoing frustration. It's just mechanisms and perspectives around paying people and certainly within government money saying, well, yeah, we don't want all our money being spent paying these people. (AC1)

The issues with funding and publishing bodies are clearly beyond just funding and reporting timelines. As this participant demonstrates, there is a strong misalignment between researchers on the ground and these funding bodies on the value of the labour and the knowledge of Indigenous knowledge holders. AdAC1, one of the other academic participants, one who is adjacent to ICBM work and not directly involved, reflected this divergence in understanding and valuation of Indigenous participation in research, which was expressed in their reaction to the practice of Indigenous co-management of academic research.

> So I know that the feeling by some people who are involved with co-management on the First Nations side believe that any research that is being done should be organized and overseen by the First Nations people. But I have an immediate reaction to that – that there's probably nobody there really qualified. I mean, we're dealing with such things as studying demographic patterns and looking at how movement is occurring across the landscape and, you know, the kinds of data that one might need to get a handle on, on migration and mechanisms behind migration in context of changing climate and things like that. What are the mechanisms behind the decline in the caribou herds? All those kinds of things. Those are tough questions that require

> qualified ecologists to be able to try to evaluate study design and come up with a good path forward. (AdAC1)

While divergent to most of the rest of the perspectives on Indigenous involvement in monitoring and research, AdAC1, demonstrates a perspective closely aligned to their accomplished background within the field of wildlife ecology, a perspective is likely not never uncommon. This perspective, which is critical of the credibility and value of Indigenous knowledge and participation, and is not uncommon in academic and settler-state management bodies, is identified by other expert participants as a disincentive or deterrent to pursuing collaboration or partnerships from ICBM initiatives.

> Credibility isn't the right word but it is in the sense that I think that part of the reluctance of some communities that I work with to jumping into community-based monitoring is knowing that a lot of governments are going to value that. (AC1)

4.4.2. Pathways for Mobilizing Knowledge

PL2 expressed excitement regarding the potential for his community's new highly accessible surveying and monitoring program by ArcGIS, called survey123. He goes on to question why the information collected on such applications is not more readily being used by decision-makers such as government agencies.

> So, for example, the work that we're doing in our survey123 app. That data, you know, should be being considered, you know, at various levels of government and industry. For example, fish and wildlife, you know, we're able to do pop-ups, we're able to do surveys. So let's take wood bison, for example. The lack of information

> that the government has around wood bison is mainly due to the fact that they – the government scientists don't get a chance to go there very often. We are there every day. We see bison every day. They're in our community. They lick the paint off our trucks. Right? Who better than us to be providing information. Like, not just, you know, like, I mean, useful, structured, western scientific compatible information. You know? The same information that the western scientists from Alberta would collect themselves. We can do that. A lot of it. Maybe not every single thing but we could still do a lot. [...] And same goes for caribou; same goes for water. Like, we have the scientific equipment, YSI meters, you know, different scientific equipment. We're trained with. We know how to use it. We have inputs into our existing app that can take that information already… (PL2)

One government official (Gov1) involved with aquatic reporting discussed what they believed to be an important opportunity for mobilizing knowledge from Indigenous communities into the work they do.

> I see a lot of potential in the co-creation of indicators. And that's one opportunity for people from different points of view, people – and different knowledge systems to understand where they're actually looking at similar endpoints. Right? This is what we have – how we define this and this is how you define that. And then that also enables those opportunities around, you know, going back to capacity, right?

> So, we've co-created certain indicators. Here are areas that communities would like support in terms of being able to collect their own scientific data, as well as their own indigenous knowledge, on these indicators. Great. Here's the pieces that we need to enable that. Right? Like, so I think that's an important aspect of community-based monitoring in general.

Referring to the Wood Buffalo National Park action plan covered earlier, PL1 describes how Indigenous knowledge about water and land use is being used in the placement of weirs in the PAD to control water levels.

> So if we're having flooding happening over here in a delta, well maybe the weirs should go over here where there's less water to hold. You know, there's a whole – anyways, I'm not a water management specialist but that's an example of where the government has responded, I think, and the work we're doing with them. And where the weirs belong, should be placed, should, you know. Obviously, land user Indigenous knowledge is a big part of the planning and our input there. So that's, you know, could be considered almost a success. (PL1)

Contaminated sites and their effects on the health of communities downstream have long been a source of contention among Western scientists and Indigenous communities (Huseman & Short, 2012; Westman & Joly, 2019). One participant used this sort of example to convey differences in the knowledge systems and worldviews, and how those differences manifest into disagreements.

> Two data – so you could have, as an example, you could have the western science saying there's no significant differences in our concentrations of levels of contamination that we're seeing between these two sites or these two locations, and

> they – and then you would indicate and say, well, then we don't think we have to move to the next step. Right now we don't have an indication of a problem.
>
> From an Indigenous perspective, they could have an opinion to say, we don't care about whether or not there's significant differences; you've actually demonstrated that there's still contamination presence of the contaminant in an area or whatever that we've culturally used, you know, for eons here, and that is of concern to us. So whether it's significant or not is not the issue; the presence of the contaminants is the issue.
>
> And that means that we are inhibited. You know? Maybe elders or community members might not be using an area, might not be catching a fish or utilizing it in the same way, simply because of that knowledge. Right? Whatever. So what you've got is you've got two different – same data. Same information for very different perspectives of interpreting what it means and how it informs decision processes. (Gov4)

Lastly, PL4 mentions how his program has a current focus on the importance of his community's traditional knowledge and uses it in tandem with science.

> So, at the same time, and so that's kind of why I guess with the project now we're, you know, we're stressing the importance of traditional knowledge because we know that – we know that traditional knowledge plays a very big role alongside science. So that's kind of our – that's kind of what we're kind of gearing towards, just kind of getting that – knowing that, you know, we can still hunt, we can still do these things, right? And we can still do it at a sustainable level too, right? Too. You know? We're not affecting moose populations where we're going hunting too, right? Things like that. We kind of look that to…

4.5. Funding & Financing

Similar to the theme of "capacity," Funding and Financing is also an underlying theme for a significant amount of the challenges and opportunities for ICBM that were brought up throughout the interviews.

4.5.1. Time Scales & Funding

One very prominent issue, mentioned by 13 of 15 participants, was the need for longer timelines for funding, as the current standard of smaller, often annual funding for programs requires a significant amount of administrative work on the reporting side of things. This ties to earlier mentions of a need to invest in relationships and baseline capacity-building infrastructure, such as departments and administrative staff.

But I think it's more than that. It's structured funding. And I think just as the, you know, the indigenous guardian opportunity had different tiers, more different, you know, let's say, abilities within communities. You know? That program that needs to happen the funding program really needs to be community-specific. And so what would that entail for our community? You know, I think that, you know, doing some of the work to bring the information that we have on survey123 and back into the community realm… (PL2)

I don't think we're going to make it if we keep it as a year-to-year funding envelope that people have to apply for and report on. We'll just turn people into a nation of bureaucrats. (CN1)

I think maybe finding funding sources that can go beyond one year or two years. Because, you know, it may take a year to scope something or to engage the broader community in co-developing, you know, what is it we want the objectives of a program to be or what's important to us to monitor. That takes time. And if you can only find a year or two of funding, you know, things are at risk of being disrupted or, you know, not being able to actually follow through to implement. So I think that's been – that's another challenge. And again, those two I know pop up often, like, the time and the money. But, I mean, the real practical barriers, there can be practical barriers or limitations. (Gov2)

But I think the funding piece, it's the same with, you know, almost any government program where it tends to be short term. And then a big challenge with that is the sort

> of reporting requirements that come with the short-term funding as well. And we're seeing that. You know? (AC2)

Short-term funding is similarly a challenge in Academia, where AC1 explains its importance and his frustration with not securing enough funding for projects for the long term.

> Funding is critical, of course. We have to have money to pay for these and sometimes the communities have some but they often don't have all of it or enough. And especially long-term sustainable funding. And probably the biggest failure of my career I think has been starting up some really exciting projects that we just simply run out of cash and just get painted into a corner and then have to pause or end those. And we have a couple of those.

Using an example of Parks Canada, and the large amounts of funding that they consistently receive, one participant argues that that sort of funding cycle should be given to communities and that a barrier to this sort of action is grounded in the federal government wanting to hold on to power and resources.

> Those huge agreements for power sharing, they're still very, very controlled and micromanaged by the federal government and its arms through parks, through ECCC et cetera.
>
> I'd like to see the federal government to – again, this is back to look at yourself in the mirror, federal government. I'd love to see the federal government look at themselves in the mirror and actually take apart their negotiation structures and their negotiations approaches and power share and reduce their own power. They're so fearful of losing

> their money in parks. They're so fearful of losing their power and control over lands. And, I mean, look at the massive bureaucracies that parks has and manages. But massive bureaucracy, and those funds, should be in Indigenous governments. (CN1)

Something that arose was the need for monitoring efforts, especially those which were intended to be long-term, to be properly financed, rather than piecemeal annually funded. This was reflected in several comments below.

> One of the things that I would really like to see is community-based monitoring trust where instead of saying here's a one-year, two-year, three-year, here is a pot of money. Here's $200,000, it's seed money, and we'll look for others to play, and this is a trust fund for this project or this program saying that we want to see this go very, very long term.

> I work with the Nature Conservancy and one of the ways that Nature Conservancy works is that it's all based – primarily based on donations. But when they buy a piece of land they say, OK, we're going to spend $200,000 on the land and we're putting $45,000 into a monitoring trust. And so that will be there in perpetuity to ensure that we're monitoring. And I think that was absolute genius. (AC1)

4.5.2. In-Kind Support & Flexibility

One component of program support that could change, and could potentially make more resources available to programs would be an increased level of in-kind assistance from collaborators and other levels of government.

> So having people willing to contribute. And we've had – the Canadian Wildlife Service doesn't engage in our research at all in any way but they've for many, many years gave us drums of fuel. And so we've had a lot of people that have contributed a lot. So having just a lot of good will and good engagement I think is great.
>
> And the provincial government this past summer, you know, they've said, well, we've actually got a couple of drums of fuel sitting around. We're probably not going to get around to use it so that's free. Well that's, like, almost $1000 of in-kind right there. (AC1)

Also mentioned was the need for quick access to funds, to allow for more ad-hoc research endeavours, allowing for quicker distribution before interest is no longer there from partners.

> And even we say – and we've been talking a lot about this in Indigenous Land Management, saying, what I'm saying is I don't need you to hand me a hundred thousand bucks. What I need you to do is the minute this guy called me and said we want to look at wolf stomachs, say, yes, here's two grand, set up some meetings, do some preliminary work, and don't wait a year to get it going. Don't wait six months or wait six months and even worse get a get a firm no, no funding, and then the whole thing falls apart. Have – here's two grand, get started, get the ball rolling and then when you write a proposal you've got the partners. You might have some preliminary data. (AC1)

As has been partially covered already, multiple participants noted difficulties with their administration when attempting to properly pay people for their labour and knowledge. AC1 explained some of the difficulties he has had on this front.

> And so finding local stuff has been where I can make commitments indefinitely and know that's workable but when you – the other problem I think that's been quite – with all aspects of indigenous engagement, including community-based monitoring, is this assumption that communities work for free and that, you know, that I'm making $190,000 a year and these guys for whatever reason are should be going out and trumping around the bush and putting up trail cameras and collecting data and putting poop in bags or whatever it is and not get paid. I appreciate that a lot of communities are pushing back on that. But in a lot of places that's still a widespread assumption and a lot of funding agencies, it's hard. Trying to pay indigenous community members through our university system is hard. Hiring a student takes two hours. I can have them hired and working tomorrow afternoon. Hiring and paying indigenous communities for their engagement: they want receipts; they want Social Insurance Numbers. I mean, we've been through absolute madness just trying to get people paid for their time. (AC1)

PL4 explained how participation from Elders decreased, potentially due to the amount of money they were paying them.

> Yeah. It's just I guess a matter of just cost, I guess, and just value of their knowledge was kind of I guess a little underscored, I guess, and just kind of maybe we could have had more to offer and would have had a lot more participation at the time when we were first doing interviews. But at the time we were just following that standard of, you know, the $50 for standard surveys, right? So.

These discussions underscore the vital and adaptive role of in-kind support and financial flexibility in enhancing the efficacy of Indigenous Community-Based Monitoring (ICBM) programs. These insights reveal the multifaceted nature of program support, extending beyond conventional financial mechanisms to include mechanisms with less administrative burden to cover things like fuel and other logistical aids in more urgent scenarios, highlighting the need for swift access to funds for emergent research opportunities highlights the importance of adaptable and responsive funding mechanisms. Additionally, the challenges of compensating community members, particularly Elders, for their invaluable contributions and knowledge, point to a broader issue within funding structures and assumptions about community work. Addressing these issues by ensuring fair compensation for labour and knowledge sharing, and recognizing the value of local expertise, is important for sustaining ICBM initiatives. These insights collectively suggest that a reevaluation of support strategies, encompassing both material contributions and financial policies, is imperative for the support of ICBM efforts.

4.5.3. Consultancy & Funding

Addressing the nuanced relationship between consultancy firms and Indigenous communities, AC2 advocates for a paradigm shift in funding allocation. Her perspective underscores the need for directing resources towards empowering communities themselves, rather than outsourcing to external consulting firms. This approach not only fosters community capacity but also ensures a more authentic representation and management of data pertaining to their lands.

> And, you know, over the long term, in the north, whether it be Northern Alberta or, you know, further north, instead of hiring consulting firms to go out and collect all this information, like, provide the funding to the First Nation, to the community, to be

> developing the capacity and to be the go-tos over time for monitoring on their areas in particular. Right? And that then becomes a way of, you know, supporting longer term, I think, consistency in this. (AC2)

The insights from AC2 are further echoed and expanded upon by Gov4, who highlights the ongoing efforts and challenges within the Alberta oilsands monitoring group. He points out the complexities inherent in involving consultants in community representation. He claims that while these consultants are integral to the process, their dual role as business entities and community representatives can sometimes lead to conflicts of interest, where the pursuit of profit may overshadow the community's needs and perspectives.

> ...They're [the Alberta oilsands monitoring group are] working very hard, they have an indigenous community-based monitoring committee now. They're trying to have in their technical advisory committee's representation of communities. [...] And/or their consultants, which also at times creates a bit of an issue, because it's sometimes on that side of it that – you think they're representing the communities but yes and no at times, if you know what I mean. You're a hired consultant to – when you're there to make [money] – you're there for your own business… (Gov4)

This discussion leads to a broader contemplation of the current structures in place for environmental monitoring and the proportion of funding that ends up going to Indigenous communities. AC2 critically observes that despite the significant financial resources allocated to environmental monitoring in regions like Alberta, Indigenous involvement remains minimal. This discrepancy seems to indicate a systemic issue in how funds are distributed and utilized, suggesting a need for a more equitable and community-focused approach to funding.

> I think the big barrier is that the structures don't really support it [ICBM] right now, even though there's a lot of money that goes into monitoring. I mean, think about it in Alberta with the oil sands – there are a lot of environmental consulting companies around. There is the Alberta Biodiversity Monitoring Institute. But I think if you looked at the indigenous participation in that, it would be really, really, really small. So, there's lots of money out there and it needs to be redirected. And that's not going to please some people. But I do think that's what should happen. And to build the capacity within communities. And so I think the longevity of the funding and really building that capacity is important. (AC2)

These findings highlight the complex structures surrounding the funding mechanisms for environmental monitoring. They suggest that by prioritizing the development of community capacity and ensuring a more equitable distribution of resources to communities but also long term, ICBM programs' long-term success and sustainability can be significantly enhanced.

4.6. Conclusion

The thematic analysis of the expert interviews with professionals who are engaged in or adjacent to Indigenous Community-Based Monitoring (ICBM) in central and northern Alberta uncovered a breadth of themes both aligning and contending with the previously covered literature. The analysis identified four central themes: community capacity, policy and regulation, Indigenous knowledge and mobilization, and funding and financing, each with several sub-themes nested within. While wide-ranging in their critiques and experiences, this culmination of challenges presents several distinct potential solutions or areas of focus, those of which are covered in the following chapter.

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5. Discussion

5.1. Introduction

This research contributes to the growing body of social science research focused on Indigenous Community-Based Monitoring (ICBM) and is explicitly focused on investigating the challenges to implementing and conducting effective Indigenous Community-based Monitoring (ICBM) in Alberta but with some inclusion of voices doing work in the Northwest Territories and the Yukon. The research is one component of the Taking Care project's efforts to study and support Indigenous-led natural resource management in Alberta. As identified in the results chapter, several prominent findings arose through the iterative thematic analysis of the expert interviews. This discussion chapter threads the relevant findings together by exploring their interconnections and situating them in the broader literature covered in Chapter 2.

Throughout the interviews conducted for this research, there was a strong emphasis on the challenge of capacity within communities and the limited structural and financial access to encourage the development and upkeep of long-term Indigenous community-based monitoring programs. Throughout the interviews, there was also a clear indication that ICBM programs could and should be structured to provide meaningful training opportunities for community members, with a strong focus on youth. ICBM programs' ability to fully realize this capacity-building potential is constrained by the historical, socioeconomic, political, and regulatory structures that these programs function within and with the support of. Drawing on insights from the results and the relevant literature referenced prior, this chapter explores these challenges facing the practice of ICBM in Alberta.

5.2. Community Capacity & Access

The findings of this research identify two significant material barriers to implementing and upkeeping Indigenous Community-Based Monitoring (ICBM) programs: a lack of community capacity and, relatedly, a lack of access to the physical infrastructure and the financial resources and mechanisms required for funding and sustaining long-term monitoring activities often resulting in administrative and labour challenges to starting or sustaining programs.

These barriers to building capacity are closely intertwined with the extensive administrative duties often falling on already overburdened individuals, occasionally proclaimed “local champions” or “community champions.” The concept of community champions frequently appears in the literature (Kouril et al., 2016) and varies slightly between different pieces of research. Some academics refer to community members in similar roles instead as “local researchers” (Tremblay et al., 2008). Of the 15 interviews, 5 experts directly mentioned “champions” in their responses. Still, interestingly, almost all of the experts' thoughts on “champions” shared a nuanced perspective of the value that champions bring to a program. While the importance of these skilled individuals was highlighted, interviewees also reflected on the burden of being a “champion” and the exhaustion and burnout that can accompany community members taking so much on. Several of the experts interviewed described the exhaustion of research partners that resulted from an overreliance on a small and limited number of people, describing how this can disrupt the function of the monitoring or research programs, with some experts how these circumstances often end up necessitating external capacity to run ICBM programs. This critical perspective on community champions ties back to the main narrative thread arising from these interviews: the need for effective tools and resources for

building capacity within communities for an approach that shifts the focus to the collective capacity of the community rather than the role or efforts of a single individual.

The concept of "access," as described by Ribot and Peluso (2003), can be described as the ability of an individual or group to pursue something. This ability is composed of, but not limited to, the physical, financial, and legal resources and skills that are accessible. The results of this research coincide well with this theory and strengthen the argument for an ontological position that is less focused on property ownership or tenure as an indicator of ability and instead is focused on the complex set of factors that allow community members to gain benefit. This theory of access was particularly topical when discussing the experience and expertise that the participants brought forward regarding their work with chronic wasting disease (CWD).

Experts who work in CWD monitoring and management mentioned the infrastructure and regulatory barriers to testing for CWD in isolated Indigenous communities– in that they were not able to test for CWD in-community due to the medical infrastructure needed, and more so the regulatory policies which limit a community's ability to test for CWD, even in a scenario where they did have the equipment. This barrier to testing and monitoring is a strong example of the tie between the conduct of programs like ICBM and more general challenges Indigenous communities may be facing, such as a lack of access to the appropriate infrastructure, water treatment facilities for clean drinking water or clinic of health services in communities. This was exemplified by their description of how nursing units or small testing facilities could facilitate the testing of hunted meat, allowing the community to have ownership and autonomy over the CWD monitoring efforts.

5.3. Private Companies & ICBM

The involvement of private companies in Indigenous Community-Based Monitoring (ICBM) programs introduces a complex layer to the practice, as revealed through both the gaps discovered in the literature review and insights from interviews. These entities, often operating within the consulting industry, have become integral to implementing ICBM programs across Alberta. Their participation ranges from providing necessary expertise and resources to potentially facilitating community capacity building. Seemingly addressing a major theme from the interviews: the critical need for expanding community capacity to effectively sustain ICBM efforts. However, the relationship between ICBM programs and private companies requires careful examination, as while the potential for these companies to contribute positively to community capacity is evident, so is it evident that, as privately owned companies, they are still bound to the basic requirement of producing profit. The reliance on external private entities for critical aspects of monitoring programs underscores a tension between the need for expertise and the aspirations for community sovereignty and power in environmental stewardship.

The prevalence of consulting companies in the sphere of ICBM in Western Canada is notable, warranting a deeper investigation into how these relationships influence the goals, structures, and outcomes of monitoring programs. While these companies' capacity-building role can be valuable in times of urgency, it must be scrutinized to ensure that it aligns with the principles of self-determination and does not inadvertently perpetuate capacity deficits within the community or undermine the integrity and objectives of existing community-led monitoring initiatives.

These observations point to a broader gap in the research on community-based monitoring, particularly regarding the nuanced impacts of private sector involvement on the sustainability

and effectiveness of ICBM programs. As such, in line with suggestions and findings from Cohen (2021), future studies should aim to critically dissect the implications of these partnerships, focusing on how they can be structured to genuinely support community goals and enhance local capacity in a manner that respects and upholds Indigenous sovereignty and environmental management aspirations. This exploration is critical in advancing our understanding of ICBM as a tool for both environmental stewardship and the reinforcement of Indigenous rights and governance.

5.4. Reimagining ICBM Financing

In some pieces of Community-Based Monitoring (CBM) literature, the practice is positioned as a cost-effective strategy for environmental monitoring, highlighting the advantages of reduced personnel costs compared to traditional monitoring approaches and existing observation (Conrad & Hilchey, 2011; Kouril et al., 2016). However, this study's findings diverge from that narrative of cost savings, revealing a starkly different perspective on financing and funding Indigenous Community-Based Monitoring (ICBM) programs, as the interviewed experts did not echo the sentiment of CBM as a method to cut costs. Instead, discussions centred on the critical issue of inadequate funding, particularly the absence of sustained, accessible financial support with minimal administrative requirements and bureaucratic hurdles.

The results of this research position ICBM as not just a tool for environmental conservation but as a potential avenue for redressing economic disparities that have historically marginalized Indigenous communities. The concept of utilizing ICBM as a mechanism for economic reparations challenges the conventional economic practices that have often excluded Indigenous peoples and exploited their lands. Such a reimagining of ICBM underscores the need for funding

models that transcend mere project-based or results-based funding, advocating instead for investments that rectify historical injustices through empowerment and capacity building within Indigenous communities.

The precarious nature of funding for ICBM programs, mentioned by participants, highlights a critical barrier to their effectiveness and sustainability. The current reliance on unpredictable, short-term funding arrangements stands in sharp contrast to the stable, long-term financial commitments typically extended to federal initiatives such as national parks. This discrepancy not only hampers the ability of Indigenous communities to develop and maintain robust monitoring programs but also reflects a broader issue of equity in the allocation of resources for environmental stewardship, particularly as Indigenous Nations have been stewarding the land for time immemorial. If the state of Canada were to truly adopt a nation-to-nation approach, as exemplified in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), this would necessitate a fundamental shift in funding strategies away from treating Indigenous Nations as project coordinators and instead treating ICBM as a public good, and one that is operating by sovereign Nations. Such a shift could ensure that financial support for ICBM programs is more consistent, reliable, and reflective of a genuine commitment to supporting Indigenous sovereignty and environmental governance.

5.5. Knowledge Systems & Mobilizing Change

The discourse within Indigenous Community-Based Monitoring (ICBM) literature frequently navigates the confluence and divergence of Western science and Indigenous knowledge systems. Such discussions often probe the extent to which these distinct knowledge systems can coexist, complement, or conflict within environmental monitoring frameworks (Tengö et al., 2014;

Berkes, 2017; Johnson et al., 2015). However, this research found that the direct comparison of knowledge systems was not a central concern among participants, emerging as one of the lesser focused themes. Interestingly, this theme was more prevalent among interviews with federal and provincial bureaucrats than those leading community initiatives, suggesting a variation in focus dependent on one's role and proximity to the implementation of ICBM programs. This observation aligns with Arun Agrawal's critique in "Dismantling the divide between indigenous and scientific knowledge" (1995), where he argues for a shift away from the binary comparison of knowledge systems.

The aspirations for Indigenous Community-Based Monitoring (ICBM) knowledge to play a significant role in broader decision-making processes were echoed by many participants, yet concrete examples where this aspiration was realized were limited. A standout instance provided by a participant PL1, sheds light on the potential for ICBM to directly influence environmental governance. PL1 detailed how their Nation's legal actions led to a mandate requiring the inclusion of ICBM insights in future environmental monitoring for oilsands projects. This legal victory not only exemplifies the potential for Indigenous knowledge to shape environmental policy but also highlights the power of legal frameworks in validating Indigenous monitoring practices.

The other example provided was the Mikisew Cree First Nation's strategic use of international advocacy to protect Wood Buffalo National Park. By petitioning UNESCO to classify the park as "World Heritage in Danger," they successfully drew global attention to the threats facing the park and the negligence of Canadian authorities towards Indigenous rights and environmental stewardship (Wheatley & Westman, 2023). This campaign exemplifies the effectiveness of

leveraging international platforms to advocate for Indigenous environmental concerns, leading to pressure on the Canadian government to address a series of specified actions to potentially avoid the park's reclassification, such as requirements to incorporate ICBM findings into the park's management strategies (Wheatley & Westman, 2023).

The discussions with PL1 and PL2 surrounding these efforts to mobilize knowledge reveal a critical sentiment and potential insight: significant environmental and policy changes necessitate substantial public and political will. Both argued that the current political system lacks the necessary will to enact meaningful changes that would benefit Indigenous communities and their lands. This observation resonates with Glen Coulthard's analysis, which posits that the foundational structures of the Canadian state were designed in a way that inherently disadvantages Indigenous peoples and prioritizes the extraction of land and resources over Indigenous rights and sovereignty, inherently often leading to limited success when Nations attempt to practice their sovereignty within existing settler-colonial structures (2014).

This structural imbalance is further compounded by the settler state's tendency to promote narratives of collaboration and practices of knowledge coproduction as forms of empowerment. As Coulthard posits, these narratives often mask the underlying power dynamics that continue to favour the settler state, maintaining the status quo rather than facilitating a genuine shift in power towards Indigenous communities. The insights from these interviews highlight a crucial point: for ICBM and Indigenous sovereignty to advance and succeed, there must be a fundamental redistribution of power and control, as is seen in the successful examples provided. Such a shift requires more than theoretical mullings of knowledge collaboration; it requires a reevaluation of governance and economic structures, which have been consistently shown to undercut

Indigenous autonomy and treat Indigenous knowledge as unequal or illegitimate in environmental governance.

5.6. Revisiting Typologies of Community-Based Monitoring

In the literature review, three different typologies of community-based monitoring were focused on: Danielsen et al. (2008), Conrad and Hichley (2011), and Kouril et al. (2016). The three typologies differ in their approach to categorizing CBM programs, and each focuses on slightly different variables. Kouril et al. (2016) are the most relevant to this research as it takes Conrad and Hichley's categorization and also includes a "traditional languages and ecological knowledge" variable, making it more appropriate for this research and its focus on Indigenous CBM programs specifically.

Given the findings of this research, it seems pertinent to suggest that an effective typology for understanding ICBM programs in Alberta should include variables related to the capacity-building nature of the program, the length and type of funding, and the role of private industry in these programs. This research has shown that all three of these variables are interconnected and related to one another, with the length and type of funding being related to the role of private industry and the capacity-building nature of the program. This inclusion is in line with observations identified by Danielson et al. (2009), where the authors state that even amongst their typology monitoring, the potential for building local capacity is dependent on a range of factors that are outside of the typology distinguishers. By including these variables, the resulting typology would be pointedly "capacity-oriented" as it would be clearer based on where in the typology a specific program fits, who is benefitting from the program, and where capacity is being built.

5.7. Conclusion

Throughout this discussion, it's evident that the research has illuminated several critical dimensions of Indigenous Community-Based Monitoring (ICBM) that intersect with broader themes of community capacity, access, and the role of private industry in monitoring efforts. These insights not only contribute to a deeper understanding of the complex context behind ICBM programs but also underscore the importance of rethinking and restructuring the support mechanisms and practices, such as funding methods and reporting timelines, associated with these initiatives. Both recognition of the important role of community champions while also recognizing the capacity context which necessitates them, and the nuanced examination of 'access' as it pertains to resources and infrastructure reveal the complex and occasionally crude barriers to effective ICBM implementation. Furthermore, the relationship between ICBM programs and private industry highlights the complex dynamics of capacity building within Indigenous Nations, and the incessant influence of the broader capitalist economy on monitoring practices, suggesting a need for approaches that center capacity building rather than expediency in order to actually empower communities rather than perpetuating dependency on external for-profit entities.

While it is potentially fraught with contradictions, this discussion highlights the need to advocate for funding models and regulatory frameworks that recognize and respect the sovereignty and self-determination of Indigenous peoples. Such frameworks have the potential to facilitate the creation of capacity-building, youth-focused programs that are capable of addressing the environmental challenges of today while setting communities up for continued success in the future.

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6. Conclusion

6.1. Review of Thesis

The objective of this thesis was to explore the opportunities and challenges to the successful and effective conduct of ICBM programs. This objective was broadly achieved, as it contributes to the evolving discourse on Indigenous Community-Based Monitoring (ICBM) within Alberta, providing a perspective on the challenges and opportunities that characterize the implementation and conduct of such programs. Using a modified Expert Elicitation, qualitative interviews were conducted with experts directly involved in or closely associated with ICBM initiatives.

The three questions guiding the interviews for this research were as follows:

(1) How do different actors conceptualize community-based monitoring?

(2) What are the challenges and aspirations these actors associate with this monitoring work?

(3) What do these actors see as the future of ICBM in western Canada?

Returning to the three questions that guided the discussions with the interview participants, this study successfully explores the second question, “What are the challenges and aspirations these actors associate with this monitoring work?” as explored in much of the results and outcomes included in the thesis. Regarding the other two questions, “How do different actors conceptualize community-based monitoring?” and “What do these actors see as the future of ICBM in western Canada?” the results and discussion of this research do not adequately respond to these questions. The lack of success in answering these questions can be attributed to the scope of both the research questions, the background of the participants, and to the experience level of the

researcher. Given the broad range of experience that the participants had, the subjective interpretations of the interview questions varied greatly, which given the semi-structured nature of the interview methods, led to a wide range of responses. This, paired with a steep learning curve that occurred throughout the research planning and expert interview process, resulted in a situation where the scope of the analysis was reduced to allow for a fulsome thematic analysis process. Given more time and resources, these questions should be revisited with the interviews with additional effort and time made to explore them to their full extent.

6.2. Limitations

This study encountered several limitations that warrant acknowledgment. The use of online interviews, while necessary due to the global pandemic, introduced its own set of challenges. As noted by Saarijärvi and Bratt (2021), issues such as unreliable internet connections become particularly significant in research involving non-urban and Indigenous communities, where digital infrastructure may be lacking or non-existent.

The participant pool, though diverse in professional backgrounds, was limited to 15 individuals. While providing valuable insights, this sample size likely does not encompass the full spectrum of perspectives on Indigenous Community-Based Monitoring (ICBM) within Western Canada. The reliance on my supervisor's professional network for participant recruitment may have further constrained the breadth of viewpoints captured.

This research is situated within a specific temporal context, as it was conducted during the unique circumstances of the 2021-2022 pandemic period. The findings, therefore, reflect the challenges and conditions of that time, acknowledging that perspectives on ICBM are subject to

change as socio-political and environmental landscapes evolve, as it is a quickly developing and changing field.

6.3. Future Research

The inquiry into Indigenous Community-Based Monitoring (ICBM) has illuminated several critical avenues for future research, with one of the most pressing being the exploration of private industry and consulting firms' roles in Indigenous Nations' monitoring and data collection efforts. This study's findings hint at a complex interplay between these for-profit corporations and Indigenous communities, raising questions about the implications for sovereignty, capacity building, and the integrity of environmental monitoring practices. This research should critically assess the benefits and challenges posed by these entities' involvement, exploring questions such as: How do these partnerships affect Indigenous communities' autonomy over their monitoring programs? What are the long-term impacts on community capacity and knowledge sovereignty?

Another area of focus in the interviews was the impacts of the federal Indigenous Guardians program across Western Canada. A focused study on the range and effectiveness of Guardians programs could yield valuable insights into best practices, challenges, and the program's contributions to environmental stewardship and Indigenous sovereignty.

By expanding the scope of future research to include these dimensions, scholars and practitioners can contribute to a more nuanced understanding of ICBM's challenges and opportunities. This, in turn, could inform the development of policies and practices that better support Indigenous-led environmental monitoring, ensuring it serves as a tool for empowerment, environmental justice, and the affirmation of Indigenous rights and stewardship over their lands and resources.

6.4. Conclusion

This study's findings highlight the critical need for reimagined structures for support, adequate funding, and genuine collaborative efforts – that center Indigenous knowledge systems and sovereignty – in order to support more successful and effective Indigenous community-based monitoring programs. Moreover, it emphasizes the imperative for researchers, practitioners, and policymakers to advocate for the full implementation of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), which is crucial for moving beyond symbolic acknowledgments to tangible actions that respect Indigenous sovereignty, cede control and resources, and foster true nation-to-nation relationships. This step is essential not only for the success of ICBM programs but also for the broader pursuit of sustainable environmental management, reconciliation, and justice.

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