Examining research policy and practice in Canada's North to support evidence-based decision-making

By

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Abstract

Research has a long and contentious history in the North, particularly with Indigenous northerners who have felt marginalized and excluded. Currently, there is movement towards a research agenda guided by northern-identified priorities and inclusive of northerners leading research. While recent studies demonstrate poor alignment of northern research with recognized societal needs, there has never been a broad systematic investigation of northern research policy or practice. In light of these gaps in understanding, this study focused on exploring the research-policy interface in the Canadian North, including Nunatsiavut, Nunavik, Nunavut, the Northwest Territories, and the Yukon.

This thesis focused on the overarching research question: How do the policies that guide research in Canada's North support or limit research practices that align with northern priorities and knowledge needs? A document analysis of northern policies established foundational knowledge of research expectations and priorities. A critical analysis of pan-territorial research licensing data developed a baseline understanding of the current research context. Employing semi-structured interviews, the experiences and perspectives of northern and southern-based research practitioners were analyzed within the northern research policy context.

This study exposed a lack of transparency in the extent to which Indigenous and northern voices inform national and territorial research policies, identifying the

need for increased northern input in developing research programs. There are significant gaps in research about northern Canada including uneven geographic distribution of research, underrepresentation of health research, and misalignment with northern priorities. Although there have been investments in research across the three territories, northern leadership is still underrepresented. This study identified a number of governance, policy, institutional, capacity, funding, and regulatory factors that limit research practice and ultimately the integration of research in policy. Funding continues to be the main limiting factor to the engagement of northerners in research, along with continuity in funding being an ongoing challenge for northern organizations. Multi-scalar, inclusive partnerships have the potential to broaden the impacts and benefits of northern research, despite the complexities of conducting partnered research. Partnership approaches that align research design with partner needs are best positioned to support the integration of research outcomes in policy development.

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Co-authorship statement

This thesis is presented using the integrated manuscript format. Three manuscript chapters (Chapter 4, 5, 6) are intended for co-authored journal articles. Chapter 4 has been published in *Sustainability*. Chapter 5 will be revised and submitted to *Arctic Science*. Chapter 6 will be revised and submitted to *Research Policy*.

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Gita Ljubicic was a co-author of 'Northern research policy contributions to Arctic sustainability' (Chapter 4), 'A comparative analysis of research trends across the Yukon, Northwest Territories, and Nunavut, 2005-2019' (Chapter 5), and 'The evolving role of northern partnerships in strengthening the research-policy interface' (Chapter 6). Aynslie Ogden was a co-author of 'Northern research policy contributions to Arctic sustainability' (Chapter 4). Jamal Shirley was a co-author of 'A comparative analysis of research trends across the Yukon, Northwest Territories, and Nunavut, 2005-2019' (Chapter 5).

The co-authors of each article have read and signed co-authorship statements outlining the role of Alison Perrin as principal investigator and main author on each publication. Alison designed and conducted the research, gathered and

analyzed all the data, and wrote and revised the manuscripts. The contributions of the co-authors entailed discussion, advice, assistance, and editorial contributions related to the research design, data collection, analysis, and writing of these manuscripts. Gita Ljubicic contributed to the papers in this thesis as supervisor of Alison Perrin and Aynslie Ogden as a member of Alison Perrin's academic committee during the doctoral program in geography. Jamal Shirley contributed as a project advisor and the Director of the Nunavut Research Institute as well as providing access to the NRI's licensing data for Nunavut. Statements are included in Appendix A.

Personal statement

I come to this research from a unique perspective, being deeply involved in northern research, as well as being a northern resident. Since moving to the Yukon in 2007, I have been conducting, coordinating, and communicating research in various roles. My perspectives on research in the North are framed by my worldview and life experiences as a non-Indigenous woman, a transplant to the Yukon, and an urban northerner based in and around Whitehorse.

My first experience in northern research began in 2007 during my Master of Arts when, having recently moved to the territory, I decided to focus my research on an outdoor education program in the Yukon. I gained further experience with the research-policy interface while working for the Government of Yukon (YG) (2010-2012) on the development of a strategy that incorporated multiple types of evidence and data. I brought that experience to the YukonU Research Centre (YRC) at Yukon College (now Yukon University) in 2012 where I continue to conduct partnered research and focus on bridging research and policy through science communication.

My interest in doing doctoral research on connecting northern research policy and practice was sparked by ongoing conversations I had been hearing amongst northern researchers, communities, and policy specialists over the years. They were identifying and discussing the disparities between the priorities consistently voiced by northerners and the priorities emphasized in research programs and funding initiatives. I wanted to dig deeper into these issues with the goal of going

beyond anecdotes to systematically investigate if and how northern research policies were influencing the practice and outcomes of research. I sought out the supervision of Dr. Gita Ljubicic (who has been working with Inuit in Nunavut since 2001) and Dr. Aynslie Ogden (a long-term Yukoner and then Senior Science Advisor for YG). This was an opportunity to do policy-relevant research in partnership with a northern government, while maintaining academic freedom through a formal research agreement that clearly laid out project boundaries and obligations (Pielke, 2007).

While the Yukon is my home and I have come to identify as a northerner, that term can have different meanings depending on the context. I acknowledge that there is a diversity of northern voices that may not resonate with my experiences. While being a northerner can provide a sense of legitimacy in doing this research, as a non-Indigenous and urban northerner, I am in many ways an outsider (not unlike many researchers when they come North). Yet, it was important throughout my project to recognize the dual roles that I hold as both a northerner and a northern researcher, and to be transparent with my affiliations and intentions when I engaged in conversations on this topic (Grimwood et al., 2012; Koster et al., 2012). I am neither objective nor independent from the topics I study, as I have direct experience with many of the issues I have been investigating, and I work closely within the network of northern researchers who contributed to my research (Dowling, 2016). I found that I resonated with many of the experiences of both the northern-based and southern-based researchers that I interviewed. I tried to reduce the bias that I bring to my interpretation of other

people's experiences by taking a reflexive approach and documenting my interpretations and comparing between interviews to seek patterns and commonalities.

Research relationships are often based on unequal power relationships (De Leeuw et al., 2012; Koster et al., 2012), but as I had a reciprocal relationship with many of my participants, the power dynamics were not always clear. In some cases, I interviewed people who had considerable influence over northern research including established professors. In other cases, I interviewed people who were independent researchers with less access to funding and other opportunities. Regardless of the participant's position, I aimed to listen with an open mind, to be considerate of people's time, and to provide value by giving them an opportunity to be honest in a confidential environment. It was challenging to balance the desire not to expose participants, or at times their organizations, to negative impacts while also taking a critical approach. In writing up my results, I refrained from including examples that were identifiable and could potentially have a negative impact on livelihoods or relationships. At the same time, my goal was to explore administrative and policy processes and so where appropriate, I used specific examples to challenge organizational programs and policies.

While the goal of completing a PhD was part of the impetus for this research, it has also been a product of my drive to contribute in positive ways to northern research. There is so much important work happening across the North, much of

it led by Indigenous northerners who have experienced the impacts of extractive research. I hope to support their work by bringing the lessons learned from this research forward to advocate for improved research policies and practice. On a personal note, this project has changed how I view my own research and responsibilities living within the land claims and self-government agreements of Yukon First Nations. I aim to use my position to develop partnerships and research that support reconciliation and benefit Yukon communities.

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List of acronyms

ACUNS - Association of Canadian Universities for Northern Studies
AICBR - Arctic Institute of Community-Based Research
AINA - Arctic Institute of North America
ARI - Aurora Research Institute
ASTIS - Arctic Science and Technology Information System
CAFN - Champagne and Aishihik First Nations
CARLI - Canadian Arctic Research Licensing Initiative
CCA - Council of Canadian Academies
CHARS - Canadian High Arctic Research Station
CIHR - Canadian Institutes of Health Research
CINUK - Canada-Inuit Nunangat-United Kingdom Arctic Research Programme
CIRNAC - Crown-Indigenous Relations and Northern Affairs Canada
CPC - Canadian Polar Commission
C/TFN - Carcross/Tagish First Nation
CYFN - Council of Yukon First Nations
ECCC - Environment & Climate Change Canada
ECR - Early-career researcher
GC - Government of Canada
GN - Government of Nunavut
GNWT - Government of Northwest Territories
GRRB - Gwich'in Renewable Resources Board
IASSA - International Arctic Social Sciences Association
ICC - Inuit Circumpolar Council
IPCC - International Panel on Climate Change
IPY - International Polar Year
IRA - Inuit Research Advisor
IRC - Inuvialuit Regional Corporation
ISR - Inuvialuit Settlement Region
ITK - Inuit Tapiriit Kanatami
KDFN - Kwanlin Dün First Nation
KFN - Kluane First Nation
LFN - Liard First Nation
LSC - Little Salmon Carmacks First Nation
NCP - Northern Contaminants Program
NEIHR - Network Environments for Indigenous Health Research
NG - Nunatsiavut Government
NGO - Non-governmental organization
NND - First Nation of Na-Cho Nyäk Dun
NRCan - Natural Resources Canada
NRI - Nunavut Research Institute
NSTP - Northern Scientific Training Program
NTI - Nunavut Tunngavik Inc.
NSERC - Natural Sciences and Engineering Research Council of Canada

NWT - Northwest Territories
OCAP® - First Nation Principles of Ownership, Control, Access, and Possession
PCSP - Polar Continental Shelf Program
PI - Principal investigator
POLAR - Polar Knowledge Canada
QHRC - Qaujigiartiit Health Research Centre
RRDC - Ross River Dena Council
SFN - Selkirk First Nation
SPOR - Strategy for Patient-Oriented Research
SSHRC - Social Sciences and Humanities Research Council of Canada
TGFN - Tetlit Gwich'in First Nation
TH - Tr'ondëk Hwëch'in
TKC - Ta'an Kwäch'än Council
TTC - Teslin Tlingit Council
VGFN - Vuntut Gwitchin First Nation
WRFN - White River First Nation
YG - Government of Yukon
YRC - YukonU Research Centre
YukonU - Yukon University (formerly Yukon College)

Chapter 1 - Introduction

"Past research in the NWT has often been driven by the scientific curiosity of national and international research and academic institutions. This research resulted in some high-quality investigations, but often overlooked or underrepresented many areas of importance to NWT residents … Research completed in the North must promote engaged decision-making based on best available evidence, including traditional knowledge, local and scientific knowledge." (Government of Northwest Territories [GNWT], 2017, p. i).

Historically northerners in Canada, in particular Indigenous northerners, have felt marginalized and excluded from research (Inuit Tapiriit Kanatami [ITK], 2018b; Shirley, 2021; Thomas & Shirley, 2005; Yukon Native Brotherhood, 1973). Much of the research in the past was led by academics and government agencies, and often northerners were not engaged in the design or conduct of research projects (Gearheard & Shirley, 2007; ITK, 2018b; Ogden & Thomas, 2013). There is an evolving conversation happening across the North about the state of northern research, including concerns around how research happens, what topics are addressed, who is involved, who makes decisions, and who benefits from research investments and outcomes (Audla & Smith, 2014; Brunet et al., 2016; Gearheard & Shirley, 2007; Ogden et al., 2016; Ogden & Thomas, 2013; Pedersen et al., 2020; Wong et al., 2020). Alongside this conversation, steps are being

taken towards achieving a vision of research in the North that is guided by northern-identified priorities and needs and, at least partially, fulfilled by northerners conducting research (Doering et al., 2022; Durkalec & Breton-Honeyman, 2022; Healey et al., 2018; Kassi et al., 2022; Pedersen et al., 2020; Tagalik et al., 2023).

Northern jurisdictions in Canada are large land masses with small populations experiencing complex socio-ecological challenges that require multi-disciplinary approaches. In this thesis, "the North" refers to the Yukon, Northwest Territories (NWT), Nunavut, Nunatsiavut and Nunavik (Section 1.3, Figure 1.1). Accordingly, the focus of "northern research" in this thesis refers to research that takes place in, or is about, these northern regions. Across northern jurisdictions there are different demographic, cultural, and governance contexts that affect how science-society relationships evolve (Korsmo & Graham, 2002). Despite a shift towards engaged science, northern organizations and governments continue to struggle with a lack of research that they recognize as relevant, designed and conducted in ways that are respectful of local interests, and builds local capacity (Brunet et al., 2016; ITK, 2018b; Ogden et al., 2016). Northerners have identified the need for improved consultation and engagement, with the goal of encouraging research that answers northern questions and provides local benefits (ITK, 2018b; Wong et al., 2020). Often faced with a lack of northern-specific information – for example, data on topics like environmental contaminants or the effectiveness of health interventions – northern governments and organizations have identified the need for relevant research,

accessible results, and engagement with northern communities as they increasingly focus on integrating evidence into decision-making (GNWT, 2017; Government of Yukon [YG], 2016; YG et al., 2016; ITK, 2018b). Although northern regions have often relied on the knowledge capital of southern institutions in relation to research, efforts are being made to build capacity amongst northern populations and institutions to coordinate and conduct research that responds to northern questions.

In recent years, northern governments, academic institutes, and organizations have become more actively engaged in research (Cirque Consulting & Communications, 2009; Korsmo & Graham, 2002), yet they continue to face challenges in asserting influence over research policies and the practice of northern research (Audla & Smith, 2014; Ogden & Thomas, 2013). Despite large investments in northern research, there is concern that the benefits – including financial, career, and knowledge outcomes – continue to accrue to southern institutions. This dynamic has started to change, particularly with recent increases in partnered and northern-led research, at least partly driven by resistance from northern communities, in particular Indigenous northerners, against extractive research that is driven by outside agendas and does not provide local benefits (Audla & Smith, 2014; ITK et al., 2007; Lafferty et al., 2022). There has been an increasing emphasis placed on Indigenous self-determination in research, as reflected in evolving research guidelines, licensing processes, and funding programs.

1.1 Rationale

With an ongoing shift towards improving northern research there is a need for a pan-northern assessment of the current state of research policies, trends and practice. Recent studies demonstrate the poor alignment of northern science priorities and funding with recognized societal needs, suggesting that northern research is not meeting regional priorities (e.g., limiting the geographic focus of funding to the high Arctic or the disciplinary focus to physical sciences) (Murray et al., 2012; Ogden et al., 2016). Northerners (i.e., northern governments and organizations, northern Indigenous Peoples, and non-Indigenous northern residents) want to see that research has tangible benefits for their region, whether it is for improving policy, supporting community well-being, building a local knowledge economy, or expanding capacity through education or infrastructure. Government, academic, non-profit, and consultant research have all made contributions to northern scholarship. There is considerable research being conducted by governments themselves or through consultants on behalf of governments or other organizations, usually to answer a specific question and under direct control of the contracting organization. While some of it is tracked through research licensing or public reports much of it is not publicly available. Although academic research is not necessarily linked directly to a policy or program in the same way, it can play an important role in informing decision-making. Yet, there is limited understanding of the tangible outcomes of academic research and how it is integrated into northern policy.

Northern researchers (i.e., researchers focusing on the geographic North whether southern- or northern-based) have called for an overarching northern science policy for Canada for more than two decades (England, 2010; England et al., 1998; Hik, 2009; Morris et al., 2013). While numerous organizations have developed policies and strategies to guide, regulate, and plan northern research, there is no single guiding document that reflects the broad range of northern contexts and priorities. There appear to be common threads shared across the North in relation to research expectations, but a systematic analysis of existing strategies and policy documents is required to illuminate those that are shared and those that are specific to regional contexts. This is the rationale for examining research policies to understand priorities and how they define and guide research in the North (Section 1.2, Chapter 4).

Several studies have shown that research efforts have intensified across the circumpolar North while also identifying gaps in our understanding of the current state of northern research (Aksnes et al., 2016; Ibarguchi et al., 2018; ITK, 2018b; Metcalfe et al., 2018). Most of our knowledge of trends in northern research comes from studies focused on research funding (Carr et al., 2013; Ibarguchi et al., 2018) or publications (Aksnes et al., 2016; Bancheva, 2019; Biresselioglu et al., 2020; Hua et al., 2012), often with a circumpolar focus and with limited information on the northern Canadian context. Understanding how research practice aligns with policy requires a baseline examination of the current state of research in northern Canada. This is the rationale for an analysis of territorial research licensing data, which is the most consistent data source available to

track northern research over time (Section 1.2, Chapter 5).

Northern experiences of research have been widely documented at local scales, but not brought together as a whole in a way that enables a broad, transformative vision for northern research (Brunet et al., 2016; ITK, 2018b; Ogden et al., 2016). While pressures exist to conform to western governance and science processes, there are also underlying responsibilities arising from colonial histories and modern treaties to improve the practice of research in relation to Indigenous northerners (Doering et al., 2022; ITK, 2018b; G. N. et al., 2020; Yukon Native Brotherhood, 1973). There have been discussions within the scientific literature about improving how northern research is conducted in terms of individual projects (Brunet et al., 2014b; Carter et al., 2019; Gearheard & Shirley, 2007; Tondu et al., 2014; K. J. Wilson et al., 2020). Yet there is a need to evaluate or understand how research is being done, how research decisions are made, how research results benefit the North, and if research is indeed informing decision-making. Research focused on understanding the effectiveness and relevance of research – including methods, communication, evaluation, and the corresponding external contexts of funding, policies, and partnerships – is essential to inform the evolving scientific enterprise (Ioannidis, 2018). This is the rationale for an examination of the experience and perspectives of northern and southern-based researchers, focused on understanding the degree to which they see their results aligning with partner needs and informing policy and decision-making (Section 1.2, Chapter 6).

There are numerous ways to evaluate the public value of science and research (European Commission, 2008; Ford et al., 2013; Head, 2015; McNie et al., 2016); however, there has been a dearth of studies evaluating the impacts and benefits of research in northern Canada. The academic literature on northern research focuses mainly on ethical research practices, participatory modes of research, or research relationships (Brunet, 2014; Brunet et al., 2016; Ford et al., 2017; Gearheard & Shirley, 2007; Grimwood et al., 2012; Wolfe et al., 2011), as opposed to exploring the effectiveness of research in terms of informing policy or being applied in northern programs (Ogden et al., 2016). Much of this literature is based on individual or team experiences with their own research projects, with only a few examples of reviews that systematically assess literature representing research across the North (Jones et al., 2018; Kouril et al., 2016; Wilson et al., 2024) or studies that examine participatory research in depth (Brunet, 2014). There are gaps within our understanding of the relationships between research policy and the current state of northern research, like how funding policies enable or create obstacles to northern leadership of research projects, highlighting opportunities to further explore experiences of northern research through practitioner experiences.

Northern jurisdictions are asserting their interest in leading the research agenda, and northern Indigenous peoples are exercising self-determination in research (YG et al., 2016; ITK, 2018b; Obed, 2018; Ogden et al., 2016; Snook et al., 2018). In undertaking an examination of northern research, I aim to support these efforts and diverse calls by northern Indigenous peoples for self-determination in

research by exploring how research decisions are made. Currently, despite expressing the need for improved research in the North, there is mainly anecdotal evidence of recent efforts. This thesis aims to fill the gap by providing insights into current issues and future opportunities that can inform and strengthen future research programs and policies. With this research I seek to investigate northern community concerns that their research contributions are not achieving desired results or affecting decision-making (Brunet et al., 2016; Gearheard & Shirley, 2007; ITK, 2018b; Pigford et al., 2017). The goal of this study is to examine the practice of research in the North through the experiences of northern researchers in the context of evolving research policies, thereby increasing our understanding of the policies and processes underlying northern research. Through this examination of research practice and policy, I aim to identify factors that support and limit northern regions participating in – and benefitting from – the research agenda and provide insight into aligning research programs with northern science policy objectives (Lavery, 2018; Lepori, 2011; McNie et al., 2016).

1.2 Research questions

This thesis explores the interrelation of research policies and practice to understand how current research aligns with northern priorities, and how the practice of research supports meaningful northern engagement and leadership in research as well as beneficial outcomes for northern governments and organizations, both Indigenous and non-Indigenous. My research aims to provide

insight into the policies that guide how northern research is done and their influence on research outcomes, providing critical information for strengthening the science-policy interface. Fundamentally, I seek to answer the question: *How do the policies that guide research in Canada's North support or limit research practices that align with northern priorities and knowledge needs?* To answer this overarching question, I identified three sub-questions that form the basis of the three papers in this integrated thesis:

1. How do the principles, priorities, and guidelines outlined in federal, territorial, regional, and local policies define and guide research in the Canadian North?
2. What is the current state of research across the three northern territories and how has it changed over time?
3. How do researchers perceive the alignment of their research with the needs and expectations of northern partners? How do different approaches to partnership influence the integration and uptake of research in policy and decision-making?

1.3 The Canadian North

Places, and our relationships with them, are informed by history, culture, governance, and language. Intersections between the landscape, environmental issues, social issues, and social and personal life inform our understanding of place (Tuck & McKenzie, 2014). While this research provides insights beyond the geographical scope of the Canadian North, it is ultimately a study that is rooted

and based in northern Canadian history, governance, and culture.

How we define “the North” and “the Arctic” are topics that have been, and continue to be, discussed at length. The North can be bounded in many different ways including by latitude, by political or cultural boundaries, by ecozone features like treeline or temperature, or other boundaries (Arctic Monitoring and Assessment Programme, 2015; Bone, 2016; ITK, 2018b). How northern regions are defined within any specific initiative ultimately has exclusionary and inclusionary impacts, yet it is usually logistically necessary to mark a boundary while scoping a project. My decision to use the word ‘northern’ and ‘Canadian North’ throughout this thesis – as opposed to ‘Arctic’ – is deliberate, to be inclusive of the sub-Arctic areas within these regions. Nations are mapped and boundaries drawn based on subjective representations of the world and political power dynamics (Dodge, 2015; Elwood, 2010). There is no consistent way of defining “the Canadian North”. In identifying a regional focus for this project, I considered how colonial boundaries interact with First Nation, Métis, and Inuit traditional territories, land claims, and political identities, as well as practicalities in relation to the jurisdictions typically included in northern science policies.

The Canadian North is sometimes delineated as the three territories, Yukon, Northwest Territories, and Nunavut, which are administered under a different structure from the provinces (Pigford et al., 2017). The North often also includes the two Inuit land claim regions of Nunavik (northern Québec) and Nunatsiavut (northern Labrador) (Ford et al., 2013; ITK, 2018b). The rest of the northern

provincial areas are also sometimes included in discussions of *the North*, or in policies or boundaries outlining *the North* (Arctic Monitoring and Assessment Programme, 2015). As an example, the Government of Canada (GC) included the Churchill area of Manitoba in the geographic scope of the Arctic Policy Framework process (GC, 2017) and included the northern part of the provinces within the eligible research area for the Northern Scientific Training Program (NSTP) which is the geographic area with permafrost and ground ice (GC, 2019b).

1.3.1 Geographic scope

This research focuses on "the North" most consistently used in science and research policy in Canada, which includes: the three northern territories (the Yukon, NWT, and Nunavut), and the two Inuit land claim regions that fall within the provincial north of Québec (Nunavik) and northern Labrador (Nunatsiavut) (Figure 1.1) (Canada Foundation for Innovation, 2024; GC, 2020a; Polar Knowledge Canada [POLAR], 2023). This definition encompasses all of Inuit Nunangat (Inuit homelands in Canada), including Inuit land claim regions of: Nunatsiavut, Nunavik, Nunavut, and the Inuvialuit Settlement Region (ISR) (part of northern NWT and Yukon) (Figure 1.2). This geographic scope excludes other areas of the provincial North, including some of the overlapping traditional territories of northern First Nations and Métis, because they are typically not included in northern programs and policies. However, as they share many characteristics and experience similar challenges, some of my findings may be transferable if accounting for appropriate cultural and political context.

All five regions are large in land area but have low population densities, often with a majority clustered in the administrative capital and the rest of the population spread through a number of smaller communities (Bone, 2016). In Nunavut, Nunavik, and Nunatsiavut, communities are mostly coastal and serviced by air and ship. In Yukon and the NWT there is a mix of access including year-round road, winter road, boat, and air.

Figure 1.1. Map of northern Canada showing five regions included in study



Note: Map created by Stephanie Saal and Alison Perrin.

Sources: Basemap layers (Government of Canada, 2021a, 2021b).

Figure 1.2. Map of Inuit Nunangat



Source. (ITK, 2019)

Although the five regions of focus have distinct differences in terms of governance (see Chapter 2), cultures, and landscapes, they also experience similar histories and ongoing challenges. For more than a century Indigenous northerners have suffered the erosion of their rights and the impacts of colonialism, exploration, and resource development, including: the dispossession of their lands, relocation to forced permanent settlements, the imposition of western governance and economic systems and policies, the removal of children to attend residential schools, physical and sexual abuse, introduced diseases, and the slaughtering of sled dogs (Abele, 2009; Jeffrey et al., 2015; Petrov, 2018; Rudolph, 2017; Special Senate Committee on the Arctic, 2019). This has

contributed to the disruption of traditional practices and languages, and intergenerational trauma (Larsen & Fondahl, 2014; Truth and Reconciliation Commission, 2015).

Science and research have played a role in colonization, as a driver of exploration and resource development, as well as part of the dominant knowledge and educational system (Paci et al., 2008). Scientific methods and results have also played a key role in establishing hunting and fishing regulations and the development of parks and wildlife preserves that displaced Indigenous northerners and affected their access to food and other resources in the name of conservation (Finegan, 2018; Green, 2021; King et al., 2023; Sandlos, 2014). Despite this recent history, Indigenous northerners continue to practice and revitalize traditional governance, law, cultural activities, Indigenous science, stewardship of land and wildlife, languages, and arts, often sharing their cultures with other northern and southern audiences through education, research, and cultural and public events (McGregor et al., 2010; Tagalik et al., 2023).

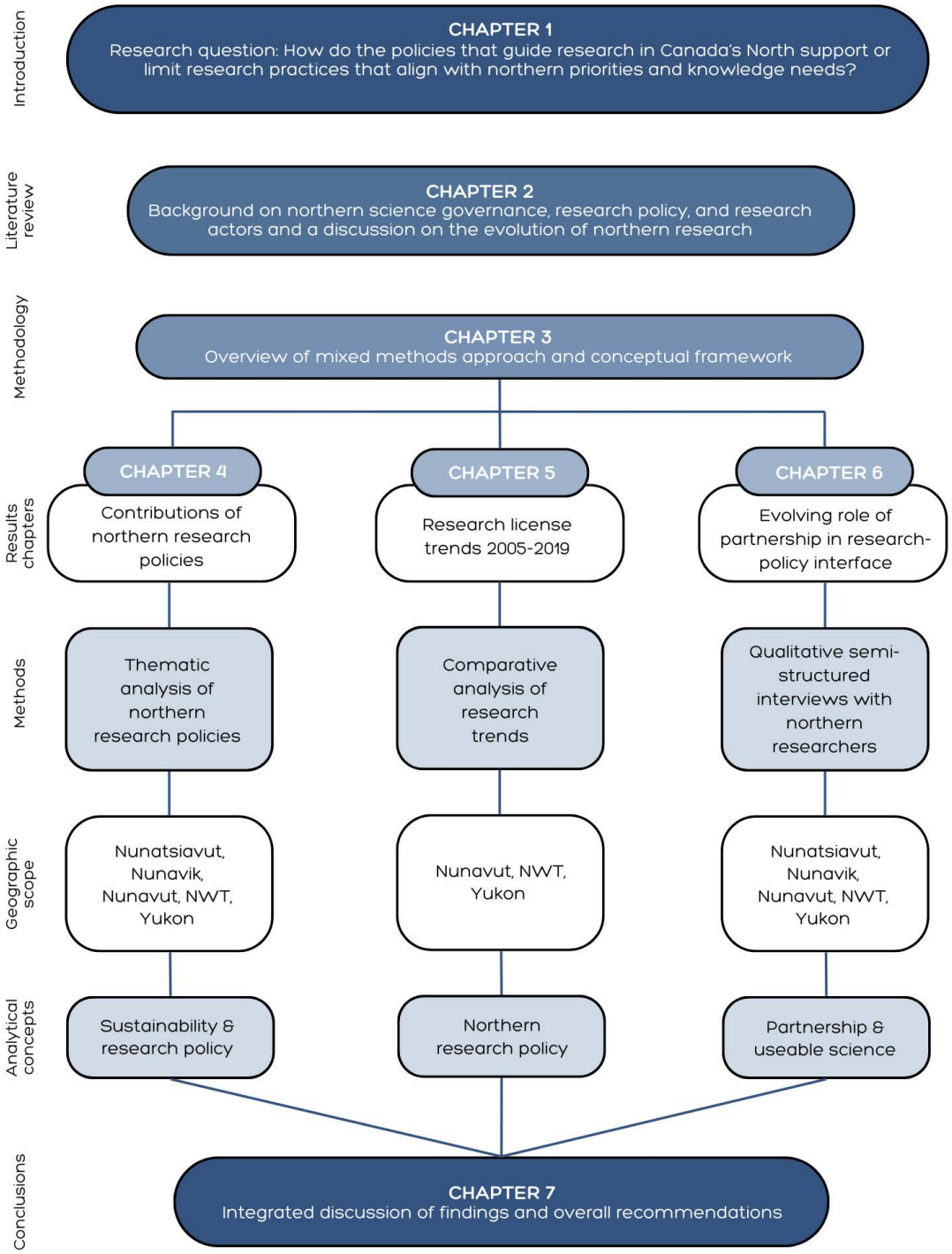
1.4 Dissertation structure

This dissertation is structured as an integrated thesis with seven chapters and supporting material. The first part includes three opening chapters that provide background on the research project (Figure 1.3). Chapter 1 introduces the research topic, rationale, research goal and questions. Chapter 2 is a literature review that establishes the geographical, cultural, and governance context for this research. It presents a review of the literature related to the northern

research context including some of the key issues and concepts that are foundational to this study. Chapter 3 outlines the overall research design of this study including the conceptual foundation, contextualizing this research within the literature on science policy and Indigenous self-determination. It provides an overview of the methodological approach and details on data collection and analysis that are not included in the manuscript-based chapters. A detailed description of the three different methods is included in each of the manuscript chapters.

The second part presents three manuscripts that address the three sub-questions outlined in Section 1.2. Chapters 4 - 6 are drawn directly from three primary research manuscripts that have been prepared for – or already published in – peer-reviewed academic journals. Some of the material from each manuscript has been removed and integrated into Chapters 1-3 and 7 to avoid repetition. As chapters 4-6 are prepared for publication with multiple authors, they are written with the plural voice, while all other chapters are written in the voice of the primary author.

Figure 1.3. Overview of dissertation structure



Chapter 4 presents the manuscript *Northern research policy contributions to Arctic sustainability* published in the journal *Sustainability* (2021). This chapter addresses the first sub-question and examines research policy, strategy, guidance, and program documents produced by northern governments and Indigenous organizations, as well as national and provincial organizations and government departments focused on the North. This was achieved by undertaking a thematic analysis of a broad range of northern science policy documents and research guidance documents, along with academic literature on northern research, to compare and contrast the research policy contexts and priorities across the five regions. It provides insight into how northern governments and organizations expect researchers to engage in and conduct research, how research programs can align with northern science policy objectives, and how academic research can support policy and decision-making related to sustainability.

Chapter 5 presents the manuscript *A critical analysis of research trends across the Yukon, Northwest Territories, and Nunavut, 2005-2019,* which has been prepared for publication in the journal *Arctic Science*. This chapter addresses the second sub-question, focusing on the geographic intensity of different types of research across the three territories, identifying areas or communities that are inundated with research (or ignored) and who is involved in research and the institutions they are connected with. This was achieved by conducting a critical analysis of the 2005-2019 research license data from the Northwest Territories, Nunavut, and the Yukon. Interpretive coding and descriptive analysis were used

to identify geographic, topical, and leadership trends in research. Chapter 6 presents the manuscript *The evolving role of northern partnerships in strengthening the research-policy interface*, which has been prepared for submission to the journal Research Policy. It addresses the third sub-question, with a focus on research partnerships, and is conceptualized within the literature on partnership and collaborative research frameworks. This was achieved through interviews with a diverse range of experienced southern-based academic and northern-based community and academic researchers. Qualitative coding was used to interpret practitioner experiences, and the results were analyzed within the context of evolving research policies.

Finally, Chapter 7 comprises a summary and integrated analysis of the research results and outcomes from Chapters 4-6, resulting in reflections and recommendations on future areas of research. This chapter identifies how research funding and institutional policies are intertwined with the outcomes of support partnerships that bring resources and research capacity northern organizations and contribute to local benefits. Through enhanced partnerships with northern organizations, northern researchers can engage in research that directly informs local decision-making.

Chapter 2 - Background

2.1 Governance in the Canadian North

Governance is more than just the institutions that govern, it encompasses the processes, activities, rules, protocols, and different actors that are involved in administration, decision-making, and policy (Felt et al., 2012; Fukuyama, 2013). The Canadian North is a unique region, where Indigenous governance, modern treaties, and territorial/provincial/federal dynamics have shaped a complex governance landscape (Table 2.1). Since the late-nineteenth to mid-twentieth century, colonial expansion, resource development, and exploration have been major sources of change with drastic impacts on northern Indigenous peoples and their ways of life. However, since the 1960s and 70s, Indigenous land claim and self-government agreements have been driving evolution in modern governance (Bravo, 2009; Higginbotham & Spence, 2016; Larsen & Fondahl, 2014; Petrov, 2018; Simon, 2009; Wilson, 2017). Within northern Canada there are Inuit, First Nation and Métis land claim and self-government agreements. There are different approaches in the five northern regions included in the geographic scope of this research, providing different degrees of autonomy from provincial/territorial and federal authority (White, 2021; G. N. Wilson et al., 2020). Across the North there are Indigenous Peoples at various stages of negotiating land claim and/or self-government agreements. Indigenous governance is enacted in diverse ways across the North, through the settlement of land claim processes including Indigenous governments, corporations, co-management boards, and institutes of public governance. Complex intergovernmental

relationships continue to exist between Indigenous governments and the territorial/provincial and federal systems, limiting Indigenous autonomy (G. N. Wilson et al., 2020).

Table 2.1. Governance and population information on five northern regions

Region	**Population**	**Governance**	**Communities**
Northwest Territories	44,520 50.7% Indigenous	Territorial public government (GNWT) First Nation, Inuit & Métis mix of land-claim and self-government as well as unsettled land claims, including transboundary claims	Capital city: Yellowknife (pop. 20,834) 32 communities (pop. 94 to 3,734)
Nunatsiavut	2,560 89% Indigenous	Inuit land-claim region within province of Newfoundland & Labrador Inuit self-governance by Nunatsiavut Government	5 communities (pop. 195 to 1,170)
Nunavik	13,180 90% Indigenous	Inuit land-claim region within the province of Québec Inuit governance by Makivvik	14 communities (pop. 210 to 2,755)
Nunavut	37,082 85.9% Indigenous 84.2% Inuit	Territorial public government (Nunavut Territory and Government of Nunavut created from Inuit land claim process) Inuit land claim representation and governance by Nunavut Tunngavik Inc. (NTI) and three regional Inuit Associations (Qikiqtani, Kivalliq, and Kitikmeot) Unsettled transboundary First Nation land claims	Capital city: Iqaluit (pop. 7,590) 24 communities (pop. 167 to 2,772)
Yukon	38,455 23.3% Indigenous	Territorial public government (YG) 14 Yukon First Nations, 11 with settled land claim and self-government agreements, as well as transboundary First Nations & Inuvialuit with a mix of settled and unsettled land claims	Capital city: Whitehorse (pop. 29,758) 15 communities (pop. 55 to 2,226)

Note: See Figure 1.1 for map of five regions.

Sources: NWT (NWT Bureau of Statistics, 2018; Prince of Wales Northern Heritage Centre, 2018; Statistics Canada, 2016); Nunatsiavut (Government of Newfoundland & Labrador, 2018; ITK, 2018a; NG, 2020c; Rodon & Grey, 2009); Nunavik (Makivvik, 2019b; Nunivaat, 2018; Wilson, 2017) (Makivvik, 2019b; Nunivaat, 2018; Wilson, 2017); Nunavut (GN, 2008, 2021; Statistics Canada, 2016); and Yukon (YG, 2019; Statistics Canada, 2016; Yukon Bureau of Statistics, 2023).

The three territories (Yukon, the Northwest Territories, and Nunavut) operate like provinces with elected governments overseeing territorial programs and services, although some control lies with the federal government. Federal control of lands and resources was devolved to YG in 2003, the Government of the Northwest Territories in 2014, and to Nunavut in 2024 (Alcantara et al., 2012; GC, 2013; GC et al., 2024). Even with devolution, the federal government still plays a key role in northern policy and programming in the territories, including through science, health, and economic development programs, Indigenous services, and overarching policies like the recent *Arctic Policy Framework* or the previous government's *Northern Strategy* (GC, 2009, 2017, 2019a).

2.2 Governance of research

Governance structures and responsibilities over northern research are complex, spread amongst territorial and provincial governments, Inuit, First Nations, and Métis organizations and governments, municipalities, federal agencies, academic institutes, northern land-claim and co-management organizations, non-governmental organizations (NGOs), and the private sector. All these different actors can play roles in setting policy, providing guidance on how research should be done, distributing funding, and/or conducting research (YG et al., 2016; Hik, 2009; ITK, 2018b; Ogden et al., 2016; Pigford et al., 2017). Northern organizations produce policy documents that communicate their needs, priorities, and expectations to those engaged in research. Many northern governments and land-claim organizations are communicating research

priorities, leading research, and administering research funding. Indigenous organizations are also involved in research in multiple ways, including leading their own research, partnering with researchers, using research for evidence-based decision-making, and developing research or Indigenous knowledge (IK) protocols and policies.

The three territories, as well as Nunatsiavut, have research licensing or permitting processes that are designed to ensure that researchers consult with relevant rights- and stake-holders, and that research does not cause environmental or societal harm (Gearheard & Shirley, 2007; GNWT, 2024a; NRI, 2021; YG, 2013). These licensing and permitting processes also provide an opportunity for northern governments, communities, and researchers to negotiate relationships and influence decisions around research (ITK, 2018b; ITK & NRI 2002; Van Den Scott, 2012). Each of the five northern regions has a unique research landscape involving different actors, policies, and initiatives, while federal and national-scale initiatives affect all of the five regions.

Across all five regions there are northern academic and research institutes that play a role in advancing northern science through their growing capacity to conduct and direct research (Korsmo & Graham, 2002; Ogden et al., 2016). Along with the territorial and regional research centres, there are research stations across the North operated by universities, federal departments, and other organizations that engage in conducting research or hosting visiting researchers. The Canadian Network of Northern Research Operators represents membership

of 31 operators and 10 associate members that range from community-based organizations to government departments and university-run research stations (e.g., Kluane Lake Research Station, Polar Environment Atmospheric Research Laboratory, Centre D'études Nordiques) (Ile Royale Enterprises Ltd., 2016). Across the North there are NGOs, often community-based, that are involved in conducting research (e.g., Ittaq Heritage and Research Centre, Institute for Circumpolar Health Research, and the recently closed Arctic Institute of Community-Based Research [AICBR]). There are also national and international NGOs that maintain northern research offices, including the Wildlife Conservation Society and the World Wildlife Fund. There are research networks that are currently, or formerly, active in northern research and greatly influence the research context. ArcticNet, originally a Network Centre of Excellence, is focused on Arctic research in Canada and administers funding directly supporting northern and Inuit-led research. Braiding Knowledges Canada (formerly the Canadian Mountain Network) is another government-funded research network that is active in the North and offers several funding streams based on different modes of research, including Indigenous-led research. The Marine Environmental Observation, Prediction and Response Network (MEOPAR) is funded through the Strategic Science Fund and is active across the Canadian Arctic. There are also international networks like those hosted by UArctic or the International Network for Terrestrial Research and Monitoring in the Arctic.

2.3 Regional context

2.3.1 Yukon

In the Yukon there are fourteen First Nations, eleven of which have settled land claims and finalized self-government agreements (Table 2.1) (Council of Yukon First Nations [CYFN], 2019). There are also several transboundary Indigenous groups from NWT and British Columbia with traditional territories and land claims in the Yukon. Yukon First Nations, through the Council for Yukon Indians (later CYFN), negotiated land claims and self-government agreements together. This resulted in the *Umbrella Final Agreement*, signed in 1993, which provided a framework for individual nations to negotiate final agreements (CYFN, 2019; GC et al., 1993; Yukon Native Brotherhood, 1973).

YG released their *Science Strategy* in 2016 and the *Yukon Science Policy* in 1986, both of which set out goals for developing research capacity in the Yukon (YG, 1986, 2016). The *Science Strategy* and online *Compendium of Research and Monitoring* are products of YG's Office of the Science Advisor, housed in the Executive Council Office (YG, 2016). The *Yukon Scientist and Explorer's Act* outlines requirements for research licenses, which are administered by the YG Department of Tourism and Culture (Scientists and Explorers Act, RSY 2002, c.200, 2002). The Act covers the physical and social sciences, with the exception of archaeological research which goes through a separate permitting process. The Act applies to anyone "who enters the Yukon to undertake scientific research" (YG, 2013). Researchers based in the Yukon are not required to apply

for a license. There are also several other permitting or approval processes that may be required in addition to a research license for research with wildlife, in parks or protected areas, or on Yukon First Nations' settlement lands. CYFN is involved in coordinating research and data governance in collaboration with Yukon First Nations. The Yukon is home to Yukon University (YukonU), which transformed from Yukon College in 2020, and hosts campuses in most Yukon communities. The YRC, based in Whitehorse, is focused on conducting research in the Yukon and across the North. There are also southern Canadian universities with representation in the Yukon including University of Alberta North (a YukonU partner), and University of Calgary's Arctic Institute of North America (AINA) which runs the Kluane Lake Research Station.

2.3.2 Northwest Territories

Negotiation of Indigenous land claims and self-government agreements in NWT began in 1975 followed by development of the guiding document *Comprehensive Land Claims Policy* in 1986 (Table 2.1) (GNWT, 2024a). While many communities or regions have finalized Indigenous-Crown negotiations, others are ongoing. Some of the already finalized Indigenous rights agreements in NWT are land claim agreements, addressing land and resources (e.g., Inuvialuit Final Agreement signed 1984), while others include self-government provisions (e.g., Tłı̨chǫ Government signed 2003). The Dene Nation is a coordinating organization that brings together First Nation governments in NWT while the Inuvialuit Regional Corporation (IRC) represents Inuvialuit.

Several Indigenous governments and land-claim organizations in NWT have research or IK protocols and policies, and some have research offices within their governments like the Dedats'eetsaa: Tłı̨chǫ Research & Training Institute (Dedats'eetsaa: Tłı̨chǫ Research & Training Institute, n.d.). The Government of the Northwest Territories (GNWT) released a knowledge agenda in 2017 and a related action plan (GNWT, 2017, 2019) which builds off an earlier science strategy with the same broad research priorities (GNWT, 2009). The GNWT identifies four roles for itself within research: practitioner, consumer, regulator, and educator. While the knowledge agenda identifies some priority areas for research, their recently published action plan outlines processes for supporting the development of research in the territory, conducting research within government, and improving research communication (GNWT, 2019). GNWT has a research partnership with Wilfrid Laurier University, which has offices in Yellowknife and an active research program in the territory.

Aurora College is the main post-secondary institution in NWT, with campuses in several communities. The Aurora Research Institute (ARI) is part of Aurora College and hosts research centres in Inuvik, Fort Smith, and Yellowknife. They operate a Research Ethics Board (REB) and any researcher applying to conduct research with humans in NWT that is not going through a research ethics approval process with their home institution is required to go through the REB process at ARI. The ARI was mandated by the NWT *Scientists Act* to license and coordinate research in the NWT until research licensing was moved to the GNWT in 2024 (GNWT, 2024b; *Scientists Act*, 2014). The Dedats'eetsaa: Tłı̨chǫ Research

& Training Institute hosts Hotìì Ts'eeda, a Strategy for Patient-Oriented Research (SPOR) Support Unit funded by the Canadian Institutes for Health Research (CIHR) and governed by NWT Indigenous governments.

2.3.3 Nunavut

Nunavut is the only example within Canada of a territory created out of a land claim process, giving it different political and legal powers than other regions with Indigenous governance (Table 2.1) (G. N. Wilson et al., 2020). Nunavut's government is a public government representing the region and all residents, while beneficiary organizations represent Inuit specifically. Nunavut became a territory as part of a land claim process and Inuit rights are recognized in the public government's mandate and through Inuit institutions of public governance (Abele, 2009; NTI, 2004). The Nunavut land claim agreement was signed in 1993 arising from negotiations that began with the Inuit Tapirisat of Canada bringing the *Inuit Land Use and Occupancy Study* to the Government of Canada in 1973 (NTI & GC, 1993). The Government of Nunavut (GN) represents all Nunavummiut (residents of Nunavut), while Nunavut Tunngavik Incorporated (NTI) represents Inuit beneficiaries and is responsible for land claim implementation and managing Inuit-owned lands. A number of Inuit land-claim organizations were also created to represent Inuit Nunavummiut in co-managing lands, waters, wildlife, planning, impact review, benefits agreements, and resource revenue sharing through joint management boards (NTI & GC, 1993).

Nunavut's *Scientists Act* requires that researchers from all disciplines obtain a scientific license unless they require an archaeological permit issued under the *Nunavut Act (Consolidation of Scientists Act,* 2011*)*. In addition to the research license, there are also separate permitting processes depending on the type of research (e.g., wildlife, water, parks). When conducting research on Inuit-owned lands, a separate approval process is required through the relevant Regional Inuit Associations in addition to the research license (NTI, 2004). The Nunavut Research Institute (NRI) administers scientific research licenses in Nunavut for which there are three different applications based on discipline. The NRI operates several research stations, supports visiting researchers, and conducts research in the region. The NRI is part of Nunavut Arctic College, Nunavut's post-secondary institution that has campuses across the territory and has recently partnered with Memorial University to provide degree programs. There are a number of Nunavut-based NGOs that are actively conducting research, as well as providing guidance on research ethics and methodologies including the Kitikmeot Heritage Society (Cambridge Bay), Ittaq Heritage & Research Centre (Clyde River), Aqquimavvik Society (Arviat), Ikaarvik (Pond Inlet), and the Qaujigiartiit Health Research Centre (QHRC) (Iqaluit).

2.3.4 Nunatsiavut

Nunatsiavut is an Inuit land claim and self-governing region within Newfoundland and Labrador (Table 2.1). The Inuit of northern Labrador negotiated the *Labrador Inuit Land Claim Agreement* and self-government at the same time, resulting in the establishment of the Nunatsiavut Government (NG) in 2005 (NG, 2020d;

Rodon & Grey, 2009). While the NG represents the region within Newfoundland & Labrador and provides local governance for all residents in Nunatsiavut, it is also an Inuit regional government managing land claim responsibilities on behalf of beneficiaries (Rodon & Grey, 2009; G. N. Wilson et al., 2020). The NG also represents Labrador Inuit beneficiaries living outside of Nunatsiavut, almost twice the number living in Nunatsiavut (Rodon & Grey, 2009; White, 2021). Unlike Nunavut and Nunavik where governance is split between the public government and a land claim organization, the NG's self-government model unifies land-claim and local governance into one organization (Felt et al., 2012; G. N. Wilson et al., 2020).

In Nunatsiavut, the NG conducts and regulates research through an advisory committee that reviews all proposed projects (NG, 2020b, 2020a). The NG operates the Nunatsiavut Research Centre in Nain which hosts field and lab-based research conducted by NG staff, collaborators, and visiting researchers (NG, 2020b). Memorial University has a campus in Happy Valley-Goose Bay which includes the Labrador Institute and the School of Arctic and Subarctic Studies.

2.3.5 Nunavik

Nunavik is an Inuit land-claim area in the northern part of Québec with a diversified governance structure including Kativik Regional Government – a public government representing the region and overseen by the Government of Québec – and Makivvik representing Inuit beneficiaries (Table 2.1) (Rodon &

Grey, 2009; G. N. Wilson et al., 2020). Nunavik was the first of the four Inuit regions to sign a modern land claim treaty as part of the James Bay and Northern Québec Agreement in 1975, followed by an agreement in principle in 2007 to negotiate self-government, and the Nunavik Inuit Land Claim Agreement in 2008 which provides Nunavik Inuit rights to the offshore region (Rodon & Grey, 2009; Wilson, 2017). Nunavik has a public government system that represents all citizens, the Kativik Regional Government, which provides public services to the communities in the region along with the Kativik School Board and the Nunavik Regional Board of Health and Social Services which manage provincially mandated programs and services (Rodon & Grey, 2009; Wilson & Alcantara, 2012). Makivvik is distinct from the regional government and is an Inuit organization that represents beneficiaries (Wilson & Alcantara, 2012), with a mandate that "ranges from owning large profitable business enterprises and generating jobs; to social economic development, improved housing conditions, to protection of the Inuit language and culture and the natural environment" (Makivvik, 2021). Self-government has been discussed in Nunavik since the 1960s and an agreement in principle for the creation of a Nunavik government was signed in 2007 (Rodon & Grey, 2009). The final agreement was ultimately rejected by Nunavik Inuit by referendum in 2011 for a variety of reasons including concern that it did not represent an Inuit self-governance model or protect Inuit culture (Hervé, 2017; G. N. Wilson et al., 2020).

Nunavik does not have a research licensing process, but Makivvik is currently leading the development of a regulatory system for research in the region.

Attaniuvik is being developed to manage and oversee research in the region with a governance structure bringing together key branches of both the regional government, Makivvik, and co-management boards. Makivvik operates the Nunavik Research Centre based in Kuujjuaq which collaborates with northern organizations and southern academic institutions to respond to research questions that directly link to community priorities, and to support policy development by Makivvik (Makivvik, 2019a). Université Laval also has two research stations in the region as part of its Centre d'Études Nordiques.

2.3.6 National science and research governance

Even with devolution, the federal government still plays a key role in northern policy and programming including through science, health, Indigenous services, and economic development. Science, resource development, and sovereignty issues have preoccupied federal government interest in the North for many years, leading to a range of political strategies and initiatives (Abele, 2009; Stuhl, 2013).

The federal government's recent northern strategy, an *Arctic and Northern Policy Framework* (GC, 2017, 2019a), replaces the previous policy documents, *Canada's Northern Strategy* and the *Statement on Canada's Arctic Foreign Policy* (GC, 2009). This latest policy provides overarching federal direction on priorities, activities, and investments in the Arctic with a vision to 2030 (GC, 2017). POLAR, established to replace the Canadian Polar Commission (CPC) in 2015, is the branch that represents and coordinates the Government of Canada's Arctic

science interests. POLAR operates the Canadian High Arctic Research Station (CHARS) in Cambridge Bay, Nunavut, provides research project funding, and administers support for student research through the NSTP (GC, 2020b). Natural Resources Canada's (NRCan) Polar Continental Shelf Program (PCSP) has supported northern research since 1958 through a research station in Resolute and by providing logistical support to field researchers (GC, 2023). NRCan has a number of northern science programs, some delivered in partnership with territorial governments. Other key federal government departments involved in administering, conducting, or overseeing Arctic science include Environment and Climate Change Canada (ECCC), Fisheries and Oceans Canada (DFO), Health Canada, and the Canadian Space Agency.

ITK is the national political organization that represents and advocates for the rights and interests of Canadian Inuit nationally (ITK, 2020). Inuit Nunangat comprises the four Inuit land claim regions of: Nunavut, Nunavik, Nunatsiavut, and the ISR (Figure 1.2, and see Section 2.1). ITK's mandate focuses on advocacy, research, outreach, and policy guidance on issues affecting Inuit, including climate change, education, and research, with a particular focus on Inuit relations with the federal government (ITK, 2020). ITK governance includes representation from the four Inuit land claim organizations: IRC, NTI, Makivvik, and the NG as well as the Inuit Circumpolar Council (ICC) Canada, Pauktuutit Inuit Women of Canada, and the National Inuit Youth Council.

ITK is engaged in science policy by advocating for better research practices, relationships, and outcomes within Inuit Nunangat. Research is one of ITK's current priority areas, and they have developed the National Inuit Strategy on Research (NISR) (ITK, 2018b) among other research guidance documents (Higginbotham & Spence, 2016; ITK, 2016a, 2018c; ITK et al., 2007; Nickels & Knotsch, 2011). Self-determination in research is the backbone of the NISR, and the four Inuit regions have been directly involved in its development and implementation. Through their own research programs, ITK supports research in key areas including health, education, and climate change, and are actively pursuing the development of an Inuit university in Canada. This includes co-leading Qanuippitaa? National Inuit Health Survey with the four land claim organizations and developing a federally funded Inuit Research Network. ITK has also played an important role in ArcticNet's governance structure. The President of ITK has a position on the Board of Directors and ITK is also represented on the Research Management Committee along with representatives from the four Inuit land claim organizations. Through the work of ITK and the four Inuit land claim organizations with ArcticNet and the GC's Northern Contaminants Program (NCP), Regional Inuit Research Advisors (IRA) are in each of the four regions as a resource for developing local research and connecting visiting researchers and communities.

The Assembly of First Nations (AFN) represents First Nations in Canada nationally. It is involved in political advocacy but plays a coordinating role for First Nations on a number of issues. The First Nations Information Governance

Centre (FNIGC) is an organization that promotes data governance in relation to First Nations, specifically the Principles of Ownership Control Access and Possession (OCAP®). Although no longer operating, the National Aboriginal Health Organization (NAHO) also produced several documents promoting data governance for Indigenous Canadians. The NAHO had First Nations (FNC-NAHO), Métis (MC-NAHO), and Inuit Centres (IC-NAHO) that addressed issues particular to each Indigenous group.

2.4 Evolution of northern research

Governance of science and research in the North is evolving along with land claims, modern treaties, and the devolution of federal decision-making to territorial governments. Northern organizations have become more actively engaged in conducting and partnering in research (Cirque Consulting & Communications, 2009; Korsmo & Graham, 2002).

Research has been part of the colonial legacy in the North and the relationship between Indigenous northerners and research has been fraught with issues (ITK, 2018b; McGregor et al., 2010; Yukon Native Brotherhood, 1973). Historically, northerners felt excluded from research decision-making in their region. In particular, Indigenous northerners did not trust researchers due to a long history of poor or no communication, misunderstanding, and extractive research (Castleden et al., 2012; Gearheard & Shirley, 2007; McGregor et al., 2010; Ogden et al., 2016). This distrust in research is directly related to the loss of control over decision-making, land, and other aspects of their lives experienced by Indigenous

northerners (ITK, 2018b; Yukon Native Brotherhood, 1973). Poor communication and uneven relationships have existed between researchers and communities, which contribute to ongoing distrust in the contemporary discussion of research and colonialism in the North (Castleden et al., 2012; Ford et al., 2017; Gearheard & Shirley, 2007; ITK, 2018b; Martello, 2004; NTI, 2013; Tondu et al., 2014). Some of the challenges with research include research data and results not being shared with participating communities, sensitive data being published without consultation, and researchers not attributing Indigenous or local knowledge to knowledge holders (Asch, 2001; Grabowski, 2017; ITK, 2018b; Loseto et al., 2020; McGregor et al., 2010; Wong et al., 2020; Yukon Native Brotherhood, 1973). This has markedly impacted Indigenous northerners who have been advocating for more control over research processes for years (Dehcho First Nations, 2004; Gwich'in Tribal Council, 2011; Ikaarvik, 2018; ITK, 2018b; Northwest Territory Métis Nation, 2016; Yukon Native Brotherhood, 1973).

The settlement of land claim agreements, and resulting self-government, co-management, and other expressions of Indigenous control over resource and land management, have influenced how northerners in general, and Indigenous northerners in particular, interact with research. Research was a consideration in some of the foundational discussions during the initiation of northern land claim agreements (Yukon Native Brotherhood, 1973) and played a key role in land use and occupancy studies that were the foundation of land claim processes (Freeman, 2011). As Indigenous northerners have asserted rights and land ownership (e.g., Inuit-owned lands and First Nation settlement land), land claim

and self-government agreements have supported Indigenous self-determination in research in a number of ways. These include establishing Indigenous research approval processes (such as the research approval processes administered by the NG and the Vuntut Gwitchin First Nation (VGFN) and the one currently being developed by Makivvik for Nunavik (Atanniuvik, n.d.; NG, 2020a; VGFN, n.d.), research leadership (e.g., the IRC established a specialized research division: Innovation, Inuvialuit Science and Climate Change), and research infrastructure (e.g., Nunatsiavut Research Centre).

Indigenous governments, land claim organizations, and co-management bodies also play important roles in territorial licensing and review processes (GNWT, 2024b; NRI, 2021; YG, 2013), along with being partners and leaders in conducting research. Northern government and Indigenous organizations have recently started taking a more active role in shaping northern science by outlining expectations for research that is relevant, respectful, and solution-oriented (ITK, 2018b; Ogden et al., 2016; Ogden & Thomas, 2013). Through the IPY program, northern organizations saw opportunities to change how research was being done, to build partnerships to further their own research priorities, and to build northern research capacity through training and infrastructure (Carter et al., 2019; Gearheard et al., 2011; Grimwood et al., 2012; Hovelsrud & Krupnik, 2007; ITK & ICC Canada, 2007; Kulkarni et al., 2012; Pulsifer et al., 2012). Through international initiatives and organizations like the International Arctic Science Committee, research practices and policies from northern Canada have influenced the emphasis placed on community engagement and Indigenous

ethics in other circumpolar regions (Williams, 2011).

While a societal push from northerners for collaborative, relevant, applied research has influenced some of the change in the Canadian North, this shift in research is also influenced by both organizational research policies and the development of guidelines for the conduct of research (Brunet et al., 2014a, 2016; Ford et al., 2017; Gearheard & Shirley, 2007; ITK et al., 2007; Ogden et al., 2016; Wolfe et al., 2011). Legislative and administrative policies like research licensing processes, ethical review procedures, and funding programs have played important roles in this progress (Ford et al., 2017; Gearheard & Shirley, 2007; Gittelsohn et al., 2020; Polidoro et al., 2024; Wolfe et al., 2011). Although they have not always been effective, the research licensing processes in the three northern territories, and the approval process in Nunatsiavut, have had an impact on researcher consultations with communities and community participation in research (Gearheard & Shirley, 2007; Grabowski, 2017; Korsmo & Graham, 2002; Van Den Scott, 2012). Some northern Indigenous peoples have developed their own policies, guidelines, review boards, and protocols to establish how research or consultation should take place in their communities (Gearheard & Shirley, 2007; Gittelsohn et al., 2020; Hughes, 2018; Ogden et al., 2016). A number of northern research organizations have also developed research frameworks, methodologies, and guidelines based on Indigenous values and knowledge (Aqqiumavvik Society, n.d.; Bell, n.d.; Healey & Tagak Sr., 2014; Ikaarvik, 2018; McGrath, 2018).

The Government of Canada has deeply influenced the development of northern research through funding and leading research, and as the original operator of northern research stations and infrastructure (Bravo, 2009). Over the past sixty years, the Canadian North has been the focus of several national or international scientific strategies and programs. Calls for a more coordinated response to science across northern jurisdictions are motivated by the impacts of resource development, sovereignty issues, self-government and land claim agreements, and more recently the impacts of increasingly rapid environmental changes (England et al., 1998; Hik, 2009; Korsmo & Graham, 2002; Morris et al., 2013; Pigford et al., 2017). Since the 1970s, efforts have been made by academia to articulate the need for a single unifying northern science policy that guides investments in northern research (England, 2010; England et al., 1998; Hik & Sloan, 2004; Hik, 2009; Pigford et al., 2017). Serious gaps in funding for Canadian Arctic research were identified in the 1990s (Natural Sciences and Engineering Research Council of Canada [NSERC], 2000), and from that realization investments were made including the International Polar Year (IPY) (2007-2008), a northern research chair program (2002-2012), and the NSERC Northern Research Supplement which is still in existance. These were opportunities to develop robust research programs in the North and invest in students, and increased research activities have been documented (Aksnes et al., 2016; Bancheva, 2019; ITK, 2018b).

There continues to be a desire in the North for greater access to the necessary resources and facilities to conduct and manage research locally (Gearheard &

Shirley, 2007; ITK, 2018b; Korsmo & Graham, 2002; Moffitt et al., 2015; Ogden et al., 2016). This includes support for increased research capacity at governments, co-management bodies, and institutes of self-government as they pioneer new forms of governance in the North (McGregor et al., 2010; Snook et al., 2018). For example, northern governments have identified the need for more research on social, cultural, and health related topics (GNWT, 2017; YG, 2016; ITK, 2018b; Ogden et al., 2016), and yet these topics continue to receive less funding and attention than natural sciences (ARI, 2014; Gearheard & Shirley, 2007; Giles, 2015; Ibarguchi et al., 2018; Polidoro et al., 2022). Although northern organizations are actively involved in monitoring, there are also limited opportunities for northerners to lead research projects for a variety of reasons including lack of access to research training, funding, and infrastructure (Caughey et al., 2022). Nevertheless, northerners recognize the potential for research to bring capacity-building benefits through new knowledge, improved decision-making, training and education, as well as economic benefits through employment and local spending in small communities with limited economic opportunities (Carr et al., 2013; Gearheard & Shirley, 2007; Paci et al., 2008; Wolfe et al., 2011).

2.5 Indigenous and northern leadership in research

An Indigenous knowledge (IK) system is values-based and holistic with an underlying responsibility of maintaining good relations, and it is unique in relation to place and people (Kovach, 2009). The reference to IK encompasses a variety of labels used to describe the body of knowledge held by Indigenous peoples. In

the literature these terms include traditional knowledge (TK), tribal knowledge, traditional ecological knowledge (TEK), aboriginal knowledge, Inuit knowledge, and Inuit Qaujimajatuqangit (IQ). While all of these have been used in the northern context, currently IK is used across the North, while IQ is commonly used in Inuit Nunangat and TK is more common in the Yukon and NWT (Buschmann, 2022; ICC, 2019; Jack et al., 2020; Karetak et al., 2017; Pederson et al., 2020; Tagalik et al., 2023).

The evolution in northern research governance is reflected in an emerging dialogue about Indigenous self-determination in research, and a desire for control over what research happens and how research is conducted (Association of Canadian Universities for Northern Studies [ACUNS], 2017, 2018; Gearheard & Shirley, 2007; YG et al., 2016; ITK, 2018b; Ogden et al., 2016). There is also increasing emphasis on IK informing both research and policy-making in northern homelands (GNWT, 2004a; Henri et al., 2020; ITK, 2018b; Wheeler et al., 2020; YG et al., 2016). According to the territorial governments, IK is valued across the three territories as equal to scientific knowledge and has an equivalent role in informing evidence-based policy (Government of the Northwest Territories, 2004, 2017; YG, 2016; YG et al., 2016; ITK, 2018b). *A Pan-Northern Approach to Science*, co-produced by the three territorial governments, identifies IK as one of four key elements to their approach to science (YG et al., 2016). During the Berger Inquiry, IK gained recognition as a contributing body of knowledge that can inform science and decision-making (Abele, 1987; Gamble, 1978; McGregor et al., 2010). Yet there has been slow progress in meaningfully

and equally considering IK alongside scientific evidence in northern governance stemming from issues with existing processes (e.g., what is considered evidence), unfamiliarity with IK, or lack of Indigenous representation (Castleden et al., 2017; Latulippe & Klenk, 2020; Rathwell et al., 2015; Wheeler et al., 2020).

Although there are gaps in opportunities for northern Indigenous scholarship (Petrov et al., 2016), Indigenous northerners are asserting their role as leaders in northern research (Healey et al., 2018; Karetak et al., 2017; Mearns, 2017; Pedersen et al., 2020; Price, 2007; Snook et al., 2018; Sudlovenick, 2019; Tagalik et al., 2023). Research in the North often deals with complex issues or problems, like the impacts of climate change or resource development on the physical and social environment, and identifying issues or desired outcomes through Indigenous conceptualizations can move research towards playing a role in decolonization, or at the very least in reducing the role research plays in perpetuating colonialism (McGregor et al., 2010; Petrov et al., 2016; Tagalik et al., 2023; K. J. Wilson et al., 2020). A growing number of northern Indigenous scholars are employing Indigenous research methodologies, and also informing the practice of non-Indigenous researchers partnering with Indigenous communities (Carter et al., 2025; Castleden et al., 2015; Healey & Tagak Sr., 2014; Ljubicic et al., 2022; McGregor et al., 2010; K. J. Wilson et al., 2020).

2.6 Challenges with research funding

Historically, northern regions have relied mainly on federal (or provincial) funding for research activities. The federal government is one of the main funders of

northern academic research in Canada through the tri-council granting agencies: Canadian Institutes of Health Research (CIHR), NSERC, and Social Sciences and Humanities Research Council of Canada (SSHRC). Another key source of funding are federal government departments including Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) (e.g., NCP; Climate Change Preparedness in the North – CCPN), Health Canada (e.g., Climate Change Health Adaptation Program), NRCan (e.g., PCSP), National Research Council of Canada (e.g., Arctic and Northern Challenge), amongst others. The Government of Québec's Fond de recherche du Québec also funds northern research both in Nunavik and other northern regions through research grants. For the most part, outside of some competitive monitoring programs like the Nunavut General Monitoring Program and the GNWT's Cumulative Impact Monitoring Program (GNWT, 2021), territorial governments and other northern organizations do not regularly fund competitive research grants but do contribute financially to research through contracts and transfer payments. Other funders include NGOs and charities that support research. Research funding through federal government departments tends to target topical areas related to the department's mandate. A recent study by Ibarguchi et al. (2018) found that less than 3% of overall tri-council budgets go to Arctic research, with funding for Arctic natural sciences decreasing in recent years, reinforcing past concerns that the federal government is not adequately supporting northern research.

Funding plays a critical role in supporting successful and respectful research partnerships (Doering et al., 2022; Ljubicic et al., 2022; Witteman et al., 2018;

Wolfe et al., 2011). Northern field and community-based research are both generally more expensive than conducting research in areas with easier access and lower cost of living. The participation of northern organizations or community members is often an expectation when conducting research in the North and is one of many factors contributing to increased funding needs (Doering et al., 2022; Gearheard & Shirley, 2007; Mallory et al., 2018). Northern research can require flexible funding that allows for time to build relationships, changes to research design based on changing community priorities, and support for community participation and employment (Brunet et al., 2017; Doering et al., 2022; Hauser et al., 2023; Houde et al., 2022; Wolfe et al., 2011). It may require support for complementary activities like training, educational programs, and on-the-land camps, that contribute to community outcomes (Hauser et al., 2023; Ljubicic et al., 2022; Mallory et al., 2018). A key consideration in partnership dynamics is who can access and control research funding, which can impact decisions about what research happens, where it happens, how it supports research capacity, and what benefits local communities experience (Paci et al., 2008). Funding programs, networks, and other institutional processes created in partnership with northern organizations can contribute to the evolution of northern research by supporting northern-led and northern-partnered research. Recent examples like the Canada-Inuit Nunangat-United Kingdom Arctic Research Programme (CINUK) and the Inuit Qaujisarnirmut Pilirijjutit (IQP) fund have prioritized Inuit involvement in research and included Inuit in setting priorities and reviewing proposals.

Chapter 3 - Research design

3.1 Conceptual foundations

This study examines the relationships between research, policy, and society, while also being grounded in the particular geographical and cultural context of northern Canada. In developing this project, I took a problem-oriented approach, identifying the focus through engagement with northern rightsholders and stakeholders. While this led to a project that is not explicitly driven by theory, there are several key concepts that inform the methodological approach, analysis, and discussion. To explore the ways in which decisions are made about research in the North, and how that influences the practice of research, I drew on three main concepts that serve as the conceptual foundation for the thesis including: i) useable science; ii) Indigenous self-determination in research; and iii) the research lifecycle. Individual papers also draw on complementary analytical concepts specifically relevant to the focus of the chapter. Chapter 4 discusses research policy within a sustainability framework and Chapter 6 employs concepts from the literature on partnership and collaborative research to explore the evolution of partnered research in the North.

3.1.1 Science policy and useable science

Within the academic literature, there tends to be a separation between the study of science policy and the study of scientific practice (Gläser & Laudel, 2016). A policy is a decision, or a commitment to a particular course of action, but can also be a set of guidelines to inform decisions and therefore science policy

refers to all decision-making related to science or to the systematic pursuit of knowledge, including research (Pielke, 2007). Research policies include strategies and priorities, guidelines and protocols, regulations and licensing, networks and funding programs. Science policy literature focuses mainly on evaluating research efficacy (Mårtensson et al., 2016; McNie, 2007; McNie et al., 2016), analyzing knowledge translation between research and policy (Brownell & Roberto, 2015; Cairney et al., 2016; Cash et al., 2006; Pohl, 2008; Weichselgartner & Kasperson, 2010), or examining dynamics between different institutions or actors in the research network (Braun, 2008; Intarakumnerd & Goto, 2018; Lepori, 2011). The governance of science, science priorities, funding, and science conduct are generally studied separately from the use of science and research in decision-making and the impact of science on society (Gläser & Laudel, 2016; Pielke, 2007). However, these two areas shape each other and, especially in the northern context, it is important to acknowledge this interconnection and consider them together (Pielke, 2007; Pielke & Betsill, 1997).

One of the key concerns around northern research is that it has been lacking relevance and application to the North. In the past, the Arctic was seen as a natural laboratory for field observations (Bravo & Sörlin, 2002; Powell, 2008). Research brings value in answering important questions, but a shift towards how those questions are identified has come from a new relationship between society and universities (Greenwood & Levin, 2003). Engaging research users in the development of research projects and identifying research priorities has been identified as a strategy that could lead to more relevant results with both public

value and potential to inform decisions (Ford et al., 2017; Hik, 2009; Lavery, 2018; McNie et al., 2016; Ogden et al., 2016; Owen et al., 2012). Collaboration throughout the research process, good communication between knowledge users and producers, and respect for cultural relevance are key characteristics affecting research uptake (Ford et al., 2013; Healey & Tagak Sr., 2014; Sarewitz & Pielke, 2007). In the North, this is reflected in the evolution of community-engaged research from consultation to co-production of knowledge, which can be a complex undertaking in a northern context where there are multiple levels of decision-making responsibility (Ford et al., 2013; Rodon, 2014).

With an increased interest in evidence-based decision-making, researchers are starting to explore how current science policies impact the availability of science to be used in policy-making (Head, 2015; McNie, 2007; McNie et al., 2016; Smajgl & Ward, 2013). The decisions made around science funding and priorities impact the availability of relevant knowledge for decision-makers (Pielke, 2007; Sarewitz & Pielke, 2007). Science policy relationships stem from governance, and as northern governance is a complex system shared between federal, territorial, provincial, and Indigenous governments (Section 2.1) , science policy relationships require the bridging of both western and Indigenous knowledge and governance systems (Latulippe & Klenk, 2020; Wyborn, 2015). Policy developed from different sources of knowledge and considering multiple scales is more robust and generally more accepted; in the North this means that engaging with IK and local knowledge in developing policy can strengthen governance (Head, 2015; Pielke, 2007; Rathwell et al., 2015). As knowledge is central to better

governance, when certain subject areas, theoretical approaches or worldviews are underrepresented, it limits the ability for governance to evolve in those areas and may limit the relevance to – and benefits for – Indigenous populations (Paci et al., 2008; Wyborn, 2015).

3.1.2 Indigenous self-determination in research

Northern governments and Indigenous organizations are calling for more relevant research while also highlighting that the process of conducting research is of utmost importance (Audla & Smith, 2014; GNWT, 2017; YG, 2016; ITK, 2018b; Ogden et al., 2016; Ogden & Thomas, 2013). There has been a progressive evolution from an emphasis on participatory methodologies, to more collaborative and community-driven research, to co-production of knowledge, and ultimately to Indigenous self-determination in research (Brunet et al., 2014a; Castleden et al., 2015; ITK, 2018b; Koster et al., 2012; Morton Ninomiya & Pollock, 2017; Petrov et al., 2016; Wong et al., 2020). Concurrent with the changes happening in northern research are a national and global shift in research with Indigenous communities toward Indigenous-led research and more collaborative and equitable methodologies (Absolon, 2011; Kovach, 2015; McGregor, 2018).

The literature on Indigenous self-determination in research provides insights into the extractive and colonial context of research in the North, as well as the resurgence of Indigenous governance and leadership of research. Indigenous governance has progressed in the North, but “another element alongside autonomy is the right to participate in and genuinely influence decision-making

on matters that affect Indigenous peoples within a state" (Wilson & Selle, 2019, p. 9). Indigenous research is intrinsically linked with governance, particularly control of the research agenda, whereby "Indigenous research … is in itself an enactment of governance" (McGregor et al., 2010, p. 103). Research can benefit from Indigenous governance and leadership, and – by making knowledge and evidence available to decision-makers – support Indigenous governance (Asch, 2001; Snook et al., 2018; K. J. Wilson et al., 2020). Indigenous northerners have used research to challenge colonial policy, defend land rights, and contest resource development, often working in partnership with academics and employing western methodologies with Indigenous values and knowledge (McGregor et al., 2010).

IK provides long-term understanding of the region, yet is rarely given the same recognition as science in western governance processes like policy-making (Caughey et al., 2022; Pfeifer, 2018; Rathwell et al., 2015). Efforts to integrate scientific and Indigenous knowledge have led to issues like IK being mined for evidence that supports scientific findings and is used out of context (Martello, 2004; Nadasdy, 1999; Rathwell et al., 2015). Participatory processes and the inclusion of IK can bring local voices into research and move some of the control to participants. However, unless research is co-created throughout the project, the values, language, culture, and ways of life that those observations are embedded in do not necessarily inform the analysis (Fox et al., 2020; McGregor et al., 2010; Wilson et al., 2022).

3.1.3 The research lifecycle

The research lifecycle (Figure 3.1) identifies the steps taken throughout the research process from inception to completion of a project. Existing concerns around northern research include how these steps are taken and who is involved throughout the process. For example, it is important for northerners to be involved in identifying research questions and designing the methodology, and essential to communicate findings to northern partners and participants in appropriate ways (Healey & Tagak Sr., 2014; Henri et al., 2020; Kassi et al., 2022; Pedersen et al., 2020; Tagalik et al., 2023). The research lifecycle provides the backbone for understanding how different theoretical elements of research that are prioritized in policy and guidance documents intersect with the practice of research. For example, northern research policy documents provide insight into priorities and expectations for how research is conducted and communicated which can be mapped to the processes included in the research lifecycle. Research expectations and the various roles of northern organizations and individuals were mapped with the steps of the research lifecycle to understand how northerners participate in or guide different processes. The intersection of the research lifecycle with northern policy documents provided a framework for interview data collection and analysis for this study (Babbie & Benaquisto, 2002; Hennink et al., 2011; Ritchie & Spencer, 2002). The steps in the lifecycle became codes used in the analysis of northern research policy documents (Chapter 4) and were applied in the critical analyses conducted in Chapters 5 and 6.

Figure 3.1. Research project lifecycle



Source: Adapted from (Oregon State University, 2019; University of Central Florida, 2019; University of Washington, 2019).

3.2 Engagement with northern research stakeholders

With this project, I aimed to develop knowledge that reflects northern concerns and is useful for improving policy. Some of the key principles for research that northern organizations have shared is that it should be engaged with the community, relevant to northerners, responsive to northern priorities, and

applicable at the decision-making level (Ikaarvik, 2018; ITK, 2018b). Best practices in a northern context for participatory research design include listening to the community in project development, integrating multiple voices in identifying project questions and objectives, and choosing a relevant methodology with the community (Brunet et al., 2014b; Carter et al., 2025; Castleden, Morgan, et al., 2012; Grimwood, Doubleday, et al., 2012; Ljubicic et al., 2022; Tondu et al., 2014). As there was no physical community to engage with for a pan-northern study, I consulted with northerners actively engaged with research as policymakers, researchers, and end-users while developing my project proposal. This exploratory work gave me a sense of the diversity of perspectives held by those engaged in research facilitation and leadership roles in the North, and the complex nature of the issues at hand (Stratford & Bradshaw, 2016). I continued to apply these principles by engaging with a small informal group of northern advisors working in the field of science policy at key points in my project.

3.2.1 Research scoping consultations

As my original intent was to focus on the territorial North, I held discussions with people involved in research across the three northern territories. The goal of these consultations was to identify research gaps, concerns, and knowledge needs around research policy for the North to inform the design of my research project. I had informal conversations with individuals or small groups of colleagues focused on eliciting information to guide the development of research questions, objectives, and methods. These discussions were with people who are

setting research policies, leading research programs, partnering on research, making decisions on research, funding research, administering research licenses, or otherwise involved in or benefiting from northern research. They worked with northern Indigenous and territorial governments, the federal government, northern colleges and research institutes, land-claim organizations, non-governmental research organizations, and other Indigenous organizations Table 3.1).

Table 3.1 Details of project development consultations in three territories

Dates	Location	Participants	Participant organizations
February 13-23, 2018	Whitehorse, YT	10	AICBR, AINA, CYFN, YG, Yukon College, VGFN, Teslin Tlingit Council, Wildlife Management Advisory Council-North Slope
March 14-16, 2018	Yellowknife, NT	5	NWT Association of Communities, GNWT
March 17, 2018	Ottawa, ON	1	CIRNAC
March 20-25, 2018	Iqaluit, NU	11	GN, QHRC, NRI
April 11, 2018	Ottawa, ON	1	CIRNAC
January 28-February 1, 2019	Inuvik, NT	7	ARI, Gwich'in Renewable Resource Board (GRRB), IRC, Joint Secretariat-Inuvialuit Settlement Region
February 25-March 8, 2019	Iqaluit, NU	1	NTI

I conducted informal conversations either one-on-one or with a small group of people with a total of 36 people. Consultations took place during five trips to the North, as well as two meetings in Ottawa. In these discussions, I introduced the goal of the consultation (to develop a PhD research project) and the general focus (the policies that guide research in the North). As the purpose of these conversations was to get feedback and not to collect data, they were not

recorded, and the notes were combined and aggregated into a short report (Appendix B). While there was general agreement on some of the key issues, their interests diverged depending on how they interacted with research.

Overarching issues that were identified included:

1. The research process is getting better but the institutions that fund and control research make it challenging to conduct research in a way that meets the needs of northerners and researchers;
2. There are institutional barriers to researchers based in the North which impede northern leadership in research;
3. Investments in northern research tend to benefit southern institutions; and,
4. Northern governments and organizations are advocating for improved research funding and decision-making but lack data and evidence beyond anecdotal stories on the current state of research.

These conversations identified two potential directions for my thesis research: i) an in-depth study focusing on one particular area of concern related to research policy or decision-making (e.g., funding, licensing, community consultation); or, ii) a broader approach exploring a range of issues through the perspectives of researchers. I chose the latter and identified a mixed method approach to examine the current state of research policy and practice through the lived experiences of both northern-based and southern-based researchers.

3.2.2 Ongoing engagement

Ongoing community engagement is recognized as an important element of northern research (Degai et al., 2022; Ikaarvik, 2018; Tondu et al., 2014). While this project is not community-based, the initial engagement process provided a foundation, and ongoing informal engagement throughout the project continued to inform my approach. Informal advisors provided input through identifying and sharing policy documents, providing feedback during development of the interview guide, identifying interview participants, and providing feedback on presentations and other communication tools. I originally aimed to set up a formal advisory committee, however, it became evident that an informal approach was better suited to the project based on the interest and availability of potential advisors. A number of advisors from different organizations including northern land claim organizations and research institutes, YG, GNWT, ITK, and the federal government provided advice at key moments in the project, particularly in developing research tools and in identifying potential participants.

Initially, I planned to limit my study to the three northern territories due to their shared characteristics in relation to governance and research policy. However, I was advised that recognition of Inuit self-determination requires Inuit Nunangat be considered as a whole, and I expanded my geographic focus to include Nunavik and Nunatsiavut. As no engagement was done in those two regions during the initial scoping of the project, I communicated with the NG and Makivvik's Nunavik Research Centre during the development of my research proposal.

One of the challenges for a project that is focused across the Canadian North is that there is not one specific community or organization to engage with. Much of the advice directed towards northern researchers is relevant to research based in a specific location, like case study research or field research. For community-based research there are more obvious pathways for consultation, particularly when it comes to preparing for formal approval processes like research licensing. Part of the research licensing process involves contacting regional and local Indigenous governments and organizations, and other relevant stakeholders, and there are sometimes local consent processes that require dual consent: consent from the local government or organization and consent from the individual. When working in northern regions there is a clear need to engage with appropriate governance bodies before going through the licensing process - but what does that mean when your interviews are with a group of people that are not living within the same traditional territory or governed by the same organization? This was a question that I struggled with throughout my project, and I found different approaches for the five regions. For the Yukon, I contacted all fourteen Yukon First Nations and transboundary Indigenous governments about my project, receiving feedback from a minority. In the Northwest Territories I was advised to identify interview participants and then consult with the relevant organizations from their communities. In Nunavut I communicated with NTI and the NRI throughout my project. In Nunatsiavut I communicated with the NG including their Research Advisory Committee. There was no approval process for conducting research in Nunavik; however I did communicate with the

Makivvik's Nunavik Research Centre about my project before conducting interviews. In the future when conducting a project with a broad geographic scale, I would follow the approach I used in the Yukon and contact all Indigenous governments and land-claim organizations within the geographic scope providing information on the project and inviting further discussion.

3.3 Mixed methods approach

This research topic is multi-faceted and required an approach that integrates multiple methods in the research design. There were three complementary parts to this project that included both qualitative and quantitative approaches, including: i) a document analysis (detailed methods in Chapter 4); ii) quantitative analysis of research trends (detailed methods in Chapter 5); and iii) key informant interviews (detailed methods in Chapter 6). Data collection for the three approaches happened concurrently, but data analysis was sequential starting with an analysis of northern research policy documents to inform the analytical approach used for thematic coding of interview data. Bringing together multiple lines of evidence allows for the triangulation of results and validation of findings across different data sources (Tashakkori & Charles Teddlie, 1998). In the context of this project, matching the method to the research objective allowed for consideration of the data and local context, providing an understanding of research policy and practice in the North across different scales, including pan-northern, regional, local, and project-specific (Collins et al., 2007; Tashakkori & Charles Teddlie, 1998).

3.4 Ethical considerations

There were two parts of this research project that required ethical clearance, including conducting research with human participants and access to secondary data for the license trend analysis. Data collection protocols for interviews were reviewed and approved by Carleton University's Research Ethics Board A (CUREB-A) (#111293) and received secondary ethics clearance from McMaster University's Research Ethics Board (MREB) (#5018). Ethical approval for secondary use of data from the Yukon, Northwest Territories, and Nunavut research license databases was provided by CUREB-A (protocol #111441), and secondary clearance from MREB (#4959). This project also received research licenses through the permitting processes from YG (20-03S&E; 21-18SE; 22-06S&E), ARI (16692; 16841; 17000), and NRI (01 036 19N-M; 01 008 21R-M; 01 017 22R-M), as well as research approval from the NG (NGRAC-10972332).

All participants gave informed consent, and interviews were recorded, transcribed, and de-identified during the transcription process. Transcripts were returned to participants for review highlighting specific quotes that may be used. Through the consent process, participants could choose how/if they wanted to be recorded and identified (see *Appendix C: Recruitment materials and consent form*) and participants had the opportunity to review quotes and photographs. Participants were assured confidentiality and are referenced using a codename representing northern- and southern-based researchers (N# or S#). The interviews explored personal and professional experiences, and confidentiality

provided some participants the opportunity to answer questions without concern of damaging their reputation or relationships. Due to the COVID-19 pandemic, all interviews between March 2020 and October 2021 were conducted virtually using Zoom or the telephone. I received approval to recommence interviews in-person in fall 2021, following COVID-19 protocols and local health regulations and guidance.

The community of northern researchers in Canada is fairly small, and some of the participants had previous professional relationships with either myself, my supervisor, or other members of my committee, including but not limited to collaborating on projects, co-writing articles, reviewing publications or grant proposals, working at the same institution, and attending conferences and meetings together. Despite these pre-existing relationships, we chose not to exclude participants who have worked with members of the research team because we recognized that they had valuable experiences to share. As participants are known to my committee members, participant confidentiality was maintained. As a non-Indigenous social science researcher living in the Yukon for the past seventeen years, and involved in northern research throughout that time, I am deeply embedded in the context of the topic that I am researching. Throughout this project I have participated in northern research conferences and events, interacted with researchers, northern organizations and community members, and listened to diverse perspectives on research. As an employee at a northern academic institute, I have direct experience with research policies and programs, and I have interacted with and received support from a number of

institutions that administer research funding. I have also partnered with a variety of researchers and organizations working in the North, based in both northern and southern Canada. As such, I came to this project with opinions and biases informed by my experiences. However, by seeking out people from different backgrounds and listening to a diversity of opinions with an open mind, I tried to balance my experiences with a broader contextual understanding of this topic. Throughout this process, I have been exposed to a wide spectrum of ways of approaching and thinking about northern research and I hope I have honoured the diversity of experiences in my analysis.

Chapter 4 - Northern research policy contributions to Arctic sustainability

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4.1 Introduction

Given the pressing importance of sustainability issues in the Canadian North, academic research can play a key role by contributing information to support sustainability transformations in the region (Fondahl & Wilson, 2017; Petrov et al., 2016; Riedlsperger et al., 2017). However, there are gaps in understanding relations between sustainability research and practice, including how research can support sustainability policy and decision-making (Petrov et al., 2016). The guidance and expectations coming from northern governments and organizations are generally not reflected within the academic literature, but are captured in policy documents and grey literature. This policy analysis seeks to contribute to a better understanding of northern Indigenous, organization, and government perspectives on research policy through a unique systematic approach to policy analysis.

There are a wide variety of organizations developing policies or providing guidance on research in northern Canada. There are strategy, guidance, and program documents produced by northern and northern-focused governments,

Indigenous, and NGOs that discuss research policy. Northern organizations often play a role in mediating how researchers engage with northerners, and their research policy documents outline how they would like those relationships to unfold. Research policy documents discuss northern leadership of research and provide insight into the diverse roles that northerners and northern organizations fill in research programs and projects. Through an analysis of these documents, we explore how organizations define and guide research in the Canadian North and the anticipated contributions of research to northern sustainability.

The goal of this study is to examine northern research policy documents to identify commonalities amongst the goals and priorities of northern organizations, and shared expectations for research in northern Canada. The objectives are to understand how organizations expect researchers to engage in and conduct research and how research programs can align with northern science policy objectives. A related objective is to identify pathways for academic research to support policy and decision-making related to sustainability. Governance structures, policies, priorities, and organizations that guide, regulate, and interact with northern research are examined. This analysis identifies themes related to principles, priorities, and guidelines, as well as the different steps in the lifecycle of a research project and the roles different actors play in research. It is clear that sustainability, particularly in terms of climate change and resource development, is a priority for northern regions. Research is identified as an important means of supporting sustainability transformations. This analysis provides insight into how academia can contribute to a northern-led

sustainability research agenda that supports evidence-informed policy.

4.2 Sustainability context

Arctic sustainability is a growing research area that aligns with many of the priorities articulated by northern governments and organizations. Yet, despite the numerous contributions this research area has already made, there are still big gaps in our understanding of sustainability in the Arctic (Petrov et al., 2020). A broadly accepted definition of sustainability includes meeting the needs of today without compromising the future (Fondahl & Wilson, 2017; Riedlsperger et al., 2017; Vuntut Gwitchin First Nation, 2009; World Commission on Environment and Development, 1987). However, it can have different meanings depending on the context of the discussion and perspective of those involved (Fondahl & Wilson, 2017; Kealiikanakaoleohaililani & Giardina, 2016) and there is no clear definition of what that means specifically for the North. Sustainability frameworks include several dimensions of sustainability, including: socio-cultural, economic, environmental, and institutional (Fondahl & Wilson, 2017; Riedlsperger et al., 2017; Valentin & Spangenberg, 2000). Indigenous sustainability frameworks incorporate holistic approaches to sustainability, emphasizing cultural values that are not necessarily inherent in western scientific sustainability paradigms (Kealiikanakaoleohaililani & Giardina, 2016; Sheremata, 2018).

Research that supports sustainability is a core goal shared by diverse organizations despite differences in some of their specific sustainability priorities (CPC, 2014; GNWT, 2009, 2017; International Expert Panel on Science

Priorities for the Canadian Arctic Research Initiative, 2008). In northern research, sustainability is often linked with problems characterized by long-term and complex interactions such as: climate change, resource development, well-being, impacts of colonialism and residential schools, and economic development (Petrov et al., 2016; Vuntut Gwitchin First Nation, 2009). While these broad priorities are shared across the North, communities and regions have their own specific challenges including waste and water management, infrastructure, food or energy security, safe and healthy communities, housing, and economic diversity (GNWT, 2017; Riedlsperger et al., 2017; Vuntut Gwitchin First Nation, 2009). Although there is general agreement that environmental, socio-cultural, and economic sustainability are important end goals for research, there are still knowledge gaps around how to achieve these transformations.

Northern governments and organizations have declared their interest in moving towards a science policy framework that is informed by northern priorities and produces research that supports policy development, decision-making, and local action for environmental, socio-cultural, and economic sustainability. The policy documents included in this analysis emphasize the importance of research that aligns with local needs, benefits local communities and regions, and produces research outcomes that improve the lives of northerners or affect broader change. In northern Canada, scientific knowledge is not the only type of evidence used in decision-making. “[O]penness to alternative epistemologies creates a space for envisioning a future that is different from the present” (Rathwell et al., 2015, p. 855). Putting IK at the forefront of policy development promotes

resiliency in northern communities and prepares them to adapt to change. IK is valued by the territorial governments as equal to scientific knowledge and has an equivalent role in informing evidence-based policy (GNWT, 2017; YG, 2016; YG et al., 2016). Sustainability transformations require action and policy relevant research attuned to local needs and values. This policy analysis provides insight into the contributions of research to sustainability and how that can be improved to ensure that there are valuable outcomes from research in the North.

4.3 Methodology

Document analysis is a systematic method for analyzing and evaluating documents using qualitative interpretive analysis (Bowen, 2009; Charmaz, 2014; Corbin & Strauss, 2012). The document analysis undertaken in this project includes a focused review and thematic analysis of policy documents related to northern research. This policy analysis method was used to gain insight into the context, values, and origins of northern research policies (Bowen, 2009; Karppinen & Moe, 2012). To clarify terminology, a policy is a decision, a commitment to a course of action, or a guideline for action that is based on a combination of values, beliefs, evidence, and political ideology (Cardno, 2019; Pielke, 2007). Policy for science refers to all decision-making related to science or the systematic pursuit of knowledge, including research (Pielke, 2007). Policy documents provide insight into the priorities, values, and belief systems that guide decision-making within a government or organization, as well as identifying practical issues that are current and emergent (Cardno, 2019; Karppinen & Moe,

2012). The policy documents included in this study have a variety of uses including communicating information on research in the North and the regulatory context, as well as providing insight into the goals, values, and motivations of the organizations that influence northern research. Therefore, documents were examined with attention to intention and credibility, including the purpose, the author, and the influence over actions or decisions (Karppinen & Moe, 2012). For many northern-based organizations, science policy documents are used to advocate for their research expectations and priorities, while in some cases they communicate where an organization is focusing their research resources or how they approach their own research.

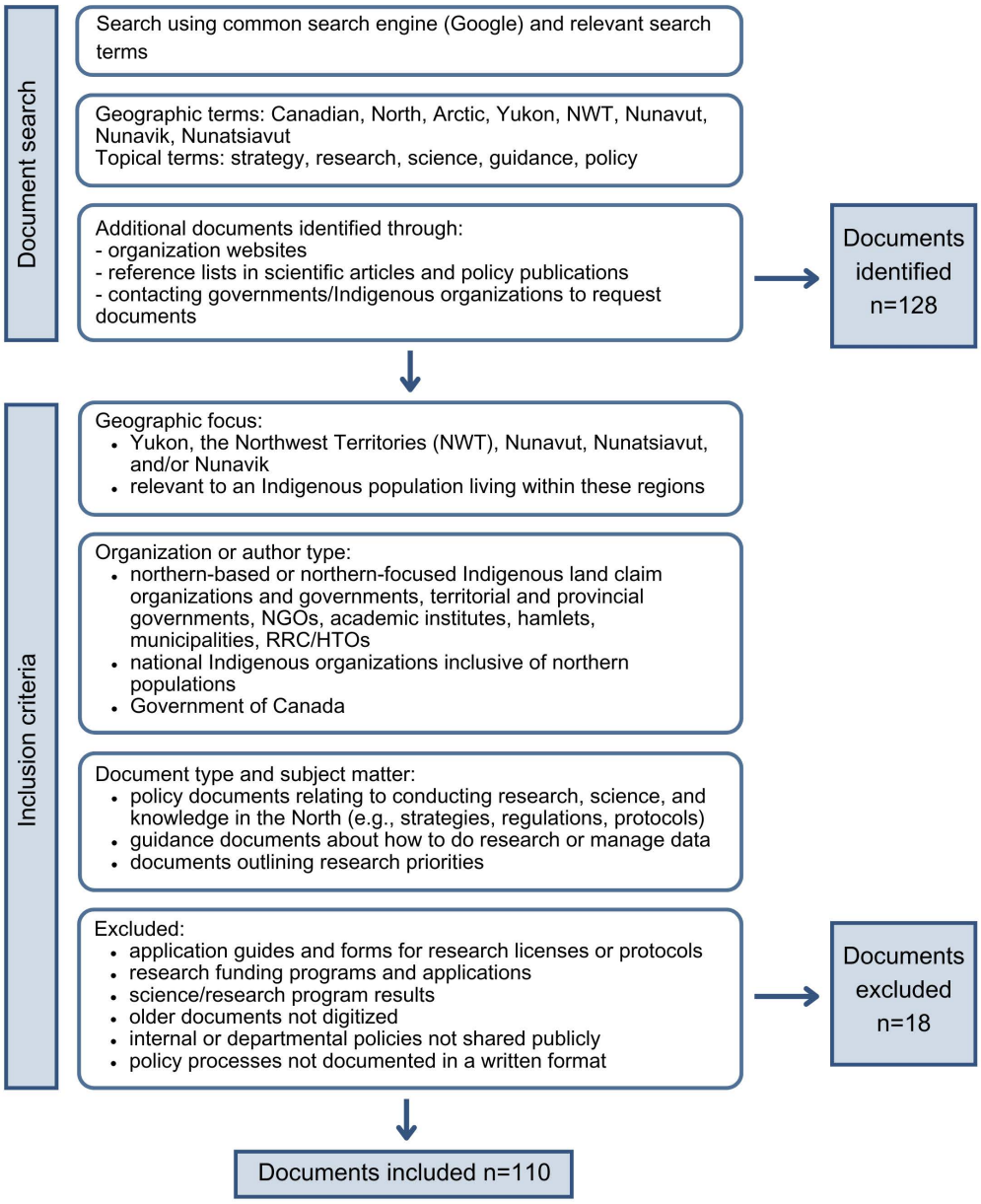
4.3.1 Sourcing documents and inclusion criteria

A thorough online search was conducted in English using a common search engine as well as sourcing documents from the websites of known governments, Indigenous organizations, and NGOs (e.g., territorial governments, ITK, Dene Nation, CYFN). In some cases, documents were identified through prior knowledge or suggestions from project advisors. Documents were selected based on their relevance to the overall study goals and approach, and according to three main inclusion criteria including geographic focus, organization/author type, and document type/subject matter (Figure 2) (Berrang-Ford et al., 2015; Bowen, 2009; Gough et al., 2012, 2017; Miake-Lye et al., 2016). The initial search identified 128 relevant documents; however, 18 were removed after reviewing the full text. Therefore, 110 documents were included for in-depth analysis. Most of the documents were in a stand-alone format (e.g., report, guide, pamphlet,

discussion paper), but when research guidance or priorities were shared as a webpage instead of as a standalone document, they were also recognized and included (GRRB, n.d.; International Arctic Social Sciences Association [IASSA], 2020).

The process was designed to be as comprehensive as possible, including all documents that met the inclusion criteria (see Appendix D for a list of documents, including author organizations and websites) and were available digitally. There are limitations to the study based on the goals and approach, which focus on policies for research, as opposed to policies developed from research, and therefore did not include research program results (Karppinen & Moe, 2012). Research funding programs and forms were not included as they change regularly and are often updated or removed from the host website. Application forms for research licenses or protocols were not included, which in some cases were the only documentation available from an organization (e.g., NG, VGFN). For the federal and territorial governments, government-wide or corporate policies were the focus for this study. These governments are actively conducting research in the North and may have additional departmental-level science policies that were not included within the scope of this study because of our focus on examining corporate policies.

Figure 4.1. Document sourcing and screening process



There are potentially relevant policies being enacted by northern organizations that are either internal and not shared publicly or not documented in a written format and were therefore not part of this analysis. There are northern

organizations and many First Nation governments that are actively involved in influencing, conducting, and guiding research in their region that are not represented in the study because no relevant policy documents were found online. Some of those organizations have information online about their involvement with research, but without extensive policy information their webpages were not included in the study (e.g., Dechinta Centre for Research and Learning, Dedats'eetsaa: Tłı̨chǫ Research and Training Institute).

4.3.2 Coding

In the process of reviewing relevant documents, descriptive information related to each document was recorded in an Excel spreadsheet to track and categorize documents, as well as to assist with initial analysis. These include author type, geographic scale (which regions it is relevant to), publication focus and type (policy, research priorities, or research guidance), discipline focus, relevance to or focus on Indigenous peoples, mention of Indigenous Knowledge and local knowledge, and focus on local or regional protocol or research license. Descriptive statistics were produced in Excel to provide insight into the types of documents that exist and their geographical and topical coverage. These characteristics were then entered as document attributes in NVivo to be used in the thematic analysis.

The coding process combined a deductive and inductive approach. An initial coding scheme was developed based on a literature review focused on research issues and approaches relevant to the North, and new codes were created as

they emerged during the coding process. Research planning and guidance documents were used to identify the research project lifecycle and the types of actors that are involved in northern research. A comprehensive list of codes (Appendix E) guided the coding process, including codes relating to: (i) elements of the research project lifecycle (e.g., research design and approval, conducting research, sharing results); (ii) concepts relevant to research practice (e.g., partnership, community engagement, participation, capacity building); and (iii) roles that different actors play in northern research (e.g., funder, regulator, student). Within the groups of codes there are parent codes that represent general or broad themes and sub-codes that are more specific. Codes were applied when concepts were named explicitly, but also through interpretation when a concept was discussed without using key terms. A clear description of each code was developed to help reduce error and bias in the coding process. Documents were coded in NVivo software which supports document analysis by enabling the comparison of document codes and attributes within a large number of documents. NVivo was used to explore relationships between codes and attributes and compare themes across regions and author types using crosstab queries. Lifecycle process, research practice, and actor codes were analyzed together to understand how key concepts should be applied to the steps of a research project, and which actors should be involved.

Coding for sustainability

Sustainability was identified early in the coding process as a driving issue for northern research. It was added to the coding framework and tracked throughout

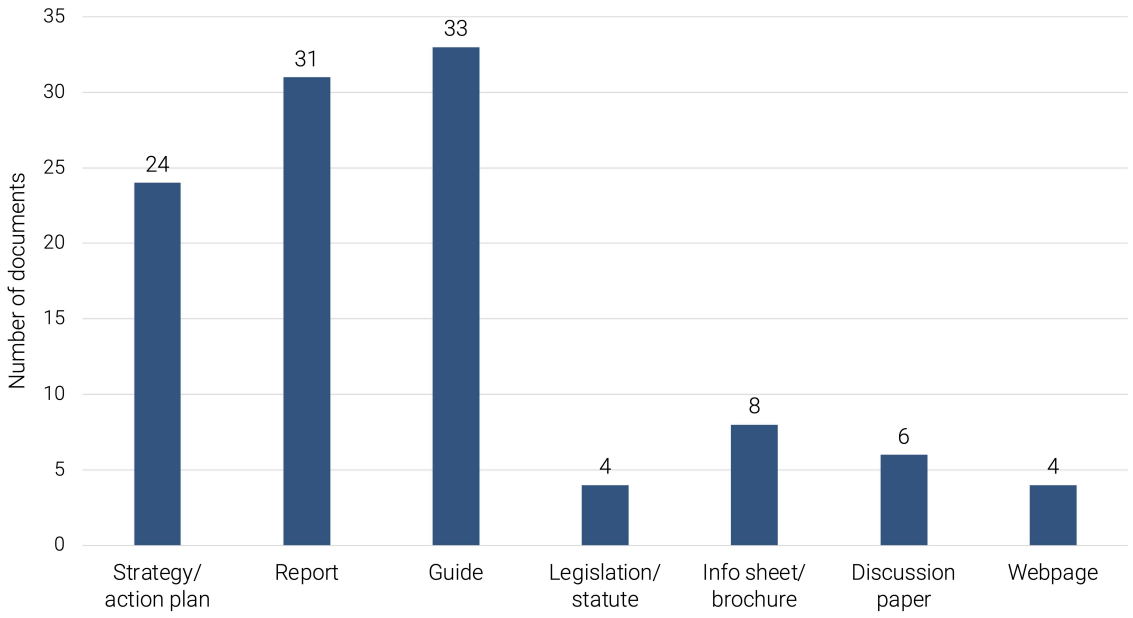
the documents, providing insight into research priorities. Sustainability was coded by searching for explicit mentions of the word *sustainability*, as well as coding for discussions of issues or priorities related to complex changing environmental, socio-cultural, or economic conditions. Environmental sustainability issues included impacts of climate change, resource development, and shipping. Socio-cultural sustainability was identified in relation to issues like community well-being, health disparities in the North, food and water security, and cultural concerns like language revitalization. Economic sustainability was discussed in relation to economic diversification, tourism, institutional research capacity, and funding stability.

4.3.3 Description of documents

The analysis focused on several types of documents including strategies, action plans, discussion papers, reports, guides, statutes, information brochures, and webpages (Figure 4.2). Some of these documents communicate internal policies, such as how an organization will support and fund research or how they will incorporate science into decision-making (GNWT, 2017; YG, 2016; YG et al., 2016). Other documents communicate guidance or expectations to external stakeholders, for example by discussing concerns with current research practices and expectations for how research should be conducted. Some research guidance documents outline internal policies on how an organization approaches their own research (Aqqiumavvik Society, n.d.; QHRC, 2019), while others provide guidance to external researchers or organizations in conducting research (ACUNS, 2003; Van Bibber & George, 2012; YRC, 2012). A large majority

of the documents included in the study were produced from 2000-2020 (100), which reflects the limited availability of digital documents prior to that time, the project focus on contemporary science policy, and the more recent emphasis by various organizations on articulating science and research policy.

Figure 4.2. Documents analyzed according to publication type



Most of the documents (88) focused on research in general, although there were also some with a discipline-specific focus including: social sciences (4), humanities (2), health research (18), physical and natural sciences (3), and Indigenous research (meaning research using Indigenous research methodologies (7). Some of the policy documents communicate a protocol, or provide guidance on how to apply a protocol, such as an IK (or Traditional knowledge) protocol and policy and a regional research licensing protocol. Documents produced by the Canadian Arctic Research Licensing Initiative

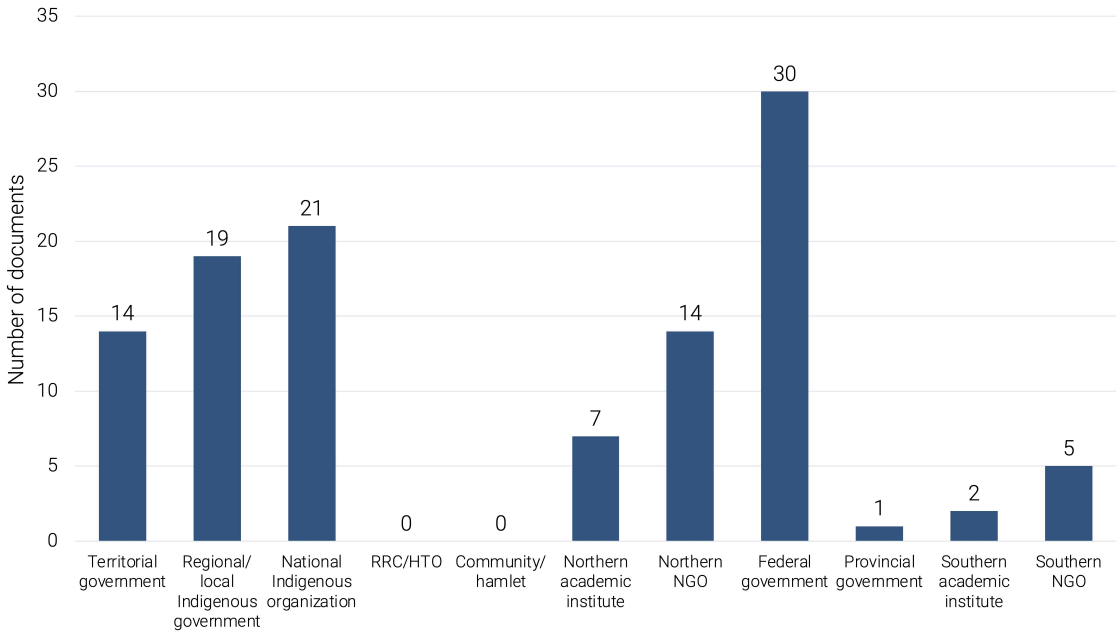
(CARLI), which reviewed the licensing and permitting processes in the three territories during IPY, were also included in this category. Although they are not regulatory documents themselves, they provide information on regulatory processes. Protocols and associated documents were communicated through different types of publications including legislations, guides, and information sheets (Figure 4.2). Within the 110 documents reviewed, 19 were about a protocol at the regional or pan-Arctic scale, while 6 were focused on a local protocol targeted at a community or a sub-region.

All documents were tracked according to author type (Figure 4.3), and any documents produced by a consultant on behalf of another organization were included in the main author type of the organization that initiated the document (e.g., NGO documents cited under the individual author's name). The majority of documents were produced by the GC (30), including by POLAR, the CPC, and federal advisory boards (e.g., Science Council of Canada). National Indigenous organizations produced 20 documents, including organizations that represent and advocate for Inuit, First Nations, and Métis on a national or pan-northern scale (e.g., ITK, AFN). Regional and local Indigenous governments produced 19 documents, including Indigenous governments, Indigenous land claim and co-management organizations, and other northern Indigenous organizations (e.g. Sambaa K'e Dene Band, NTI, GRRB, CYFN). Documents produced by the Territorial governments (14) include policies produced by the governments of the Yukon, NWT, and Nunavut. Northern NGOs (14) include regional and community-based non-profit organizations that are involved in research (e.g. AICBR, QHRC).

Northern academic institutes, including northern colleges, universities, and research institutes (e.g., ARI, YRC) produced 7 documents. Southern NGOs include 5 documents produced by associations focused on northern research (e.g., ACUNS, IASSA). Southern academic institutes (2) include documents produced by research networks led by southern universities (e.g., Yukon Initiating Group of the Canadian Mountain Network, Resources and Sustainable Development in the Arctic (ReSDA)). The only provincial government document was produced by the Government of Québec and relevant to Nunavik. Two groups that were identified as potential author types but did not produce policy documents identified in this study include Renewable Resource Councils/Hunter and Trapper Organizations (RRC/HTOs) and Communities/Hamlets.

In terms of geographic coverage, half of the policy documents analyzed have a pan-northern focus, with many others having a regional focus (Table 4.1). Far fewer focus at the sub-regional level, with only one focused at the community level. Furthermore, the documents analyzed are relevant across the five northern regions (Figure 4.4). Of the 53 pan-northern documents, 27 were focused on all five regions and were mainly produced by the GC, southern NGOs, or southern academic networks. However, some of the pan-northern documents focused on a subset of regions, usually either at the pan-territorial scale (the three territories) or Inuit Nunangat scale (the four Inuit land claim regions).

Figure 4.3 Documents analyzed according to author type



Note. Number of authors is larger than the total number of documents as 3 documents are co-authored

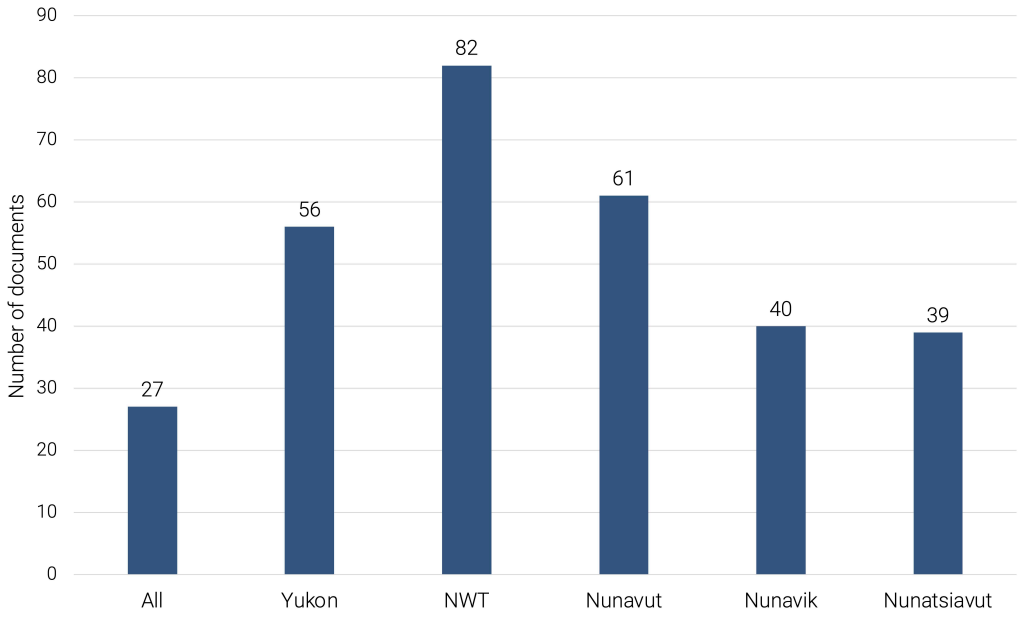
Table 4.1 Documents according to regional scale coverage

Regional scale	**Number of documents, n=110**	**Description**
Pan-northern	53	Relevant to 2 or more regions
Regional	43	Relevant to a region (Yukon, NWT, Nunavut, Nunavik, or Nunatsiavut)
Sub-regional	13	Relevant to a sub-region or traditional territory (e.g., ISR)
Community	1	Relevant to a single community

No region-specific documents were identified in this study for Nunavik and Nunatsiavut with the exception of the *Québec research and innovation strategy 2017-2022* which is relevant to Nunavik (Gouvernement du Québec, 2017). All other documents coded to those regions are pan-northern either focused on all five regions or across Inuit Nunangat. Although the ISR is geographically in the NWT and the Yukon, settled Inuvialuit communities are all in the NWT so relevant

documents were coded to the NWT. There are two exceptions, the documents produced by the Wildlife Management Advisory Council (North Slope), a co-management board related to the Inuvialuit Final Agreement, are specific to the Yukon North Slope region of the ISR and were therefore coded to both the Yukon and NWT.

Figure 4.4 Documents analyzed according to regional relevance



4.4 Results

The coding process and thematic analysis identified key themes that were discussed throughout the documents, although diverse lenses were applied to these concepts. The most commonly identified codes include partnership, Indigenous knowledge, research capacity, informing policy-decisions, governance capacity, research benefits, communicating research, sustainability, and consultation-engagement (Figure 4.5). Partnership was emphasized most (in

86 documents), followed by Indigenous knowledge (76), research capacity (72), and communicating research (69), while the remaining codes were evenly distributed (66-64). Several codes are related to the impact that research has (informing policy-decisions, outcomes of research, research benefits), or the context in which research is conducted (research capacity, governance capacity), while others focus on approaches to research (partnership, communicating research, and consultation-engagement). Two of the codes were related to the research project lifecycle (informing policy-decisions, communicating research), but none were from codes related to roles in research. Many of the documents discussed the role of researchers generally, without specifying specific types of researchers. There were also numerous mentions of Elders, students, local researchers, and local coordinators, yet the occurrence was much lower than codes from the other two categories.

The top ten codes were then cross-referenced with document attributes to explore how they were prioritized by region (Figure 4.6) and author type (Figure 4.7). The number of coded documents were compared as a percentage of the total number of documents per region and author type.

Figure 4.5. Top ten codes by number of documents they are referenced in

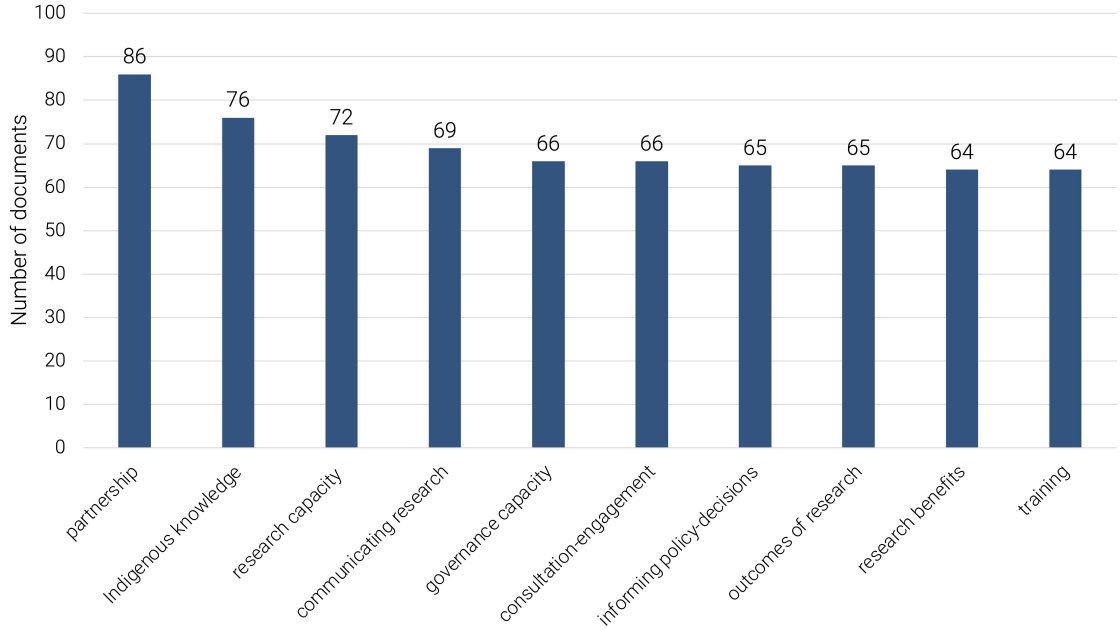


Figure 4.6. Top ten codes analyzed by region.

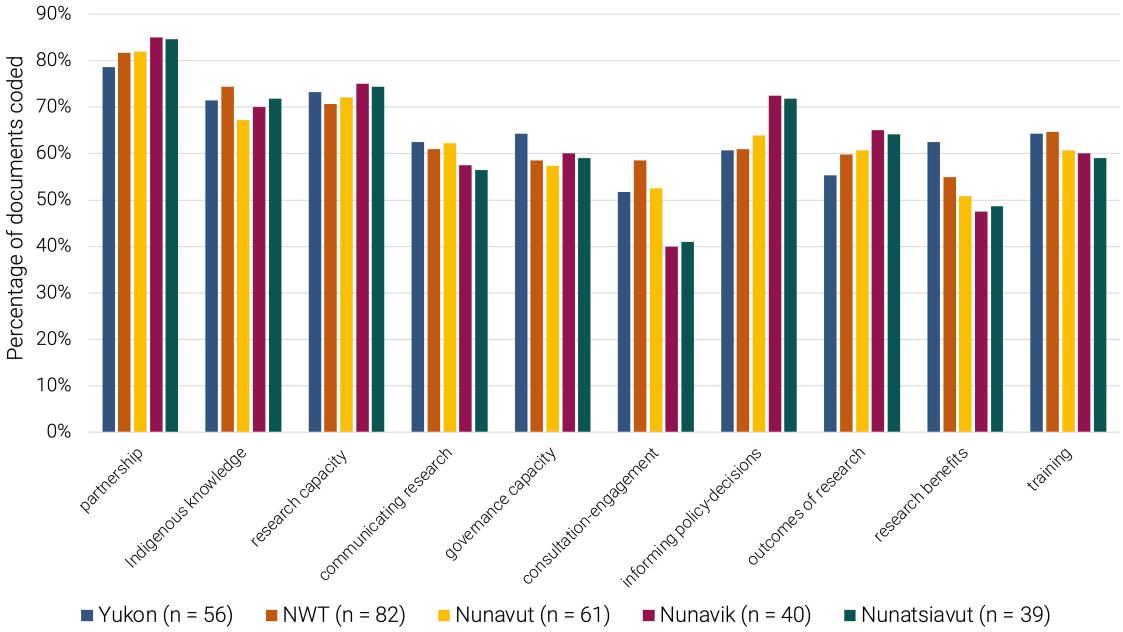
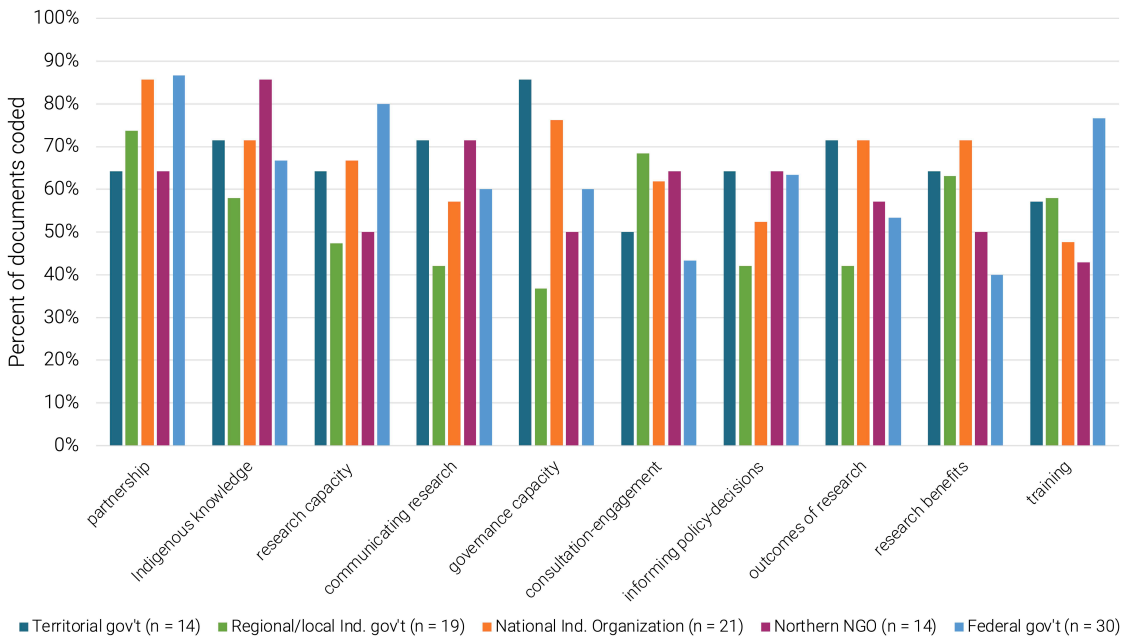


Figure 4.7. Top ten codes analyzed by author type.



There is not a lot of variation amongst the top ten codes overall across the five regions (Figure 4.6). There is a slightly greater importance put on governance capacity and research benefits in documents relevant to the Yukon, on consultation-engagement and Indigenous knowledge in documents relevant to NWT, and on informing policy-decisions and outcomes of research in documents relevant to Nunavik and Nunatsiavut. Documents related to each region were analyzed separately to identify the most used codes in each region, and seven of the top ten codes ranked consistently high in all regions, including partnership, Indigenous knowledge, research capacity, informing policy-decisions, governance capacity, and communicating research. Other themes that were important regionally were northern participation (Yukon, NWT, and Nunavut), and research agreement (Nunavik and Nunatsiavut).

There was more variability in the thematic coding when the top ten overall codes were cross-referenced by the five most common author types (Figure 4.7). Indigenous knowledge and communicating research were more commonly coded in documents produced by northern NGOs. Many of these organizations center IK or at the very least emphasize its importance in their research approach. Communicating research is an important role for northern NGOs, many of which focus on research with communities and Indigenous, often promoting participatory methodologies which require ongoing communication throughout the research project. Governance capacity was emphasized by territorial governments and national Indigenous organizations as a key focus for research in the North. For northern governments this directly relates to their role legislating research in their own regions and advocating for relevant priorities in federal research programs.

For national Indigenous organizations governance capacity was discussed in relation to individual research projects and data management (First Nations Centre - National Aboriginal Health Organization, 2005; ITK, 2018b). They also identified some of the challenges that communities or Indigenous organizations face when engaging in processes that govern research such as advising on funding programs, participating in research committees, or advocating for priorities in federal research programs. While larger organizations may have the capacity to engage in these processes, supports are required for many Indigenous organizations or community members to participate including funding for positions, training for necessary skills, or the opportunity to take part

in relevant boards and committees (ITK, 2018b). National Indigenous organizations also focused on how research is done, with an emphasis on partnership and research benefits (Figure 4.7). The federal government emphasized partnership, research capacity, and training, often in relation to their role supporting other organizations to participate in research. The major themes identified through the coding analysis are explained and explored in detail in the following section.

4.4.1 Partnership as the foundation for research relationships

Partnership is identified as a key component of research, although it is rarely defined or contextualized within policy documents. Generally, the concept of partnership is presented in relation to researchers and their relationships with other stakeholders, particularly in terms of developing strong researcher-community partnerships. However, there is also a discussion of the role partnerships can play in governing research, including relationships between governments, other organizations, and communities in setting expectations for research, guiding priorities and topics, and developing northern research programs. Partnership is highly related to the elements in the research lifecycle that are involved in developing relevant, useable research such as: identifying priorities and goals for the project, informing policies and decisions, and communicating research.

National Indigenous organizations like ITK, AFN, and the Métis and First Nations Centres of the NAHO, emphasize the importance of partnership in research.

These organizations advocate at the national scale for Inuit, First Nations, and Métis to be equal partners in research. “In order to truly benefit from research focusing on our people, Inuit must be included as equal partners with researchers at every step of the process” (ITK, 2016b, p. 18). Partnerships are a means of achieving research goals where capacity is limited for researchers, communities, and northern organizations. Trust, respect, and accountability are identified as integral to a research partnership, and northern participation in research projects was also identified as a core priority. Research relationships can be challenging, but as described by the MC-NAHO, “Support and commitment from both sides are needed for quality research … a mutual commitment between researchers and communities to resolve these issues … will ensure that the process is respectful.” (Métis Centre - National Aboriginal Health Organization, 2010, p. 4).

In an era of Indigenous self-determination in research, Indigenous partners have expectations for how research projects will unfold. Research agreements are recommended as a tool to facilitate partnerships and ensure that community and partner needs are considered along with the needs of the researcher. Formal agreements were not discussed as frequently as the importance of building good relationships. A research agreement does not create a relationship, it is a way of formalizing a pre-existing relationship by clearly outlining expectations of all involved. While a research agreement may not be a place to outline all aspects of the relationship, it can include a process for dealing with challenges and negotiating conflicts if they arise during the project. It is also an opportunity to

document plans for storing, using, and sharing data, which has been a contentious issue between Indigenous communities and researchers in the past (First Nations Centre - National Aboriginal Health Organization, 2005; IRC, 2013). In some cases, research agreements are required, particularly when communities have a protocol for working with IK (CYFN, 2000; Dehcho First Nations, 2004; Sahtú Renewable Resources Board, n.d.).

Within this thematic analysis, governance capacity refers to the leadership, oversight, and promotion of research, while research capacity refers to the resources, expertise, and infrastructure to participate in research. Partnerships are a key factor affecting both governance and research capacity in the North. At the federal level, partnership and governance capacity arose as themes in terms of their relationship with other circumpolar countries, particularly the United States (GC, 2009). However, in recent documents produced by the federal government more focus is placed on the relationship they have with northern governments and ITK. For northern governments and ITK, partnership is an essential component of their capacity to govern or influence the northern research agenda. Each government or organization only operates within its specific sphere of influence (e.g., as a regulator, funder, research agency, or partner), and must look to other governments for those areas where they do not have direct influence. This means that they can outline expectations and priorities for research but need to work with other organizations to achieve and promote them. As an example, ITK promotes Inuit self-determination in research by working with partners like governments, universities, research institutes, and

academics to enhance the outcomes of research for Inuit. Specifically in relation to the GC, "the development of an Inuit Nunangat research policy is necessary to coordinate research initiatives among the more than 10 federal departments and agencies that carry out Inuit Nunangat research, and to formalize guidelines for advancing Inuit governance in research" (ITK, 2018b, p. 14).

This approach to partnership is necessary, yet it is also fraught with challenges. In her work on the consultation process for the development of the Arctic Policy Framework, Mary Simon heard numerous concerns about a lack of accountability by the GC to these relationships:

> *"I encountered in my discussions a profound sense of disillusionment, and sometimes distrust, related to agreements with the Government of Canada … The term co-development of policies with Canada was looked upon with suspicion. My overall impression was that there was a longstanding disconnect between the aspirational intentions and commitments of Ministers, and the paternalistic, at times obstructionist, approach by the bureaucracy to the implementation of these ideas" (Simon, 2017, p. 21).*

Within the policy documents produced by the federal government there is a changing discourse in relation to partnership that highlights changes in government, including the recognition of community and regional priorities (GC, 2019a; POLAR, 2020b).

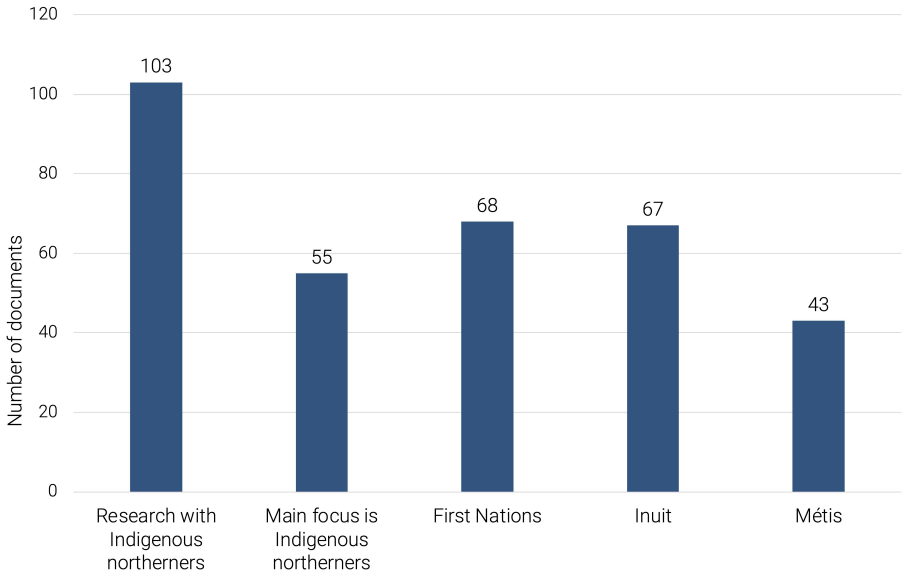
The contributions of partnerships to the research capacity of northern individuals, communities, and organizations are well documented; however, they can benefit researchers as well. As northerners gain comfort with research and find new ways to contribute to projects, there is more interest in seeking out research opportunities for their communities. As outlined by the GNWT, “The creation and sharing of knowledge is an important legacy for any research project; however, capacity - to plan, initiate and participate in research - is also an important legacy. If researchers are able to share their approaches, ideas and successes the stage will be set for more positive community involvement in research and monitoring in the future” (GNWT, 2004a, p. 13). Local organizations can provide key supports to researchers through partnerships, as long as research goals are relevant to the community (Pielke, 2007; QHRC, 2019). Reciprocity in research relationships is a fundamental principle for research with Indigenous communities (Healey et al., 2008; Van Bibber & George, 2012), and the ability to meet the needs of both the researcher and community is emphasized as part of a strong partnership.

4.4.2 Indigenous knowledge in relation to research

Most of the documents recognize Indigenous northerners as a key population for consideration in relation to research, with 103 documents at least mentioning or discussing research with Indigenous northerners (Figure 4.8). Many of these documents had a pan-Canadian focus and were relevant to all northern Indigenous populations, as well as non-Indigenous northerners, while others were regionally or locally specific. A few documents are not specific to the North but

focus on research with First Nations or Métis on a national scale and therefore have relevance for First Nations and Métis living in northern Canada. These include documents produced by AFN, the FNC-NAHO and the MC-NAHO. Pan-northern documents that had relevance to all five regions were coded to First Nations, Métis, and Inuit. For regional documents, those relevant to the Yukon were coded to First Nations, to Northwest Territories were coded to First Nations, Métis, and Inuit, and to Nunavut, Nunavik, and Nunatsiavut were coded to Inuit. Overall, 68 of the 110 documents were relevant to First Nations, 67 to Inuit, and 43 to Métis (Figure 4.8).

Figure 4.8. Documents that discuss research with Indigenous northerners



Of the documents that mention or discuss research with Indigenous populations, 55 have research with Indigenous northerners or Indigenous peoples as the main focus of the document (Figure 4.8). These include IK protocols and guidance documents for research with Indigenous communities (CYFN, 2000; Dehcho First

Nations, 2004; YRC, 2012). They also include strategies, priorities, and research policies produced by Indigenous governments and organizations (GRRB, 2018a; Sahtú Renewable Resources Board, n.d.). Indigenous-focused documents were more likely to be produced by a national Indigenous organization, regional or local Indigenous government or land-claim organization, or a northern NGO (Figure 4.9). Regionally, a greater number of these documents were relevant to the NWT but that is a reflection of the diversity of First Nation, Métis, and Inuit populations in the territory. Among the three Inuit regions, it is interesting to note the higher number of Indigenous-focused documents in Nunavut compared to Nunavik and Nunatsiavut. This may reflect increased capacity in Nunavut to develop research priorities or guidance, where there are more local organizations producing research policies.

Figure 4.9. Inclusion of Indigenous northerners in document focus by author type

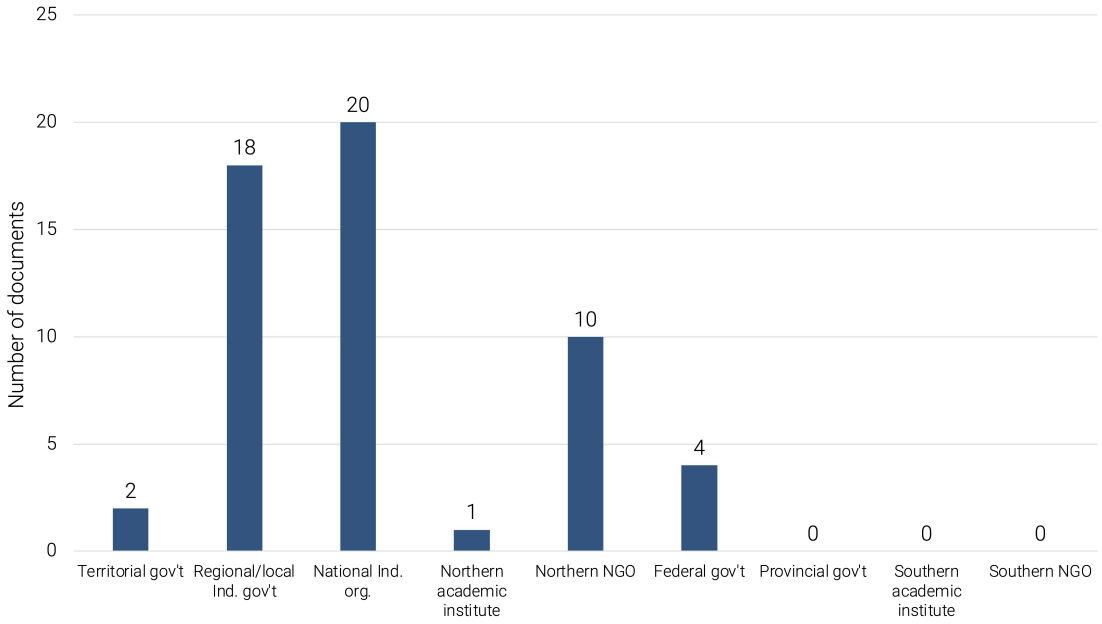
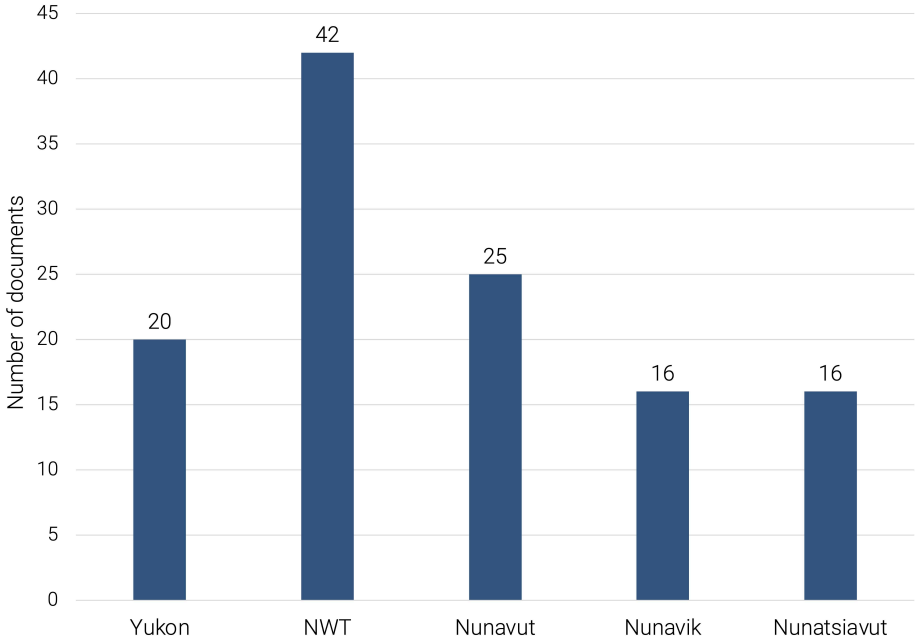


Figure 4.10. Inclusion of Indigenous northerners in document focus by region



The majority of the documents (88) included a discussion of IK as a key source of understanding for northern environments and society, but only 27 provided specific guidance on how to include or engage with IK (e.g., CYFN, 2000; Gwich'in Tribal Council, 2011) (Figure 4.11). These documents showed a wide range in their depth of discussion on IK. In some cases, this is limited to a small mention of the importance of including IK, while others included an in-depth discussion of IK in research, or guidance on how to collect IK.

The 27 documents that provide guidance on IK are produced by several different types of authors including mainly regional and local Indigenous governments or land-claim organizations, but also national Indigenous organizations and northern NGOs (Figure 4.12). There are double the number of documents relevant to the Northwest Territories that provide guidance on IK compared to the

other regions (Figure 4.13), again reflective of the diversity of NWT's Indigenous population.

Figure 4.11. Documents with a main focus on Indigenous knowledge and local knowledge.

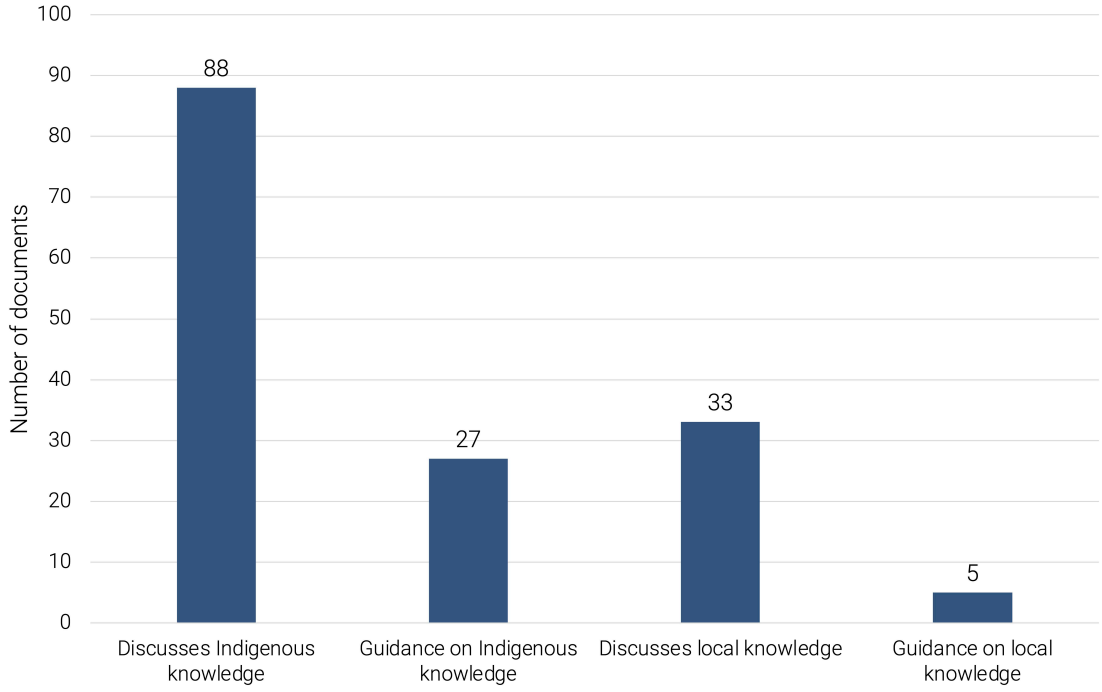


Figure 4.12. Guidance on Indigenous knowledge by author type

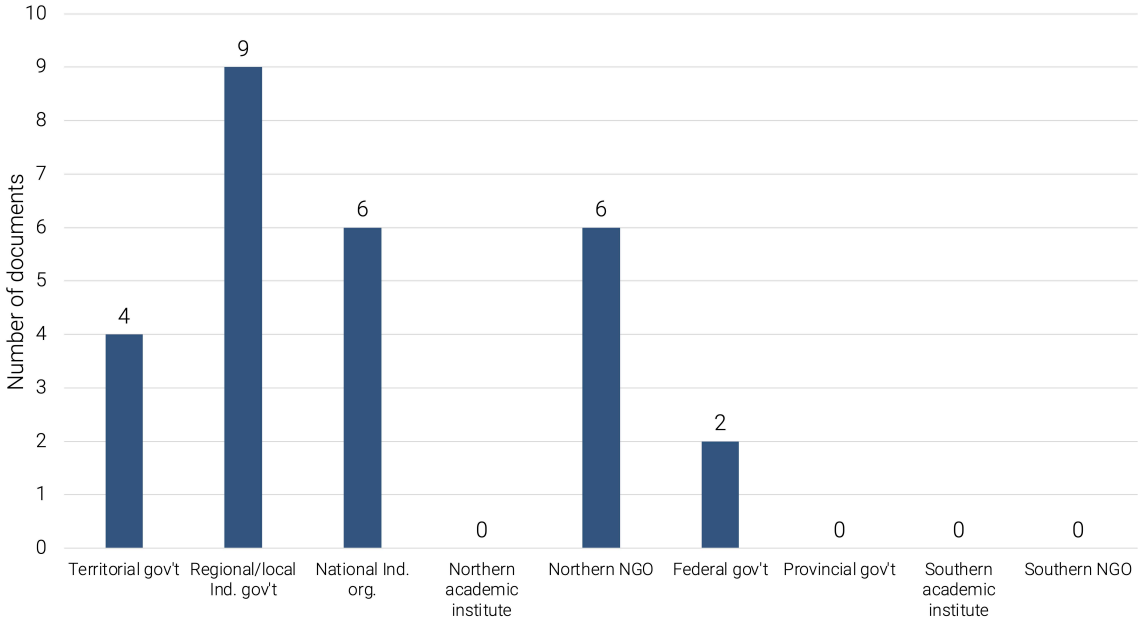
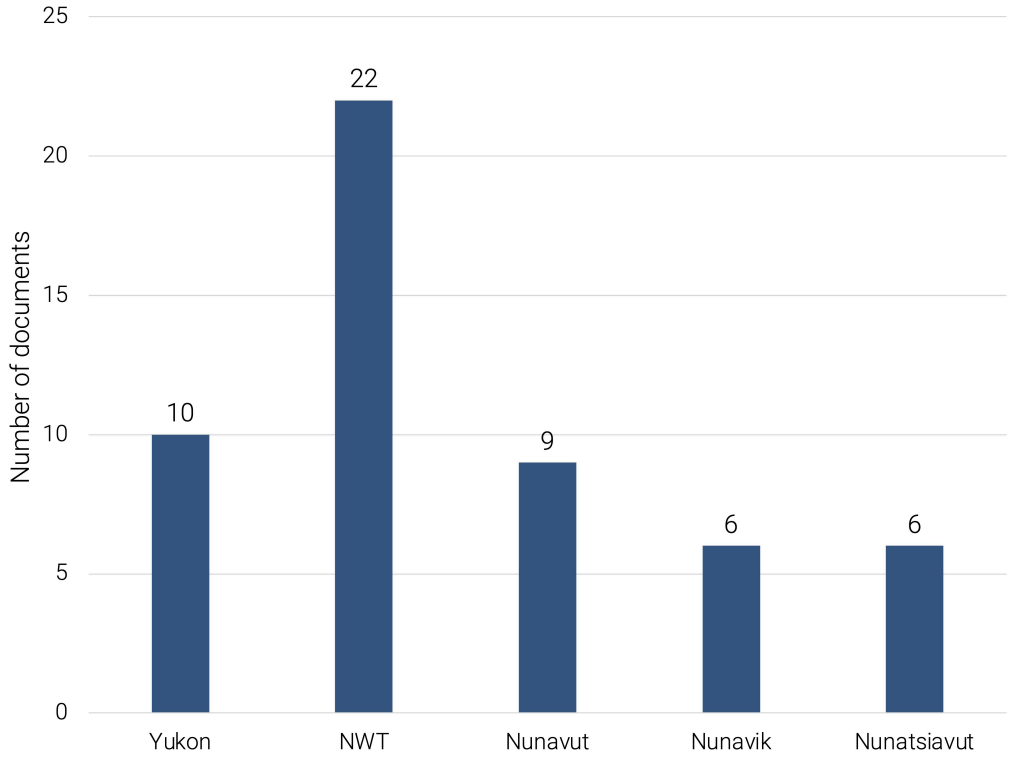


Figure 4.13. Guidance on Indigenous knowledge by region



Although IK was used as an attribute to track how many documents referenced IK, it was also one of the most applied codes in the thematic analysis. The code was only applied where IK is discussed more in depth, often with associated methodological and ethical considerations. Many northern organizations recognize that IK and science come from different worldviews and should be considered in different ways. The language around IK changes over time and varies between different organizations. Organizations that come from a western science background and tradition, particularly federal government departments, tend to discuss IK as another data source that supports western science. On the other hand, northern governments and Indigenous organizations tend to discuss it as an equal source of knowledge that cannot necessarily be included or

integrated in the same way as science. Indigenous organizations emphasize that IK is a knowledge system and worldview. In more recent publications, emphasis is placed on respecting IK as a stand-alone knowledge system as opposed to a source of data to be integrated with science (Ferrazzi et al., 2020).

Many organizations note the importance of IK in contributing to our understanding of key sustainability topics including climate change, wildlife ecology, and well-being. In some cases, for community uptake of research it is essential that IK be considered in developing the project, particularly in identifying relevant research questions. “Inuit occasionally dismiss scientific studies (especially those on harvested wildlife species) as unnecessary and irrelevant where they believe the studies will provide knowledge that Inuit already possess” (ITK et al., 2007, p. 2). Researchers often approach IK as another form of topical knowledge that can inform research results and outputs. However, considering IK should start at the beginning of the project with how research is done, the principles and values that are incorporated in research design, and the relationship between the researcher and the community (Ferrazzi et al., 2020; Ikaarvik, 2018). Some organizations emphasize the importance of recognizing and including the interests and priorities of Indigenous northerners in the development of the project over specifically incorporating IK in research (GRRB, n.d.; Ikaarvik, 2018). This can also extend to ensuring that Indigenous interests and priorities are reflected in broader research policies, for example in funding programs (ITK, 2018b). Some northern and Indigenous organizations advise researchers to focus on a respectful, inclusive approach with Indigenous

communities as opposed to prioritizing the integration of IK in scientific research. As an example, the youth of Nunavut that are part of *Ikaarvik: Barriers to Bridges* highlight that Inuit Qaujimajatuqangit (IQ) is more than just knowledge, "IQ … incorporates knowledge, customs and values. It is a way of life. It is as much about how we interact with one another, our attitudes and behaviours, as it is about what we know." (Ikaarvik, 2018, p. 3).

Indigenous knowledge was frequently cross-coded with informing policy-decisions, indicating the value IK can bring to the decision-making process. While there was some discussion of bridging IK and science in designing and conducting research, bridging knowledge sources also comes up as a strategy for informing policy. This can be accomplished by bringing the two knowledge sources together at the decision-making level, as opposed to in an individual research project (GRRB, n.d.). Concerns have been expressed that IK collected for a researcher's project may not result in practical applications, so approaches that ensure that IK is available for use by Indigenous northerners would ensure that IK is available for their policy needs (CYFN, 2000). In order for this to happen successfully, IK needs to be valued as an equal source of evidence with scientific knowledge.

Both IK and western science are recognized as having a role to play in supporting social, economic, and environmental sustainability in the North. IK was discussed as a key source of information for developing policy in relation to land and wildlife management, resource development, and environmental assessment.

There is also interest in better understanding methodologies for incorporating IK into management and planning processes. Socio-cultural sustainability, including language, traditions, and cultural practice, is a pan-northern priority and is intrinsically linked with IK. Language revitalization is a concern across the North, and while it can be the focus of research it can also be integrated into research through use of Indigenous languages wherever possible.

Data sharing and data ownership were widely used codes that were also cross-coded with Indigenous knowledge. This highlights the importance of OCAP® and other data management frameworks for protecting the rights of Indigenous peoples to own and access their data, and to control how it is used and communicated. As the Guidelines for Research with Yukon First Nations points out "researchers have the ability to construct legitimate arguments for or against ideas, theories or practices. Researchers are collectors of information and producers of meaning, which can be used for, or against Yukon First Nations interests" (YRC, 2012, p. 3). There are numerous references to IK or data being shared without permission or used for applications that were not approved. "Research has been damaging in the past in instances where genetic material is used, sensitive information is published and confidential cultural information is shared inappropriately" (Ownership, Control, Access and Possession of Data (OCAP) Resolution, 2006, p. 2). Northern research has been described as extractive, where data is used by researchers but not always returned to the community; "Communities have seen countless researchers come and go, taking

samples and data to build their careers and leaving communities feeling used." (GNWT, 2004b, p. 2). In their guide to OCAP®, the FNC-NAHO (First Nations Centre - National Aboriginal Health Organization, 2005) highlights a few ways that Indigenous peoples have been wronged by research, as well as providing options for First Nations communities to apply OCAP principles to support self-determination.

4.4.3 Research and governance capacity

Research capacity is about having the capacity, whether it is tools, resources, infrastructure, personnel, skills, or other requirements, to engage in the practice of research, including: conducting research, managing data, and implementing results in programs and policies (First Nations Information Governance Centre, 2014; Van Bibber & George, 2012). Capacity building is not always a North-South relationship, it can happen within a region or across the North (ACUNS, 2018). Capacity building is a partnership that requires efforts from both community and research partners, and ultimately benefits both (Van Bibber & George, 2012). Research is often identified as a sector that requires funding and support to sustain ongoing activities, coordination, employment, and training opportunities for northerners and students. While the federal government has been a primary support for building local capacity by investing in colleges, research institutes, and infrastructure, there are still barriers to local research capacity and a need for support at the institutional, community, and individual scale in the North (GC, 2019a; GNWT, 2004b). Funding, partnerships, support for human resources,

technology, information and data management, assistance for proposal writing and research specific training can all contribute to both institutional and community research capacity (First Nations Centre - National Aboriginal Health Organization, 2005; GNWT, 2019). Capacity to conduct research includes the need for adequate and sustainable research funding at the community level and for northern organizations and institutions to coordinate, contribute, and participate in research projects, networks, and partnerships, including infrastructure, equipment, or training as required (GRRB, n.d.; ITK & ICC Canada, 2007; IRC, 2013).

Capacity to conduct research and be part of the research process is also intertwined with capacity to administer and govern research. Where there is institutional capacity to engage in the oversight of research in the region and in research partnerships, there are more research opportunities for community members and organizations (ITK & ICC Canada, 2007). Involving northerners in research can contribute to both capacity to do research and capacity to use research; participating in research helps to develop skills, but it also helps build local understanding of an issue which can help with applying the results (IRC, 2013). Research that builds on existing capacity or community strengths is respectful of Indigenous values and contributes to meeting community research and knowledge needs (GNWT, 2019; Van Bibber & George, 2012). Data management and ownership require the institutional capacity to apply the principles of OCAP (First Nations Centre - National Aboriginal Health Organization, 2005; First Nations Information Governance Centre, 2014).

Questioning the capacity of Indigenous and northern organizations when they assume control of data or the research process can interfere with northern leadership in research (First Nations Centre - National Aboriginal Health Organization, 2005).

International partnerships also play a role in Canada's research capacity. In 2002 it was identified that Canadians were falling behind in research capacity - specifically in funding. Canadian researchers were reliant on their international partnerships to participate in international committees and projects (NTI, 2000). International partnerships are still an important part of advancing northern scholarship and knowledge of northern systems, allowing Canadian researchers to share knowledge and experience from other regions with northern Canada (GC, 2017). International collaboration can happen through research projects, but also through formal partnerships, committees, or science associations (GC, 2017). Canada's participation in these international arenas depends on the support of the Canadian government (NTI, 2000). IPY and the northern research chairs were successful examples of national funding to support northern research and foster international collaboration. POLAR and the CHARS are examples of how the federal government is continuing to support this capacity (GC, 2009, 2010, 2011, 2017, 2019a).

Governance capacity in northern research affects organizations at the local, regional, and national scale. For smaller organizations this means identifying their limits in terms of support and partnership potential and prioritizing where to

expend their resources (GRRB, n.d.). Local governance usually includes organizational or advisory group oversight of research. That can include reviewing research proposals, monitoring projects, and negotiating research relationships, as well as advocating for local priorities and interests (ITK, 2018b). Not all communities or local organizations have the capacity to provide this kind of oversight or have equivalent experience working with researchers (ITK et al., 2007; IRC, 2013). Whether or not a community has a formal governance structure for research should not change how researchers approach the community. They should still consult with community leaders and organizations, providing similar opportunities for engagement. They may need to consider providing resources for the community to engage in the project.

At the regional level, territorial governments play multiple roles in governing research: leading and conducting research, developing partnerships, advocating for northern research priorities, influencing other organizations, and regulating research (GNWT, 2017, 2019; YG, 2016). The ability to regulate research through licensing or permitting, identified with the code compliance capacity, is a key component of governance capacity for the northern regions. However, to be effective this system requires the active participation of community reviewers. More support for communities to engage in this would improve the licensing process, whether that is through community research advisors or other personnel (ITK & ICC Canada, 2007; Purple Dog Consulting, 2010). The capacity of communities to review licensing applications can be affected by staff turnover and the loss of institutional knowledge.

Governance capacity is directly related to research sovereignty, or self-determination in research. When organizations have the capacity to engage in the oversight of research, they can directly influence the research agenda. As compared to funding for training which supports the development of individual research capacity, support for organizations to engage in the oversight and governance of research can affect whether research meets local and regional needs (ITK & ICC Canada, 2007). Local research capacity is also intertwined with governance capacity, as funding for research capacity in the North relies on the advocacy of northern organizations. Governance capacity includes formal policies and strategies that commit funding for the participation of northerners and northern organizations in research oversight, without which research capacity can be vulnerable (NTI, 2000). Governance capacity at the organizational level includes the ability to engage in research agreements and data management agreements, which can require human resources, policy support, and data infrastructure (First Nations Information Governance Centre, 2014). This capacity ensures that community and regional scale organizations can advocate for their research priorities and expectations and can implement OCAP and other data management principles.

4.4.4 Outcomes of research

A common expectation across different policy documents is that research should be relevant and have beneficial outcomes for the land, animals, and people in the North and provide specific contributions to the communities and regions where it takes place. Outcomes of research can include tangible benefits

but can also include how the information produced and experience with research can be used by local residents, organizations, and decision-makers.

> *"For Inuit, knowledge can only be described as such if it is used to improve the lives of others. If one has knowledge but does not share it or use it for the common good, then it is seen to have no value. In this light, all research must result in direct application to improving the lives of the people who contributed to the knowledge development. This understanding is critical to the design of all research being carried out with Inuit populations, but should be essential in all research anywhere." (Aqqiumavvik Society, n.d., p. 3).*

Researchers are recognized as experts who possess specialized skills and knowledge and who can help provide information for sound decision making. Northern organizations and governments value research for the contribution it can make to local issues and northern society, in particular for contributions to environmental and socio-cultural sustainability (YRC, 2012). Research from all disciplines can contribute to decision-making, however health and social science research in particular are expected to contribute to sustainability transformations (First Nations Information Governance Centre, 2011; ITK, 2018b; Petrov et al., 2016). Despite being identified as key priorities, health and social sciences, as well as humanities, have generally been underrepresented in northern research (ACUNS, 2017, 2018; GC, 2019a; ITK, 2018b; Perrin, 2018; Petrov et al., 2016).

Canada's Arctic and Northern Policy Framework recognized the need and committed to supporting more social science research (GC, 2019a).

Many northerners regard scientific research as a valuable tool to protect public wellbeing, generate wealth, and to advance knowledge for the benefit of communities and society at large. At the local scale, research can benefit communities by providing employment, training, equipment, contributions to local economy, and honoraria for participants (ACUNS, 2018; Brockman, 2010a, 2010b).

> *"Research provides much-needed capacity transfer between communities and researchers, opportunities for Indigenous peoples to address issues of local priority, and jobs that put food on the table for many families, and that can become pathways to educational and knowledge development opportunities and stable employment." (Irlbacher-Fox, 2018, p. 4).*

However, there are also concerns that research can have adverse impacts on communities and the natural environment. Regulatory processes are in place across the North, including a research licensing process in the three territories and a research approval process in Nunatsiavut, to identify and mitigate potential negative impacts. A commitment to ethical approaches and communication with communities while designing research projects facilitates the pathway to positive outcomes and creates opportunities for northerners to engage with the research project.

4.4.5 Informing policies and decisions

The role of research in informing policies and decisions was a key theme that arose in the document analysis and having scientific knowledge available for use in decision-making processes is a key priority, particularly in documents produced by territorial and federal governments, ITK, and regional or sub-regional Indigenous organizations (e.g., the IRC and CYFN). The code informing policy-decisions was applied to two different aspects of research informing policy: i) as a key step in the research lifecycle (the act of sharing results to affect decisions or policies); and, ii) as an outcome of research (policy has been informed by research). With respect to policy as an outcome of research, there is a desire for research to contribute to social, health, and environmental solutions (YG et al., 2016). While research and science are recognized as important contributors to sustainability decision-making in the North, this is usually discussed as something that will happen in the future as opposed to a current reality.

The importance of informing northern policy and decision-making emerged as a key theme in the documents analyzed. This emphasis on the importance of useable science in the North is also a key issue noted in the literature (Brunet, 2014; Ford et al., 2013; Ogden et al., 2016). While all different types of organizations discuss the contributions research can make to policy and decision-making, the importance of research informing policy is particularly emphasized by Indigenous organizations that are involved in policymaking (e.g., ITK) and governments. However, little advice is given as to how this can be accomplished. There seems to be a common assumption that as long as

research is based on local priorities, there will be uptake by policymakers. Yet, there is not always a causal link between relevant research and action or decision-making. Policy development incorporates a variety of information sources beyond academic research and science, and those can conflict with research results. Policymakers may require data at a different scale or format, or may have identified different data gaps, than researchers or communities. Participatory research methods are identified as a means to impact policy, through inclusion of relevant decision-makers in the process. By including decision-makers early in the project, ideally in developing the project goals and research question, the hope is that research will be relevant to their needs and easily accessed.

The documents highlight the disparity between priorities at different scales, leaving gaps in the knowledge that is available and valued for decision-making. There is potential for tension between community needs and policy needs; however, open dialogue early in the project provides the opportunity to address these issues.

> *"The next step in the evolution of scientific practice in the Arctic is linking community-driven Arctic research priorities with national policy development to ensure scientific investments benefit communities and answer key questions facing the Arctic. I firmly believe that the foundation of effective decision-making is good information. In the Arctic, that means being committed to placing*

equal value on Indigenous knowledge and western science."

(Simon, 2017, p. 12).

There is a need for effective communication between research policymakers, funders, researchers and research users to encourage the sharing of results for decision-making.

4.4.6 Communication and engagement

Sharing knowledge is a dynamic process with knowledge flowing in multiple directions between researchers, knowledge holders, policymakers, community members, practitioners, and boundary organizations (Healey et al., 2008; Institute for Circumpolar Health Research, 2015; ITK, 2018b). Relationships are the foundation of research in the North and communication is part of building and maintaining relationships (ITK et al., 2007; Van Bibber & George, 2012). Consultation and engagement relate directly with the themes of communicating research and building research partnerships. Ensuring that research is relevant to the community or partner organization requires consulting with them on priorities and goals for the project. Consultation is not only encouraged, to a certain extent it is mandated through permitting and licensing processes. Across the North there are requirements for consulting with rightsholders regarding research, however there are also examples of researchers not complying or ignoring those requirements. Local protocols, like IK protocols (CYFN, 2018; Dehcho First Nations, 2004) also set expectations for engagement and communication. There is more of an obligation put on social science and health researchers to ensure

their research is relevant, particularly as they are more likely to require local participation in their research (Van Bibber & George, 2012). However, research priorities for many northern organizations include natural and physical science topics that are relevant to community decision-making and can benefit from local consultation. For example, the GRRB has a list of priority wildlife topics that they recommend researchers engage with them on (GRRB, 2018a, 2018b). Researchers in these disciplines are also encouraged and expected to engage with the community before defining their research question to explore how the researcher's goals might align with the community's interests and needs. Early engagement and communication with communities will help researchers avoid initiating projects that the community is not interested in (GNWT, 2004b).

Consultation can be time-consuming for northern organizations and communities who may not have the time or interest to engage with all the researchers working in their area. Although the onus is on the researcher to initiate communication with the community or relevant organizations, ongoing communication throughout a project requires commitment from all partners (Métis Centre - National Aboriginal Health Organization, 2010). As an example, if the community clearly communicates their research expectations during preliminary engagement, there is less room for misunderstanding and conflict and the project will be more likely to fulfill the community's needs (ITK & NRI, 2002). Clear and ongoing communication was highly related to several codes within the research lifecycle including planning for a new project, identifying priorities and goals, defining questions, and reporting to communities and

partners. Clear communication using plain language, and translation where needed, is important for establishing an agreement and ensuring that everyone understands what will happen throughout the process. For the Aqquimavvik Society in Arviat, NU, communicating research to the whole community starts while identifying goals and developing a shared understanding of the research project, which ultimately translates to informing local decision-making.

> *"This is also a time when all of this information is shared and promoted across the community so that there is a collective awareness of the issues and the process being proposed and that by sharing the background information, every community member is then able to consider the topic through the lens of personal experiences and ideas. In this way, the process of research is shared beyond those who are selected informants. This is an approach which seeks to raise critical consciousness across the community and build critical mass through engagement around the issues. It also sets the stage for meaningful knowledge translations of the data results." (Aqqiumavvik Society, n.d., p. 3)*

Communities or local organizations can play a role in developing communication products, particularly in putting results in the broader context. An example is the Inuit Health Survey and the role NTI played in developing relevant communication products (NTI, 2013). In cases where community members or organizations have directly contributed to the project there may be an expectation that any reporting

of results requires the consultation of local leadership and participants. “Sometimes researchers have published without consulting the community, resulting in negative consequences from publications where communities had no opportunity to correct misinformation or to challenge interpretations.” (Healey et al., 2008, p. 13). Expectations for community input or control over the communication process might vary from project to project depending on the relevance and importance of the topic for the community and the level of community involvement. Of utmost importance is identifying how and when results will be communicated, and who has control over those decisions (First Nations Centre - National Aboriginal Health Organization, 2005; First Nations Information Governance Centre, 2014). Community reporting is a key communication milestone and step in the research process that is reiterated through the documents analyzed.

In terms of when communication is essential within the research lifecycle, it was highly related with the code identifying goals and priorities which is a critical stage for northern participation. When a community or partner organization has influence over research goals, the project is more likely to produce information that is useful locally. The next step in ensuring that the results are used is sharing the data and results with interested communities and organizations in a format that is accessible and applicable. These two steps are essential for achieving research outcomes at the local scale. Recommendations for returning results to communities include sharing them through posters, community radio, pamphlets, and hosting a community presentation or open house (Healey, 2007;

ITK et al., 2007). Depending on the type of information being produced, there may also be a need to present key findings to local leadership for their feedback before publishing. Local governments or partner organizations may want a copy of the data and a report summarizing the project and key findings, particularly if there is relevance for policy. For example, the Gwich'in Tribal Council requests that researchers conducting IK research present findings to the Chief and Council, the Renewable Resource Council and the Designated Gwich'in Organization while also encouraging researchers to present their findings to community members (Gwich'in Tribal Council, 2011).

4.5 Discussion

Discussions of sustainability are intrinsically linked with how organizations communicate their desired outcomes of research. In discussing the need for and value of research, all different types of organizations conceptualize research as a contributor to environmental, socio-cultural, and economic sustainability in the North. Both broad and focused sustainability priorities are identified across the policy documents. Although physical and natural science topics are a high priority in the North, there are opportunities for all disciplines to contribute to sustainability research. The following section discusses key insights into how to align research with policy objectives to ensure research outcomes are relevant to the questions that northern governments and organizations are dealing with. It also brings together the expectations that northern organizations have for researchers as they engage in sustainability research and identifies key avenues

for academic research to support sustainability decision-making that is inclusive of northern values.

4.5.1 Aligning research with northern policy objectives

A key objective in conducting this research was to identify how research programs can align with northern science policy objectives. With increasing emphasis on sustainability issues in the North, finding ways to bridge research with policy is of utmost importance; however, there is a gap in identifying how that knowledge transfer occurs. Using research results to inform policy is usually identified as a step that happens at the end of a research project once the results are compiled and analyzed. However, by identifying potential users of research or policy makers at the beginning of the project, and including them in key steps along the way, there is an opportunity to ensure the project can meet policy and program needs. Sustainability issues are often complex and multi-faceted and can implicate several different organizations. Part of developing relevant projects is understanding the local context and local policy needs. Therefore, it is important to identify key groups in the community and region such as organizations and decision-making bodies involved in the issue of concern. Engaging stakeholders that will be involved in incorporating results into decisions or programs during early stages of project development can promote knowledge transfer later in the project. This goes beyond tailoring communication products and includes designing a research question and methodology that are suitable for arriving at data and results that are relevant to policy. While this approach ensures policy priorities are considered at the outset,

it needs to be done in a way that is respectful of the leadership and participation of local and Indigenous partners.

Some northern organizations, including the IRC, have recognized that if they want knowledge available to inform their decision-making and programs, they need to play an active role in setting the research agenda for their region (ACUNS, 2018). While Arctic research plays an important role in addressing global and circumpolar sustainability issues, it should also support northern and Indigenous self-determination. This involves more than just providing knowledge to support local sustainability, but also considerations around local consultation, ethical protocols, and accountability. For northern Indigenous governments and organizations, improving relationships and partnerships is intrinsically linked to their capacity to govern and influence the research agenda and process, and ultimately self-determination in research (Brunet et al., 2016; First Nations Centre - National Aboriginal Health Organization, 2005; ITK, 2018b; Snook et al., 2018). There is strong support within both the academic and policy literature for sustainability research that is relevant and based on community priorities and goals (Carter et al., 2019; K. J. Wilson et al., 2020). Research that responds to community needs, respects local perspectives of sustainability, and incorporates community strengths can contribute to developing both policy and local research capacity. For researchers, ensuring that research is relevant to the community or partner organization requires consulting with them on priorities and goals for the project. Consultation is encouraged already in northern regions, and to a certain extent it is mandated through permitting and licensing processes, but it mainly

focuses on a particular research project and does not typically extend to policy relevance and governance organizations. Local protocols like IK protocols set expectations for engagement and communication in research. However, such protocols must also be extended to developing respectful and meaningful policy that considers evidence based on Indigenous ways of knowing, values, and oral traditions.

Respecting northern leadership and self-determination requires careful consideration of how to include northern voices throughout research decision-making. There was a noticeable lack of documents at a community scale or sub-regional scale focusing on research policy broadly. Instead, those that did exist were focused on IK, specific methodologies, or guidance on community-based research. This could reflect a lack of resources within Indigenous governments or land-claim organizations and a need to focus energy on their immediate experiences with researchers. This puts an onus on the larger organizations that are producing policy documents to engage meaningfully with northern rightsholders and communities and effectively represent their input when putting forth northern research policies. It also indicates that there may be a need for resources to support smaller organizations and communities to engage in policy-setting exercises, or to develop and communicate their sustainability research priorities to regional organizations and governments. The GRRB provides an example of how this can be done through their community consultations. On their website they communicate both community research priorities that arise out of those consultations as well as GRRB organizational research priorities.

This process provides a voice for community members while also respecting that the GRRB has a specific mandate and research interests (GRRB, n.d., 2018a, 2018b).

4.5.2 Expectations for engagement in and conduct of research

One of the objectives of this study was to understand how organizations expect researchers to engage in and conduct research. The process of developing and conducting research can be as important as the knowledge that is produced (Gearheard & Shirley, 2007; Ikaarvik, 2018; K. J. Wilson et al., 2020). There are already ongoing conversations in both policy and scientific literature about the importance of participatory methodologies in northern research (Brunet et al., 2014a; Carter et al., 2019; Henri, Carter, et al., 2020), and there is guidance available on how to build relationships, engage in partnerships, and co-produce knowledge with northern communities (CIHR et al., 2002; Kawerak Inc. et al., 2017, 2020; Knapp & Trainor, 2015; Omma et al., 2020; Stone, 2020; Tondu et al., 2014; K. J. Wilson et al., 2020).

Northern policy documents support the foundational concepts of relationship, partnership, and communication that underpin the development of relevant and applicable research. Although research relationships can be challenged by conflicting values, different worldviews, and competing needs and priorities, these challenges can be overcome by ongoing communication, shared goals, ethical approaches grounded in local needs, and formal research agreements (First Nations Information Governance Centre, 2014; Healey et al., 2008; Van

Bibber & George, 2012). The voices and perspectives of northerners are not necessarily reflected in the scientific or policy literature. However, participatory approaches and the co-production of knowledge are approaches that have shown success in bringing these northern voices in. When these approaches are not suitable and other methodologies are being employed, an emphasis on relationships and communication with local partners can still result in useable research to inform sustainability decision-making. There is no single approach to participation that can be applied to all research projects, rather there is a continuum of participation that can be implemented according to local needs (Brunet et al., 2014a; ITK et al., 2007). Identifying where a project appropriately fits on that continuum comes from conversations with communities and local partners, and requires dedication of appropriate time and resources for community and partner participation in project development. Local organizations may need financial or in-kind support for personnel to engage with researchers, or resources to participate in priority-setting exercises.

Distrust of researchers is the result of past relationships where researchers were not accountable or did not communicate or share results (GNWT, 2004b, 2017; YG et al., 2005; ITK, 2018b; NTI, 2013). Social license to conduct research is important in the northern context and comes from open communication and follow-through on commitments. Expectations for research conduct are generally upheld by ethical review processes or other regulatory processes; however, these can conflict with local and Indigenous protocols that value community (collective) consent as well as individual consent. Both licensing and ethical

processes are opportunities to regulate research, but the primary concerns of the two processes are not always aligned. Ethical review processes are usually concerned with the individual consent of participants, while northern protocols value community consent as well (First Nations Information Governance Centre, 2014). Northern legislators and regulators support the community consent process through the review of applications by local and regional organizations; however, without any capacity to enforce compliance the process is not always accountable to communities (Healey et al., 2008; ITK, 2018b). Accountability mechanisms are often lacking and can undermine research relationships, programs, and ethical processes.

There is a long history of communities not receiving the results of research, or receiving a copy of a scientific publication that is not understandable or useful. When the community partners play a role in guiding and leading communications, there is more likely to be trust in – and uptake of – the research results. Communicating research is an iterative process that happens throughout a project, particularly if the goal is to influence policy. Communication with potential research users can create pathways for implementing research results in decision-making. Partner organizations with established relationships in the region may be better suited to communicating results than the researcher, effectively playing the role of a boundary organization by bridging science and policy through two-way communication (Blackstock et al., 2007). This is particularly relevant when communicating sensitive information or IK, which may require contextualization by community members or partners.

4.5.3 Supporting sustainability decision-making

The final objective was to identify avenues for academic research to support policy and decision-making related to sustainability. Northern research is expected to directly impact local decision-making, supporting sustainability transformations in resource development, wildlife management, healthy communities, cultural revitalization, and economic development, among other issues (GNWT, 2017; YG et al., 2016; Petrov, 2016). Incorporating northern voices, context, and values in developing priorities and goals related to sustainability research is essential in approaching sustainability in a way that is relevant and potentially transformational (POLAR & Pitquhirnikkut Ilihautiniq/Kitikmeot Heritage Society, 2016; Vuntut Gwitchin First Nation, 2009). Sustainability transformation requires local context and input; co-production and participatory methodologies can support the incorporation of local perceptions of sustainability (POLAR & Pitquhirnikkut Ilihautiniq/Kitikmeot Heritage Society, 2016; Sheremata, 2018). An example of this is Inuit Qaujimajatuqangit, which has sustainability principles embedded within Inuit societal values, particularly the principle of avatimik kamttiarniq which “encourages sustainable social/environmental stewardship” (Ferrazzi et al., 2020, p. 13). Self-government and self-determination can support the capacity for Indigenous northerners to engage in sustainability research, and to apply the results within their own decision-making organizations (Riedlsperger et al., 2017; Shirley, 2005).

Within the broad sustainability priorities discussed throughout the policy documents, variability exists between regions and communities regarding

specific research priorities and questions. Overwhelmingly, environmental sustainability is discussed throughout the policy documents as a key concern for northern regions and an expected outcome of northern research. Climate change and resource development are the two major threats discussed in relation to northern environmental sustainability, and climate change is identified as "arguably the single greatest challenge facing the Arctic and its residents" (Special Senate Committee on the Arctic, 2019, p. 70). Social and economic sustainability priorities in the North also include issues like language revitalization and preservation, cultural heritage, mental health and suicide prevention, impacts of residential schools, healthy lifestyles, economic opportunities, and the impacts of tourism and other economies (CPC, 2014; GC, 2017; GNWT, 2009, 2017; ITK, 2016b; Kawerak Inc. et al., 2017; Special Senate Committee on the Arctic, 2019). While some sustainability topics that have global significance may not appear to be a local priority, through thoughtful communication and consultation they may garner local interest. There are countless sustainability research gaps with local relevance and scientific significance.

Research on climate change is noted as a community, regional, and circumpolar issue, yet it is discussed in different ways by different author types. Although climate change broadly is a shared priority, there are divergent priorities between different types of organizations. For territorial governments, Indigenous governments, and ITK, climate change research provides information that can improve local decision-making. The Government of Canada has obligations to

both the northern regions and to circumpolar science, which is reflected in their discussion of climate change priorities. They identify the importance of advancing global knowledge and scholarship of climate change, while also acknowledging the importance of contributing to local knowledge of climate change for solving sustainability issues (NTI, 2000). Priorities at the community scale, as identified by northern NGOs, northern Indigenous governments and organizations, territorial governments, and ITK, include how climate change and resource development impact the land, wildlife, and community well-being in their region. Their priorities are to identify local solutions and adaptations to support sustainability, emphasizing the critical need for climate change research to be relevant and contribute to local decision-making. Climate change and resource development at the local scale are discussed as cross-cutting issues that impact socio-cultural and economic sustainability as well as environmental sustainability, with wide-ranging impacts on cultural activities, food security, community well-being, traditional and resource economies among others (ITK, 2016a, 2016b; Kawerak Inc. et al., 2020; Omma et al., 2020; Special Senate Committee on the Arctic, 2019).

4.6 Conclusion

This examination of northern research policy documents across Canada emphasizes the critical importance of sustainability research in addressing policy and decision-making priorities identified by a broad range of organizations. While there are overarching issues commonly identified across

the North, local interests can vary greatly, as can local perspectives on what sustainability entails. Understanding and responding to this diversity are important aspects of addressing local needs. This analysis serves to highlight the importance of co-production and participatory approaches in aligning sustainability research and policy. We also articulate the impact that including policy- and decision-making organizations can have on creating a pathway from research to evidence-informed policy. Ultimately the policy documents analyzed emphasize the need for sustainability research to be conducted in a way that is attentive to the research process regardless of methodology, including: accountable partnerships, institutional and community ethics, and clear and open communication.

Although the need for research that is inclusive of northerners and particularly Indigenous northerners, focuses on northern priorities, and is led and conducted by northerners has been recognized for years, the most recently produced policy documents and current academic literature still discuss challenges and gaps with research meeting specific northern needs. Northern organizations continue to focus their limited resources on advocating for better research practices, indicating that there are ongoing issues. Arising from our policy analysis are five key recommendations that can support both researchers and northern and Indigenous organizations to strengthen the research-policy interface for Arctic sustainability:

1. **Develop multi-scale inclusive research partnerships** – Research partnerships can be improved at both the individual and organizational scales to focus on northern sustainability priorities. This involves being inclusive of northern leadership, recognizing northern conceptualizations of sustainability, and ensuring benefits for northerners. Better partnerships with individual researchers result in improved projects and initiatives; however, organizational-scale partnerships (e.g., Indigenous, or territorial government to university) have the potential to influence research agendas and improve research across multiple projects.

2. **Ensure distributed benefits** – To ensure that the benefits of sustainability research are distributed across the North, both larger partner organizations and individual researchers need to consider how they can contribute to local research capacity and where their research could have the most impact. Some communities may be over-burdened with research, while others do not benefit because they are lacking capacity to attract and engage researchers.

3. **Develop dynamic tailored communications for different audiences** – Policy documents can be an effective means to communicate an organization's research interests; however, they need to be tailored to the appropriate audience. The messages must be clear, concise, and avoid jargon. While sustainability issues are often complex and persistent, local priorities may change regularly. This type of information needs to be updated regularly and can best be communicated through a website as opposed to a static report.

4. **Expand on research guidance related to policy contributions** – There are numerous documents already available that provide research guidance, and several established ethical and permitting processes for research. Organizations considering creating their own research guidance are encouraged to consider how they can fill gaps in existing guidance documents and avoid duplication of existing advice. Useful additions would be organizational-specific advice on connecting research with policy priorities, including clear guidance on how, when, and who to approach at a specific organization. Articulating specific policy and research interests or priorities can also help to attract relevant research partners.

5. **Create more inclusive and accountable processes** – Organizations that have the resources to develop and communicate broad research policies can create more inclusive processes to ensure transparency and accountability in how they include and represent Indigenous and community voices. Northern voices have been included in both scientific and policy literature in the past; however, their interests are usually communicated through the lens of the authoring organization. Crediting all contributors, including direct quotes, articulating and respecting Indigenous values, and developing more creative approaches to communicating guidance or policy-relevant findings (e.g., artistic graphics, short plain language text with appropriate translation, videos, podcasts, etc.) can help to enhance inclusion and accountability.

Research policy documents are an avenue for northern organizations and governments to communicate their research goals and priorities and advocate

for research that responds to their needs and contributes to Arctic sustainability. Policy documents provide insight into the motivations of organizations that are actively involved in guiding, legislating, and conducting research. This study provides unique insight into the policy context of northern research, examining issues from the lens of different types of organizations. Relationships, partnership, and communication are the foundation of relevant and applicable research, and our analysis shows that these are also essential in ensuring research can inform sustainability policy and decision-making. Policy applications must be considered at the outset of a research project, and ensure inclusive and accountable research processes throughout, in order to present evidence that is meaningful in northern and Indigenous contexts. While common sustainability issues were shared amongst the organizations, addressing diverse perspectives and priorities in different regions and at different scales means that sustainability research needs to be embedded in local needs and perspectives. Ultimately, aligning northern research programs and science policy objectives requires dedicated time and resources for communication and engagement.

Chapter 5 - A comparative analysis of research trends across the Yukon, Northwest Territories, and Nunavut, 2005-2019

Modified from a manuscript to be submitted as:

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5.1 Introduction

The three Canadian territories (Yukon, NWT, and Nunavut; see Figure 1.1) share commonalities in their strategic approach to science (YG et al., 2016), as well as their research licensing processes (Van Den Scott, 2012). They are often grouped together by the federal government for development of policies and funding programs, including topical areas and regions to target for research capacity development (GC, 2019a; POLAR, 2020b). They have also faced similar challenges, along with other northern regions, in asserting influence over research policies (Audla & Smith, 2014; Ogden & Thomas, 2013). Several studies have shown that research activities have intensified across the circumpolar North (Aksnes et al., 2016; Bancheva, 2019; Biresselioglu et al., 2020; ITK, 2018b). While a few efforts have been made to understand the state of research in Nunavut and the NWT (ARI, 2011, 2014; ITK, 2018b; NRI, 2004; Polidoro et al., 2022, 2024), no systematic analysis of research trends has previously been attempted in the Yukon, and no pan-territorial comparison has been conducted.

This analysis of research trends provides insight into the current state of licensed research across the three territories, including key information on how research has evolved over a fifteen-year period (2005-2019). Using research licensing data provided by the research licensing organizations in Nunavut (NRI), the Northwest Territories (ARI), and the Yukon (YG), this study identifies geographical and topical trends across the three territories and examines them within the context of existing research policies (Chapter 4). We explore opportunities and challenges in research distribution and linkages to northern priorities. This analysis can inform the development of future research programs and policies, particularly those targeted at academic research, highlighting where a pan-territorial approach may be appropriate and where it might be ineffective. This study also provides important information for both northern organizations and researchers working in the North, towards identifying topics and locations that may benefit from more research focus. Furthermore, the results provide a baseline that can be used for future comparison to track changes in research over time, and identify opportunities to improve licensing processes and research metrics.

5.2 Background

Two separate partnerships led to this investigation of pan-territorial research trends. The first was a partnership developed between the NRI, McMaster University, and Carleton University to analyze the NRI's licensing database (Polidoro, 2022; Polidoro et al., 2022, 2024). As part of that partnership, the

Geomatics and Cartographic Research Centre at Carleton University developed a new interactive, publicly accessible database, released as Isirvik: Nunavut Research Portal in December 2023 (NRI, 2024a; Polidoro, 2022). At the same time, a second partnership was established between YG and Carleton University to develop a doctoral student project focused on northern research policy and practice. This project included a 3-month internship with YG's Office of the Science Advisor. Through that internship, a preliminary analysis of YG's licensing data was conducted. From these two partnerships, the idea for this pan-territorial comparative analysis was developed, and ARI and was approached to see if there was interest in the project. The three licensing agencies supported this work by providing access to their administrative databases.

In the three territories (Figure 5.1), there are several different permits that may be required by researchers, but most research requires a research license, administered by the NRI, GNWT (administered by the ARI (ARI) until 2023), and YG. Research license data is one of the more available and consistent approaches to tracking research over time, although there are limitations based on certain types of research being exempt from licensing. Other options for tracking research include bibliometric studies, surveys of individuals and organizations involved in research, administrative data from other research permitting processes, data on research activities from research institutes, and research funding data. Bibliometric data is easily accessible but primarily captures academic publications, and not all licensed research ends up being published. Conducting a survey of researchers and organizations depends upon

a high level of participation to arrive at a rigorous dataset, and would require a considerable amount of time and resources to conduct. Administrative data from other northern research permitting processes, organizations conducting research, and research funders also poses several challenges: i) it would require a large number of organizations to agree to gather, prepare, and share their data in order to get a fulsome record; ii) it would be time-consuming and challenging to get a high level of participation to ensure representative data; and, iii) there is likely to be a lack of compatibility between datasets, limited data tracked, and inconsistency or data errors. Therefore, despite limitations in licensing data, in comparison to other options it was the most practical, relevant, and reliable source of information to investigate territorial research trends.

Generally the nature of the activity, the location, and scale of the project determine how many different types of permits are required in each territory and affect the associated consultations (Aarluk Consulting Inc., 2011). While ethical review processes tend to focus on the individual's rights in relation to research, the territorial licensing processes consider Indigenous and community rights as well as bringing northern considerations to protecting participants' rights in research (George, 2012; Thomas & Shirley, 2005; Van Den Scott, 2012). The research license process plays three main roles: 1) minimizing potential harms from research conduct; 2) tracking research activities; and, 3) encouraging community consultation.

Figure 5.1. Map of the northern Canadian territories with licensing regions shown



Note: Map created by Stephanie Saal and Alison Perrin. Yukon region labels include: CAFN – Champagne Aishihik First Nations, C/TFN – Carcross/Tagish First Nation, INUV – Inuvialuit Settlement Region, KDFN – Kwanlin Dün First Nation, KFN – Kluane First Nation, LFN – Liard First Nation, LSC – Little Salmon Carmacks First Nation, NND – First Nation of Na-Cho Nyäk Dun, RRDC – Ross River Dena Council, SFN – Selkirk First Nation, TGFN – Tetlit Gwich'in First Nation, TH – Tr'ondëk Hwëch'in, TKC – Ta'an Kwäch'än Council, TTC – Teslin Tlingit Council, VGFN – Vuntut Gwitchin First Nation, WRFN – White River First Nation.

Sources. Basemap layers (GNWT, 2013; GNWT, 2024c; Government of Canada, 2024b; YG, 2024).

The research license process is aimed at mitigating the potential harm to natural, social, or cultural environments that can be caused by research (*Consolidation of Scientists Act*, 2011; GNWT, 2024b; NRI, 2021; Scientists Act, 2014; YG, 2013). Yet questions have been raised about whether or not the licensing process is achieving this goal and if the regulations are enforced (Cirque Consulting &

Communications, 2009; Gearheard & Shirley, 2007; Grabowski, 2017).

Requirements for research license applications and reporting enable territorial governments to track research activities, which provides both northern jurisdictions and northern researchers with information on what research is happening in the region. In the Yukon, research licensing was introduced with the primary goal of maintaining oversight over the scientific and exploration activities of people entering the territory (YG, 2013). Research licensing in Nunavut and the NWT also enables tracking of annual research activities, and efforts have been made to compile and share this information through online portals, published compendia, and reports of licensing trends (ARI, 2011, 2014; GNWT, 2024b; NRI, 2004, 2024a, 2024b).

Licensing is also used as a tool to encourage researchers to consult and engage with communities where (or relatively near where) they are working. For local Indigenous, community, and regional organizations and government, licensing is a way to stay informed of, have a say in (i.e., through licensing review processes), and benefit from research happening in their community or region. The review process administered by the territorial licensing agencies does not replace the need for researchers to consult with local organizations and communities in planning their projects, which should happen before they apply for a license (GNWT 2024b, ARI, 2021; YG, 2013). It does provide an avenue to initiate consultation when that step has been overlooked, and for local organizations to learn more about projects and ask questions or provide feedback (Shirley, 2021).

While the data from the licensing process does not provide insight into whether licensing is achieving the goal of mitigating harm, it can be used to track research activities and identify which local organizations are included in licensing review.

When researchers apply for a license, their application undergoes a review by relevant community and regional organizations (e.g., Indigenous governments, hamlet and municipality (in NWT and Nunavut), co-management boards and committees, local NGOs, territorial departments). This license review process gives northern organizations the opportunity to provide feedback to researchers. Depending on the type of project, this can range from information sharing to co-developing the project with community organizations (Cirque Consulting & Communications, 2009). Reviewers can recommend either approval or rejection of the project to the licensing organization, although questions have been raised over the power of reviewers to withhold or deny a license (Gearheard & Shirley, 2007; Grabowski, 2017). Concerns regarding the effectiveness and efficiency of the licensing processes were raised during the CARLI review initiated as part of IPY 2007-2008 (Aarluk Consulting Inc., 2011; Cirque Consulting & Communications, 2009; NRI, 2010; Purple Dog Consulting, 2010; Terriplan Consultants, 2010). In a recent assessment, it was noted that research licensing policies are “cumbersome and could benefit from an update to better support the self determination of Indigenous peoples”(Council of Canadian Academies [CCA], 2023, p. 83). Although licensing processes may not always meet the needs of the regions or the review organizations involved, they have established a long-term –

albeit limited – record of research undertaken across the three territories and documented in administrative databases.

The three territories all have a unique licensing process administered by a regional organization and legislated by a related Act (Table 1). The Nunavut *Scientists Act* was developed from NWT's Act, so the approach of the two territories is similar in terms of how it is applied and the kinds of research that require a license, although they do have different processes for administering licenses. There are certain types of research that are exempted from requiring a research license, since they are reviewed and permitted by other legislative bodies (Table 5.1). There are also certain types of research (e.g., fish, migratory birds) that require multiple permits in addition to a research license and this varies across the three territories. The Yukon's *Yukon Scientist and Explorers Act Licence* is quite different and only applies to researchers entering the Yukon for scientific or exploration purposes, meaning that Yukon-based researchers are exempted from getting a license, although some do.

Notably, research led by local residents or organizations is not well represented in the Yukon and Nunavut licensing numbers. In Nunavut, there was a past practice of giving exemptions for some local community-based research. Yukon-based researchers are not required to get a license, although some do. Research activities by territorial governments are for the most part not captured in the Nunavut and Yukon databases. As well, while industry-led research appears in the Nunavut and NWT databases, it is mostly unlicensed in the Yukon. There is

no comparable data source that captures unlicensed research activities. In the Yukon, creating a comprehensive record of unlicensed research would require accesing public and private records from a few agencies, including YG, YukonU, and the Yukon Environmental and Socio-Economic Assessment Board as well as a survey of local consulting firms and Yukon First Nation governments to identify other research.

Table 5.1: Comparison of the three licensing processes

Territory	**Nunavut**	**Northwest Territories**	**Yukon**
Licensing organization	Nunavut Research Institute, Nunavut Arctic College	Government of the Northwest Territories, Education, Culture and Employment (transferred from ARI in 2023)	Government of Yukon, Department of Tourism and Culture
License name	Scientific Research License	Northwest Territories Scientific Research License	Yukon - Canada Scientists and Explorers Act Licence
Relevant legislation	*Scientists Act*, RSNWT (Nu) 1988, c S-4 Amended S.NU 2011	*Scientists Act*, RSNWT 1988, c S-4 Amended 2014	Scientists and Explorers Act, RSY 2002, c 200
Annual and/or multi-year	Multi-year license with annual reporting and annual community review	Multi-year license with annual reporting	No multi-year license
Types of research not licensed	Archaeology and paleontology; Wildlife; Ocean, fish and marine mammals; Migratory birds; Research in national parks	Archaeology and paelontology; Wildlife	Archaeology; Research in national parks
Applicant	Anyone conducting research in or based on Nunavut	Anyone conducting research in or based on the NWT	Anyone entering the Yukon to conduct research (researchers based in the Yukon do not require a license)
Cost	None	$200	None
Data availability	Isirvik Nunavut Research Portal (2004-present); annual compendia on website (1997-2023); ASTIS	POLAR license portal (1974-present); annual compendia on website (1984-2019); ASTIS	ASTIS; No public database hosted by YG

While Nunavut and NWT have developed compendia and online portals to share information on license holders (GNWT, 2023, 2024c; NRI, 2024a, 2024b), Yukon's license database is not shared publicly. Limited information on licensed projects for all three territories is hosted online by AINA on the Arctic Science and Technology Information System (ASTIS) (AINA, 2019).

5.3 Methodology: A comparative analysis of research trends

This study used non-confidential administrative data from the three territorial licensing agencies to conduct a secondary data analysis (MacInnes, 2020). Data sharing agreements with each of the individual agencies outlined responsibilities for holding, using, and sharing data. Although the primary purpose of collecting this data is for administering research licenses, the datasets are useful for understanding research trends, and provide important illustrative information on research numbers and composition (Connelly et al., 2016; Hotz et al., 1998; Turner & Lambert, 2015). Although licenses have been distributed for longer, the Excel databases shared by the three licensing agencies consistently included data for 2005-2019 only, so a fifteen-year timeframe was used for the analysis.

As the application process differs in each region, the datasets required some standardization for comparison (Connelly et al., 2016; Huxley, 2020; MacInnes, 2020). As is common with administrative data, the licensing data had inconsistencies in what data were available, the format of the data, errors in data entry, and incomplete or missing data and required extensive cleaning and standardization for analysis (Turner & Lambert, 2015). The datasets were edited

to correct spelling mistakes, fill in missing data, and standardize format of organization and personal names (e.g., order of surname and first name or standardizing acronyms). Missing entries (e.g., institution name) could sometimes be filled with available information in the database, in the research compendia produced by the ARI and NRI, in ASTIS, or through an online search of the research project or lead researcher.

5.3.1 Coding and analysis

There was variation in the fields available (Table 5.2), so interpretive coding was used to identify critical information that was missing from the dataset. For example, NWT and Yukon datasets were not organized by discipline so for each license, project information was reviewed and coded based on the topic (Cohen et al., 2007; Erlingsson & Brysiewicz, 2017; Stemler, 2015). Several fields were added to all three datasets and every license was coded to those, including territory, project duration, and affiliation type. A list of Principal Investigator (PI) affiliation types for the analysis of Nunavut research licenses was created through a separate project with the NRI (Polidoro, 2022), and this was applied to the NWT and Yukon data as well.

Table 5.2: Description of database fields

Field	Format and description	Nunavut	NWT	Yukon
Project identifier	Unique identifier; text-based entry	License number from license database; new number created for duplicates or those missing a license number	Assigned application number from project description or license number from online database	License number from license database
Year	Four-digit number	From license database	From license database	From license database
Project duration	A/M (Annual/Multi-year)	New field: assigned using license number which includes identifier A or M	New field: coded multi-year projects based on repeating project titles (verified using online database)	New field: coded multi-year projects based on repeating project titles
Title	Used existing title	From license database	From license database	From license database
Territory	Categorical: Nunavut, NWT, Yukon	New field: assigned based on database source	New field: assigned based on database source	New field: assigned based on database source
PI name	Last name, First name Initial.	From license database	From license database (changed format to Last name, First name)	From license database
Affiliation of PI	Organization name	From license database	From license database	From license database
Affiliation type	Categorical; type of organization (e.g., Canadian university)	New field: assigned based on category of affiliation	New field: assigned type based on category of affiliation	New field: assigned type based on category of affiliation
Discipline	Categorical: H, P, SS (Health; Physical & natural science; Social science, humanities & IK)	From license database (researcher self-selects during application)	New field: coded based on project title and when necessary further research on project	New field: coded based on project title and when necessary further research on project
Reviewers	Organization name; multiple entries per case	From license database	From license database	From license database
Number of reviewers	Numerical: number of reviewer organizations per license	New field: used count function in Excel to calculate based on number of reviewers	New field: used count function in Excel to calculate based on number of reviewers	New field: used count function in Excel to calculate based on number of reviewers
Regions	Categorical; multiple entries per case	From license database; administrative regions	From license database; administrative regions	New field: coded to traditional territory based on Indigenous review organizations

Overarching research trends were identified and compared across the three territories using descriptive analysis of the frequency of occurrence of project attributes or codes (Black, 1999; Loeb et al., 2017; McHugh, 2003; Tashakkori & Charles Teddlie, 1998). This included trends in geographic location (territory and region), discipline, project duration, principal investigator (PI), institution, affiliation type, number of license reviews, and reviewer type. The three datasets were combined into one Excel database and imported into SPSS, a statistical software program used to explore relationships between variables, allowing for frequency counts combining multiple variables (e.g., affiliation type by discipline and by territory) (Almquist et al., 2019). The count (i.e., number of occurrences) of different variables was used to identify research trends over a fifteen-year period (2005-2019). The results from SPSS were exported into Excel to create visualizations including bar and line graphs and pie charts. The linear trendline function in Excel was used to provide the rate of change over the fifteen-year timespan for key variables.

As key results were identified, questions arose that required further analysis. For example, identifying the top 10 universities working across the territories led to further exploration of those licenses to identify the main topics being researched by the top universities.

5.3.2 Limitations and considerations

The research licensing data has limitations in terms of research coverage and available metrics, in particular, the databases do not capture all research done in

the territories (Table 5.1). There are also variables that are not captured by the licensing process that could provide valuable information on research trends, such as: research funders, northern representation, community engagement and partnership, project budgets, research expenditures, and student involvement (Polidoro et al., 2022, 2022). Within the three licensing processes there are key differences that affect the comparability of data between regions, as well as the completeness of the data.

There were differences across the three regions in who needs to get a license depending on where they work and what the focus of their research is. Research in certain topical areas is permitted by other agencies and sometimes does not require a research license. This includes archaelogy and most wildlife across all three territories. In other cases, a researcher might be exempt in the Yukon or Nunavut, but not in NWT. The guidance is not always clear, and the differences across the three regions may lead some researchers to think they do not need to apply. For example, a researcher permitted through Fisheries and Oceans Canada in Nunavut does not need a license, but in NWT or the Yukon they would. In NWT it is clear that federal government researchers require a license unless they are being permitted for achaeological or wildlife research, while that is not always the case in Nunavut (GNWT, 2024b).

The main limitations include the lack of tracking consultant or industry-led research in the Yukon and incomplete records of locally led research in both the Yukon and Nunavut. The research done by industry on behalf of other

organizations, including governments, is private and without a record there is no way to document the scope or impact. Only some of the locally led research done by organizations in Yukon and Nunavut is publicly available and there is not enough information available to document it in a format that is compatible and comparable with the licensing database.

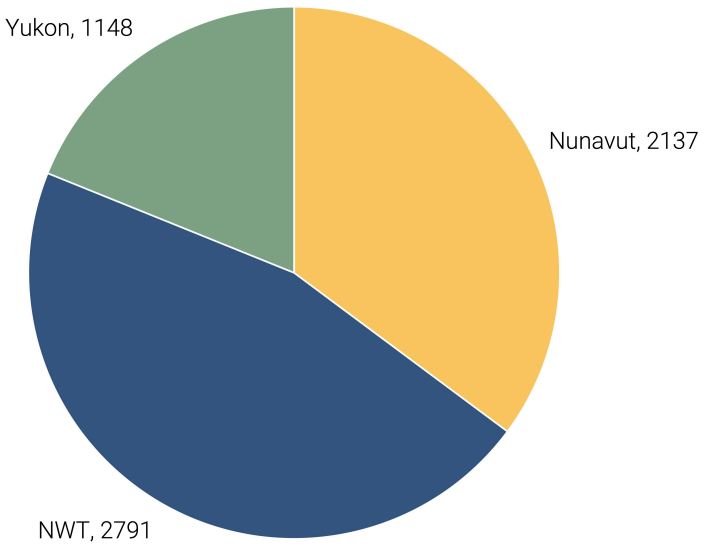
Finally, the analysis was limited to the information provided by the researcher in the license application (i.e., prior to the start of research), which in some cases may not accurately reflect what actually happened (i.e., how research was conducted during the project). For example, timelines and team member roles are not well documented in the licensing process and can change throughout a project. Project applicants may not be the actual research lead, or that role may be shared amongst collaborators not listed in the application, making it difficult to characterize research leadership and affiliation. There are also large initiatives like ArcticNet's ship-based research where one license application covers many research projects, limiting accurate tracking of individual project numbers and leaders. Acknowledging these limitations and noting that not all research is captured in this analysis, this project is still the first pan-territorial investigation into research trends using licensing information and contributes to understanding and creating a baseline for future comparative analyses.

5.4 Results

5.4.1 Where is research happening?

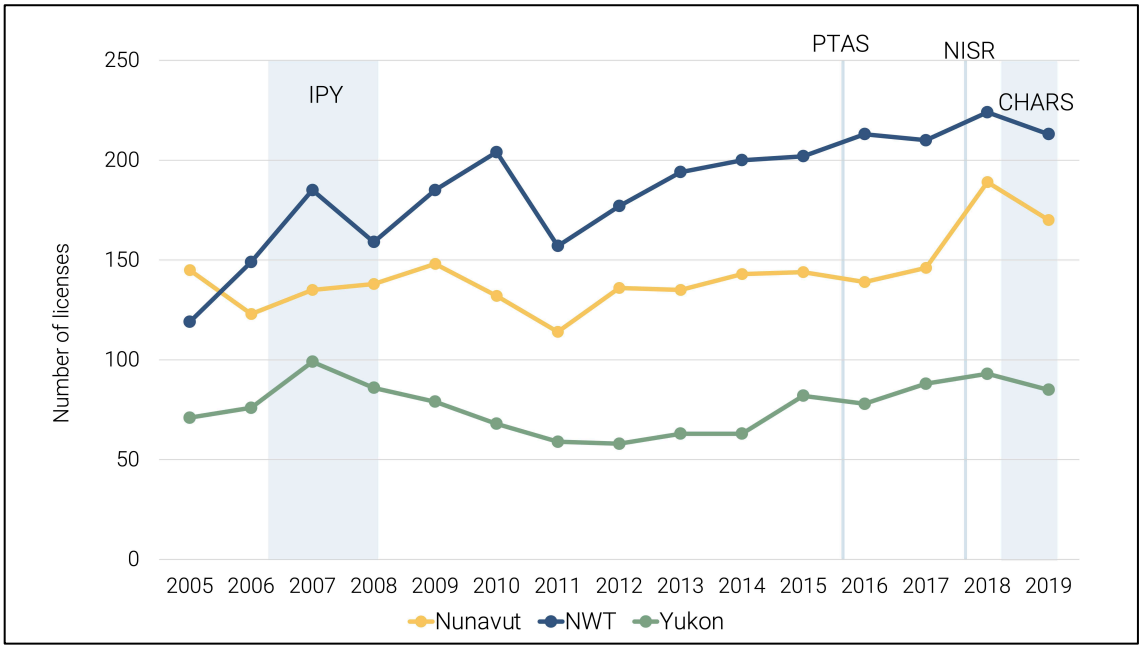
There were 6076 licenses administered between 2005-2019 in the three territories, with 46% distributed in the Northwest Territories, 35% in Nunavut, and 19% in the Yukon (Figure 5.2). A higher proportion in the NWT is somewhat expected, as the NWT dataset is more comprehensive, capturing research led by GNWT and local organizations, which are not consistently included in the other territories. The Yukon receives considerably fewer license applications than the other two regions, indicating that even while accounting for differences in tracking, much less research is happening in the Yukon. Few projects led by YukonU or AICBR, two key research groups in the Yukon, are captured in the license database, which is also missing most industry research. Websites from the two organizations listed 41 unlicensed research projects led by YukonU between 2012-2019 and 16 led by AICBR between 2009-2019. It is not possible to verify if all of these projects would have been deemed “research” (some focused on developing resources like courses or a seed bank), the time scale does not match, and there is not enough corresponding information available to compare these projects with those in the licensing databases. A more fulsome investigation of research across all three territories could provide a complete database of research, while also sparking discussion on what we recognize and include as research, how we track it, and the role of research licensing and permitting.

Figure 5.2: Total number of licenses by territory, 2005-2019



Over time, research has been increasing in each territory since 2005, with the highest rate being in the NWT (approximately 5 licenses per year), followed by Nunavut (2 licenses per year), and then the Yukon (0.5 licenses per year) (Figure 5.3). The annual distribution of licenses across the three territories shows some similar peaks and troughs including a peak in 2007-2009 and one 2018 that correspond with IPY and the creation of CHARS in Cambridge Bay (POLAR, 2020b; Sloan & Hik, 2008). There was a slight decrease in all three territories in 2010-2011; however research increased again in Nunavut and NWT eventually surpassing IPY numbers, while the number of licenses in the Yukon has remained consistently low.

Figure 5.3: Number of licenses annually by territory, 2005-2019

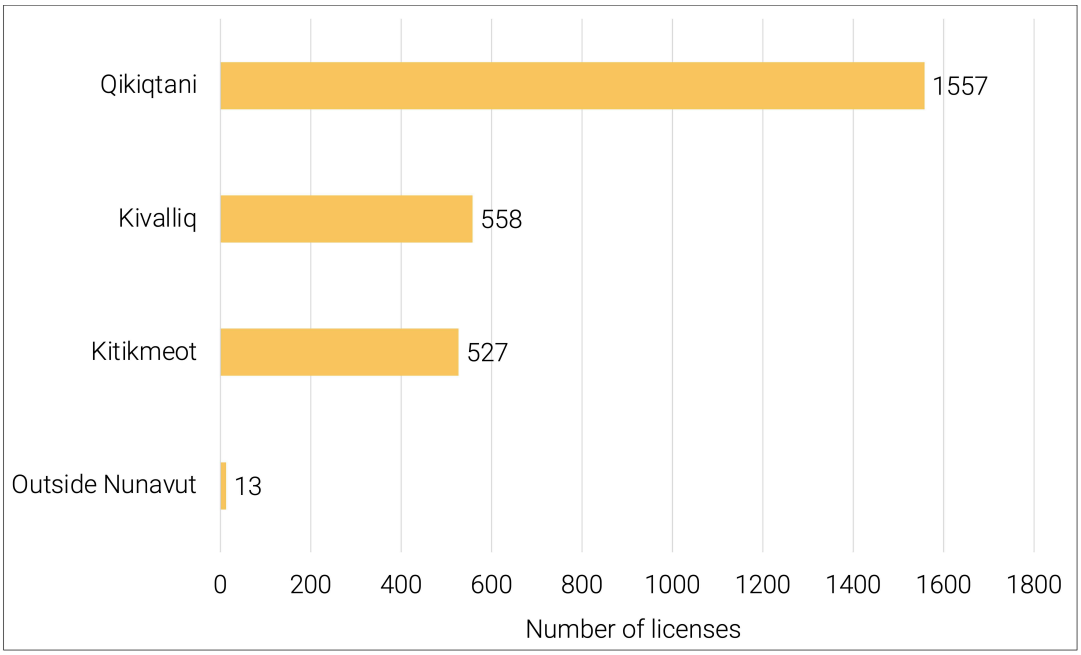


Note. Nunavut n=2137, NWT n=2791, Yukon n=1148. The timing of IPY, CHARS, and the release of the National Inuit Strategy on Research (NISR) and the Pan-Territorial Approach to Science (PTAS) are noted for context (CPC, 2012; YG et al., 2016; ITK, 2018b).

The regional distribution of licenses shows that geographic intensity of research varies in all three territories (Figures 5.4-5.6). There were projects that took place in more than one region in a single territory, explaining why the number of licenses per region combined exceeds the total licenses. In Nunavut, licenses are administered according to three regions which are also political and administrative regions for organizations like NTI and the GN: Qikiqtani, Kivalliq, and Kitikmeot (Figure 5.1). The Qikiqtani region (73%), which includes the capital city of Iqaluit, experienced almost three times more licensed research than the Kivalliq (26%) or Kitikmeot (25%) regions (Figure 5.4). A small amount of research about Nunavut takes place outside of Nunavut and also requires a license (e.g., research conducted in hospitals outside Nunavut focused on

Nunavummiut experiences with health care travel).

Figure 5.4. Total licenses by administrative region in Nunavut, 2005-2019



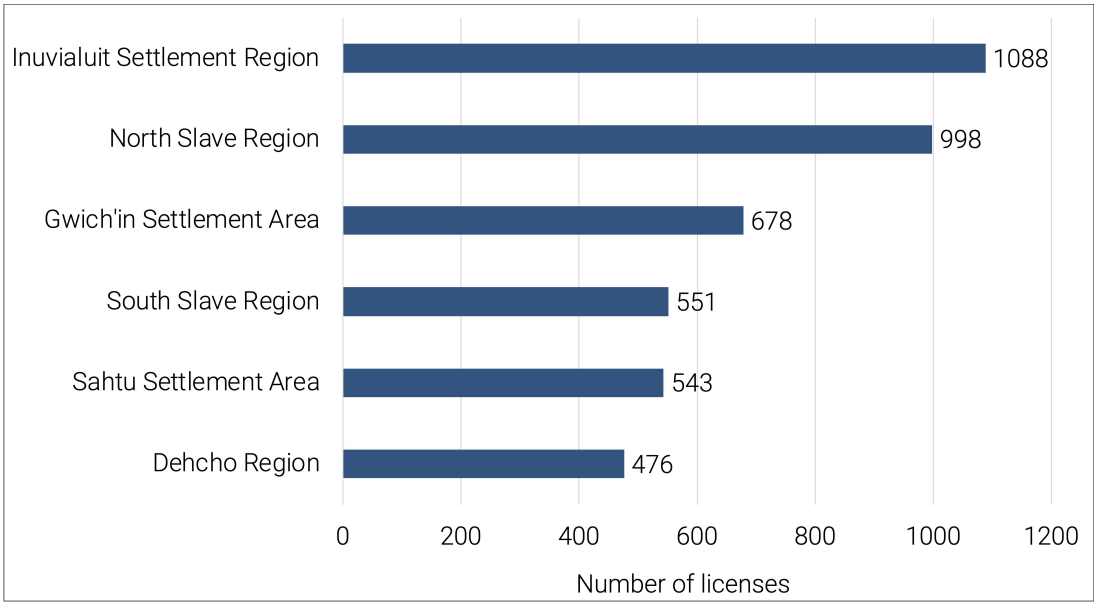
Note. See Figure 5.1 for geographic context of the Nunavut regions; n=2136.

NWT research licenses are organized by the licensing agency into six administrative regions based on land claim regions (Figure 5.1). More research happened in the ISR (39%) and North Slave (36%) than in the other four regions (Figure 5.5), and this has been consistent since 1974 (GNWT, 2024d).

The licenses administered by YG were not organized by region; however through the review distribution list it was possible to create a regional breakdown based on traditional territories of Indigenous review organizations (Figure 5.6). Note that these regions are overlapping (Figure 5.1), so a project with a discreet location could exist within the traditional territories of more than one nation. As processes changed, umbrella organizations like Kaska Dena Council

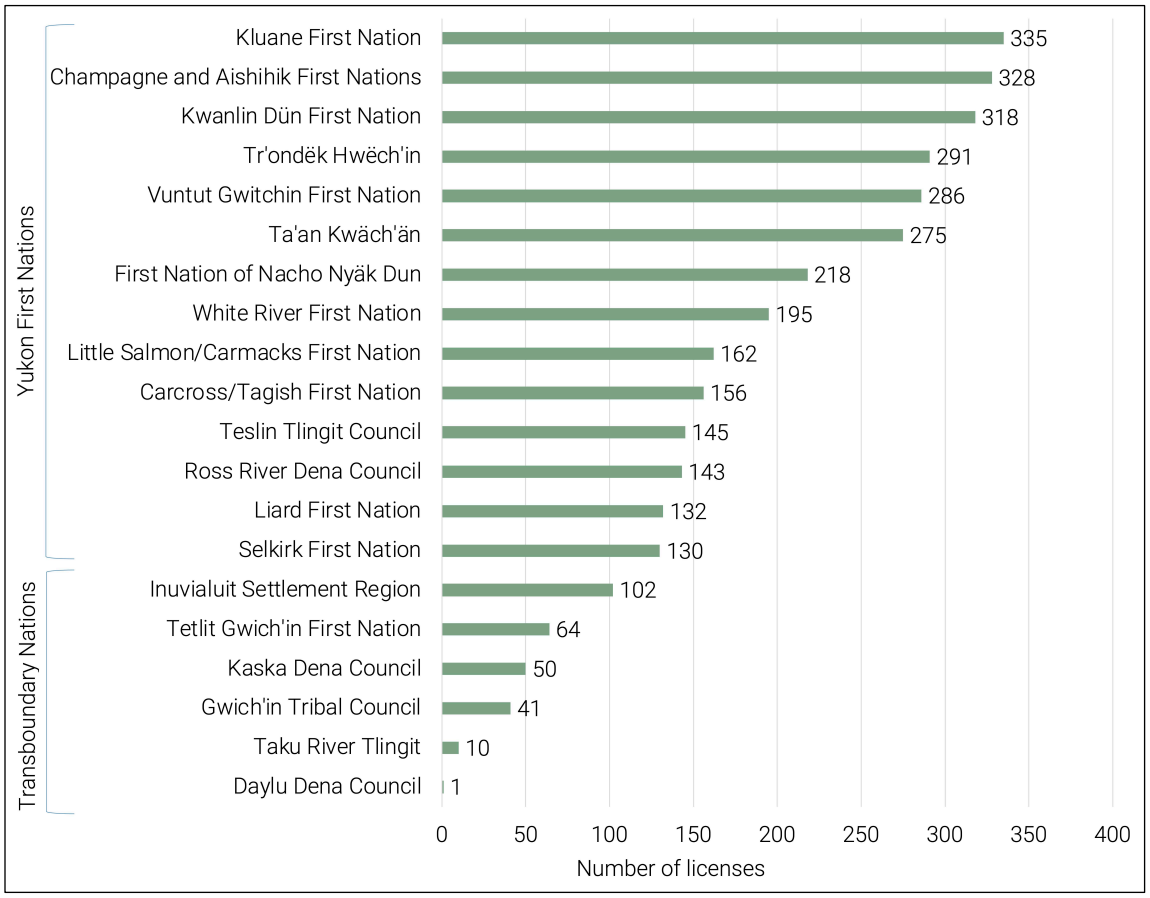
(representing Ross River Dena Council, Liard First Nation, and Daylu Dena Council) and Gwichin Tribal Council (representing Tetlit Gwich'in First Nation) were added as reviewers which means some licenses may have been counted in both the traditional territory of the nation and in the region represented by the umbrella organization. Kluane First Nation (KFN) (29%) and Champagne and Aishihik First Nations (CAFN) (29%) experienced the most research on their traditional territories, which are partially overlapping (Figure 5.6). Other First Nations that saw a high number of researchers are the Kwanlin Dün First Nation (KDFN) (28%), Tr'ondëk Hwëch'in (TH) (25%), and VGFN (25%). There was one project that had no location information and is not represented in the regional breakdown.

Figure 5.5. Total licenses by administrative region in the Northwest Territories, 2005-2019



Note. See Figure 5.1 for geographic context of the NWT regions; n=2791.

Figure 5.6. Total licenses by traditional territory or settlement region in the Yukon, 2005-2019



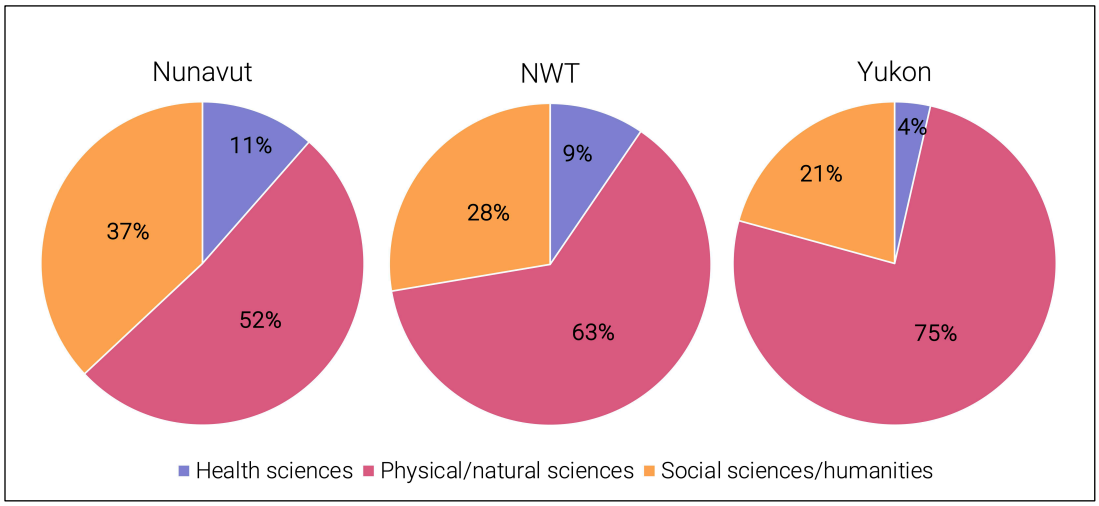
Note. See Figure 5.1 for geographic context of the Yukon regions; n=1147.

5.4.2 What kinds of research are happening?

There was considerably more licensed research in the physical and natural sciences than in the other disciplines. Overall across the three territories, there was more than double the amount of physical science research (inclusive of natural science and engineering research) (3723 licenses) than social science (inclusive of humanities and IK research) (1800), and almost seven times more than health science research (553). All three regions had a larger percentage of physical science research (52-76%), less social science research (21-37%) and even less health research (4-12%) (Figure 5.7). The Yukon had the widest

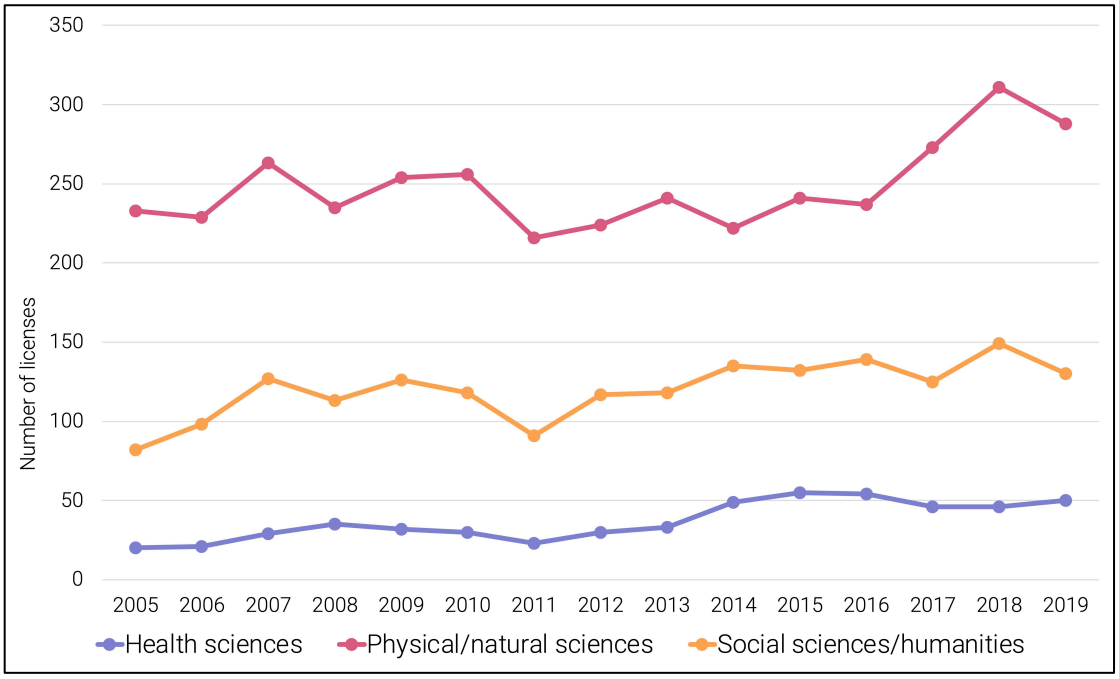
disparity between physical and health sciences with only 42 health research licenses distributed over the 15-year time period (4% of all licenses), while at least six times that number occurred in the NWT and Nunavut (Figure 5.7).

Figure 5.7. Proportion of licenses by discipline in each territory, 2005-2019



During this time period, licensed research in all three disciplines increased slightly over time, with physical and social sciences increasing by approximately 3 licenses per year, and health sciences by 2 licenses per year (Figure 5.8). NWT experienced the biggest growth in social science research by approximately 2 projects per year over the time period, while in Nunavut it grew by 1 project per year (Appendix F, Figure S5.1). NWT was the only territory to experience notable growth in physical science research at a rate of 2.5 projects per year (Appendix F, Figure S5.2). Health research increased by approximately a project per year in Nunavut and the NWT (Appendix F, Figure S5.3). In the Yukon, however, there have been only marginal increases in research across all three disciplines.

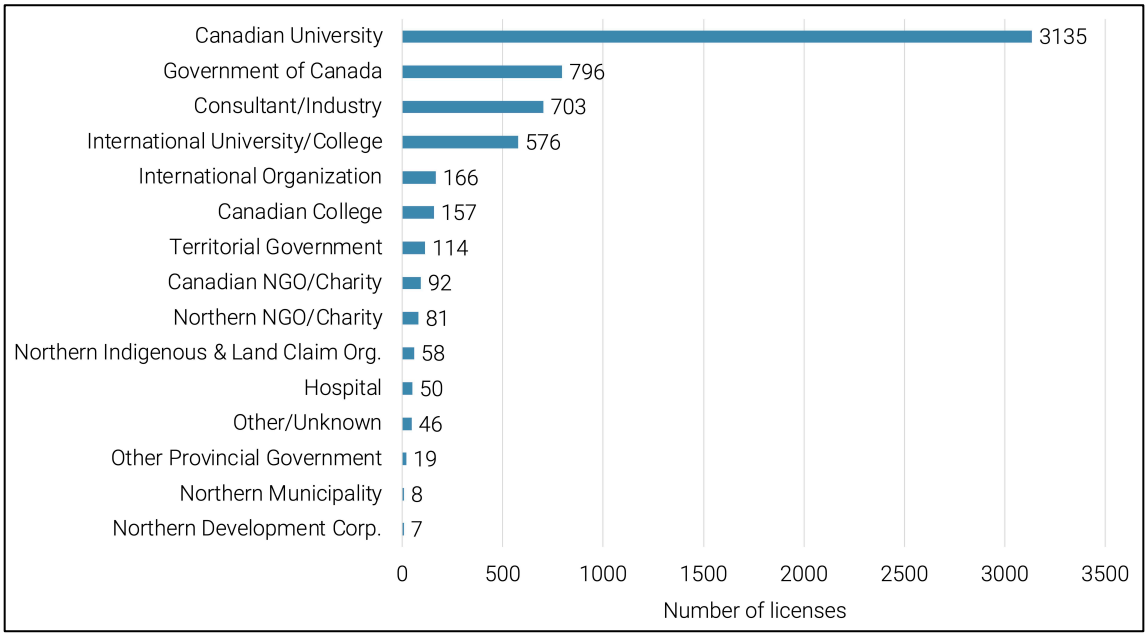
Figure 5.8 Pan-territorial licenses annually by discipline, 2005-2019



5.4.3 Who is leading research?

Half of all licensed research happening in the three territories was led by PIs at Canadian universities (52%), with the balance mainly conducted by GC (13%), industry (12%), and international academic organizations (9%) (Figure 5.9). This is based on the primary affiliation listed in the license application and does not include unlicensed research and monitoring conducted by the territorial governments or local Indigenous organizations (Section 5.3.2). Independent and unaffiliated researchers were captured as affiliation type “other”.

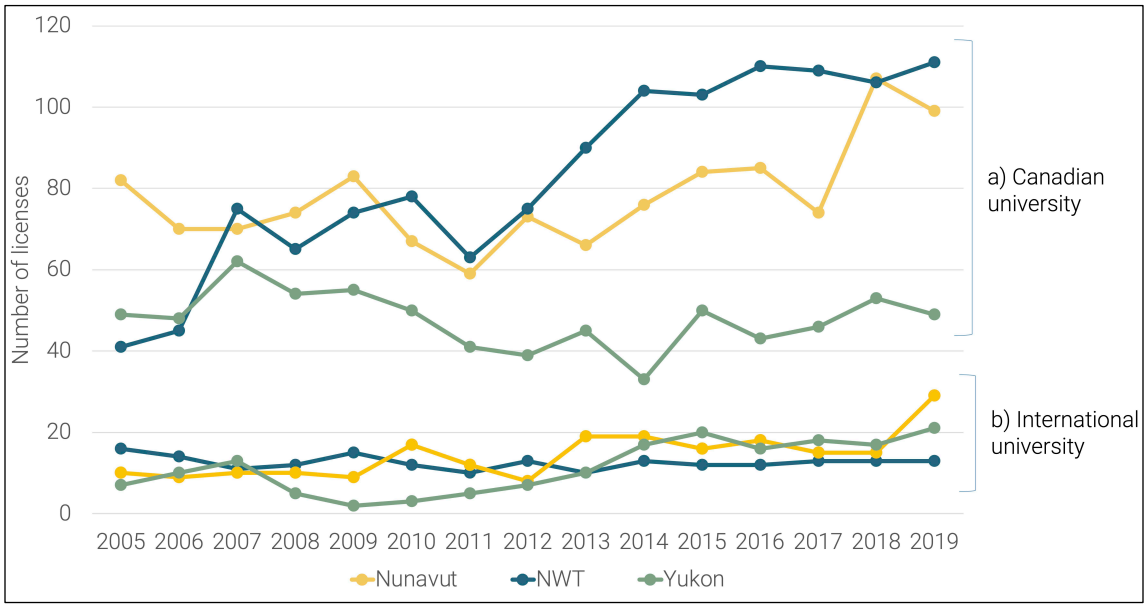
Figure 5.9. Total pan-territorial licenses by primary affiliation type, 2005-2019



University research

University research has increased over time by approximately 1.5 licenses per year in Nunavut and almost 5 licenses per year in the NWT, while it has remained stable with a very slight increase in the Yukon (Figure 5.10). Canadian universities played an important and dominant role in northern research, leading 55% of all licensed research in Nunavut, 45% in NWT, and 62% in the Yukon (Appendix F, Figures S5.4, S5.5, S5.6). International university research has remained stable with a slight increase of approximately 1 license per year in the Yukon and NWT. International universities conducted 9% and 8% of all research in Nunavut and the NWT respectively but played a bigger role in the Yukon where they were responsible for 15% of all research (Appendix F, Figures S5.4, S5.5, S5.6).

Figure 5.10. Licenses annually by a) Canadian and b) international university affiliation

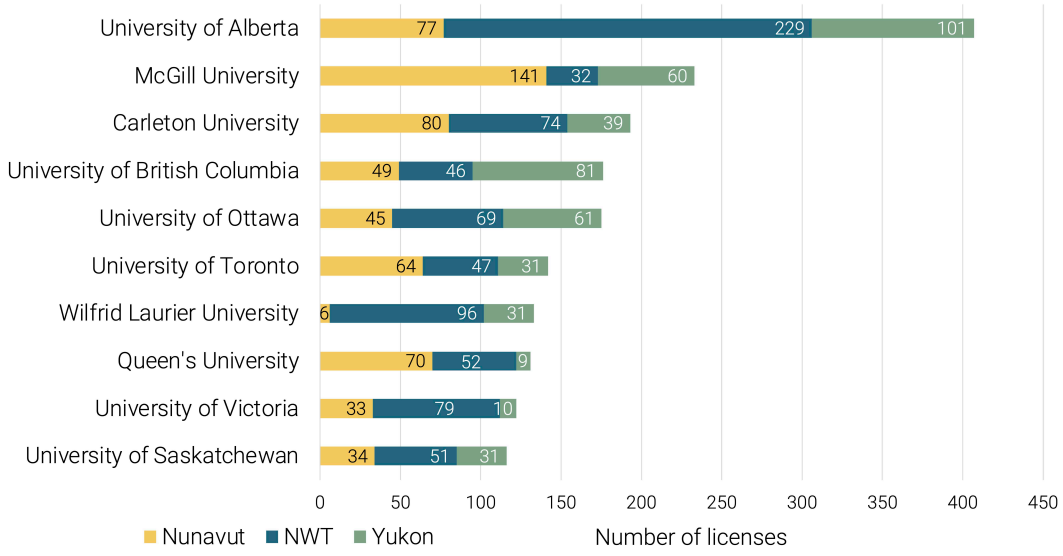


Note. Canadian university licenses n=3135; international university licenses n=576.

Of the 62 Canadian universities conducting research in the three territories, the ten most active universities hold 30% of all the licenses. Three universities, University of Alberta, McGill University, and Carleton University, combined hold 14%. The University of Alberta has the most licenses across the North, almost double McGill, which is the second most active university (Figure 5.11). Five of the ten most active universities in the North are also in the top ten in all three territories. The University of Alberta, which was the most active university across the three territories, appears within the top five in all three territories. The universities that are most active are based in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, and Québec. While there are some obvious geographic links (e.g., between British Columbia and the Yukon, or Ontario and Nunavut) there are also examples of universities active in regions that are not connected by proximity. University research covered a diversity of topics with no

specific area of focus in the physical sciences. Social science research tended to bridge disciplines by exploring topics related to environmental or resource management, climate change, or food security. Indigenous culture or knowledge were also frequently a focus of social science research. Key topics in university health research included contaminants, infectious diseases, community wellness, infant health, and experiences with the health care system.

Figure 5.11. Ten most active Canadian universities in northern research, 2005-2019



There are 180 different universities and colleges from outside of Canada (classified here as “international universities”) that conducted research in the three territories and held 576 licenses. More than half of those licenses were held by researchers from 83 universities in the United States of America (321), and 36% were held by researchers from 80 universities in Europe. Within Europe, researchers from 28 universities in the United Kingdom held the most licenses

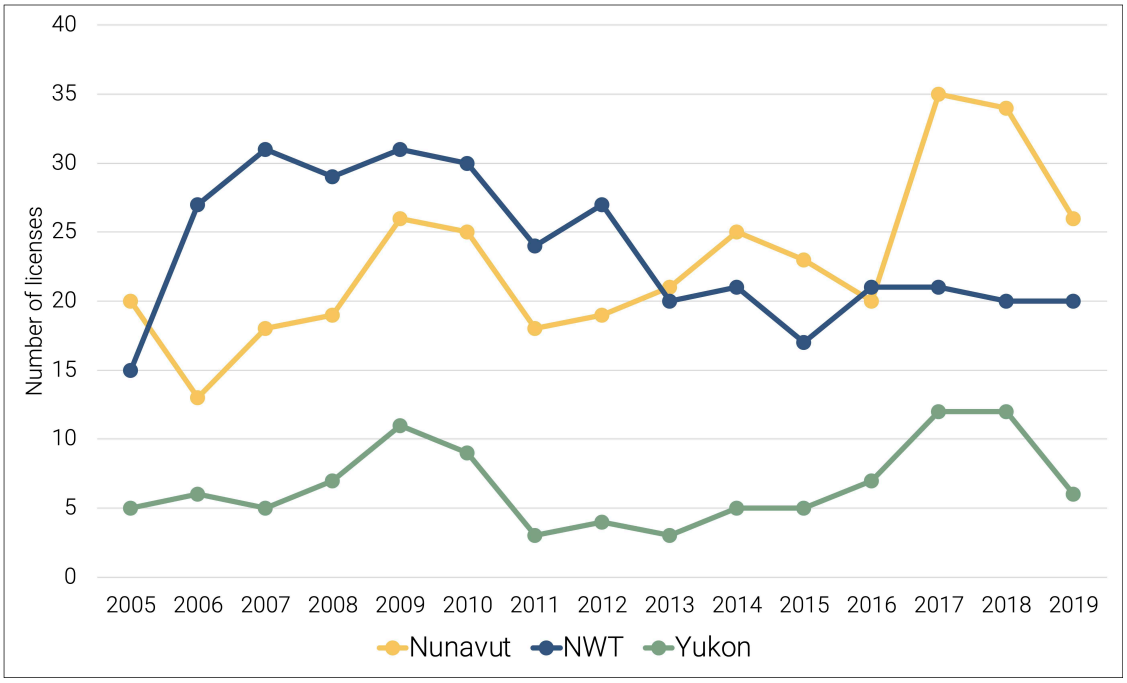
(107), and from 15 universities in Germany (27). The ten most active international universities held 192 licenses, or 33% of licenses (n=576). The three most active universities were the University of Alaska (48), University of Edinburgh (21), and University of Colorado (20) and collectively they held 15% of international university and college licenses. University of Alaska researchers were mainly focused on the physical and social sciences and worked across the three territories, while University of Edinburgh researchers focused mainly on physical science research in the Yukon and University of Colorado researchers were mainly doing physical science research in NWT.

Government research

Regionally, there was more GC research in NWT (354) and Nunavut (342), with considerably fewer licenses issued in the Yukon (100) (Figure 5.12). These numbers reflect specific research projects, but do not include the regular environmental monitoring that does not require licensing that many departments are doing in all three territories. Of the 14 government departments represented across the three territories, the most active were NRCan with 383 licenses (48%) and ECCC with 189 licenses (24%) while other departments ranged from 1-68 licenses. The amount of federal research in Nunavut increased significantly in 2017 and 2018, around the time when CHARS opened, while there were only minor increases in the Yukon and decreases in NWT. Federal government research trends mirror disciplinary trends overall but show a bigger divide between the disciplines, with 93% (740) focusing on the physical sciences, 6% (45) on social sciences, and 1% (11) on health (Appendix F, Figures S5.7, S5.8).

There was a large variety of topical focus across federal research with a strong focus on the earth sciences, atmospheric research, and contaminants. Notably, Parks Canada conducted 64% of all federal social science research during the time period (29 of 48 licenses) with a focus on oral histories and IK studies.

Figure 5.12. Annual licenses by researchers affiliated with Government of Canada, 2005-2019



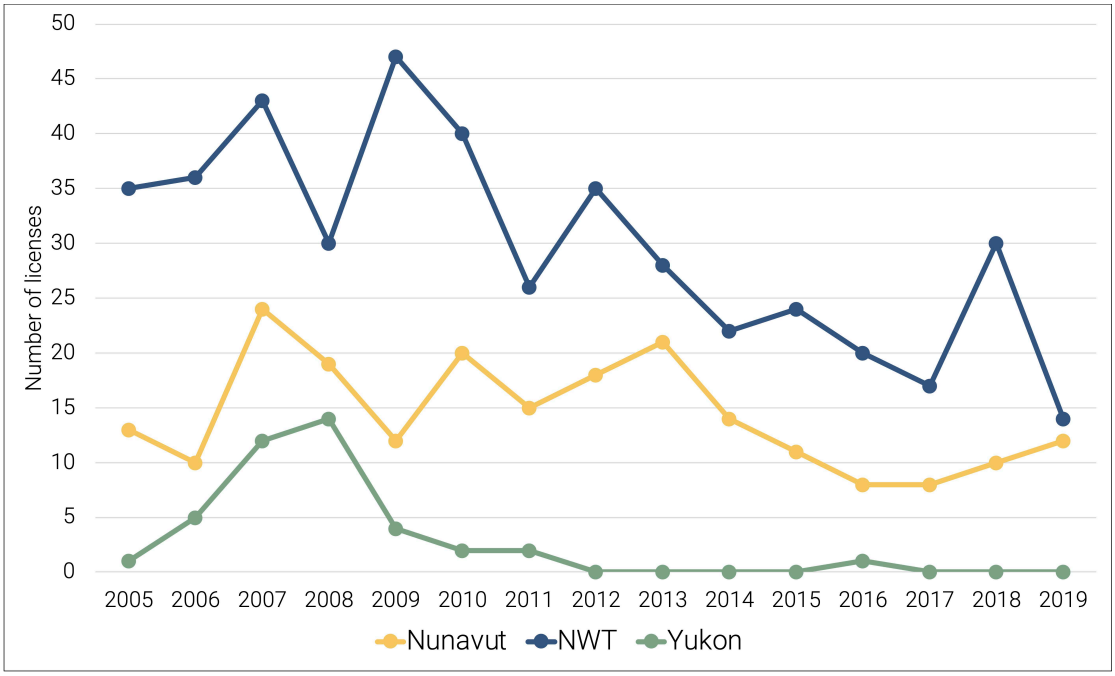
Note. Government of Canada licenses n=796.

Industry research

Industry accounts for 12% of the licensed research across the three territories, with considerable differences regionally (Figure 5.13). More than half (64%, 447) of all licensed industry research happened in NWT, while 31% (215) was in Nunavut and only 6% (41) was in the Yukon. Within the licensed research conducted by industry, 83% (581) was in the physical sciences, 16% (112) was in the social sciences and 1% (10) was in health. There was a downward trend in all

three territories between 2012-2017, and only 1 industry license was administered in the Yukon between 2012-2019. Tracking industry research is hampered by exemptions for local companies in the Yukon. The majority of the research conducted by industry focused on resource development projects and included environmental baseline monitoring, geological assessments, species assessments, or IK studies. Other industry research focused on species assessments to support fishery activities and baseline assessments to support infrastructure development (e.g., development of an ice road or port). There were also a few licenses given to consultants working with northern communities or organizations on topics like climate change adaptation, caribou habitat recovery, hearing loss prevention, healthy foods, and education.

Figure 5.13. Annual licenses by researchers affiliated with consultant/industry, 2005-2019

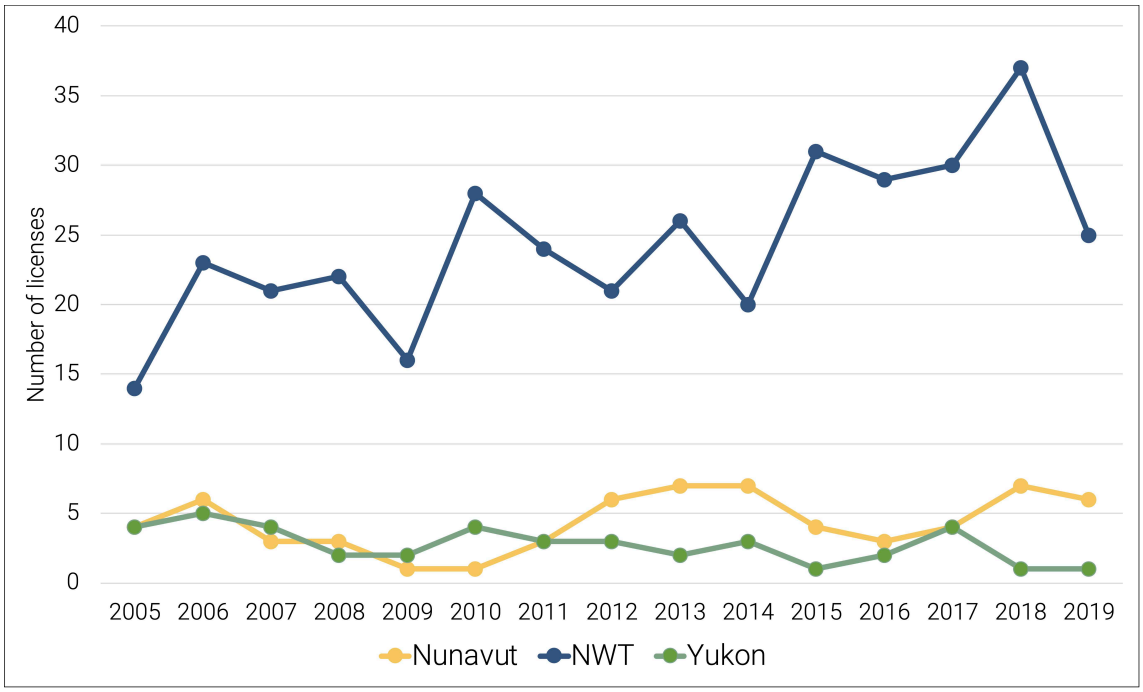


Notes: Consultant/industry licenses n=703

Northern leadership of research

Northern organizations leading research represented 8% of all research in the three territories and include the territorial governments, Indigenous governments and organizations (including development corporations), land claim and co-management organizations, municipalities, NGOs, and charities. The NWT data shows an increase in locally led research in the territory at a rate of 1 license per year (Figure 5.14). Researchers from NWT-based organizations make up a higher percentage of the total licenses distributed in NWT (13%), particularly researchers affiliated with the GNWT, ARI and Aurora College. Other key organizations are Indigenous governments (e.g., Dehcho First Nations) and land-claim organizations (e.g., GRRB, Paulatuk Hunters and Trappers Committee, and the Fisheries Joint Management Committee). NWT NGOs like the Institute for Circumpolar Health Research, Ecology North, and Arctic Borderlands Ecological Knowledge Society also contribute to license numbers held by northern PIs. Without comprehensive representation of local researchers in the licensing processes in the other two territories, there is not an accurate picture of locally led research. Licensing data currently show that northern-based PIs hold 3% of research licenses in Nunavut and 4% in the Yukon, but this underrepresents research leadership in these two territories. In Nunavut the main license holders were Qulliq Energy Corporation, the Qikiqtani Inuit Association, QHRC, and the Aqqiumavvik Society (previously the Arviat Wellness Centre). In the Yukon the main license holders were the VGFN and Yukon College (now YukonU).

Figure 5.14. Annual licenses by researchers affiliated with a northern organization, 2005-2019



Note. Northern organization licenses n=473

Principal investigators

Each license has a PI, or applicant, who is responsible for the licensed activities and reporting. There were 2385 PIs working across the three territories between 2005-2019, the majority of which have held one license (54%) (Table 5.3), while 37% held 2 to 5 licenses and 9% of PIs (218) held more than 5 licenses. Seven PIs held more than 25 licenses including five physical science researchers and two health researchers, and all seven held licenses in at least two territories over the timeframe of this study.

Of the top 20 PIs with the most licenses working across the three territories (Table 5.4), 15 are primarily from the physical and natural sciences, three from the social sciences, and two from the health sciences. Three of these PIs are

interdisciplinary, applying for licenses in more than one discipline. Of the PIs with the most licenses, 16 held licenses in more than one territory, including four that held licenses in all three.

Table 5.3. Pan-territorial number of licenses held by individual PIs, 2005-2019

Number of licences held by PI, n=6076	Number of PIs
1	1284
2-5	883
6-10	134
11-15	57
16-20	13
21-25	7
26-30	1
31-35	4
36-40	2

Six held licenses primarily in Nunavut (Arbour, Lamoureux, Miles, Muggli, Pollard, Sharp), nine in NWT (Evans, Giles, Lantz, Pearce, Pisaric, Simmons, Smith, Sonnentag, Trimble), three in both Nunavut and NWT (Burgess, Prowse, Turner), and two in both NWT and Yukon (Burn, Goodman). Some PIs held multiple affiliations over the time period because either they changed organizations or were cross-appointed between a government department or hospital and a university. A few PIs worked for both a university and industry (as a consultant) at the same time. In total 14 were affiliated with Canadian universities, five with the GC, three with industry, and one each with a Canadian college, a land-claim organization, and a hospital.

Table 5.4. Twenty principal investigators with the most licenses, pan-territorial, 2005-2019

PI	Discipline	Topic	Affiliation	Territory	# Licenses
Evans, Marlene	P	Contaminants; Fish	GC; ECCC	NT, NU	38
Pollard, Wayne	P	Permafrost	CU; McGill University	NU, YT, NT	36
Trimble, Annika	P	Plants; Wind energy	CC; Aurora Research Institute	NT, YT	35
Arbour, Laura	H	Congenital and infant health	CU, H; University of Victoria, University of British Columbia, Victoria General Hospital	NU, NT	33
Goodman, Karen J.	H	H. pylori	CU; University of Alberta	YT, NT	31
Lamoureux, Scott	P	Rivers and lakes	CU; Queen's University	NU, NT	31
Burn, Chris R.	P	Permafrost	CU; Carleton University	NT, YT	26
Lantz, Trevor C.	P, SS	Plants; Environmental change; Indigenous knowledge	CU; University of Victoria, University of British Columbia	NT, YT	25
Simmons, Deborah L.	SS, P	Indigenous knowledge; Wildlife; Climate change	LC, CU, IC; Sahtú Renewable Resources Board, University of Manitoba, SENES Consultants	NT	24
Pearce, Tristan D.	SS	Community adaptation; Climate change; Indigenous knowledge	CU, IU, IC; University of Guelph, University of the Sunshine Coast, ArcticNorth Consulting	NT	23
Burgess, David	P	Glaciers	GC; NRCan	NU, NT	22
Sharp, Martin	P	Glaciers	CU; University of Alberta	NU	22
Smith, Sharon L.	P	Permafrost	GC; NRCan	NT, YT, NU	21
Turner, Elizabeth C.	P	Rocks and soils; Paleobiology	CU; Laurentian University	NT, NU, YT	21
Giles, Audrey R.	SS, H	Recreation safety; Indigenous culture and knowledge	CU; University of Ottawa	NT, NU	20
Pisaric, Michael F.J.	P	Paleoecology; Environmental change	CU; Brock University; Carleton University	NT, YT	20
Prowse, Terry D.	P	Lakes and rivers; Climate change	CU, GC; University of Victoria; ECCC	NU, NT, YT	20
Miles, Warner	P	Rocks; Geophysics	GC; NRCan	NU, NT	19
Sonnentag, Oliver	P	Permafrost; Carbon flux	CU; Université Montréal	NT	19
Muggli, Deborah	P	Environmental monitoring	IC; ERM Rescan Environmental Services; Sabina Gold & Silver Corporation	NU, NT	18

Note. Most common topics researched are listed but these lists are not exhaustive. Affiliation codes: CC-Canadian college; CU-Canadian university; GC-Government of Canada; H-Hospital; IC-Industry/consultant; IU-International university; LC-Land claim organization.

5.4.4 Who is reviewing research applications?

In all three territories, license applications are sent to community and regional organizations, regulatory agencies, and territorial and federal government departments for review and feedback. Across the three territories there are different types of organizations receiving applications for review, although not all licenses had reviewers listed. These results reflect the number of organizations that received an application for review. However, organizations have differing capacity and interest in reviewing applications, so these numbers do not represent how many actually review or submit responses. While there was one license application in the NWT that was sent to 81 different review organizations, it is common across all three disciplines that an application is reviewed by an average of eight organizations (Table 5.5). Reviewers can include community-based organizations, territorial government departments, Indigenous and land-claim organizations, and federal government departments, which have differing levels of organizational capacity for engaging in license review. License applications with high numbers of reviewers were for projects that were taking place in multiple communities (e.g., a project mapping the social economy across the North) or across a wide landscape (e.g., ArcticNet's sea-based expeditions).

In Nunavut, hamlets received a 29% (4,915) of the review requests (Figure 5.15), including the City of Iqaluit (532), and the smaller communities of Resolute Bay (486), and Grise Fiord (381). Other communities like Naujaat (4) and Sanirajak (5)

see much less research happening in their community and surrounding area. The individual organization that received the most licenses to review was Nunavut Tunngavik Incorporated (NTI), which reviewed 1647 license applications from 2005-2019. The three regional Inuit organizations (included in Indigenous governance organizations along with NTI) and the institutes of public governance (captured in land claim organizations) also received high numbers of license reviews (ranging from 318 to 1154), along with federal departments CIRNAC (724) and Fisheries and Oceans Canada (654).

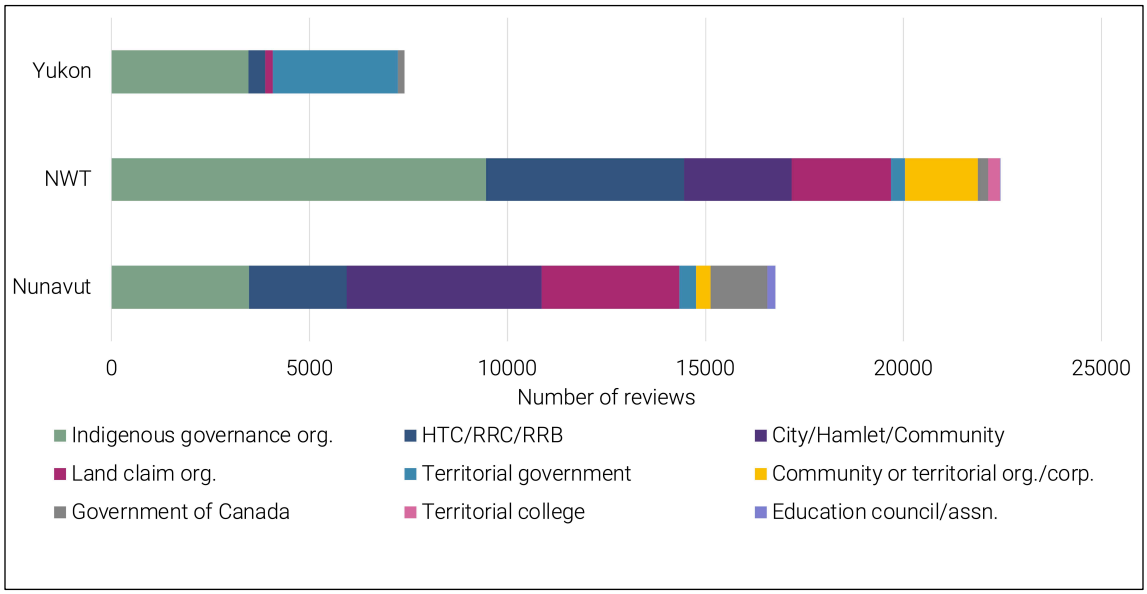
Table 5.5: Number of license reviews, 2005-2019

	Total reviews	**Range of reviews per license**	**Average reviews per license**
Pan-territorial total (n=5933 of 6076)	46,620	1-81	8
Nunavut (n=2049 of 2137)	16,767	1-64	8
Northwest Territories (n =2740 of 2791)	22,455	1-81	8
Yukon (n=1144 of 1148)	7,398	2-26	6

Note. 143 licenses did not include review information, n=number of licenses with information.

In NWT, Indigenous governance organizations received more licenses to review than any other reviewer type, including 51 different community and regional Inuvialuit, First Nation and Métis organizations. Of these organizations, four received the most licenses to review: Akaitcho Territory Government (965), North Slave Métis Alliance (808), Northwest Territory Métis Nation (790), and IRC (746). Other key reviewers were the Hunters and Trappers Committees (HTC), Renewable Resource Councils (RRC), and Renewable Resource Boards (RRB) with the most active being the Wek'èezhìi RRB (562) and Inuvik HTC (531).

Figure 5.15. Number of reviews by type of review organization, 2005-2019



Note. License with information available on review organizations n=5933

The main reviewers in the Yukon were YG departments and Yukon First Nations. In YG, Energy, Mines, and Resources (1655) and Environment (1157) were the departments that reviewed the most licenses. Of the 14 Yukon First Nations, KFN (335), CAFN (326), and Kwanlin Dün First Nation (317) reviewed the most applications, while Tetlit Gwich'in First Nation (62) reviewed the most of all the transboundary Indigenous groups. Parks Canada was the only federal department that received applications for review in the Yukon. Notably, with transboundary Indigenous groups in the Yukon, there were discrepancies in how transboundary organizations received review requests with some only starting later in the time period (e.g., Taku River Tlingit). For research happening within the ISR, license applications were not always sent to IRC, but sometimes to various land claim organizations and co-management bodies instead.

5.5 Discussion

Growth of research in the North has been happening well before the timeframe of this study. However, as discussed here, the licensing databases provide important insights into how northern research has evolved in recent years, which can inform ongoing efforts to ensure northern regions are benefitting from research outcomes. Some of the key challenges noted from this examination of research trends include the variation in geographic intensity of research across the North, referring to the amount of research happening in a region. As well, there are key disciplinary and topical areas related to northern priorities that are underresearched. Another issue emerging from the results is the underrepresentation of key actors in research leadership. At the same time, there are opportunities to support northern research capacity and leadership of research. To understand the relationship between research policy and the current state of research, we interpret the licensing analysis results in relation to the results of an analysis of northern research policy documents (Chapter 4). Ultimately, the licensing process can provide oversight of research and influence how research happens in the North, and this analysis identifies challenges and opportunities within existing processes.

5.5.1 Variability in research intensity across the North

While there are differences across the three territories in terms of the organizations involved in research and licensing processes, they do have a common interest in science and share some priorities (YG, GNWT, GN, 2016).

Across all three there has been an overall increase in research during the study period (Figure 5.3), with the timing of the peaks in licensed research matching both IPY (2007-2008) and an increase in federal funding for the granting councils (Douglas et al., 2009; Naylor et al., 2017). ARI is the only territorial licensing organization that analyzed their licensing database for an early time period and thus has baseline information on research trends available for temporal comparison (ARI, 2014). Their evaluation of forty years of research licenses in the NWT demonstrated an average number of 99 licenses issued per year from 1974-2013 ranging from 29 to 203. From 2005-2019 the average annual number of licenses issued in the NWT was 186 with a range from 119 to 224, demonstrating an ongoing trend in growth of research in the NWT. This increase has positive implications for the region, including a growing evidence-base in topics that are useful for decision-making, opportunities for residents to engage in research activities, and economic activity related to research (Carr et al., 2013; Ogden et al., 2016). However, this growth also results in research duplication and contributes to increasing research fatigue in communities with nearby research stations or that attract high levels of research activity (Gearheard & Shirley, 2007; Polidoro et al., 2024; Southwick & Ballegooyen, 2019). The license numbers indicate that the rate of growth is not uniform and there is significantly less research happening in the Yukon than in the other two territories (Figure 5.3). There are various reasons for geographic differences in research intensity. Exploring these reasons in relation to research policies provides insight into how to support a more even distribution of research across the territories.

While the difference between the Yukon and the other territories might be partially explained by licensing processes that do not capture locally led research in the Yukon, the gap is wide enough to indicate that there are other factors. This begs the question of why the number of licensed research projects remains consistently low in the Yukon while growing in the other two territories? There are several potential reasons for less research in the Yukon, including the Yukon's smaller physical size (Figure 5.1) despite having a similar population size (Table 2.1) and being comparatively easy to access. Firstly, national or regional funding opportunities could attract researchers to other regions and explain some of the geographic disparity in research numbers, particularly after IPY. As an example, ArcticNet is a Networks Centre of Excellence and "Canada's largest financial commitment to northern research to date" (ArcticNet, 2020, p. 4). ArcticNet has played an important role in developing and promoting research in Inuit Nunangat (Pigford et al., 2022); however, the geographic scope of ArcticNet research did not include northern First Nation or Métis homelands. It was only in the network's renewal in 2019 that funding eligibility was expanded beyond Inuit Nunangat, to include areas in the NWT outside the ISR, and to include the Yukon (ArcticNet, 2020). This pattern is mirrored in community-based monitoring trends, where Inuit are well-represented compared to other Indigenous peoples, partly due to the funding opportunities in northern Canada but also to growing Inuit leadership in research and monitoring (Kouril et al., 2016). There is an opportunity for research funders to use targeted funding calls to support the growth of research in under-researched geographic areas (CCA, 2023; Ogden et al., 2016).

Second, specialized topics bring researchers to specific locales. Many Arctic and northern research topics are of national or global interest (Husebekk et al., 2020; Roots, 1996), and may receive more attention than local research interests (ITK, 2018b). Higher license numbers in NWT and Nunavut are partly due to growing research interest in Arctic topics like sea ice (Biresselioglu et al., 2020) and Inuit culture (Polidoro et al., 2024) as opposed to the subarctic. Interest in marine topics in Nunavut and NWT ranging from community-based ice and wildlife studies to large ship-based expeditions supported by ArcticNet also attracts physical science researchers (ARI, 2014; Polidoro et al., 2022). The Yukon has only a short northern coastline with no coastal communities making access challenging. Yet other regions in the Yukon experiencing the most research are also geographically unique and host long-term physical science research programs (Figure 5.6). VGFN traditional territory is in Beringia which has historically attracted both paleontological, anthropological, and earth science researchers (Brunet et al., 2014b; Lantz & Turner, 2015; Wolfe et al., 2011). The icefields and local ecology of the Kluane region also have a long history of attracting researchers to the traditional territories of KFN, CAFN, and White River First Nation (Danby et al., 2014; Southwick & Ballegooyen, 2019).

Third, research infrastructure attracts researchers to specific locations by increasing accessibility or affordability (Danby et al., 2014). In Nunavut, the Qikiqtani region sees the highest research intensity. This is partly because it includes the capital city of Iqaluit, which is the community in Nunavut with the most licensed research (Polidoro et al., 2022). It is also home to some of the

northern-most islands in Nunavut that attract high numbers of physical science research and diverse research infrastructure including the PCSP station in Resolute Bay that has influenced the growth of research in the area (GC, 2023). POLAR is planning to have a similar impact in the Kitikmeot region through its investments in CHARS, with funding and in-kind support for researchers (POLAR, 2020a). Research infrastructure also plays a role in the development of research in the Yukon. Two of the areas that see the most research intensity are the traditional territories of KFN and CAFN. These two regions include Kluane National Park, which is home to one of the largest land-based ice fields in the world and the location of three different research stations: University of Calgary's Kluane Research Station, the independently run Outpost Research Station, and a multi-university program called Squirrel Camp. In the NWT, the support of the Western Arctic Research Centre in Inuvik has played a role in the growth of research in the ISR and Gwitch'in Settlement Area (Gareis & Mercer, 2015). Research stations provide logistical support, improve access to remote areas, and contribute to the development of long-term research programs (Danby et al., 2014; Wilson, 2021), but they concentrate resources in specific locales while other locations get limited research attention. Research infrastructure can be expensive and logistically challenging; however, even smaller scale infrastructure makes travel more affordable and attracts researchers to a community. For example, NRI operates a bunkhouse in Arviat, NU that provides affordable temporary housing to researchers and a variety of operators offer gear storage to researchers, including ARI in Inuvik, NT and Parks Canada in Old Crow, YT.

Fourth, local capacity to engage in research plays a role in attracting research to the area and has an impact on how research benefits are distributed (Carr et al., 2013). The North Slave Region of the NWT, which is the most populated region in the territory, and includes the capital city of Yellowknife, has the second highest amount of licensed research (Figure 5.5). The North Slave Research Centre, along with a number of ARI and Aurora College research programs, are located within the region. It is also home to the Tłı̨chǫ Government and the Dedats'eetsaa Tłı̨chǫ Research and Training Institute, an organization that has developed Tłı̨chǫ research capacity and partners extensively with visiting researchers (Dedats'eetsaa: Tłı̨chǫ Research & Training Institute, n.d.). In the Yukon, this intersection of local research capacity with high research intensity is demonstrated in the traditional territory of VGFN, home to 25% of all projects licensed in the Yukon. VGFN has a long history of working with researchers on a number of different topics and has developed internal research capacity through their heritage department and the administration of their own research permitting process (Cirque Consulting & Communications, 2009). VGFN's partnership with several tri-council funded academic researchers initiated a series of collaborative projects that have informed research processes across the North (Brunet et al., 2014b; Tondu et al., 2014; Wolfe et al., 2011).

The ISR, which has the highest number of researchers in the NWT (Figure 5.5), is an example of how all four factors intersect to influence research capacity. In the Mackenzie Delta area there is: i) oil and gas potential and related industry research; (ii) interest in marine, ecosystem, and earth sciences; (iii)

comparatively easy access by air or road plus the logistical support of the ARI; and iv) the relatively robust research capacity within the IRC. The IRC has a department focused on research that currently includes 11 employees (IRC, 2024) and is one of four Inuit governance bodies that partners with ITK on research initiatives. Nationally, Inuit are proactive in terms of research advocacy, and the ISR benefits from policies, programs, and projects that span the four Inuit regions that make up Inuit Nunangat, like the National Inuit Strategy on Research (ITK, 2018) and the Inuit Health Survey (Fletcher et al., 2024).

While the regions and communities described above have benefitted from internal capacity and research partnerships, the demands of increased research interest have at times strained local capacity (Gearheard & Shirley, 2007; ITK, 2018b; Southwick & Ballegooyen, 2019). This is particularly evident in communities that host research infrastructure like PCSP in Resolute Bay, NU or AINA near Haines Junction and Burwash Landing, YT. These communities do not necessarily benefit from visiting researchers but have the burden of reviewing all of the license applications (Figure 5.15). Researchers may prefer to work in specific communities or regions because of the opportunity to partner with an active local organization; however, there are opportunities for researchers to expand their geographic focus. Public licensing databases can be used to identify communities or regions in the North that do not have active research in a specific topic area, opening up opportunities for new partnerships. Increased support for the capacity of organizations in under-researched geographic areas could help expand the geographic coverage of northern research by encouraging

local and Indigenous-led research while also attracting outside partners. While researchers can play a small role in contributing to this capacity through project-specific funding, ultimately this is where targeted investments by government organizations like POLAR and the tri-councils are required (Irlbacher-Fox, 2018; Purple Dog Consulting, 2010). Flexible approaches that bring new skillsets to northern organizations including post-doctoral internships, position sharing amongst organizations, regional research advisor or coordinator positions, or interchanges between organizations also contribute to local research capacity.

5.5.2 Underrepresentation of health and social science research

Historically there has been a stronger focus on research in the physical and natural sciences in the North, with less funding and attention going to research in the health and social sciences, or IK (Chatwood & Young, 2010; Giles, 2015; Ogden et al., 2016; Young & Chatwood, 2011). Despite recent small increases (Figure 5.8), these topics are still under researched in Nunavut and NWT compared to the physical sciences (ARI, 2014; Polidoro et al., 2022) and this is accentuated in the Yukon, where the health sciences and social sciences combined make up less than a quarter of all research licenses (Figure 5.7). This is happening despite the critical health and social inequities in the North compared to other regions in Canada and has consequences for the distribution and impact of research benefits and outcomes. It means that there are potential knowledge gaps that limit the availability of evidence for policy makers in making decisions around health and social issues in the Yukon, and to a smaller degree in Nunavut and the NWT, potentially leaving them to extrapolate from information

based on other regions (Ogden et al., 2016). It also means that there are less employment opportunities in community-based research for local residents without field research skills or training (Gearheard & Shirley, 2007).

Social and health research topics are of high priority to northern governments and organizations, who have identified diverse topics ranging from specific challenges to system-wide issues (ACUNS, 2017, 2018; GNWT, n.d., 2017; YG, 2016; YG et al., 2016; ITK, 2018b). Promoting research in the health and social science disciplines will require a variety of approaches. Territorial governments and academic institutions have a role to play by increasing their internal research capacity in the social and health sciences, but they are dependent on federal funding to create new programs or research positions. In the Yukon, a new unit focused on public health and epidemiology has increased capacity at YG in the past ten years to conduct health research internally. Territorial research policies and strategies provide a signal to research funding bodies and researchers that more health and social science research is needed (Chapter 4). GNWT produced a research agenda focused on health and social services that outlines a commitment to supporting researchers who address GNWT's health and social research priorities (GNWT, n.d.). This type of research policy document provides a roadmap for researchers, directing them towards local priorities and ultimately may attract health researchers to the NWT by creating a pathway for partnership and support. Government-academic partnerships like the Strategy for Patient Oriented Research (SPOR) hubs in each of the three territories catalyze research capacity. Hotìì ts'eeda and YSPOR have dramatically transformed health

research in NWT and Yukon respectively through increased capacity for research conduct, coordination, training, engagement, and communication (Irlbacher-Fox, 2018). Nunavut's new SPOR unit, *Paqqijamik Naalangniq* is expected to strengthen existing capacity in the same way.

Small increases in social science and health research (Figure 5.8) align with emerging funding opportunities (Biresselioglu et al., 2020; Ibarguchi et al., 2018), specifically increased spending for Arctic social sciences by SSHRC between 2003 to 2014 (Ibarguchi et al., 2018). The focus of federal grant funding influences growth in research subject areas, as has been noted in the field of environmental sciences and particularly the topic of climate change (Quinton et al., 2022). Funding policies impact how research happens, as evidenced with the growth of networked research (Naylor et al., 2017; Quinton et al., 2022). While CIHR funding has supported the growth of local research capacity in health science, recent strategic funding opportunities by the tri-councils could support Indigenous and interdisciplinary research in the North (CIHR et al., 2019). Northern governments and organizations can lobby for more funding to support research in critical areas of the health and social sciences, encouraging funding agencies to support with targeted calls, northern research supplements, and other financial supports.

Nunavut has the highest proportion of social science research, at least partly due to research interest in Inuit culture. This is exemplified by the number of projects focused on culture and society and Inuit Qaujimajatuqangit (IQ) (Inuit knowledge)

in Nunavut (Polidoro et al., 2024), and the existence of a journal and biennial conference devoted to circumpolar Inuit studies (Dorais, 2024). Cultural topics of comparative interest in the NWT and Yukon, including Indigenous governance and modern treaties, are not researched at a scale comparable with Inuit cultural research in Nunavut. The growth of IK and cultural studies has also created some tensions in researcher-community relationships that have resulted in the development of new guidelines, methodologies, and increased scrutiny on how research with Indigenous Peoples is conducted (ITK et al., 2007; Pedersen et al., 2020; Southwick & Silas, 2018). At the same time, northern Indigenous researchers are increasingly taking the lead in research across all disciplines (Buschman, 2022; Charlie, 2021; Fraser, 2019; Healey & Tagak Sr., 2014; Houde et al., 2022; Mearns, 2017; Pedersen et al., 2020; Tagalik et al., 2023).

The GC has a major role in directing northern research through strategic policies and funding programs, as well as the research conducted by government departments (Figures 5.9, 5.12). Although federal strategies and other reports indicate a recognition of the critical social, health, and economic challenges in the North (CPC, 2014; GC, 2017, 2019a; Simon, 2017), spending on internal federal research activities has not changed. In fact, the disparity between the disciplines is amplified in federal research (Appendix 9.4; Figure A9.8). According to internal financial data on federal science personnel and spending in the three territories combined, during the 2004-2019 time period only 9% was on social science, humanities and arts ($97 million), while 91% was on natural science and engineering ($983 million) (Statistics Canada, n.d.-a, n.d.-b). Not only can social

science research inform decision-making on social issues, it also provides valuable information on lived experiences, cultural values, and northern priorities in relation to other fields (ACUNS, 2017; Giles, 2015). Through internal spending, the federal government underlines a societal bias towards valuing the contributions of physical and natural science for decision-making and undervaluing social science research.

POLAR was mandated to advance knowledge of the Canadian Arctic and subsequently it plays a role in promoting northern research (POLAR, 2020b). This includes operating CHARS in Cambridge Bay, funding northern research, disseminating knowledge, and representing Canada's interests in international Arctic science. Despite having a mandate to "encourage synthesis across disciplines", much of POLAR's funding has focused on the physical sciences (POLAR, 2020b, p. 3). Along with the PCSP station in Resolute Bay, CHARS supports access to Nunavut mainly for field-based physical science research (GC, 2023; POLAR, 2020a). Increased research in Nunavut in 2017 aligns with CHARS providing funding and logistical support, bringing more federal researchers to the Kitikmeot region of Nunavut. The influence of federal policies through both internal and grant funding on disciplinary and geographic research trends is significant and indicates an opportunity for a change in what kinds of research are supported and where. Diversifying the research conducted – and funded – by the federal government can expand the northern knowledge base and impact how decisions are made within all levels of northern governments (Ogden et al., 2016).

Currently, the territorial licensing processes reflect disciplinary silos of academic and federal funding structures according to physical, social, and health sciences. This makes it difficult to track changes in interdisciplinary research over time. Northern organizations have identified the importance of interdisciplinary approaches to address complex issues like climate change (GNWT, 2017; Ogden et al., 2016). Funding agencies (e.g. tri-council funding initiatives, ArcticNet) also increasingly support interdisciplinary research. Polidoro et al. (2022) tracked interdisciplinary research in Nunavut through qualitative thematic coding of license summaries. However, undertaking such coding retroactively across all northern licensing databases was not feasible due to time and inconsistency of detail in license data. Updating license applications to include a question about interdisciplinarity, or for researchers to select relevant topical codes, would make interdisciplinary research much easier to track.

5.5.3 Institutional representation in research leadership

Licensing analysis results highlight the important role that Canadian universities play in northern research, where they are dominant in licensed research across the three territories (52%) and increasing in both Nunavut and NWT (Figure 5.9). This trend is not unique to northern Canada; across the circumpolar Arctic, universities and colleges were found to be the main institutions publishing Arctic research (Hua et al., 2012). There has also been increased participation from international universities in the Canadian North over the past 15 years that coincides with an increased focus on international research collaboration across Arctic states (Agreement on Enhancing International Arctic Scientific

Cooperation, 2018). This includes European Union interest in developing research partnerships with Canada, such as support from funding programs like the Belmont Forum, Horizon 2020, and the Canada-Inuit Nunangat-United Kingdom Arctic Research Programme (CINUK) that promote international partnerships. There is also increasing interest in the Canadian North amongst international academia, bringing large teams of international researchers to northern Canada (Ibarguchi et al., 2018; Killeen, 2012). As an example, the Horizon 2020 funded Nunataryuk project involves 26 research partners from 12 countries focusing on permafrost environments in a number of sites across the Arctic, including the ISR in northern Yukon and NWT (Nunataryuk, 2021). As geopolitical issues affect opportunities for researchers to work in some Arctic countries like Russia, there may continue to be increasing international interest in the Canadian North. Canada's engagement in international science programs like IPY and organizations like the International Arctic Science Council may also attract international attention to the Canadian Arctic, along with increasing Canada's influence over research practices in other circumpolar regions. One of the challenges using licensing data is tracking international partnerships and networked research. With the information available in this study, it was not possible to link individual licenses with partner projects led by other PIs or to identify funding sources or connections with larger projects or networks. This could be accomplished in the future by including a question about funding or partnered projects.

A large proportion of research in the three territories is being conducted by a small number of universities. Some of the most active universities across the North were also key leaders of IPY, including University of Alberta, McGill University, Carleton University, University of British Columbia and University of Toronto (Paci et al., 2008). Some universities that have been successful in northern research have also invested in institutional initiatives and partnerships to promote northern scholarship. This is likely to attract faculty interested in doing research in the North and encourage existing faculty to expand their research to northern regions. As an example, the University of Alberta, which holds the most licenses (Figure 5.11), hosts UAlberta North, an internal program that provides coordination to support northern research through partnership development, student and faculty support, and communications (University of Alberta, 2024). This program is built upon “a strong and comprehensive set of research and educational relationships across the North” and spans all three disciplines (University of Alberta, 2024). It also has a Circumplar Students Association that encourages student interest in the North. There are a number of long-term researchers at UAlberta working in a broad variety of topics inclusive of glaciology and permafrost thaw across all three territories, h-pylori in NWT and Yukon, Traditional knowledge of polar bears in Nunavut, and community-based research on environmental issues in NWT (Table 5.4). University of Alberta also has a strong presence at YukonU, where a partnered degree in Northern Conservation Sciences has brought research to the institution and allowed undergraduate and graduate students to study directly in the North.

Industry also plays an important role in northern research, particularly in the NWT. Higher license numbers in the NWT compared to the other two regions could reflect the importance of the resource industry in that territory, but are also likely due to the requirement in the NWT for consultants to have a research license. In contrast, the Yukon has a resource-based economy and yet distributes few research licenses to industry (and in 7 out of 15 years did not distribute any). The lack of industry research licensed in the Yukon is surprising, considering the important role that resource development and associated environmental research and monitoring play in the Yukon economy (Huskey & Southcott, 2016). This lack of licenses does not reflect an absence of industry research, rather it is likely due to the participation of numerous Yukon-based consultants and companies that are not required to apply for a research license. It could also indicate that companies outside of the Yukon are not aware of the need for a license, or perhaps are working under the assumption that because they are hired by a local government or organization (or they are doing monitoring that they do not consider to be research), that they are not required to get a license (Purple Dog Consulting, 2010). While the NWT and Nunavut licensing processes are fairly clear, information on who and what types of research require a license in the Yukon could be more clearly communicated in the guidebook for the YSEL.

Most of the industry and consultant licenses, including many in the social sciences, were held by environmental, engineering, and geological companies conducting studies related mainly to mining or oil resource development projects in the region (Table 5.4; Appendix F). Although the resource industry can be

volatile (Petrov, 2010) there is also licensed industry research that has been ongoing throughout the study period in relation reclamation at closed mines. Regardless of who initiates industry research, often the results are proprietary, and thus the datasets and results may not be shared with anyone beyond the project partner (Thiessen et al., 2022). With very little industry researchers applying for a license in the Yukon and no other record available, it is challenging to quantify. With industry contributing 12% of licensed research across the three territories (Figures 5.9, 5.13), and likely considerably more happening that is not tracked, this represents a large source of knowledge about the North that is not publicly available to all potential knowledge users including Indigenous northerners, which does not not align with data sovereignty principles (First Nations Centre - National Aboriginal Health Organization, 2005; ITK, 2018b). It may be possible to create a database of known projects using resources like the YESAB registry and publications prepared for northern governments. However, without updating Yukon legislation to require local researchers and industry to apply for a license, there is no way to systematically track and analyze industry research in the territory. Improved tracking of industry research and more accessible results could aid in reducing research duplication, as well as contributing valuable data and knowledge to other research efforts.

5.5.4 Northern leadership and priority-setting

Increased northern engagement in research is an important strategy for realizing research that is relevant and responsive to local needs (Brunet et al., 2016; Degai et al., 2022; ITK, 2018b; Lafferty et al., 2022; Perrin et al., 2021). Opportunities

exist to increase northern participation in research through both northern-led and northern-engaged research. Although it was difficult to get a clear indication of northern leadership across the three territories, in NWT where northern-led projects are consistently tracked in the licensing database, they represented 13% of projects (Figures 5.9, 5.14). Similarly, during IPY, which was a pan-northern initiative, northern-led projects represented 13% of the overall budget (Paci et al., 2008). In the Yukon and Nunavut, where northern-led research represented only 4% and 3% of the overall licensed research respectively, there is research being conducted by local researchers that may not be reflected in the data. As noted, there are limitations in what this study can show, and these results would benefit from a comprehensive understanding of the state of locally led research in both the Yukon and Nunavut beyond what is captured in the licensing database.

There are opportunities for research funders to address local and regional research needs and support relevant research through collaborative research program design. CINUK is an example of how a research program can be designed to ensure that Indigenous priorities go beyond informing individual research projects to informing funding program development and processes. A partnership between ITK, United Kingdom Research and Innovation, POLAR, the National Research Council of Canada, Parks Canada, and the Fonds de recherche du Québec, CINUK focuses on aligning with the National Inuit Strategy on Research (NISR) and supporting Inuit representation in research (United Kingdom Research Institute, 2024). Funders can also address local and regional research needs by requiring that projects align with local priorities, follow local protocols,

and are approved by relevant Indigenous organizations. In a recent funding call targeted to the Yukon, POLAR required applicants to align their project goals and objectives with local priorities from four Yukon-focused climate change strategies (POLAR, 2022). Community-led or partnered research was also prioritized and applicants were required to demonstrate community engagement and support in the application beyond a letter of support. As well as directly addressing local needs, these types of targeted funding programs can result in research that meaningfully includes local Indigenous organizations and communities as project leaders or partners.

Northern research capacity

Supporting the development of research capacity in all three territories can contribute to northern leadership in research. Research capacity includes supporting both individuals and organizations to engage in the production and use of knowledge (Darling et al., 2022). There were a variety of different northern organizations represented in the data, including Inuit, First Nation, and Métis governance bodies and co-management boards that are leading their own research. The territorial academic institutes play an important role in leading research, particularly in physical science research, but they are working across all three disciplines. There are also many research-focused NGOs that play important roles as research leaders, contributing to the overall research capacity in the North (Southcott & Walker, 2009). In the northern Canadian context, research capacity also includes engagement in the governance of research. Several Yukon First Nations, including VGFN and KFN, are taking the lead in

developing opportunities for community-engaged research by hosting annual research summits or gatherings that bring researchers to their communities. These types of locally-led initiatives serve to shift the narrative around research towards local priorities, while also providing a venue for interested citizens to hear from researchers about the research happening on their land (Dän Keyi Renewable Resources Council & KFN, 2019; Green Raven Environmental, 2018).

Examples from the three territories demonstrate how supporting northern research capacity can contribute to growth in topics and areas that are under-researched. In Nunavut, prior to 2005 60% of licensed projects were in the physical sciences while 30% were social sciences and 10% were health (Gearheard & Shirley, 2007). The average proportion of physical science projects has decreased to 52%, with both social science and health research have grown by 7% and 1% respectively. Growth in these disciplines is partially due to the growth of community-based health and social science research capacity (Cueva et al., 2022) with organizations like the QHRC, Aquimmavvik Society, and Ilisaqsivik Society all actively leading research (Gearheard et al., 2011; Healey et al., 2018; Tagalik et al., 2023). The NWT has a relatively robust local health research sector, with organizations like the Institute for Circumpolar Health Research and Hotıì ts'eeda both funded by multi-year CIHR grants (Irlbacher-Fox, 2018). The ARI and the nursing program at Aurora College are both contributing to health research in NWT, demonstrating the potential influence that local post-secondary programming can have on local research capacity (Paci et al., 2008; Poelzer, 2009). In the Yukon some locally led health research is not reflected in

the licensing numbers, including research conducted by the AICBR who played a key role in social science and health research in the territory prior to closing its doors in 2020. Local research organizations contribute to health and social research capacity in the region by identifying research priorities, providing training, and acting as boundary organizations in research partnerships, thereby attracting non-resident health and social science researchers to the region (Cueva et al., 2022). At the same time, they contribute to how research is framed and conducted, ultimately changing the discourse on health and other social topics in the North (Cueva et al., 2021; Healey Akearok et al., 2019).

A key contributor to research capacity is having northern-based positions focused on research conduct, administration, and coordination. Supporting the development of research coordination and advisory positions in the North can create opportunities for northern communities and organizations to engage in research and build partnerships (Perrin et al., 2021). Local IRAs contributed to the success of ArcticNet, creating bridges between academia and the four Inuit regions and advising on how research is conducted (Hayward et al., 2021). The regional coordinators from IPY are another example of the important role advisory positions play in research capacity (Brunet et al., 2014b); however, it is not always possible for small northern organizations and Indigenous governments to fund and maintain research-focused positions. While there were a number of northern research organizations represented in the license databases, having researchers embedded in Indigenous and northern governance organizations can also create opportunities for growth in locally

relevant research (Ogden et al., 2016). Having an employee focused specifically on research in the organization can contribute to improved partnerships with researchers from outside the region by making local information accessible, connecting them with communities that have relevant questions, and advising them on local context. Ultimately this type of capacity can contribute to more research that is community-engaged and locally relevant but will require significant financial support and long-term investment (Henri, Carter, et al., 2020; Perrin et al., 2021).

Research capacity is influenced by the availability of funding to do research and support participation. The license databases do not include information on funding, but by examining research trends in conjunction with research policies and programs potential connections appear. Programs like IPY and ArcticNet demonstrate the influence funding programs can have on the development of northern research in general, but also in prioritizing specific locations, disciplines, topics, or research leads. In recent years, as northern-focused funding programs have made efforts to meaningfully supported northern research capacity, ArcticNet has influenced the capacity of northern regions to lead research. Inuit Qaujisarnirmut Pilirijjutit (IQP), which is an Inuit-led ArcticNet funded program, prioritizes research that aligns with the NISR and only funds projects led by Inuit. ArcticNet's Northern Research Leaders program also supports northern research capacity by funding researchers, infrastructure, and training hosted by academic institutes in the North. Flexibility in the program means that each institution can adapt the funding to their needs and local research priorities. Locally led funding

programs can target knowledge gaps while also supporting local research capacity but often require the financial support of the federal and territorial governments. For example, with access to federal funding, YG responded to the need for research on the health and social impacts of COVID-19 by launching a competitive research fund and creating a diverse local committee to screen proposals (YG, 2021a).

Partnerships play a role in supporting northern research capacity

One of the challenges with the license databases is accurately tracking research teams and partnerships (Polidoro, 2022). Co-authored research publications demonstrate the important role that northern partners play in research (Carter et al., 2019; Goodman et al., 2019; Henri, Carter, et al., 2020; Petrov et al., 2020), yet research trends identify Canadian universities as key actors. While the license databases provided insight on project leads, they did not effectively track team composition and dynamics and the role of northerners as team members or partners. If tracked, these metrics could help us better understand the contributions of northern researchers and capacity to engage in research.

Respectful relationships are the foundation of meaningful research partnerships, contributing to northern research capacity, improved outcomes in northern communities, and increased uptake of research into policy- and decision-making (Brunet et al., 2017; Perrin et al., 2021). Partnerships with northern organizations or governments are an opportunity for southern universities to respond directly to the needs and interests of northern organizations and communities, while

providing an opportunity for northern governments and organizations to benefit from university research (Perrin et al., 2021). For example, the GNWT and Wilfrid Laurier University (WLU), which is the second most common university affiliation in NWT, established a partnership over a decade ago (Wilfrid Laurier University, 2024a). WLU maintains an office in Yellowknife and hosts NWT-based field research stations as well as the Cold Regions Research Centre which is active across the North supporting research in a variety of topics ranging from earth sciences, biology, and resource management to IK and food security (Wilfrid Laurier University, 2024b). WLU's partnership with GNWT created opportunities to support self-determination in research; notably, the transition of ownership of the Scotty Creek Research Station to the Łíídlı̨ Kų́ę́ First Nation (Pilkington, 2022; Quinton et al., 2022). With a mandate to support "locally relevant … knowledge creation" (POLAR, 2020b, p. 3), POLAR could play an important role in facilitating high-impact research partnerships that contribute to local capacity. Their recent fellowship program takes a step in this direction by embedding post-doctoral students in northern organizations, however it falls short at supporting long-term sustainable capacity by limiting fellowship terms to one year.

Partnerships can also be used to enhance research on the community scale, as evidenced by the recent partnership between the First Nation of Na-cho Nyäk Dun, a self-governing First Nation in the Yukon, and Carleton University (Brulé, n.d.). Built from a longstanding partnership with an academic researcher, the institutional partnership opened opportunities for research in other topics and disciplines. As an institution with a long history of both physical and social

science research across all three territories, Carleton University has invested in an interdisciplinary Northern Studies program that brings students to the North through a field school and internships with northern organizations. These experiential opportunities contribute to ongoing relationships in the North and increased potential for partnership opportunities.

These types of strategic partnerships provide opportunities for northern organizations and governments to invest in research relationships that bring reciprocal benefits. By sharing information on their research priorities, developing cultural training, and hosting research summits and gatherings, northern organizations are guiding researchers towards respectful partnerships. Northern organizations leverage partnerships to create employment opportunities, promote investment in research in the North, and contribute to knowledge sharing (Irlbacher-Fox, 2018). With the existing databases, limited information on northern involvement in research teams is tracked. Tracking partnerships and northern team members would contribute to a better understanding of the role northerners play in licensed research.

5.5.5 Challenges within research licensing processes

Finally, working with the three territorial research license databases highlights where the licensing process could be improved, particularly with tracking and sharing licensing data and information. Research licenses and protocols provide an opportunity for northern governments, communities, and researchers to negotiate relationships and influence decisions around research (George, 2012;

Thomas & Shirley, 2005; Van Den Scott, 2012). There is an opportunity to improve tools for engaging with research licensing which could include adjusting application and reporting processes to accurately track and disseminate information on research in the territories. Improved communication and engagement tools can contribute to more fulsome community and Indigenous consultation on licenses and support oversight of research, and improve engagement of researchers with the licensing process.

While the primary purpose of collecting license data is not for evaluating research trends in the territories, or sharing information with the public, there are potentially important uses of the research licensing data in both areas. ARI has previously analyzed licensing data for the NWT, combining it with the administrative data from other research permitting processes such as archeological, paleontological and wildlife research permit data to provide a more complete picture of research in the region (ARI, 2011, 2014). Recent research in Nunavut did the same for climate change research, combining several datasets to identify trends (Rahman, 2024). In Nunavut and the Yukon this type of comprehensive analysis for all research topics could provide valuable insight into what is currently known, and where more research would be useful. In the Yukon in particular, it would be beneficial to find a means of tracking research conducted by local researchers so that these critical Yukon-led contributions could be included in future analyses. This could be a simple research reporting tool for unlicensed projects (e.g., a form to report on research projects) as opposed to a lengthy license and approval process. This could

greatly assist with research tracking without increasing administrative demands for licensing agencies or local researchers.

Past consultations have indicated that there is value in having an accessible tool for community members and researchers to find information on licensed projects (Cirque Consulting & Communications, 2009; Purple Dog Consulting, 2010). While ASTIS publicly shares information on research projects from the three licensing databases, it has limited project information and topical codes, particularly within the social and health sciences (Purple Dog Consulting, 2010). Both the ARI and NRI have invested in developing online, interactive, public databases to facilitate ease of searching for licensed research of interest. For researchers, this kind of online database assists in identifying topics and regions that are over or under researched, giving them important context when planning new or follow-up projects (Polidoro et al., 2024; Purple Dog Consulting, 2010). For northerners, an online database provides a means of identifying the research happening in and around their community or region. Such databases also help decision-makers and community organizations to identify PIs who may be a potential source of information. NWT's public database is useful for searching by region, community, PI, or topic but has an over-abundance of topical tags. NRI's portal Isirvik, allows for searching by location, topic, and a variety of other metrics (NRI, 2024a). Currently there is no comparable public, searchable database to explore research projects in the Yukon and the region could benefit from having a similar resource to NRI's Isirvik portal, although even the addition of an annual compendium of research would be an improvement. Coordinating

application processes and public databases amongst the diverse research permitting organizations could improve researcher-legislator interactions and contribute to a better record of research in the three territories.

Currently license application and reporting requirements vary across the three territories and do not consistently track information that is valuable for understanding the state of research. A standardized reporting form could assist in ensuring that appropriate information is available for both an online database and for annual research compendia, making it easier for licensing administrators to track research and for researchers to complete their annual reporting. Reporting could include valuable information on community involvement, methodology, reporting tools, sources of funding, and other metrics that might be of interest to local community members and organizations and would reflect what actually happened as opposed to what was proposed in the license application (Polidoro et al., 2024). An initiative to standardize metrics across the three territories would allow for a more robust study in the future on research trends across the territorial North, providing valuable information for research funders.

5.6 Conclusion

The goal of this study was to understand the current state of northern research in the three territories in relation to research policies and programs through an investigation of licensed research from 2005-2019. Although it is generally known that there is an imbalance between physical, social, and health sciences

in the North, this analysis helps to quantify that difference. This study also demonstrates the dominance of university research within the topics that require licenses and shines a light on topical areas (e.g., health) and communities (e.g., Naujaat) that are underrepresented. There are limitations to the dataset due to existing licensing processes which exclude certain topics and do not effectively track locally led research in both the Yukon and to a lesser extent Nunavut, and industry research in the Yukon. Without other comparable sources of information available to fill these data-gaps, this study does not provide an accurate picture of northern-led and industry research. Despite these limitations, the results reveal clear geographic, disciplinary, and leadership trends across the three territories, summarized here according to three key findings.

Key finding 1: There is considerably less research licensed in the Yukon compared to the NWT and Nunavut, notwithstanding the limitations of the Yukon license database. Research intensity is not evenly spread amongst the different northern regions and communities, as evidenced by higher concentrations of research around the communities of Resolute Bay, Grise Fiord, and Old Crow, or in the Mackenzie Delta and Kluane regions. This analysis highlights the influence that investments in research infrastructure and programs (e.g., PCSP, CHARS, ArcticNet) have on the concentration of research in specific areas. In some cases, northern governments and organizations have had a voice in these strategic decisions but not always (Chapter 4), yet they have to make decisions and set policy with the limited data and information available. Smaller scale investments in infrastructure and local organizational capacity to conduct,

administer, coordinate, and disseminate research also attract researchers to communities and can benefit from strategic investments. While licensing data shows geographic differences in research intensity, there may be locally-led or consultant research in those underresearched areas that is not captured in this study. However, many of the communities and regions that attract outside researchers are also those that have strong local reseach capacity.

Key finding 2: While the focus of research in northern Canada is changing, there are still disparities amongst the disciplines, and a misalignment of research disciplines with local priorities. Notably, despite the critical health and social issues that northern regions are grappling with (Lavoie, 2013; Young et al., 2019), there is less health and social science research licensed across all three territories compared to the physical and natural sciences. While there have been increases in social science projects in the past 20 years, health research continues to be under-represented across the North. This is accentuated in the Yukon where only 4% of licensed research is focused on health topics, leaving knowledge gaps that could impact territorial and community capacity to make evidence-informed health decisions.

Key finding 3: An exploration of research leadership quantifies the dominant influence of Canadian university researchers in leading northern research. Within licensed research, Indigenous and northern-based leadership is low, despite over a decade of calls for increased self-determination in research. This is certainly an underrepresentation of northern-led research due to differing

licensing protocols. In NWT and Nunavut, northern-led projects included a higher percentage of social science and health research. Support for northern research capacity (e.g., QHRC, IRC) contributes to increased opportunities for northern leadership, while also benefiting visiting academic researchers.

Considering these findings in relation to the current context of research policies and programs helps to identify opportunities to contribute to a more balanced distribution of research. Moving forward, four recommended areas of focus are suggested for addressing current limitations and improving representation in northern research.

1. **Support for northern leadership in research can contribute to more balanced disciplinary – and interdisciplinary – research on a broad range of topics that align more closely with northern priorities**. Physical science research investments come from granting agencies, public governments, and resource projects, yet this study showed that equivalent investments are not being made in other disciplines in the North. Addressing critical health and social issues in the North benefits from northern-led research that is embedded in local context but requires consistent support. Diversified leadership in research requires flexible funding that is accessible for applicants unaffiliated with southern universities. As one of the main funders of northern research, this is an opportunity for the tri-councils to review and modernize their funding policies including eligibility rules and target new audiences with innovative approaches to funding.

2. **Investments in research infrastructure and programs can influence the availability of information for northern decision-making.** Large centralized investments have had an impact on certain areas and attracted researchers to specific locales. However, investments into a distributed network across the North could support research in underresearched locations and contribute to increased decision-making capacity across the three territories. The inclusion of diverse northern voices in federal research planning for the North – particularly in decision-making and advisory roles – can impact how future investments are distributed across the North. As was noted in Chapter 4, transparent advisory and consultation processes also contribute to equitable distribution of investments.
3. **Support for research capacity at northern organizations can benefit both northern and southern-based researchers**. Increased research capacity at organizations based in communities contributes to more locally led research and also strengthens connections to visiting researchers. Investments and support for increased capacity at northern organizations can come from outside partners or funders. Ultimately, however, sustainable capacity also requires leadership from local organizations and champions.
4. **Licensing processes can be improved to support local governance of research.** Research licensing continues to play an important role in moderating community-researcher relationships in the North, although

processes vary across the three territories. Improvements in processes, including how research is tracked, monitored, and communicated, could better support local governance of research. Tracking and monitoring research metrics helps with understanding the evolution of northern research, yet there is important information that is currently missing, particularly related to funding sources, team composition, and the level of community engagement and leadership. There is an opportunity for licensing organizations to redefine the goals – and eventually the legislation – of the licensing process based on regional needs. Thisis particularly relevant in the Yukon where the process and tools are outdated. Rethinking how research licensing considers the current context of research in the North is imperative and could include finding ways to track local and Indigenous involvement in and leadership of research.

Research licensing numbers provide baseline information and insight into the current state of northern research. When combined with research policy and program information, we gain insight into the decisions that influence research and identify opportunities to contribute to improved research decision-making.

Chapter 6 - The evolving role of northern partnerships in strengthening the research-policy interface

6.1 Introduction

There is a growing recognition that partnerships play a critical role in conducting research in the Canadian North. With an increasing emphasis placed on Indigenous self-determination in research, partnerships with northern Indigenous governments and communities have grown in importance. This is reflected in evolving research guidelines, licensing processes, and funding programs. While there is a body of knowledge that discusses partnership in research broadly, and a number of case study examples sharing partnership approaches within individual research projects, there are few attempts to systematically understand northern research partnerships and their impact on the uptake of research in decision-making.

The goal of this study is to examine northern research partnerships in practice, through the experiences of researchers and in the context of evolving research policies. For this study, 'researcher' includes southern-based academic researchers working in northern regions, as well as northern-based researchers who work for a variety of organizations. Northern-based researchers were involved in research through a variety of roles, ranging from lead researcher to project coordinator to guide and field assistant. Research focused on understanding how research is done, including methods, communication, evaluation – and the corresponding external contexts of funding, policies, and partnerships – can contribute to progress in the scientific enterprise (Ioannidis,

2018). Brunet's survey of northern research practitioners (2016) provides insight into researcher-community relationships and a foundation that we build upon with this qualitative approach to understanding practitioner experiences with partnership. This study takes a broader focus, going beyond researcher-community partnerships to include partnerships with governments, industry, and other researchers. Both northern- and southern-based researchers shared their experiences in northern research through interviews, which were analyzed using a qualitative interpretive approach. Through these interviews we aimed to answer the questions: How do researchers perceive the alignment of their research with the needs and expectations of northern partners? How do different approaches to partnership influence the integration and uptake of research in policy and decision-making?

This chapter examines how existing institutional forces, including research policies and programs, influence how partnered research is conducted in the North. The key elements of a research partnership are identified, along with factors that contribute to successful collaborations or pose ongoing challenges. We explore how partnerships can impact the outcomes of research for both decision-making and self-determination in research. The results are discussed in relation to the literature on partnered research and useable science as well as the expectations and principles that emerged from a document analysis of northern research policies (Chapter 4).

6.2 Partnership & participatory research models

6.2.1 Partnership and collaboration

The concepts of partnership and collaboration are interpreted within a research context in divergent ways, resulting in a wide variety of approaches to partnering (Doering et al., 2022; Drahota et al., 2016; Frankfort-Nachmias & Nachmias, 2008). There are diverse types of partners involved in northern academic research, including researchers from different disciplines, knowledge systems, and institutions, research organizations, northern governments, northern and southern academic institutions, Indigenous organizations, schools, and youth organizations, among others (Carter et al., 2019; Hoekstra et al., 2020). While partnered research can be driven by the motivations and interests of the partners, it is also affected by outside actors including research funders, stakeholders, users, and participants, and the level of engagement of both partners and outside actors can vary (Fransman et al., 2021).

A basic definition of a research partnership is when two or more individuals or organizations engage in research together in a more formal relationship. This implies that they both have a commitment to the research although the level of commitment may vary. Collaboration generally refers to people working together, which can happen within or outside of a partnership and can be more informal. For example, SSHRC (2021) defines a *partnership* as working "collaboratively to achieve shared goals for mutual benefit… a formal partnership is grounded in trust and mutual respect, with partner organizations contributing in a meaningful

way to the success of the endeavour". Doering et al. (2022, p. 7) emphasize the importance of collaboration in partnerships, which means that "the research project itself is co-constructed, that new knowledge is co-generated and that research outputs are co-produced". For the purposes of this research, we explore partnership as a research relationship between different actors, whether formalized or not, and collaboration is used throughout as a term to describe the act of working together.

Funding plays a critical role in supporting successful and respectful research partnerships (Doering et al., 2022; Ljubicic et al., 2022; Witteman et al., 2018; Wolfe et al., 2011). The participation of northern organizations or community members is often an expectation when conducting research in the North and is one of many factors contributing to increased funding needs (Doering et al., 2022; Gearheard & Shirley, 2007; Mallory et al., 2018). Northern research often requires flexible funding that allows for time to build relationships, changes to research design based on changing community priorities, and support for community participation and employment (Brunet et al., 2017; Doering et al., 2022; Hauser et al., 2023; Houde et al., 2022; Wolfe et al., 2011). It may require support for complementary activities like training, educational programs, and on-the-land camps, among others, that contribute to community outcomes (Hauser et al., 2023; Ljubicic et al., 2022; Mallory et al., 2018). A key consideration in partnership dynamics is who can access and control research funding, which can impact decisions about what research happens, where it happens, how it supports research capacity, and what benefits local communities experience

(Mallory et al., 2018; Paci et al., 2008). Funding programs, networks, and other institutional processes created in partnership with northern organizations can contribute to the evolution of northern research by supporting northern-led and northern-partnered research (Mercer et al., 2023). Recent funding examples like the Canada-Inuit Nunangat-United Kingdom Arctic Research Programme (CINUK) and IQP fund have prioritized Inuit involvement in research and included Inuit in setting priorities and reviewing proposals.

6.2.2 Participatory research and co-production of knowledge

Participatory research and co-production of knowledge are approaches to research where partners are directly involved in the research process. Typically in the northern context, these approaches are employed with communities through a partnership with an Indigenous or community-based organization (Brunet et al., 2016; Davis et al., 2021). Participatory methodologies like community-based participatory research (CBPR) and participatory action research (PAR) are forms of relational research that can be used within a decolonized approach to conduct research with Indigenous communities, although they do not centre Indigenous epistemologies and methodologies (Asselin & Basile, 2018; Castleden et al., 2015; Kovach, 2009; McGregor, 2018; Smith, 2012). Co-production methodologies and processes involve research partners co-developing and conducting research together, ideally with all research partners involved throughout every step of the process. In northern research, they have emerged as a means to bring together different knowledge systems, bring equity to the research process, and support research outcomes that benefit northern

residents (Buschman, 2022; Degai et al., 2022; Heikkinen et al., 2020; K. J. Wilson et al., 2020; Yua et al., 2022).

While participatory research and co-production of knowledge are not the only approaches to partnership, they are often recommended as best practice for engaging in research with northern communities. Participatory research can shift some of the control within research to the participants (Table 6.1), influencing how research is conducted, analyzed, and communicated as well as how the discourse is framed (Cameron, 2012; Castleden, Morgan, et al., 2012; Gram-Hanssen et al., 2021; Jull et al., 2017). Including knowledge users in the research process can strengthen the outcomes and contribute to the production of useful information, but the level of participation will vary depending on the project (Lavery, 2018; McNie et al., 2016). Partnered research can be explored through the level of engagement and control partners have over the project (Table 6.1). Fully engaged participatory research or co-production of knowledge can require a high level of community engagement (Castleden et al., 2015; Castleden, Morgan, et al., 2012; Koster et al., 2012). Community-driven research where the community is consulted at key points of the project - usually in designing the research question and approach – can be less demanding (Bull, 2010; ITK et al., 2007).

Table 6.1: Comparison of different levels of engagement by academic partners with non-academic partners in northern research

Level of engagement	Key characteristics	Supportive/limiting factors	Relevant literature
Partner control	• Funding is held by the partner • Partner has final decision-making power	• Partner's governance & administrative capacity • Long-term collaboration • Flexible funding	Bell, n.d.; ITK, 2018b; McGregor et al., 2010; Sawatzky et al., 2020
Co-produced	• Funding and decision-making power is shared between partners • Partner is involved in all steps of project	• Partner's administrative & research capacity • Ongoing communication • Trusting relationship • Flexible funding • Flexible timelines	Buschman, 2022; Degai et al., 2022; Heikkinen et al., 2020; K. J. Wilson et al., 2020; Woodall et al., 2021; Yua et al., 2022; Zurba et al., 2022
Partnership	• Partner participates in decision-making at key points • Partner brings resources to the project & may share in funding	• Research agreement • Ongoing communication • Partner's research capacity • Flexible timelines	Brunet et al., 2016; Carter et al., 2019; Henri, Carter, et al., 2020; Jull et al., 2017
Engagement	• Funding is held by the researcher • Partner has input on research design and/or other steps in research process • Partner may influence decision-making	• Appropriate avenues for engagement • Plain-language communication • Relevant engagement methods • Flexible timelines	Hauser et al., 2023; ITK et al., 2007; Itchuaqiyaq et al., 2023; Lafferty et al., 2022; Pedersen et al., 2020
Consultation	• Funding is held by the researcher • Researcher has final decision-making power • Partner has opportunity to provide feedback at certain point(s) in research process	• Transparent communication • Relevant mechanisms for providing feedback • Relevant forms of communication	Audla & Smith, 2014; Mallory et al., 2018
Information	• Funding is held by the researcher • Researcher has final decision-making power • Partner is kept informed	• Plain-language communication • Relevant forms of communication	Brunet et al., 2014a; Gearheard & Shirley, 2007

Notes. Adapted from (Galendé-Sanchez and Sorman, 2021).

6.2.3 Research opportunity

There is limited reporting in the academic literature on the impact of northern research on policy and decision-making, in particular, with respect to researcher-partner relationships (Brunet et al., 2014a, 2016). Despite increasing emphasis on research partnerships and participatory approaches, in practice, there are ongoing challenges to measurably increasing engagement of northerners – particularly Indigenous northerners – in research (ITK, 2018b). Academic literature on northern partnerships focuses mainly on self-reported case studies (Buschman, 2022; Carter et al., 2019; Fox et al., 2020; Hauser et al., 2023; Ljubicic et al., 2022; K. J. Wilson et al., 2020) and systematic literature reviews (Bremer & Meisch, 2017; Davis et al., 2021; Jones et al., 2018). Challenges have been identified in assuming that participatory and co-production models infer partner or community benefits, including issues with divergent research objectives, miscommunication, cultural differences, lack of financial resources, and unavailability of local trained personnel (Brunet et al., 2014a, 2016, 2017; Kettle, 2019; Robards et al., 2018; Zurba et al., 2022). Tangible approaches to implementing collaborative research have been identified, including co-constructing research questions and methodologies, collaboratively conducting analysis, maintaining transparency, respecting data sovereignty, and creating a culturally-informed research agreement (Asselin & Basile, 2018; Bull, 2010; Buschman, 2022; Zurba et al., 2022). Yet these approaches to research partnerships have not been thoroughly evaluated in terms of their influence on policy outcomes.

A key challenge is developing research partnerships that are transparent and accountable, bringing tangible benefits to the communities and organizations that engage in research. Understanding how research partnerships are employed to further evidence-based decision-making in the North can contribute to the development of science policies that promote relevant, useable research in future.

6.3 Methodology

This study was developed based on consultations with northern research stakeholders (Chapter 3), a literature review focused on northern research practice and policy (Chapter 2), and a document analysis of northern research and science policies (Chapter 4). Grounded theory guided the design and analysis of a qualitative research process that is open-ended, interpretive, and inductive, allowing for themes and ideas to emerge from the interviews throughout the process (Charmaz, 2006, 2014; Glaser & Strauss, 2017; Hennink et al., 2011; Ritchie & Spencer, 2002). This study relies on key informant interviews with northern researchers, allowing for an investigation of the complexity of the northern research context from the perspective of practitioners, while providing insight into their personal experiences and motivations (Cohen et al., 2007; Dunn, 2016; Hennink et al., 2011; Seidman, 2006). The goal of these interviews was to focus on the research process as a whole, along with the influence of research policies on research practice. For this reason, participation was limited to northern- and southern-based research

practitioners, while research users or decision-makers were not included in the scope.

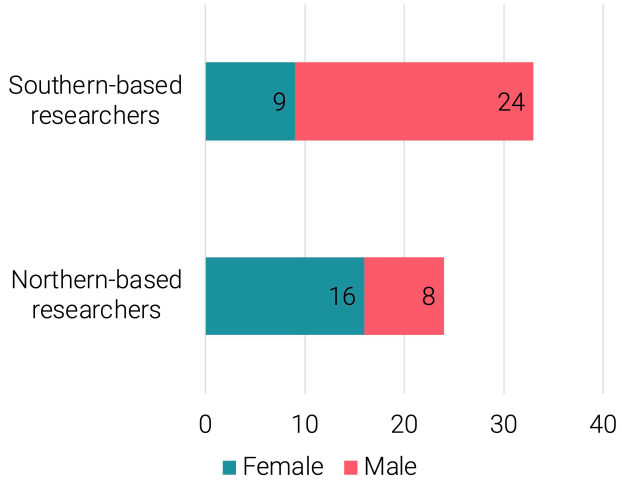
Between October 2019 and September 2023, 57 interviews were conducted, including 17 in person and 40 virtually using Zoom, Skype, or phone. Interviews lasted between 1 and 5 hours, with most being 1.5 to 2 hours. Interviews were audio-recorded and 49 were also video recorded. Interviews were semi-structured and designed to make participants feel comfortable by employing open-ended questions in a conversational approach (Dunn, 2016). The interview guide (Appendix G) explored key themes related to northern research policy and practice, including researcher roles, partnerships, research outcomes and benefits, knowledge translation, research guidelines and regulations, research programs and funding, research capacity, northern leadership, and the future of northern research. The guide was used to ensure consistency, but was not followed strictly, and questions were adapted to follow the participant's lead. When necessary, follow-up questions were used to elicit more information.

6.3.1 Profile of interview participants

Interview participants included 33 southern-based and 24 northern-based researchers (Figure 6.1) who have been conducting research in the Yukon, Northwest Territories, Nunavut, Nunavik, and Nunatsiavut for ten or more years (Figure 6.2). Inclusion as a researcher was defined as having direct involvement in conducting research in the region either as a research leader, as a key team member on research projects, or as a community research liaison working with

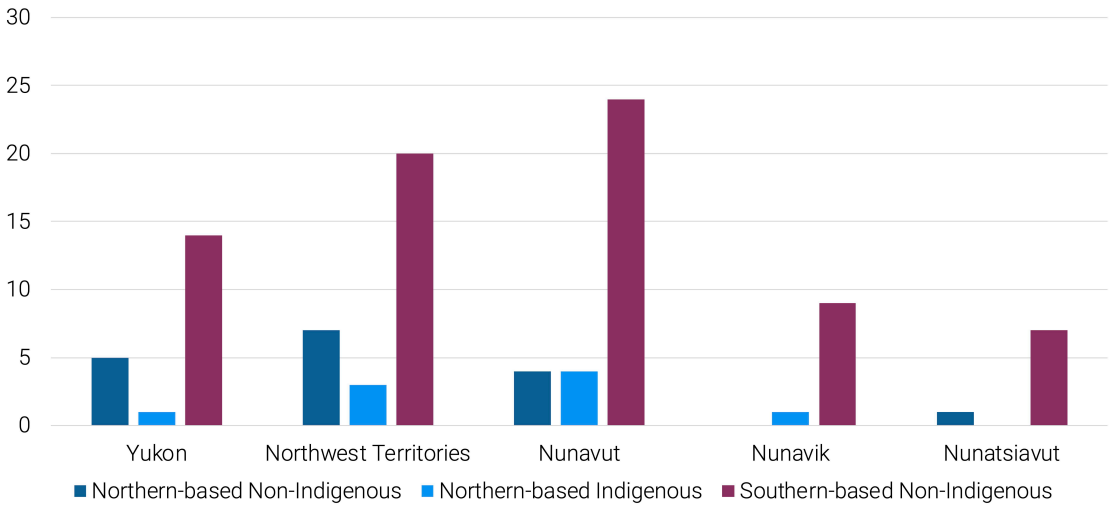
visiting researchers. We focused on participants involved in academic research because this is directly influenced by a variety of science and research policies including grant funding, research licensing, and ethics, although some participants also engaged in industry or government research.

Figure 6.1: Geographic location and gender of interview participants



Note. There were 4 southern-based researchers who had previously been northern residents

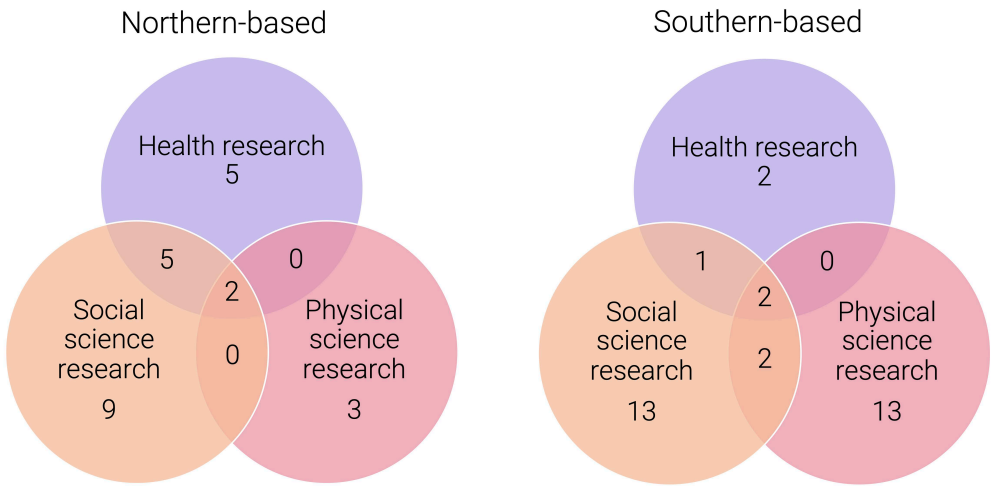
Figure 6.2 Geographic focus and Indigenous identification of interview participants



Note. Some northern-based (2) and southern-based (22) participants worked in more than one region.

Sampling bias was managed by using several sources to identify participants including territorial research license databases, journal and conference author lists, and advice from northern advisors. Snowball sampling, a technique whereby participants identify new participants, was used to expand the list and particularly for identifying northern-based researchers (Merriam, 2009). Participants were selected with consideration for diversity in relation to gender, regional and subject area focus, and institutional affiliation (Figure 6.1-6.4).

Figure 6.3: Research discipline of interview participants

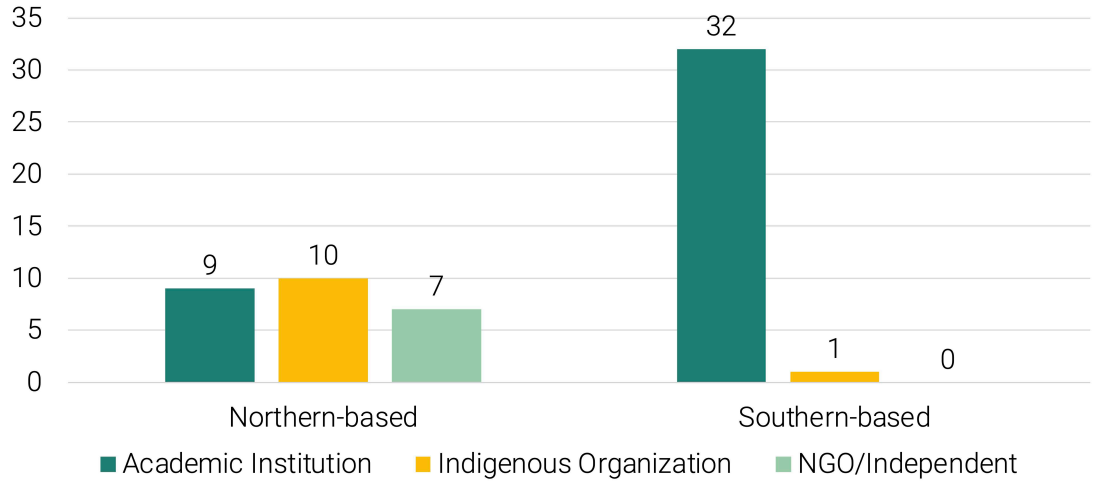


Note. Some researchers worked in and were counted in more than one discipline as demonstrated in the overlapping areas of the circles.

Independent northern researchers received an honorarium for their participation. Although for some participants, Inuktitut or French was their first language, all participants were fluent in English and interviews were conducted in English without translation. Data collection protocols received research ethics and regional licensing approvals (Section 3.4). All participants gave informed consent

(Appendix C), and interviews were recorded, transcribed, and rendered anonymous during the transcription process. Participants are referenced anonymously using a codename representing northern- and southern-based researchers (N# or S#).

Figure 6.4: Affiliation of interview participants by geographic location



6.3.2 Analyzing interview data

Interview audio recordings were first transcribed verbatim using NVivo's automated transcription process. Audio recordings were then reviewed, and transcripts were corrected manually to ensure accuracy. Transcripts were edited for clarity by removing grammatical errors, repetitive words, and space fillers (Tilley, 2016). NVivo 14 (QSR International), a qualitative data analysis software, was used to facilitate thematic coding and analysis. Key participant attributes (Figures 6.1-6.4) were applied in NVivo to track basic descriptive information on participant demographics to inform the analysis (Bazeley, 2013; Lofland et al., 2006; Saldaña, 2013).

Transcripts were analyzed and coded in a two-part process (Babbie & Benaquisto, 2002; Corbin & Strauss, 2012; Lofland et al., 2006). An initial coding framework captured key concepts, themes, and research processes related to the interview guide questions (Krippendorff, 2018; Saldaña, 2013), including: theoretical codes focused on concepts, values, attitudes, and beliefs (e.g., research benefits; northern leadership of research), process codes focused on actions (e.g., communicating results; reviewing proposals), participant attribute codes (e.g., research discipline and topics), and definitions (e.g., definitions of partnership, collaboration, and research) (Appendix H). These codes were developed based on a literature review (Chapter 2) and analysis of relevant northern research policy and strategy documents (Chapter 4). During the first round of coding, parent codes from the initial coding scheme were applied to the transcripts to organize data into broad themes (Gibbs, 2007; Maxwell, 2002; Miles & Huberman, 1994; Saldaña, 2013). A second round of coding focused on adding more specific child codes that emerged from the initial interpretation, refining the themes and reorganizing the data (Miles & Huberman, 1994; Saldaña, 2013). To make the coding process as transparent and accessible as possible, analytic decisions and assumptions were noted in memos as codes were developed and applied and transcripts were reviewed after coding to ensure consistency in applying emergent codes (Charmaz, 2006; Hennink et al., 2011; Ritchie & Spencer, 2002; Wolcott, 1994).

The interviews covered a broad scope of topics; however, the analysis presented here focuses on: i) partnership and collaboration in northern research in relation

to northern priorities; ii) northern leadership and Indigenous self-determination in research; iii) the link between research and policy; and, iv) limiting factors in current research programs. Interview results were triangulated with a literature review and an analysis of northern science and research policy documents (Perrin et al., 2021) to ground them within the policy context (Cohen et al., 2007; Maxwell, 2002).

6.4 Results

Participants were asked to consider the meaning of partnership and collaboration in relation to research and to reflect on what a successful partnership looks like. N13 highlighted how the equivalent Inuktitut word has a much deeper and more complicated meaning:

> *Piliriqatigiingniq means partnership, it means teamwork …when Inuit talk about working together, teamwork, partnership, piliriqatigiingniq, it's much deeper in the sense that there must be a respected relationship. There must be a deep integrated collaboration. There must be a shared understanding about sense of purpose and outcomes which are going to improve the common good. There must be real open communication and integrated way of working together … when we talk about partnership from an [Indigenous] perspective, we're talking about being in deep, respectful, highly collaborative, communicative relationships.*

It was generally agreed that engaging in research partnerships has grown in importance and that funding calls reflect that growth. Participants discussed partnerships at both individual and institutional scales ranging from informal collaborations where partners participated when and if it suited them, to formal collaborations where all parts of the research lifecycle were a shared effort (Table 6.2). Most participants were involved in partnerships at a variety of scales, including partnerships with other academics or northern researchers, network partnerships that included institutional and/or individual partners, and partnerships with community-scale organizations. Examples of institutional partnerships were also discussed ranging from small partnerships (e.g., between a single university and First Nation) to large academic networks encompassing many organizations and individual researchers (e.g., ArcticNet or MEOPAR). Most northern-based participants had beneficial long-standing partnerships with other northern organizations and researchers. In community-researcher partnerships where there was not always a clear institutional partner, participants noted concerns around who represents the community and who has authority to commit to a partnership. In some cases, trusting the wrong person led to a failed project. As N04 experienced, “I was really badly burned, where I trusted people, that they had the authority and stability in their organization, and they were gatekeepers. And then ultimately, people felt they couldn’t or didn’t want to support the research.”

Table 6.2: Types of partnerships as discussed by participants

Type of partnership	Examples
Academic	Between academic researchers and/or academic institutions; network with researchers and/or organizations; team science; multi- and interdisciplinary
Community-researcher	Between a researcher or research team and a community organization or Indigenous or municipal/hamlet government; co-management organizations (e.g., HTO, RRC)
Community-community	Between northern community organizations conducting research
Researcher-government	Between a researcher or research team and territorial or federal government department
Institution-institution	Academic institute with Indigenous government, territorial government or northern organization; network with academic and/or northern organizations

Successful partnerships have several key elements that were consistent across the interviews, including: trusting relationships, a shared vision, roles and accountability, and consistent and clear communication (Figure 6.5). As S08 summarized:

> *[Partnership] is where people make the time that they said they would make, that there is really good communication both ways, that there's meaningful involvement from everyone in every step, that deadlines are met. That there's good communication about problems as they arrive instead of letting it fester. That the outcomes are meaningful for all parties, and that usually means different types of outcomes.*

Several factors were identified that could either contribute to or limit successful partnerships including institutional capacity and supports, funding, timelines, and research agreements (Figure 6.5). Participants also noted a number of other

limiting factors that have an impact on effectively conducting northern research and working in partnership including administrative processes, contextual factors, governance and leadership, relevant knowledge, infrastructure access, and institutional policies (Appendix I). When addressed, many of these factors support better relationships and contribute to shared outcomes. Participants highlighted the important role research partnerships played in contributing directly to the development of policy and programs and supporting Indigenous self-determination in research (Figure 6.5).

Figure 6.5: Key elements, contributing factors, and outcomes of a successful partnership



Note. The diagram is a visual representation of how the main concepts discussed in participant interviews are interrelated.

6.4.1 The key elements of a successful partnership

> *People want to know, are you invested in the North? … They want to know who you are. They want to know that they can trust you. They want to know that they can reach you if they have a question… that you're going to protect them. (N03)*

Trusting relationships

While partnerships often happen at the institutional level, the interpersonal relationships between individuals are critical to success. A strong trusting relationship provided participants with the confidence to embrace challenging work, creating the potential for creative and impactful research. "If we've got a foundation built on mutual interest, respect, openness and honesty and trust, and we get along, we just like spending time together. Those are the opportunities where the door is open for a lot of free and interesting and exciting intellectual exchange where we can be freely starting to create new ideas together across disciplines or across knowledge systems" (S02). When working in their own community, some northern-based participants found it easy to encourage local engagement in their projects (N07, N11, N19, N20), but at times had to manage interpersonal dynamics that visiting researchers did not experience (N03, N04). Many found themselves acting as gatekeepers between their community and visiting researchers (N04, N13, N17, N18, N20, N22). When they had trusting relationships with academic researchers, these local researchers played the role of community liaison and facilitated community-researcher relationships.

Shared vision

Participants discussed partnerships as being built around a common vision, noting tension when academic goals were prioritized over community or partner needs. There was general agreement that in the past academic research was not responsive to northern-identified priorities. However, a couple of participants questioned the assumption that only "northerners" should identify research priorities and questions when they (and others) had worked in the region for more than 20 years while some northerners were only temporary residents (S20, S30). For community-researcher partnerships the focus was on an issue of shared interest, while academic partnerships often came together to tackle interdisciplinary questions. It was important that the goals and outcomes translate to all partners and meet a variety of needs, ensuring that all partners benefit from the research. When research goals were not community-driven, some participants found other ways to serve the community, including training (N10, N13 N16, S02, S15, S08, S24, S25, S31), employment (N04, N10, S01, S08, S16, S22), hosting local events (S06, S18, S25, S26), visiting schools (N14, N19, S03, S04, S14, S15, S17, S23, S30, S31), contributing to local infrastructure or equipment (S01, S03, S25, N17, N22), or providing travel support for local residents to attend conferences or workshops (N07).

Roles & accountability

There was general agreement that all partners should be engaged and share the workload through clear roles and responsibilities, despite bringing different resources, knowledge, and skills to the project. Introducing new people to

projects, whether due to staff turnover or the addition of new students or partners, was identified as a common challenge that requires ongoing orientation and renegotiation of roles. Participants identified several ways that community members contribute even when not explicitly part of the research team, notably as project advisors such as with the Canadian North *Helicobacter pylori* project which hosted advisory committees in every research community (S11). Leadership turnover can be disruptive to institutional relationships and affect project goals, particularly when organizational priorities change. One participant shared how a change in university leadership led to a reduced role for community partners in a government-university partnership (S15). In another instance, leadership change at an Indigenous government led to new priorities that did not align with the original project goals, creating challenges for the research team in a community-researcher partnership (S03). New leadership could also lead to improved partnerships, as several participants noted in relation to a ArcticNet (N01, S02, S05, S15, S31). With new leadership, northern organizations gained a stronger voice in new iterations of the network, ultimately bringing more resources to the North.

Good communication

Having shared experiences and a long-term relationship help to develop a common language and improve communication in all types of partnerships, which in turn supports relationships through managing project changes, timelines and deliverables. As S20 said, “I call it the continuous conversation. So, there’s not been anything written, but there’s a feedback loop that just doesn’t

really stop." While it is critical throughout a project, good communication during project development was highlighted by several northern participants in terms of community-researcher partnerships, including N17 who noted, "those researchers who made that extra effort to come in person here, to sit down and explain their research and really take time to meet and get to know folks on the ground have had more success in securing that kind of… partnership arrangement." Lack of communication was most problematic at the end of projects if researchers did not bring back results (N16).

6.4.2 Contributing factors to a successful partnership

> *We're very selective in the kinds of research that we do or partner or support. We are very careful in the projects that we participate in. Because we have such a long history of research being done, the data being collected and then taken away and so we're very cautious and wait to ensure that the work that is being done and the work that we participate in actively is coming back to our communities directly. (N16)*

Institutional capacity & supports

Almost all participants identified limitations in administrative processes and institutional capacity (Appendix I) and noted the challenges they posed to partnerships and project timelines. The need for institutional supports - including financial, human resource, and policy supports - to engage in partnerships was discussed by both northern-based and southern-based participants, albeit in

different ways. Both researchers and partners struggle with having the time available in their workload to develop and maintain research relationships. For northern partners, having a position or committee dedicated to research contributed to their capacity to engage in research. There were a number of different examples of this in action including inter-agency health research committees in both Nunavut (N18) and Nunavik (N02), IRA positions in the four Inuit regions (S05), and a science advisor and/or committee in the territorial governments (S32). Lack of infrastructure was also a common factor limiting the participation of northern organizations in research – particularly access to reliable internet.

Funding

The role of funding in supporting partnerships was illustrated by examples of a growing number of grants supporting northern capacity by facilitating overhead funds going to northern organizations (e.g., NCP) and supporting student travel to develop and report back on projects (e.g., NSTP). For a few participants, the growing importance of partnerships exemplified a shift in power towards northern leadership of research. As noted by N23, “we’re at a seismic shift right now … we’re seeing it reflected in funding calls, we’re seeing research dollars flow directly to communities. Where having a community partner is a meaningful requirement.” However, for researchers working far from communities or on topics unrelated to community priorities it was sometimes a challenge to engage with potential partners (Appendix I). A couple of participants conducting physical science research felt their topic was not a priority for local communities or that

spending time mainly in the field left little time to build relationships. For a couple of field researchers, attempts to include community members in their research were often unsuccessful due to a lack of interest in the employment or training opportunities they offered, yet the engagement effort was appreciated by community partners.

Despite the shift, administrative rules at some funding programs and universities were common issues experienced by almost all participants (Appendix I). In particular, participants noted northern organizations or non-academic support staff were sometimes ineligible for funding, overhead funds could not always be shared, funding categories and timelines could be inflexible, and expenses like honoraria were not always allowed. For researchers working at small northern organizations, capacity to administer research funds was challenged by complicated reporting processes, including dealing with the divergent reporting processes of federal government departments. While CIRNAC's CCPN process was celebrated for its simplicity and flexibility, POLAR's reporting process was comparatively highlighted as overly complicated. Delayed funding processes threatened the viability of research projects, occasionally leaving northern partners without the support to participate in a project to the extent that had been planned. The timing of funding processes also posed challenges, with many giving only two months or less to engage with partners and develop a proposal for submission. When those calls overlap with winter holidays and fiscal reporting in March there are added challenges for northern partners to contribute to project development.

Flexible timelines

Project funding and proposal timelines were identified as key challenges for collaborative work, as changing priorities, administrative hurdles at partner organizations, and the need to renegotiate the research relationship can all cause things to move slowly, requiring partners to be nimble and adaptable (Appendix I). Time availability for staff at northern organizations was identified as an ongoing, intensifying challenge for community partnerships, yet the importance of the project team spending significant periods of time together to understand the context and build strong relationships was noted by most participants. IRAs or similar liaison positions were mentioned as playing a key role in community-researcher partnerships, facilitating smoother relationships (N16, N19, S05, S21, S24, S30) . Other examples of effective institutional supports at northern organizations that helped manage project development timelines included having a policy or established practice that guides partnerships (S03, S09) and a list of topics or questions ready to share with prospective partners (N07). Some of the examples shared include the territorial research strategies, NG's research approval process, VGFN's research protocol, GRRB's online research priorities, and KFN's research expectations.

Partnership agreements

While only a few participants used research agreements consistently, they are becoming more common in northern research as a way of formalizing partnerships, outlining roles and responsibilities, and supporting accountability. A few participants did not see value in agreements, highlighting the need to remain

flexible to changing timelines and concern that administrative policies (e.g., university policies) limited the development of equitable agreements (Appendix I). As noted by N09: “universities have templates that are much more about university ownership of the intellectual property rights. So, we’ve had to do some real work to push back on some of those things.” A few participants shared first-hand experiences of a research project failing when one partner had control over funding and decision-making – despite having a research agreement in place.

6.4.3 Partnered research supports shared outcomes

> *In terms of partnership for Inuit, everything has to result in something that improves the lives of people. So, knowledge is not knowledge if it doesn’t result in an application that improves the lives of people. (N13)*

Policy-relevant research

Many participants expressed a desire for research to move beyond focusing on academic impact, towards policy impact (i.e. decision-making, legislation, planning processes, or program design). It was noted that much of the research happening in the North has “immediate policy uptake potential” (N01) that can lead to program changes, new resources, and political advocacy. However, with few participants directly evaluating their projects or tracking outcomes beyond publication citations or number of students involved, it is often difficult to identify tangible policy outcomes. Participants employed by, or working closely with, northern organizations were more likely to identify decision-making outcomes

related to their work, in particular when co-producing research together. In some cases, participants acted as bridges between communities and decision-making agencies; “taking what the community wants and putting it into a format that’s accessible for those decision makers elsewhere” (S09). Some of the program or policy outcomes noted by participants at the community scale included creation of youth or on-the-land programs (N18, S15), delivery of information required for safe travel decisions (S13), and more resilient built infrastructure (S06). At the regional organizational scale, outcomes included the development of community health resources (S11), culturally-relevant curriculum (N13), housing strategies (N13), and community-based tourism programs (S03). At the national scale, participants discussed contributing northern data to national datasets and using research results to advocate for culturally appropriate messaging for the North (S08). For one southern-based participant, one of their proudest achievements was seeing the results of their research influence food policies and reduce the costs for remote communities (S07). This research was successful because it was co-produced with all relevant partners, including community organizations and governments.

Several southern-based participants, particularly working in the physical sciences, noted that their research does not have a direct impact on decision-making (S17, S21, S23, S24, S28). However, some of those participants felt their research had influenced national or international assessment processes like the International Panel on Climate Change (IPCC) or Arctic Council assessment reports, and a couple noted they had engaged in media and film with the goal of

influencing public perception of climate change. One participant identified how their research had contributed to an endangered species listings (S31). Others had mixed-success, and when projects were unsuccessful in terms of local uptake it often hinged on partner or community engagement. In one example, a participant had partnered with the territorial government to do research on interventions to animal-human interactions (N21). Without community engagement and support, the government decided not to continue with the project and research funding was not renewed.

It was noted by several participants that engaging directly with the end user at the inception of the project was the best way to produce policy-relevant research. As described by S03, “most of the things I’ve been asked to do recently have specific goals for policy planning in Indigenous governments and in Indigenous tourism, so I’m helping them build their economies in a way that they want to”. While S03 and several other participants co-produce research in community-researcher partnerships that require high levels of partner engagement and participation, there were several other researchers (N03, N04, N13, S04, S11, S14, S25) that engage in what one participant described as “community-driven” research. This was achieved through a variety of means including consulting directly with relevant staff at a partner organization, including end-users on an advisory committee, engaging in formal approval processes with elected leadership that increase decision-maker awareness of research (e.g., through a board or council), and developing projects based on the research priorities shared by northern organizations. In forming partnerships with potential end

users, it was noted that there is a need to balance the importance of developing policy-relevant knowledge with the reputational risks of working closely with partner organizations. Those risks – which include the potential of partner influence over research results – were particularly heightened when partnering with industry. Some academics felt they upheld scientific integrity by pairing a partner-identified issue with an academic research question and by maintaining the freedom to publish results.

Indigenous self-determination in research

Several northern participants noted that increased northern engagement has potential to support Indigenous self-determination in research. For some, this was an explicit outcome they hoped to achieve with their research. A number of participants – both southern and northern – shared first-hand experiences of community-researcher partnerships that had caused harm to Indigenous communities or contributed to a sense of distrust in research. A couple of northern participants hoped that northern-led community-researcher partnerships would improve attitudes towards research; "I would like to see Indigenous people … who have had the benefit of working on good research projects share and [understand] why research is important and how it can be harnessed to a community's benefit… and have a broader understanding of research and confidence in participating in research" (N04). One southern-based participant shared how their long-term research program morphed from an academic-focused endeavour to a community-owned project (S15). The motivation for this was a change in outlook that came from years of increasing

engagement with local Indigenous community members. Several academic participants discussed how they had pushed for administrative changes at universities and governments to support Indigenous engagement in and leadership of research, including advocating for improved research agreements, funding processes, ethical review processes, and the recognition of community expertise. Ownership of data was brought up several times in terms of data not being returned to northern partners, or being published or shared without permission (N16, N18). Data management was an area where the need for increased capacity was noted, particularly as Indigenous organizations grapple with complex datasets and sensitive data. A southern-based participant who works on Indigenous-led projects summarized this issue: “for research to be really beneficial and to become a full-fledged partner, Indigenous governments need to establish protocols for archiving research data within the communities because they want that data, but they have no manner of saving it … and they have privacy concerns” (S03).

Shared capacity

Research partnerships can bring together different capacities, goals, and knowledge systems to achieve results that benefit partners in different ways. There was strong agreement that research outcomes should benefit all research partners, and that community-researcher partnerships should make important contributions to the research capacity of northern communities. This was particularly evident in co-produced community-researcher projects where northern organizations have strategically used partnerships to further

organizational goals and address limitations including accessing funding and supports for administrative costs, human resource capacity, equipment, and access to infrastructure (Appendix I). Capacity-sharing happens in both directions, and southern-based researchers have gained important contextual knowledge from their northern partners, particularly from Indigenous researchers and knowledge holders, but also from local youth. In some cases, academic partners have taken on some of the research administrative burdens on behalf of a northern organization or supported them through the creation of research processes – like developing a data management plan for a northern partner (S24). They have acted as advisors (S11, S18, S26, S30) or advocates (S16, S18) when northern partners needed technical expertise. One participant shared how their involvement in traditional economy research led them to become an advocate for local hunters and providing critical evidence on hunting activities at national policy discussions (S16). In other cases, northern organizations have supported the work of academic partners by accessing funding or providing local administration and coordination. Examples were shared of how investments in research infrastructure and local personnel can impact the community's ability to participate in research and ultimately change local opinion of research, including hosting workshops and training on research and proposal writing skills (N16).

6.5 Discussion

> *People are in this together in a form of creative sharing, of multiple ways of knowing so not just Indigenous science and western science, but there's myriad other ways of knowing and being in the world. And so, bringing those all together in conversation is a key part of what makes research really beautiful and exciting rather than kind of instrumental and transactional. It's relational, it's creative, it's dynamic, it's co-generative. (N01)*

Growth in northern research has been accompanied by advocacy from northern and Indigenous organizations, along with allied researchers, for research that is beneficial for Indigenous communities, relevant to northern needs and priorities, and inclusive of northern voices (GNWT, 2017; YG et al., 2016; Ikaarvik, 2018; ITK, 2018b; Ogden et al., 2016; Ogden & Thomas, 2013; Perrin et al., 2021). Interview participants offered differing views on whether research should focus on northern and Indigenous community questions or fundamental science questions, with some recognizing that inclusive research can accomplish both. When research does not take into account local needs, opportunities for northerners to play a meaningful role or for diverse local benefits are sometimes missed (Brunet et al., 2016; Cameron, 2012; Quinton et al., 2022; Tagalik et al., 2023).

Indigenous organizations and governments are increasingly exerting influence over research by publishing research priorities (GRRB, 2018a; ITK, 2018b),

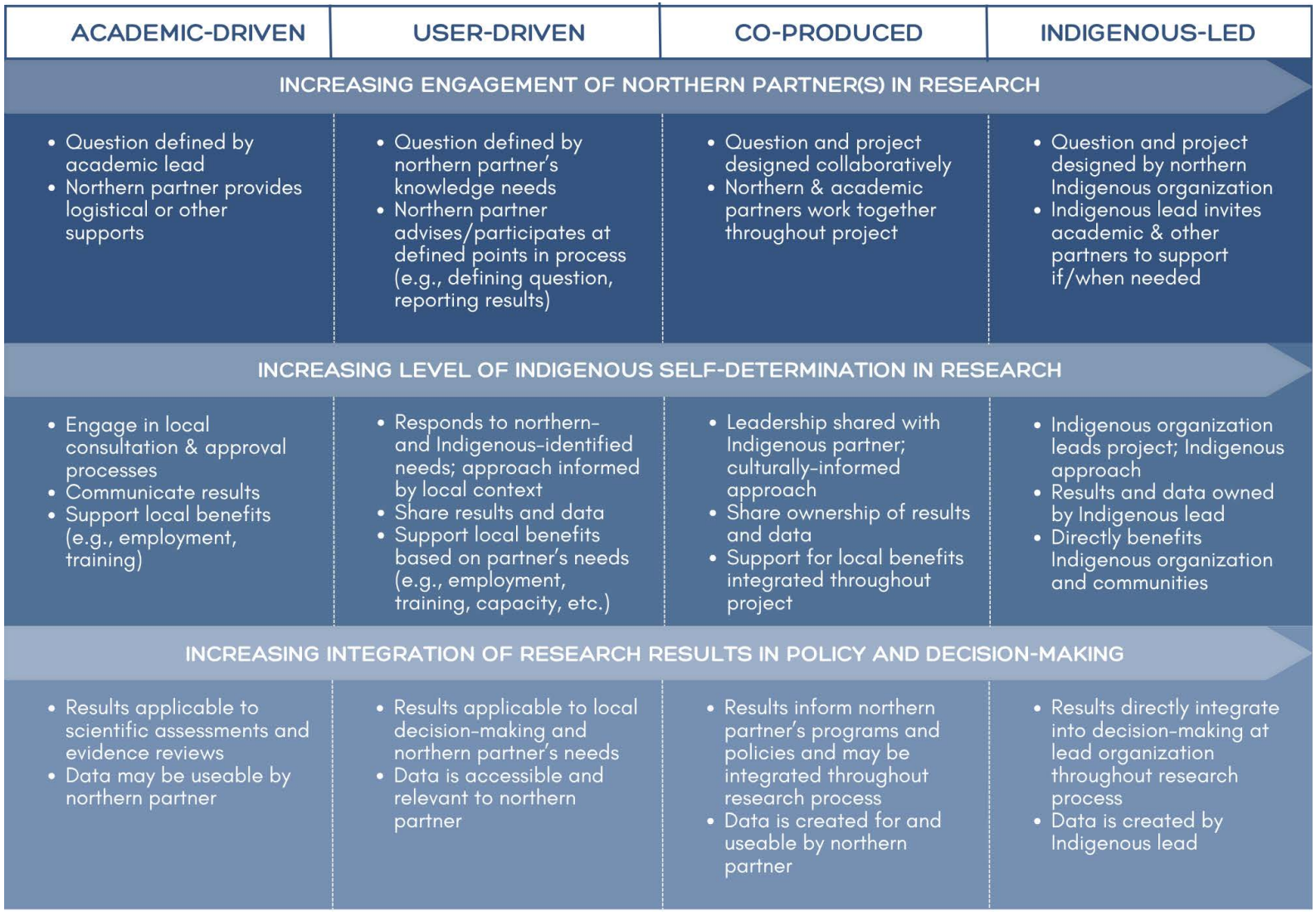
developing internal research capacity (IRC, 2024), hosting research gatherings for community members and researchers (KFN & Dän Keyi Renewable Resources Council, 2019), creating guidance for researchers (Aqqiumavvik Society, n.d.; ITK et al., 2007; Van Bibber & George, 2012), and taking on ownership of existing research programs or infrastructure (Fletcher et al., 2024; Pilkington, 2022; Quinton et al., 2022). While researchers have an ethical responsibility to involve Indigenous voices and knowledge in research that affects their communities (Carter et al., 2019; Gearheard & Shirley, 2007; ITK, 2018b; Ljubicic et al., 2022; Yukon Native Brotherhood, 1973), they do not always understand or prioritize the connection between their work and local communities. Some are concerned that increased northern control of research will limit academic freedom and opportunities to investigate other critical scientific priorities (Alcantara et al., 2017; Korsmo & Graham, 2002; Latulippe & Klenk, 2020). Many find the differing forms of accountability challenging to reconcile, including being accountable to partners, funding agreements, institutions, and western measures of research rigour and impact (Castleden et al., 2015; Jones et al., 2018; Ljubicic et al., 2022; Mercer & Ovitz, 2023). Partnerships can also intensify inequality, both within academia and amongst northerners, sidelining those with less success or without supportive institutions (Leahey, 2016).

Partnered research has grown in importance, linked to drivers like funding policies, resource sharing, increasing specialization, and problems that require multiple areas of knowledge (Brunet et al., 2016, 2017; Ferrazzi et al., 2018; Wolfe et al., 2007). Research partnerships contribute to the knowledge economy in the

North, providing local employment, fostering experience in research, and supporting local research capacity (Brunet et al., 2017; Buschman, 2022; Carter et al., 2019; Irlbacher-Fox, 2018; K. J. Wilson et al., 2020). Yet, navigating community-researcher relationships continues to be complex, requiring trust, collaborative work, accountability, and shared capacity (Freeth & Vilsmaier, 2020; Leahey, 2016; Mercer et al., 2023; K. J. Wilson et al., 2020). With an increasing emphasis on evidence-based decision-making in northern governance (YG et al., 2016; Ogden et al., 2016), our results demonstrate how partnerships can play an important role in supporting northern decision-making (Section 6.4.3). As this study identified, researchers often have the skills to effectively communicate with policy-makers and play a key role as a bridge between community partners and territorial or federal governments (Ljubicic et al., 2022). They can achieve this by providing applicable knowledge that is contextually relevant, culturally informed, and responsive to local needs (Henri, Carter, et al., 2020; Latulippe & Klenk, 2020; Tagalik et al., 2023; K. J. Wilson et al., 2020).

The results of this study contribute to the growing discussion on evidence-based decision-making and Indigenous self-determination in research, highlighting the role that equitable partnerships can play in supporting northerners in research governance and leadership. By connecting the experiences of participants with existing narratives in the literature, the following discussion introduces a typology that describes four research partnership approaches: i) academic-driven; ii) user-driven; iii) co-produced; and iv) Indigenous-led (Figure 6.6).

Figure 6.6. Typology of research partnership approaches



Individual southern- and northern-based researchers, including Indigenous researchers, may be involved in any of these four types of research. Within the first three types, southern- and northern-based researchers – including Indigenous researchers – can be either the lead or partner. However, Indigenous-led research partnerships are specifically led by northern Indigenous organizations. We explore these approaches in relation to the role of partners in research development and how data and results are managed, the level of self-determination in research and support for integration of research into policy. From the interview results, it was clear that more community-engaged partnerships sustained stronger links between research results and decision-making (Section 6.4.3). At the same time, they also increasingly supported northern Indigenous organizations in leading research and experiencing the benefits of research.

6.5.1 Academic-driven research partnerships

Historically, academic-driven research – where research questions and approaches are defined by the academic lead (Figure 6.6) – has dominated northern science (Gearheard & Shirley, 2007; Korsmo & Graham, 2002). In response to critiques of northern research, some researchers have adjusted their approach to include partnerships with local organizations. There were 16 participants (13 southern and three northern) that engaged in academic-driven research partnerships. They typically focused on research happening outside of communities or on topics in the physical sciences that did not necessitate local

participation. Partner organizations provided logistical support, shared equipment, or provided capacity through coordination (Section 6.4.3). Some participants did not have an interest in or the skills to do community-engaged research, or found it challenging to connect their topic to community interests (Section 6.4.1). For those struggling to work in partnership, the literature points to the importance of learning skills that contribute to collaborative work (Freeth & Vilsmaier, 2020; Mercer & Ovitz, 2023). This has been recognized by northern organizations, who have made efforts to educate academic partners on local context and protocols, even adapting Indigenous cultural principles to develop research guidance (Ferrazzi et al., 2019; Healey & Tagak Sr., 2014; Pedersen et al., 2020; Wong et al., 2020).

While the academic-driven approach does not align with the stated interests of northern and Indigenous organizations (Chapter 4) (Gearheard & Shirley, 2007; YG et al., 2016; ITK, 2018b; Ogden et al., 2016; Shirley, 2021; Tagalik et al., 2023), there are ways that these partnerships can support Indigenous self-determination (Figure 6.6) (Wong et al., 2020). Participants respected Indigenous protocols and local approval processes despite the associated impacts on timelines or budgets (e.g., planning project timelines to incorporate Chief & Council meetings for approval; including land guardians in planned fieldwork) (Section 6.4.3). Understanding historical harms and contributing to better relationships is something that is expected of all researchers working on Indigenous land in the North (Wong et al., 2020), and part of this involves sharing findings in accessible formats (Section 6.4.1). Researcher efforts can vary

greatly; while some struggled to engage with the local community, others attended local events, visited with Elders, or in a couple of examples, brought Indigenous community members by helicopter to visit traditional places they had not been to for many years.

Because community engagement was not deemed an essential part of their research, it was noted by physical scientists that there was not always funding available for them to spend time developing relationships with local communities. Despite these hurdles, there are examples of researchers in both this study and the literature who have found creative ways to report findings to communities or engage with youth and schools in the North (Bouchard et al., 2018; Dufour-Beauséjour & Plante Lévesque, 2020; Henri et al., 2022; Ross et al., 2012). Community benefits were derived from employment opportunities for guides and research assistants or engagement activities like offering training and visiting schools. Participants experienced challenges at times with realizing community benefits, sometimes struggling with administrative policies at their institutions and at other times finding the opportunities they offered did not match the interests of community members or partners; a challenge that was also noted in the literature (Mallory et al., 2018).

Participants engaged in this type of research had few tangible examples of how their research had been integrated into policy beyond informing national or global assessment processes (e.g., species-at-risk listings, contaminant restrictions, IPCC reports) (Section 6.4.3). However, when policy-makers engage in evidence

reviews and policy review processes that aggregate existing research results, academic-driven research can also inform local policy (Figure 6.6) (Boaz et al., 2002; Petkovic et al., 2015). It was noted that the focus and scale of the research question is often a challenge in making academic-driven research relevant for local decision-making.

6.5.2 User-driven research partnerships

User-driven research is typically framed around a research question targeted at the knowledge needs of the research partner (i.e., the end user of research results) (Figure 6.6) (McNie et al., 2016; Wall et al., 2017). In the northern context, a user-driven approach to research partnership has been used to address a wide range of topics (e.g., human health, food security, environmental management) (Goodman et al., 2019; Hastings et al., 2014; Timko et al., 2015). Northern partners may be involved to a varying degree, but would typically help direct the focus and approach of the research and play a role in communicating results, thereby ensuring that the results can directly impact policy- and decision-making (Hoekstra et al., 2020). There were 18 participants (14 southern and four northern) that engaged in user-driven research partnerships, most of whom also engaged in either co-produced or academic-driven partnerships as well. There are a number of factors that limit collaboration in project development phases, including northern organizations not having capacity to plan and identify research questions (Appendix I). Changing research priorities are also a common challenge for user-driven research, which may result in renegotiating roles, responsibilities, and research expectations, and possibly in revisiting research

and data agreements (Asencio et al., 2012; Brunet et al., 2014a; Farrell et al., 2019). While southern-based participants discussed challenges they faced in developing user-driven research partnerships, local advisors (e.g., IRAs) and regional organizations (e.g., Northwest Territories Association of Communities, CYFN, and Dene Nation) helped link them with potential partners.

Compared to academic-driven research, the involvement of northern partners in user-driven research increases opportunities to support Indigenous self-determination in research (Figure 6.6). When focusing on the needs of Indigenous partners, user-driven research can be developed to meet local needs while also respecting limited time and capacity at partner organizations to engage in fully co-produced research (Goodman et al., 2019; Kershaw et al., 2014). Integrating local partners in guiding a project can result in benefits that are not usually part of an academic-driven project, and opportunities for community benefits are often requested by the northern partner. These include providing honoraria for local project advisors, providing financial or technical support for local projects, and delivering training (Section 6.4.2). Consideration for how the outputs – including data and findings – can be used by Indigenous organizations from the outset of the project helps to ensure cultural and contextual relevance as well as accessibility (Henri et al., 2020; Wilson et al., 2022). In some cases, this was facilitated by choosing locations for data collection that aligned with Indigenous interests. Researchers can support Indigenous self-determination in research by engaging in Indigenous approval processes (e.g., NG or VGFN research protocols), respecting cultural traditions

and language (e.g., using place names or sampling animals harvested for food), and engaging in data agreements that respect data sovereignty (e.g., applying OCAP® principles).

With end-users involved as partners in setting project goals, user-driven research directly supports the integration of research into policy and decision-making (Figure 6.6). Funding calls that are designed around existing local priorities – like POLAR's recent 2023 fund that incorporated the climate change priorities of several Yukon organizations – promote user-driven research partnerships. For participants working closely with communities, opportunities at times arose to advise partners on other projects, particularly if they have worked together on related topics in the past (e.g., advising community organizations on a nearby mine expansion or reclamation project) (S12, S18). Participants noted the benefits of engaging community members, academia, and governments together to ensure decision-making bodies and local partners were guiding the project together (Section 6.4.1). This was exemplified in a workshop for a project focused on Inuit uses and needs related to weather, water, ice and climate information that brought together community members, researchers, and service providers to discuss challenges with current available weather information (Ljubicic & Carter, 2022). Another way to bridge different knowledge holders is hosting forums that bring researchers from diverse backgrounds together with community members. These are useful for disseminating findings, but can also spark new partnerships. As an example, in 2013 the three territorial governments

co-hosted the Pan-territorial Permafrost Workshop held in Yellowknife in 2013 and invited community members, decision-makers, researchers, and industry professionals to present, discuss, and collaborate on permafrost issues. Similarly, in 2022 the Canadian Permafrost Association co-hosted the North Yukon Permafrost Conference with three Yukon First Nations, creating opportunities to share western scientific, local, and IK of landscape change.

6.5.3 Co-produced research partnerships

Co-produced research creates opportunities for northerners to co-lead or contribute equitably to research (Figure 6.6). When successful, research that is co-produced with a northern partner supports northern research capacity and local governance, and promotes the integration of results in decision-making (Degai et al., 2022; Woodall et al., 2021; Zurba et al., 2022). To achieve this, partners need to find ways to overcome funding and capacity imbalances to ensure that decision-making and priority-setting is shared (Hatton & Schroeder, 2007). There were 40 participants that engaged – or attempted to engage – in co-produced research at least some of the time, although many felt they were not always successful in achieving fully co-produced research projects. Almost all northern-based participants were involved in co-produced research partnerships, as well as just over half of the southern-based participants. Most were focused on health or social science topics, but notably, there were a couple of physical scientists who had entered into highly engaged community partnerships later in their careers.

Co-produced research partnerships can contribute to the growth of research infrastructure and other capacity in the North, and the ability of northern-based researchers and northern organizations to hold research grants and be equal partners (LaValley, 2017; Woodall et al., 2021). Challenges include lack of time, funding, and available staff to commit to research initiatives (Appendix I), but northern-based researchers have leveraged their partnerships to navigate these challenges (Carter et al., 2019; Doering et al., 2022; Mercer & Ovitz, 2023).

When the research partnership is with an Indigenous organization, co-produced research contributes to Indigenous agency and leadership, ultimately supporting self-determination in research (Garba et al., 2023; Latulippe & Klenk, 2020; Tagalik et al., 2023). In the NWT, a partnership that grew out of a long-standing academic-driven research project resulted in the transfer of the Scotty Creek Research Station to the Łíídlı̨ Kų́ę́ First Nation (Quinton et al., 2022). Indigenous Elders and youth were key contributors to co-produced research, and in some cases research was a pathway for opening lines of communication between the two (Section 6.4.3). Prioritizing roles for IK holders and employing methods that are responsive to local cultural protocols, celebrates and enhances local research capacity and contributes to equalizing power dynamics (Ljubicic et al., 2022; Porsanger, 2010; Tagalik et al., 2023; Wong et al., 2020). Co-produced partnerships can bring desired opportunities to Indigenous communities and directly benefit the partner organization through stable employment with equitable wages, training opportunities, and access to research infrastructure (Caughey et al., 2022; Mercer et al., 2023; Richard et al., 2023). The *Tradition and*

Transition project in Nunatsiavut exemplified this, producing community, economic, policy, and academic outcomes (e.g., cultural engagement, tourism opportunities, support for language policies, and archaelogical knowledge) (Rankin et al., 2023).

With direct ongoing involvement of partners, co-produced research partnerships reflect local needs and employ shared leadership (Figure 6.6), which can be transformative for the communities, organizations, and individuals involved (Sivertsen & Meijer, 2020). Such mutual benefits have been exemplified in a variety of research frameworks, including networked research (Dubé, 2023), social enterprise (Beaulieu et al., 2023), and community-based monitoring (Gearheard et al., 2011; Reed et al., 2021). Co-produced research produces useable, actionable science (Galende-Sánchez & Sorman, 2021; Rossi et al., 2017), which can democratize knowledge production. As an example, in response to the impacts of changing environmental conditions, the Arctic Eider Society transformed how IQ is shared by combining it with modern technology in the SIKU platform (Heath, 2019). In comparison to user-driven research, partners work together throughout a co-produced project giving them a deeper understanding of the process, data, and results. As demonstrated in this study and confirmed in the literature, both internal and external factors like insufficient funding, wide-ranging goals, diverse methodological approaches, inflexible funding guidelines, and lack of administrative support can all impact the ability of partners to collaborate closely (Doering et al., 2022; Fransman et al., 2021; LaValley, 2017; Wong et al., 2020; and see Appendix I). However, when those

factors are addressed, co-produced research that engages diverse community members and organizations can help to share research capacity and overcome divergent community priorities (Scobie et al., 2023). Academic partners can help manage funding challenges by distributing funding to northern organizations; however, further advocacy with funding agencies by territorial governments and academic institutions is needed to change eligibility requirements and increase funding flexibility (Wong et al., 2020).

6.5.4 Indigenous-led research partnerships

Indigenous-led research can and does occur independently of partnerships. However, Indigenous organizations will often – due to capacity or funding needs – invite other northern and/or academic partners to contribute in specific roles to support Indigenous-identified challenges or goals. In this way, Indigenous-led partnerships involved the lead Indigenous organization defining the questions, holding the funding, and leading decision-making in all aspects of the research (Figure 6.6).

Indigenous-led partnerships ensure that Indigenous organizations have control over research in their homelands, often bringing clear benefits and outcomes to local communities (Figure 6.6). This can change community perspectives of research as was exemplified by a VGFN-led project where a local researcher at Vuntut Gwitchin Government worked in collaboration with a southern-based researcher to record and translate stories from Elders (Smith, 2007). This long-term project benefitted from ongoing local support and participation, as

community members immediately saw the value in research that was relevant to community priorities and led by a fellow citizen (Section 6.4.1). In Nunavut, Inuit research organizations QHRC, Aqquimavvik Society, Ilisaqsivik, and Qaggiavuut Society partnered to develop a CIHR-funded Network Environments for Indigenous Health Research (NEIHR) focused on community-based research. Based on the combined capacity of the four organizations, the grant contributed to training activities at Aqquimavvik Society, a scholarship for a Nunavummiut graduate student, and a week-long research course hosted by QHRC. The resulting increase in capacity reduced their need to partner with southern universities and allowed them to be more selective of future partnerships.

Indigenous-led research partnerships produce results that are directly integrated into the lead organization's decisions and policies, and often throughout the research process (Figure 6.6). While challenges can arise around communicating the results of co-produced research, in an Indigenous-led project, ownership of the data and results by the Indigenous organization simplifies decision-making processes about when and how to communicate results. For example, a couple of Indigenous participants were involved in cultural research that was not published or shared publicly but was incorporated directly into cultural programming by the Indigenous organization they worked with.

It can be challenging for Indigenous organizations to engage fully in research and lead partnerships when funding structures and grant opportunities limit eligibility or involvement by Indigenous governments (Table 5.4), require matching funds

(Doering et al., 2022), or limit funding for team members based on educational attainment or career stage (Caughey et al., 2022). As an example, Indigenous governments are not recognized as NGOs, which limits their access to benefits targeted at Indigenous NGOs (e.g., Mitacs internships). These limitations may not be intentional, but the outcome is that funding that could benefit the North, and in particular Indigenous researchers and organizations, is sometimes unattainable (ITK, 2018b; Wong et al., 2020).

6.6 Conclusion

Our objective with this study was to understand how northern- and southern-based researchers perceive the alignment of their research with the needs and expectations of northern partners. Based on their experiences working across northern Canada, we sought to explore how different approaches to partnership influence the integration and uptake of research in policy and decision-making. Although aligning research with local expectations was challenging for some researchers – and not a main priority for all – for most, partnerships with and amongst northern organizations played a supportive role in meeting northern knowledge needs. Despite a general lack of formal research evaluation, there were numerous examples of how research had positively impacted local communities and local programs and decision-making. Less tenuous were links to formal policy at the government level (e.g., legislation, strategic planning, etc.). A typology was developed to demonstrate how different approaches to research partnerships – academic-driven, user-driven, co-produced, and Indigenous-led –

impact opportunities for integrating research in policy and decision-making.

Key finding 1: While integration of research into policy is achieved directly through Indigenous-led research, it is also facilitated through co-produced and user-driven partnerships with research users. The research led by northern Indigenous organizations is aimed at producing knowledge that is immediately and directly integrated into their own programs and decisions. By aligning research design with the needs and priorities of northern organizations, both co-produced and user-driven research partnerships support the mobilization of research results into policy and programs. Co-produced research provides avenues for the integration of new knowledge throughout the project lifecycle, creating the potential for the individuals, organizations, and communities involved to experience a transformational process. User-driven research partnerships can be less intensive for partners, but in being responsive to partner needs, can produce research results and data that are easily integrated into decision-making. In contrast, although academic-driven research can bring benefits to northern communities, it rarely links directly to local decision-making unless policy makers actively seek the results through assessment processes and evidence reviews.

Key finding 2: The level of commitment within a partnership has an impact on the level of control and benefits that Indigenous partners experience. All types of partnership approaches identified in this study can contribute to Indigenous self-determination in research, albeit to different degrees, by respecting local

governance and data sovereignty processes. When research is led by a northern Indigenous organization, decisions about how data and results are used and shared are under Indigenous control. In a co-produced research partnership, Indigenous partners have a greater level of control compared to user- and academic-driven partnerships over the process and outcomes, including results and data. With sometimes limited partner oversight, user- or academic-driven partnerships rely on the researcher's commitment to local research and data sovereignty protocols. Yet, there are opportunities and obligations for researchers engaged in these approaches to consult with local Indigenous rightsholders and ensure that their research has local approval and respects local protocols.

Key finding 3: Partnerships add complexity to research but bring shared benefits and capacity. Authentic partnerships take time, ongoing communication, and partner engagement, and these are not always afforded by funding agreements, project timelines, and institutional policies. Yet, it was evident that research partnerships make important contributions to northern communities and regions. By contributing diverse skills, experience, and resources, both northern organizations and researchers benefit from the enhanced research capacity provided by research partnerships. While northern governments and organizations prioritize research that produces useful results, there are many other benefits that research brings to the North. These range from individually experienced benefits like employment, honoraria, and training to the those experienced by organizations like funding, administrative support, and

shared infrastructure. More unexpected was the consistent appreciation amongst academic researchers – even those working peripherally with northern communities – of the significant benefits they experienced from working with northern partners. These included both professional and personal benefits including opportunities to explore stimulating research questions, exposure to cultural teachings, and deep friendships. For many, their research programs and academic achievements would not have been realized without their northern partnerships.

This study shows that while partnerships play a critical role in northern research, there are opportunities to make research processes more inclusive and accountable. Partnerships are influenced by the governance, policy, institutional, and research capacities of the partners and affected by external factors such as funding and regulatory processes (Appendix I). In the following set of recommendations, we identify clear roles for specific actors in addressing factors that limit partnership and policy-relevant research.

1. **Improved access to research funding can support northern and Indigenous partners to engage in – and lead – research partnerships.** Funding continues to be the main factor limiting the engagement of northern partners in research, although access to funding does not solve other limiting factors. This study notes the critical need for *sustainable* funding for northern organizations (e.g., long-term or core funding), many of whom are currently operating on project-specific funding that is pieced

together with multiple funding sources. While the tri-council can play a role in supporting this, it requires action by all levels of government.

2. **Reducing administrative limitations – mainly at universities – can improve research relationships.** University researchers are frustrated by the internal administrative processes and policies that limit and threaten the trusting relationships they have built with northern partners. These include financial and policy processes (e.g., spending rules, research agreements) that are inflexible and do not recognize the unique considerations of northern and Indigenous research. Administrative policies also vary from institution to institution, and there are examples demonstrating how these can be supportive or limiting. With universities positioning themselves as northern research leaders (Chapter 5), it is imperative that they consider how their internal processes can support improved partnerships. Administrative challenges are also encountered at northern organizations, particularly when they are experiencing high turnover or when internal capacity is low. This continues to be a complex challenge that is not necessarily solved by increased funding. Northern organizations can take advantage of partnerships to find interim solutions.
3. **Identifying the impact of research and alignment with local expectations is complex and requires further efforts.** Many northern- and southern-based researchers interviewed felt that their research met local expectations, but without formal evaluation, they were unsure of the

longterm impact or policy outcomes. Evaluating research beyond immediate outcomes is challenging, and in the northern context could be informed by Indigenous approaches to evaluation. This is an area that could benefit from more consistent efforts from research teams and northern partners in terms of individual projects. There is also a role for both the tri-council and northern governments to play in creating regional approaches to evaluating and monitoring the impacts of research. This may require updating current internal and external policies including research licensing (Chapter 5) – to facilitate ongoing monitoring. There are also opportunities to develop and apply northern-specific approaches to research evaluation at the project, community, and regional scales.

Research policies identify the need for increased partnerships, particularly multi-scale partnerships that are inclusive of different types of partners (Chapter 4). This study demonstrates that researchers are engaging in partnerships at a variety of scales, but predominantly at the community scale in both user-driven and co-produced partnerships. While co-produced research partnerships achieve beneficial outcomes, ultimately, the level of engagement in community-researcher partnerships must be determined by the northern community partner. Indigenous-led partnerships require committed capacity and resources at northern Indigenous organizations.

The typology produced through this study is meant to provide a starting point that researchers – and funders – can consider in how partnerships can be

operationalized in practice (Figure 6.6). The typology provides a broad conceptual framework to help researchers identify a relevant partnership approach, in terms of feasibility of capacity and funding, as well as how it may support desired goals of informing policy and enhancing Indigenous self-determination. For example, the four types of research partnerships could be included as options in funding or license applications, making it easier for researchers to identify their approach to research and for funders or research regulators to track partnership types as a program metric. It provides some guidance on the level of Indigenous self-determination in research when engaged in different types of partnership and how that can be supported. The framework also gives researchers the terminology to discuss how their approach to partnership can support the integration of results in decision-making. While the outcomes of this study are of particular importance in the northern governance context, there is relevance for other geographic contexts where research relationships and jurisdictions are complex, and the policy implications of research are of considerable interest to Indigenous or other community partners.

Chapter 7 - General discussion and conclusion

7.1 Introduction

Research has a long and contentious history in the North, particularly with Indigenous northerners (Audla & Smith, 2014; ITK, 2018b; Thomas & Shirley, 2005; Yukon Native Brotherhood, 1973). In recent years, there has been an evolution towards research that is more inclusive of northerners and aligns with northern knowledge needs. This thesis documents parts of that evolution, providing a baseline understanding of the current context of northern research through:

1) an examination of northern policy documents to understand research expectations, priorities, and guidelines and identify regional similarities and differences (Chapter 4);
2) an investigation of licensing data across the three northern territories to provide an understanding of the current research context including topical, geographic, and leadership trends (Chapter 5); and,
3) an analysis of the experiences and perspectives of northern research practitioners to provide insight into different partnership models and how they link to the integration of research into policy (Chapter 6).

This study contributes to our understanding of the relationships between research policies, research practice, and evidence-based decision-making. It explores how policies and programs guide research in Canada's North, including their impact on northern leadership and engagement in research. Although there

are comparable experiences with research across the northern provinces, the geographic scope of this study is limited to five regions in the Canadian North that are often grouped together by research policies and programs: Nunatsiavut, Nunavik, Nunavut, the Northwest Territories, and the Yukon (Section 1.3).

This thesis focused on the overarching research question: How do the policies that guide research in Canada's North support or limit research practices that align with northern priorities and knowledge needs? To answer this question, I investigated three interconnected aspects of northern research with more focused questions and employed three different methodologies. In this final chapter, I begin by revisiting these questions and summarizing key findings. Then, through an integrated analysis of the results from these three investigations, I explore how policies for research influence evolving research practices and the alignment of research outcomes with the priorities of northern organizations and communities. This cross-cutting discussion aims to address the main research question. Finally, I identify key recommendations for both agencies and individuals involved in northern research along with potential directions for further research.

7.2 Summary of findings and significance

7.2.1 Research policies focus on ongoing challenges within northern research

The first sub-question was: How do the principles, priorities, and guidelines outlined in federal, territorial, regional, and local policies define and guide research in the Canadian North? In Chapter 4, I undertook a thematic analysis of

a broad range of northern research policy documents produced by both northern and southern-based organizations with an interest in northern research. Research policy documents are an avenue for northern organizations and governments to communicate their research goals and priorities and advocate for research that responds to their needs. This document analysis emphasized the critical importance of research in addressing policy- and decision-making priorities identified by northern organizations.

Local interests vary greatly and addressing the diverse perspectives and priorities in different regions and at different scales requires research that is embedded in local needs and perspectives. Aligning northern research programs and science policy objectives requires dedicated time and resources for communication and engagement. The study demonstrated the need for research to be conducted in a way that is attentive to process regardless of the specific topic or methodology (e.g., respectful of local protocols and approval processes, communicating results). Avenues for improved research practice include respecting institutional and community ethics, accountable partnerships, and clear and open communication.

This analysis identified the inclusion of policy- and decision-making organizations as project partners as a key pathway from research to evidence-based policy. In particular, in northern and Indigenous contexts, partnerships that contribute local perspectives assist in aligning research and policy. Examples of partnerships ranged from community-based research approaches with local

organizations as partners – including land-claim organizations, hamlets, and local research organizations – to institutional partnerships between universities and northern governments. Notably, northern organizations continue to focus their limited resources on advocating for better research practices, indicating that there are ongoing challenges within northern research. This analysis identified five key recommendations to support both researchers and northern and Indigenous organizations in strengthening the research-policy interface:

1. **Develop multi-scale research partnerships that are inclusive of a variety of institutions** and reduce the burden of research at the community level.
2. **Ensure the benefits from research are distributed across the North**, taking into account how research can contribute to local capacity and where it can have the most impact.
3. **Develop dynamic tailored research policy communications** (e.g., research priorities) for different audiences that are updated regularly.
4. **Expand on research guidance related to policy contributions**, while avoiding duplication of existing advice and protocols. Useful additions would be organizational-specific advice on connecting research with policy priorities, including clear guidance on how, when, and who to approach at a specific organization.
5. **Create more inclusive and accountable processes** to ensure transparency and accountabiity in how Indigenous and community voices are included and represented in the development of research policies.

Ultimately this thesis provides insight into the policies that influence research and the goals and expectations of northern research stakeholders. The results contribute to a foundational understanding of northern research policies, required to explore the alignment between northern expectations and research practices. This analysis identified the potential for partnered research to improve the integration of research outcomes in policy development. The results highlight the importance of engaging in partnerships that are inclusive and multi-scalar. At the same time, they expose a lack of transparency in the extent to which Indigenous and northern voices inform national and territorial research policies and strategies.

7.2.2 Opportunities to expand the knowledge base in northern research

The second sub-question was: What is the current state of research across the three northern territories and how has it changed over time? In Chapter 5, I characterized the current of research and identified research trends using three territorial research license databases. These databases are limited in what they include, as they do not capture other permitting processes (e.g., Parks Canada), certain types of research (e.g., archaeology and wildlife), or territorial government research. In the Yukon in particular, the licensing database does not include most Yukon-led research or industry research. While acknowledging that the licensing databases afford only a partial account of northern research, they still provide insight into the geographic and disciplinary intensity of different types of research, along with the characterization of northern research leadership.

This study highlighted clear geographic, disciplinary, and leadership trends in licensed research across the three territories, quantifying imbalances in northern research that have never been explored systematically at the pan-territorial scale. It demonstrates the dominance of university research and shines a light on topical areas (e.g., health) and communities (e.g., Naujaat, NU) that are underrepresented. There is considerably less research licensed in the Yukon compared to the NWT and Nunavut, notwithstanding the limitations of the Yukon license database. Research intensity is not evenly distributed across the North, as evidenced by higher concentrations of licensed research in communties like Resolute Bay, NU and Old Crow, YT and regions like the Inuvaluit Settlement Region in NWT. Investments in research infrastructure and the capacity of local organizations and communities can have an impact on the concentration of research in specific areas. Notably, health research is under-represented across the three territories but particularly in the Yukon, leaving gaps in knowledge that could impact capacity to make evidence-informed health decisions. An exploration of research leadership showed the influence of Canadian university researchers in northern research, and the potential for increased northern leadership of research.

Four opportunities to contribute to a more balanced distribution of northern research were identified:

1. **Increased support is needed for northern-led research, as well as investments in health and social research topics**, to better align research with northern priorities.
2. **Investments in research infrastructure and programs are an opportunity to influence the availability of information by directing research to specific locales.** By investing in a distributed network across the North instead of concentrating investments in a few places, the benefits of research can be shared more equitably.
3. **Support for research capacity at northern organizations can benefit both northern and southern-based researchers, but requires local leadership and external investments**.
4. **Licensing processes can be improved to resolve many of the challenges identified with current systems and to support local governance of research.** Potential improvements include tracking and monitoring research metrics that contribute to evaluating research and improving how license applications are communicated with communities and the public.

Research licensing numbers provide insight into the current state of northern research and baseline information for comparison in the future. There are still disparities amongst the disciplines and a misalignment with local priorities. Although there have been investments in research across the three territories,

northern leadership is still underrepresented in licensed research. With more comprehensive licensing processes, northern involvement in research teams could be tracked and characterized more accurately. Ultimately, this study shows that there are opportunities to support diversified research that contributes to a broader evidence-base for northern decision-making.

7.2.3 The role of partnerships in strengthening the research-policy interface

The third set of sub-questions was: How do researchers perceive the alignment of their research with the needs and expectations of northern partners? How do different approaches to partnership influence the integration and uptake of research in policy and decision-making? The experiences of dedicated, long-term northern researchers provided insight into the role of partnerships – as well as research policies, programs, networks, and other institutional forces – in supporting or limiting the alignment of research practice with northern priorities and knowledge needs. In the North, where Indigenous peoples are asserting self-determination, partnership approaches can also support leadership and governance of research by Indigenous northerners. Thematic analysis of practitioner interviews, undertaken in Chapter 6, contributes to our understanding of how the role of partnerships has evolved in northern research. This analysis identifies four types of research partnership approaches and shows how increasing levels of partner engagement influence the integration of research in policy and support for Indigenous self-determination in research.

Researchers can play a key role in communicating with policy-makers as expert advisors and by bringing together different research partners and stakeholders. Equitable research partnerships rely on supportive funding and regulatory processes as well as institutional policies and capacity that allow for northern partners to benefit from and participate in research (Chapter 6). Research policies identify the need for increased partnerships, particularly multi-scale partnerships that are inclusive of different types of partners (Chapter 4). This study demonstrates that researchers are engaging in partnerships at a variety of scales, but predominantly at the community scale. The following three key findings arise from this study and inform a set of recommendations.

1. **While integration of research into policy is achieved directly through Indigenous-led research, it is also facilitated through co-produced and user-driven partnerships with research users**. These partnership approaches facilitate the alignment of research design with the needs and priorities of northern organizations and support the mobilization of results into policy and programs. For example, a co-produced project in Nunatsiavut integrated archaeology and language into tourism programming, producing results that met academic, government, and community goals (Chapter 6).
2. **The level of engagement in a partnership has an impact on the level of control and benefits that Indigenous partners experience** and the impact on Indigenous self-determination in research. In NWT, a permafrost research partnership resulted in the transfer of a university research

station to the local First Nation (Chapter 6). Although Indigenous partners have a greater level of control in a co-produced research partnership, other approaches to partnership can also support self-determination but rely more on the researcher's initiative.

3. **While partnerships add complexity to research, they bring shared benefits and capacity and contribute to robust results**. By contributing diverse skills, experience, and resources, both northern organizations and researchers benefited from the enhanced research capacity provided gained from their partnerships.

Partnerships are influenced by the governance, policy, institutional, and research capacities of the partners and affected by external factors such as funding and regulatory processes. This study identified a number of factors that influence partnerships and recommendations to address them (Appendix I). Accessible funding continues to be a key factor limiting the engagement of northern partners in research and there remains a critical need for sustainable funding for northern organizations. Administrative processes at universities – including financial and policy processes (e.g., spending rules, research agreements) – are also a key factor in supporting partnerships. Finally, understanding how partnered research impacts decision-making and meets local needs is limited by the lack of research evaluation.

When supportive policies are in place, strategic partnerships between northern organizations and researcher institutions can contribute to shared benefits and

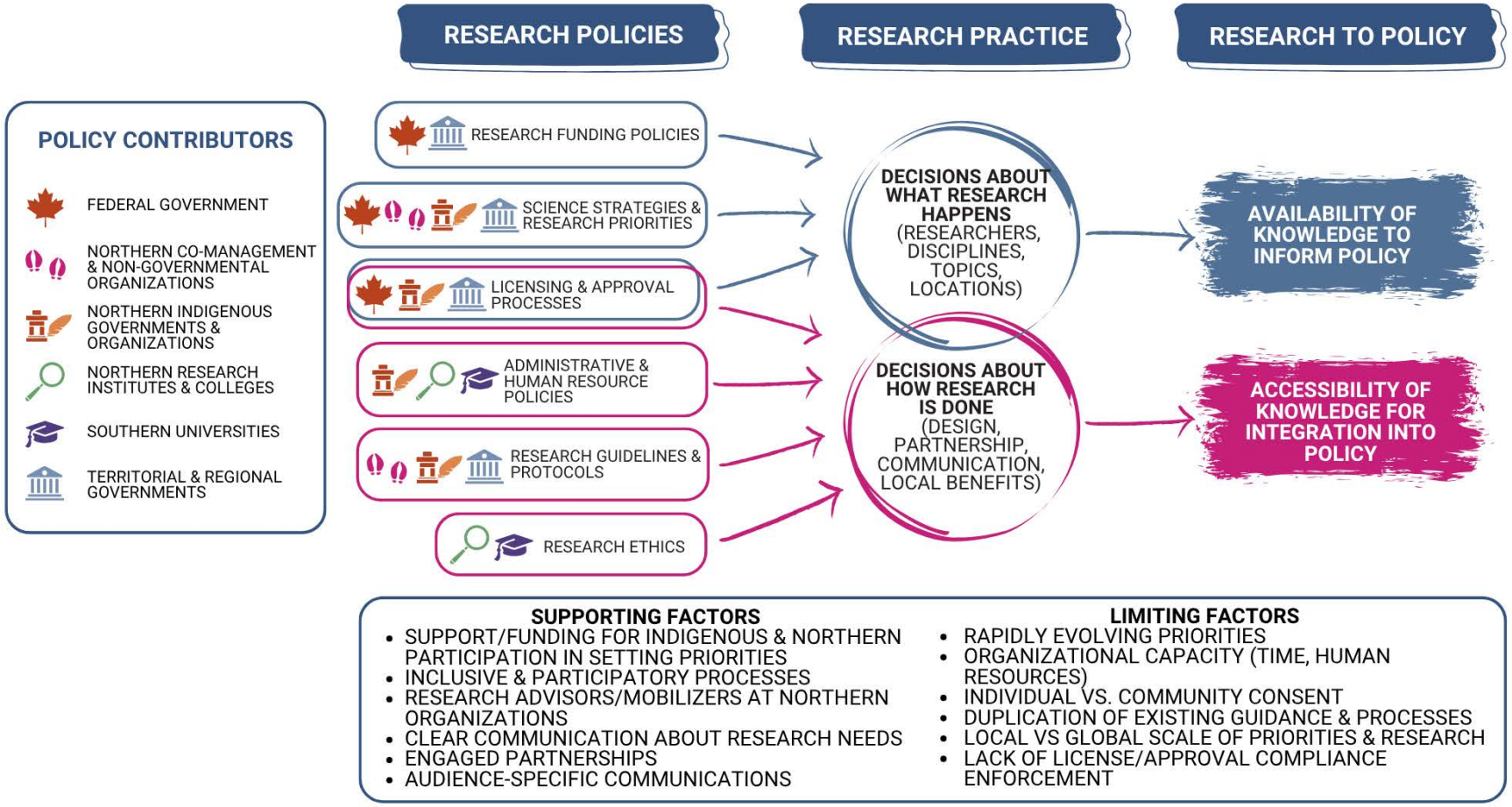
capacity. Ultimately, Indigenous-led, co-produced, and user-driven approaches to research partnership align research design with the needs and priorities of northern organizations and support the integration of research into policy and decision-making. While all types of research partnership can support Indigenous self-determination in research to varying degrees, Indigenous-led research enacts self-determination through full ownership and control of the research process and outcomes.

7.3 The northern research-policy interface

This thesis seeks to understand the relationships between research policies and practice and how those influence outcomes for northern priorities and knowledge needs. Indigenous northerners desire agency in the research happening in their homelands (ITK, 2018b; Yukon Native Brotherhood, 1973), and while they are taking steps towards achieving self-determination, support is required from governments, funding agencies, research institutions, licensing organizations, and individual researchers.

The following discussion brings together the results from chapters 4-6 to explore how research practice and policy align with northern priorities and knowledge needs. It presents a northern-specific framework for the research-policy interface and investigates the supporting and limiting factors that contribute to policy-relevant research (Figure 7.1).

Figure 7.1 A framework for the northern research-policy interface



Note. This framework is a visual representation of the influence of research policies and practice on the integration of research into policy.

7.3.1 Research policies informing research practice

The importance of having scientific knowledge available and integrated in decision-making was emphasized throughout northern research policy documents (Chapter 4). It was also a common goal for research practitioners, although many identified challenges in both integrating their work with policy-making processes and identifying if and how their research had any impact on policy (Chapter 6). It is rare to evaluate research outcomes - in particular policy outcomes – beyond documenting support for highly qualified personnel or tracking publication and citation numbers. Few researchers understand the influence of their research on policy; however, tangible examples demonstrate the opportunities that exist for researchers to have direct impact on decision-making by working with northern organizations (Chapter 6). For example, by focusing on northern-identified questions, researchers contributed to policies for affordable food programs, resilient infrastructure development, disease screening programs, and community-based safety programs, amongst others.

Evidence-based decision-making relies on the availability and accessibility of a strong knowledge base (Leeuwis et al., 2018; Sarewitz & Pielke, 2007). In this thesis, a policy – which is a decision or set of guidelines to inform decisions – refers to decision-making, legislation, planning processes, and program design (Pielke, 2007). In the northern context, the availability and accessibility of knowledge for policy relates to decisions about research practice, including what research happens and how it is done (Figure 7.1).

Decisions around what research happens influence the availability of different kinds of knowledge (e.g., discipines, topics, locations, approaches) for decision-making (Figure 7.1). These decisions are influenced by policies like research funding and infrastructure investments (Chapter 5). In the northern context, they are also influenced by the research strategies and agendas of national and territorial governments and organizations, and the research priorities identified by Indigenous governments (Chapter 4). Policies influence who can access funding, effectively influencing northern and Indigenous representation in research leadership (CCA, 2023). With few opportunities to work in an academic setting in the North, not many northern-based researchers are affiliated with a university. Limited funding for non-academic researchers has ramifications for the amplification of northern IK and Indigenous methodologies in northern research. The CIHR funded NEIHR and SPOR programs are both accessible to non-academic northern organizations, leading northern-led health-focused research programs in all three territories (Chapter 5 & 6). These large grants support distributed networks of researchers within the territories, bringing health research capacity to multiple communities and supporting both Indigenous and non-Indigenous researchers.

The analysis of research policy documents presented in Chapter 4 noted the importance of ensuring the benefits of research are distributed across the North. Yet the analysis of research license trends in Chapter 5 identified imbalances in northern research that are at least partly influenced by funding policies and other decisions. Having readily available knowledge that is relevant to policy requires

researchers to be responsive to key knowledge gaps. There are geographic and subject areas that are less studied across the North (e.g., health research), and key actors (e.g., northern-based researchers) that are not represented in research (Chapter 5). This leads to critical knowledge gaps that impact how decisions are made – and how relevant and beneficial they may be – within northern societies. Prioritizing knowledge needs also requires the engagement of northern organizations in identifying where evidence is lacking. Based on the stated goal to ensure research does not cause harm, research licensing and other approval processes can influence what research happens by denying approval to projects that are deemed unwanted. In practice, however, research projects are rarely – if ever – denied a license (Grabowski, 2017; Van Den Scott, 2012). As a tool to promote consultation between researchers and communities, licensing and approval processes can also influence how research happens.

Decisions about the research process – or how research is done – influence the accessibility of knowledge for integration into policy (Figure 7.1). These decisions are also influenced by research policies, particularly policies that guide research approaches like guidelines, protocols, and ethical reviews. They can also be supported or impeded by administrative and human resource policies that influence how funding is shared and spent (Appendix I). Informing policy requires an alignment of research goals and questions with the needs of policymakers from the outset of a project, which means that early engagement in research design is an important step, requiring dedicated time and resources for communication and engagement. Research done in partnership with northern

organizations is more likely to meet the needs of northern policymakers (Hoekstra et al., 2020). In involving northern partners in identifying the research question, both co-produced and user-driven research contribute to the alignment of research with the needs of research users (Chapter 6). In the northern context, there are numerous policies that guide this process including administrative processes at universities and partner organizations (Doering et al., 2022; Herrmann et al., 2023), research guidelines and protocols (Carter et al., 2025; Hayward et al., 2021; Perrin et al., 2021), and research ethics (Cole & Healey, 2013; Hayward et al., 2021). Many research policies are not targeted at industry research, and information on industry-led research is not always publicly accessible. For example, most industry research does not have to go through research ethics approval, except in the NWT where it requires a license and must go through ARI's ethical approval process if it involves humans.

Through their influence on research practice, research policies also influence the uptake of research in policy and decision-making. Inclusion of northern organizations in research policy development can ensure that the decisions about both the focus and conduct of research are informed by northern perspectives (Chapter 4).

7.3.2 Supporting and limiting factors for policy-relevant northern research

Effective incorporation of research into decision-making relies on available and accessible research which is influenced by the policies that guide research. There are supporting and limiting factors that underlie the policies and decision-

making processes that influence research practice, ultimately impacting opportunities for evidence-based decision-making (Figure 7.1). Notably, support and funding for the inclusion of Indigenous and northern organizations in agenda-setting processes results in research programs and funding that prioritizes relevant research (Chambers et al., 2021; Dubé, 2023). Inuit advocacy in ArcticNet has influenced the development of the network and resulted in a funding program specifically targeted at Inuit researchers (IQP). At the international scale, the Arctic Council includes northern voices in science policy through Indigenous organizations like the ICC and the Arctic Athabaskan Council.

Inclusive and participatory processes, whether in project development, priority identification, or policy development also contribute to research that meets northern needs (Flynn et al., 2018; Galende-Sánchez & Sorman, 2021). An example is the funding model for Health Canada's CCHAP and CIRNAC's CCPN programs which funds a coordinator position in each of the five northern regions and engages a local committee to review proposals (Chapter 6). The review committee prioritizes local knowledge by including local research, Indigenous, and government representatives. The CCHAP/CCPN model, similar to CIRNAC's NCP program, has been successful at funding northern-led research that is directly impactful on decision-making (e.g., beluga stewardship research in Nunavik, community permafrost assessments in NWT, country food research and planning in Nunavut). The CCHAP/CCPN model also demonstrates the important role of research advisors in supporting local research development across the North. For funders and researchers that are not directly engaged with

northern advisors, it can be helpful if northern organizations clearly communicate their research priorities and needs (Chapter 4). Recent grant opportunities that target international partnerships (e.g., CINUK and the tri-council's NordForsk grant) encourage international researchers to engage with communities by requiring partnerships with community and northern organizations. Other supportive factors affect how research is done, including engaged partnerships and audience-specific communication (Section7.3.1). Communication products that target decision-makers are critical to ensuring that information is accessible (Maas et al., 2022). When research is done in partnership, northern partners can advise on communication products and facilitate the process of sharing results with decision makers.

There are also a number of factors that limit the development of policy-relevant research. Notably, rapidly evolving priorities at northern organizations can limit their influence on researchers and funders, while also making it challenging for research partnerships (Chapter 6). Lack of organizational capacity to engage in research policy development or research projects is a common issue across the North that impacts both aspects of research practice – what research happens and how it is done (Carter et al., 2019; Mercer & Ovitz, 2023). Other limiting factors that relate directly to research conduct are tension between individual and community consent and the need for clear and ongoing communication (Section 6.4.1). These can be overcome by employing local protocols, engaging with local research advisors, and partnering with local organizations (Carter et al., 2025; Hayward et al., 2021; Henri et al., 2020). There are numerous existing

guidance and processes for northern research (Chapter 4) and duplicating those adds to the already multilayered policy context of northern research, potentially diverting efforts from identifying research priorities. However, there may still be a need for community or nation-specific guidance, or to fill gaps in existing guidance documents. When protocols are not followed, lack of enforcement related to research license and approval processes may limit relationships between communities and researchers, ultimately leading communities to engage less with researchers (Section 6.4).

Another challenge for policy-relevant research is managing local scale priorities with research questions that are focused on global-scale issues like climate change. Chapter 6 explores this question from the research practitioner perspective, acknowledging that there is a role for different approaches to research in informing broader policies. Yet in relation to the northern research-policy interface research, addressing local priorities is critical for ensuring that relevant knowledge is available. Internal decision-making tools can support both the uptake of evidence and the identification of knowledge needs. As an example, I developed an evidence summary tool in collaboration with YG to advance the use of evidence, including IK, in decision making (Appendix J). This tool had two objectives: i) to guide policy practitioners through the process of identifying, gathering, evaluating, and summarizing evidence; and ii) to provide a systematic means of communicating evidence, findings, and limitations to decision-makers. A secondary outcome was the usefulness of the tool for identifying and tracking knowledge gaps that could become research priorities.

Other northern organizations incorporated tools and processes that helped them prioritize research partnership requests, access and incorporate research results, or guide research development (Brunet et al., 2016; Colavito et al., 2019; GRRB, n.d.; Irlbacher-Fox, 2018).

7.3.3 Alignment of research practices with northern priorities

Northern organizations have identified priorities related to both addressing information needs and improving research processes. These priorities are well documented in the policy analysis undertaken in Chapter 4. In expanding this analysis to consider key findings related to research trends (Chapter 5) and the experiences of research practitioners (Chapter 6), I identified areas where research is meeting northern priorities and areas where further progress could be made.

Northern leadership in research

Northern leadership of research has multiple different meanings; however, there is considerable support for northerners having a voice in the research that happens in the region (CCA, 2023; Shirley, 2021). In particular, support for northern Indigenous research leadership contributes to reconciliation. Ultimately, northern leadership in research changes the narrative around the role of research in the North. In practice, northern leadership can be displayed through:

- Indigenous and northern leadership of – and participation in – research;
- Indigenous and northern approaches to research and research ethics;
- Indigenous and northern organizations developing and communicating research policies and priorities
- Indigenous and northern governments holding decision-making power over research and identifying research priorities;
- Indigenous and northern academic institutes hosting research positions and infrastructure; and,
- Integration of northern research into local education and policy.

Northern leadership in research is supported by changing policies (Shirley, 2021); however, the policies adopted by external organizations including research institutions, funders, permitters, and others also at times limit northern leadership (CCA, 2023). New approaches to the design and delivery of research funding programs have demonstrated a shift towards recognition of the importance of self-determination in research. At the same time, funding policies that restrict organizational eligibility and access to overhead (e.g., tri-council policies), or limit flexibility to adjust to northern realities (e.g., POLAR) do not adequately support northern leadership in research (Chapter 6). Currently small northern organizations manage a growing amount of requests in relation to research in and around their communities, including reviewing license applications, providing letters of support, liaising between researchers and communities, and reviewing communication products (Shirley, 2021). While more

consistent financial support plays a role in addressing this, improved internal processes can also create avenues to reduce the burden of research and position northern organizations to take a leadership role (Chapter 6).

Relationships as the foundation for research partnerships

Partnership is well documented as a priority in research and particularly in northern research (Brunet et al., 2016; Carter et al., 2019). Partnerships have tremendous potential to play a positive role in supporting northern leadership and Indigenous self-determination in research by creating bridges between researchers, institutions, and communities (Brunet et al., 2017; Buschman, 2022; Carter et al., 2019; Tondu et al., 2014). In discussions with practitioners, it was identified as foundational to their work and common practice to work with numerous different types of partners (Chapter 6). However, tensions exist in how northern organizations are engaged in partnerships, and their level of ownership and control over research (Brunet et al., 2016, 2017). While partnership with northern organizations is a common practice and often required by funders, northern partners often do not have access to the funding or resources required to take on a meaningful leadership role or engage on their own terms (Chapter 6). Where meaningful, early engagement has happened, partnerships have successfully brought resources and research capacity to northern organizations and further developed the knowledge base on northern-identified priority topics (e.g., traditional economy, cultural tourism, geohazards). Where northern partners were not included in key aspects of the research partnership, they were less likely to experience tangible outcomes and benefits, as one researcher

illustrated with a project on human-wildlife interactions that ultimately was not renewed because it lacked community support.

Indigenous knowledge in relation to research

There has been a movement by practitioners towards more inclusion of IK in research, often enacted through the role of Indigenous team members in research projects – as researchers, guides, interpreters, or community liaisons (Pedersen et al., 2020). However, considering the scale of research happening in the North and the breadth of topics being researched, questions exist around the feasibility and practicability of all researchers engaging with IK or even Indigenous communities (Shirley, 2021). Indigenous researchers and northern community-based organizations engage with IK regularly (Chapter 6), and some have developed methodologies that support this work (Carter et al., 2025; Healey & Tagak Sr., 2014; Pedersen et al., 2020). With high intensity of research happening in the North compared with the size of the population (Chapter 5), the burden of research engagement is a real issue (ITK, 2018b; Polidoro et al., 2024). There are ongoing challenges around respectful engagement with Indigenous northerners and appropriate inclusion of IK in both research and evidence-based policy (Shirley, 2021; Tagalik et al., 2023). Research funding policies that require or promote engagement and inclusion of IK can support improvement in this area by providing guidance on meaningful and appropriate levels of engagement, including northern Indigenous organizations in proposal review, and supporting Indigenous-led research in topics that would benefit from IK.

Northern research and governance capacity

Northern organizations have indicated a desire for more control in all aspects of research decision-making, including more northern-based research capacity. This includes growth in northern research organizations, research positions based at northern governments, funding and education for northern Indigenous researchers, and access to research funding for northern-led initiatives. There has been considerable progress in all of these areas in recent years, with northern organizations holding tri-council grants that support local networks of researchers, growth in the research teams at northern academic institutes, and leadership by northern Indigenous governments and organizations in research projects and initiatives (Cueva et al., 2021; Cunsolo & Hudson, 2018; Tagalik et al., 2023).

Relevant research outcomes

Research should be relevant and have beneficial outcomes for the North; however, there is a lack of mechanisms and metrics to track outcomes. The impact of research is rarely evaluated, and there is no clear pathway to ensure research leaders are accountable for achieving the benefits and outcomes that they proposed in either their proposals, license applications, or ethics protocols. Tracking access and use of research outputs, including data, peer-reviewed literature, or technical reports, by northern organizations is challenging. However, in recent years northern organizations have demonstrated leadership in overcoming these challenges by hosting workshops and research events and inviting researchers to participate, thereby supporting community outreach and

the development of community-researcher partnerships (Carter et al., 2019; Cueva et al., 2021; KFN & Dän Keyi Renewable Resources Council, 2019).

Strong communication and northern engagement

Communication and engagement are important components of successful research partnerships; however, they also play an important role in ensuring that research is informing and benefiting northern societies. While northern researchers often want to engage with communities, sometimes there is a mismatch between their topic and community interests. At other times they struggle with developing relationships or communicating in a way that is engaging to northern audiences. Some have found success in working with local youth as a means of connecting with the community (Hotiì ts'eeda, 2017; Pedersen et al., 2020; Sadowsky et al., 2022). Others have employed creative approaches to engagement and focused on delivering community benefits (Eerkes-Medrano et al., 2019; Henri et al., 2020).

Many researchers have embraced approaches championed by research guidelines and strategies, although some southern-based researchers struggle to identify tangible ways to connect their research focus meaningfully with northern priorities. Researchers based in the North are generally more successful at aligning their research with northern priorities, while still facing some of the same challenges as their southern counterparts. While there are ongoing challenges related to respectful engagement and the evaluation of research outcomes, there are also examples of improvements in northern leadership.

7.4 Recommendations

This study demonstrates the need to further develop research that is relevant and beneficial to the North, that responds to knowledge gaps, and that contributes to northern evidence-based decision-making capacity. In order to enhance self-determination and align research with northern needs, the following considerations should be considered in future initiatives:

- **Increase northern representation** and engagement in – and leadership of – research;
- **Strengthen partnerships** between northern and southern institutions;
- **Improve coordination** and knowledge sharing amongst researchers and organizations engaged in northern research;
- **Include diverse northern voices** in setting research priorities and informing funding programs;
- **Address the knowledge needs** of northern communities, regions, and organizations with relevant research;
- **Expand the knowledge base** in the health and social sciences and under-researched communities and regions in the North;
- **Improve evaluation, tracking, and sharing of research** information and key metrics including northern-led and private sector research contributions; and,

- **Streamline and improve research licensing**, approval, and permitting processes to improve research tracking and reduce the burden on review organizations.

Within these areas of improvement, there are recommended actions that can be taken by a variety of actors in northern research (Table 7.1). Funding agencies have an important role to play in diversifying northern research by expanding support to northern organizations, targeting funding to underresearched topics, and addressing inflexibility in funding programs. Universities can improve administrative processes that make it challenging to engage in respectful partnerships with northern organizations, including employing the research agreements and protocols put forward by northern partners. They can adjust their financial policies to respect local protocols and ensure northern partners can be paid in a timely manner.

Territorial and Indigenous governments can champion local research priorities, advocate for northerners to be involved in research opportunities, and support northern Indigenous governments and organizations to participate meaningfully in northern research. Research licensing and approval organizations can improve how they track and share information on research including incorporating metrics that relate to community engagement and northern leadership of research. Northern Indigenous organizations can advocate for inclusion in priority-setting exercises and engage with research funding, licensing, and review processes.

Individual researchers can address limitations in research practice by engaging in partnerships that support northern and Indigenous leadership in research. They can engage respectfully with communities and contribute to local knowledge development by focusing their research on northern-identified priorities. They can advocate with their institutions for improved policies and processes that support and respect northern partners.

If implemented, these recommendations have the potential to achieve outcomes that benefit the North. In particular, improving institutional and organizational policies and practices has the potential to influence research at a larger scale (McNie et al., 2016; Perrin et al., 2021). Sharing research priorities and expectations widely can encourage beneficial relationships between researchers and northern partners. A potential outcome is a more equitable distribution of research opportunities and benefits across the North, bringing desired research to underresearched northern regions and communities (McNie, 2007; Shirley, 2021). Through coordinated research information and knowledge sharing, there are opportunities to improve understanding of the North and ensure that northerners can access information on research in their community or region.

Table 7.1 Recommendations for actors involved in northern research

Researchers working in the North	• Create opportunities for equitable research partnerships with northern organizations and governments. • Consider how your partnerships promote self-determination in research, contribute to local research capacity, and create opportunities for partners to make research decisions and participate in research processes. • Develop a relationship with the people living where you conduct research to understand how your research will affect them – both positively and negatively – and ensure that there are local benefits from your research. • Follow local protocols and consent processes including around the collection, management, and publication of data, and share your data and results in a format that is accessible and useable. • Use the licensing databases to find out who is doing similar research in the region and which local partners are working on these topics; identify places and topics where your research could have the most impact. • Do not revisit research that has already been done in a specific location unless invited to do so by the community. • Develop dynamic tailored communications for sharing results with different audiences, particularly policy-relevant findings (e.g., artistic graphics, short plain language text with appropriate translation, videos, websites, podcasts, etc.).
Universities	• Support northern research capacity through partnerships with northern governments and organizations that align with northern priorities and direct benefits to northern communities. • Advocate for sustainable and accessible funding for northern organizations and the inclusion of northern partners in national dialogues on northern research. • Honour equitable partnerships with Indigenous and northern partners and recognize local protocols and consent processes including research agreements that uphold ownership of research. • Develop culturally informed research policies, guidance, and training that support Indigenous self-determination and control of research and encourage faculty, students, and research administrators to learn about relevant processes. • Improve processes and policies that limit faculty and student engagement and partnership with northern partners and communities and ensure that processes respect local/cultural protocols (e.g., financial, travel, employment, and other policies; research agreements; ethical approval processes).
Research licensing organizations and permit bodies	• Improve forms and processes for administering licenses including tracking key metrics (e.g., northern partners, funding, communication tools, etc.) and simplifying processes for applicants and reviewers. • Take a coordinated approach to tracking similar metrics across the three territories. • Make license information publicly available online through a searchable, geo-located, public database. • Track locally led research and northern involvement in research teams and as partners. • Use the public license databases to learn about the research happening in your region and identify important research gaps.

Territorial and federal governments	• Support northern Indigenous governments and organizations to participate meaningfully in northern research to ensure they have the funding and organizational capacity required to participate in and contribute to northern research priority-setting. • Advocate for the involvement of northern organizations in research opportunities including developing projects, contributing to networks, etc. • Create more inclusive processes to ensure transparency and accountability in how Indigenous and community voices are included and represented in developing government research strategies and policies, giving credit to contributors. • Champion local research priorities, protocols, and guidance with funding agencies and in national dialogues about northern research and develop funding initiatives tailored to addressing knowledge gaps.
Research funding organizations	• Create grant opportunities that target northern organizations with feasible eligibility and proposal criteria. • Create funding processes that reward or require research that is partnered and/or responds to northern priorities (e.g., co-develop funding programs, link proposal review criteria to local priorities, northerners review proposals; etc.) • Consider institutional eligibility so partner institutions are eligible to receive funds and overhead directly. Research leads at northern organizations may require grant funding for their positions. • Incorporate locally and regionally identified priorities into targeted funding opportunities including in diverse health and social science topics. • Invest in research personnel at northern organizations (e.g., research positions at non-academic northern organizations, research chairs at northern academic institutions, regional research advisors, etc.) • Build flexibility into funding guidelines to allow applicants to adapt to changing northern priorities within a project (e.g., funding categories, carry-over between fiscal years, timelines). • Honour non-academic expertise by expanding the definition of HQP to recognize the inclusion and eligibility of northerners who are both contributing and gaining expertise. • Include northern voices in program design and proposal review processes.
Indigenous governments and northern organizations	• Advocate for a research coordination/advisory position at the local or regional level to support local research capacity and reduce the burden on smaller organizations. • Engage with research funding, licensing, and review processes. • Use the public license databases to learn about the research happening in your region and identify important research gaps.

7.5 Future areas of research

This thesis took a pan-northern approach to understanding the interrelation between research policy and practice. This approach allowed for the consideration of federal and other pan-northern policies and allowed for a broad analysis of current opportunities and limitations. However, it did not allow for an in-depth analysis of local research dynamics in each region. In developing a baseline of research, this study was limited to identifying research through the licensing databases, which does not account for all industry or locally led research in the three territories. Finally, the scope identified for participants limited the focus of interviews to research practitioners with long-term experience and a background working in academic research.

There are a number of questions that could not be answered through this study that could benefit from further investigations. Suggestions for future research are organized into four main areas: i) further developing a baseline understanding of existing northern research; ii) assessing the impact of COVID-19 on northern research; iii) examining northern research conducted by industry and government; iv) exploring frameworks for monitoring and evaluating northern research; v) examining the research-policy interface through research project case studies and vi) understanding the experiences of ECRs.

7.5.1 Further developing a baseline of northern research

There were a number of metrics that I was not able to track through this project that could benefit from changes to current licensing practices and legislation, including in the application and reporting processes. Because certain types of research are not included in the licensing processes depending on research topic (e.g., wildlife, archeaology) or lead (e.g., Yukon-based researchers). Coordinating how metrics are tracked and combining data across permitting organizations would allow for a more complete picture of research in the territories (ARI, 2011; Rahman, 2024). In the case of the Yukon, capturing locally-led research may require updating licensing legislation, while in all regions, outreach may be required to ensure industry and government researchers are participating in the licensing process. To create a more comprehensive and complete database of research in the North would require going beyond the permitting agencies to gather information about research that has not been permitted. This would require contacting diverse organizations involved in conducting northern research to request access to their information on past projects. Some of this information could potentially be gathered through websites and publications, or by using data from research funding programs. However, each of these possibilities is fraught with limitations of time and capacity to navigate complex interjurisdictional regulations. To undertake this type of initiative effectively would require pan-northern cooperation, agreements to share basic research metadata, as well as amendments to some administrative processes to ensure consistent information is tracked across diverse research activities.

There are currently a number of important metrics that are not tracked through existing licensing databases that could provide valuable information on how northern research is evolving. In particular, the databases did not include information on the role of northerners in research or the sources of research funding. First, because only the PI is consistently tracked across licenses, there is no way to reliably identify the extent of community-connected or community-partnered research (Polidoro 2022). As northern participation in research is a critical issue for northern communities (Brunet et al. 2016; Ogden et al. 2016; ITK 2018), and is sometimes a requirement for research funding programs, this is an important omission that could benefit from administrative changes in licensing and permitting processes. By requesting a little more detail on team member roles and contributions in an application (i.e. what is proposed), as well as in annual reporting (i.e. what actually happened), it would be possible to more accurately assess the level of northern community engagement, leadership, and/or collaboration in northern research.

By identifying funding sources in the license application, the relationship of individual projects to larger networks (e.g., ArcticNet), along with the impact of networks and other programs on northern research, could be tracked and analyzed in relation to other metrics. In addition, specific questions could be included regarding funding investments or transfers to community and regional organizations. Interdisciplinary research is another metric that could be easily tracked on license applications and reports by asking researchers for more detail on the disciplines relevant to their project – including identifying the level of

interdisciplinarity – or asking them to identify topic codes. Tracking interdisciplinary and problem-based research activities may be increasingly of interest to northern government and research funders seeking evidence to inform decisions and assess the impacts of funding investment. Unless licensing application and reporting processes are changed to track more detailed metrics and ensure consistency across jurisdictions and organizations, it will remain challenging to develop a true baseline of the state of northern research.

7.5.2 Assessing the impact of COVID-19 on northern research

The timeframe of the license analysis in Chapter 5 ended in 2019. This decision was made based on licensing data availability at the time. Then, as the COVID-19 pandemic took place during this project, we kept 2019 as the end date knowing that assessing impacts of COVID-19 on northern research would be an entire separate research direction. However, interviews took place before and during the COVID-19 pandemic, and some participants how it affected their research. During the pandemic there were limited opportunities for southern-based researchers to travel to the North. There were researchers who relied on their northern partners or sought out new relationships with northern organizations to maintain their research. While these issues emerged during interviews, it was not the focus of this study and warrants a more targeted investigation to understand the impacts. Future work could be done to understand how COVID-19 impacted northern research, including a comparison of research licenses during and post pandemic with the 2005-2019 baseline. This could also include an examination of how research practices changed during and after the pandemic to

accommodate travel restrictions, especially in regards to different types of partnership approaches (Figure 6.6).

7.5.3 Examining industry and government research

I chose to focus on academic research and the influence of related research and science policies. However, many of the participants in this study were also involved in other kinds of research including industry-led and government-led research. Historically, both groups have played a key role in the development of the northern knowledge base. Industry and government research are impacted by both overlapping and unique policies, thus the experiences and contributions of both groups warrant further examination. In particular, their experiences of funding mechanisms, ethical processes, professional guidelines, permitting processes, and data policies may be quite different from academic perspectives.

7.5.4 Developing frameworks for monitoring and evaluating northern research

While there are a few examples where northern research partnerships and projects have been evaluated from a western scientific approach (Brunet, Hickey and Humphries, 2014, 2016; Drukenmiller 2022), Indigenous and/or northern approaches to research evaluation are not widely shared. There are numerous guidance documents that centre Indigenous perspectives and provide a framework that can be adapted to research evaluation. For example, ITK's National Inuit Strategy on Research proposed a number of indicators that can continue to be tracked as a means of monitoring progress in research related to Inuit Nunangat (2018b, 2018c). There is also a growing scholarship of

Indigenous evaluation approaches and metrics which could be applied to understanding research partnerships in the northern context (Doering et al., 2022), such as a Hotiì ts'eeda initiative to further Indigenous evaluation of on-the-land programs (DeLancey, 2020; Hotiì ts'eeda, 2020) and the QHRC's efforts to create culturally-relevant health indicators (Akearok et al., 2019; Cueva et al., 2021). There is an opportunity to develop and apply approaches to research evaluation that incorporate different knowledge systems and are tailored to specific cultural, geographic, and governance contexts across the North.

7.5.5 Examining the research-policy interface through case studies of research projects

As part of this project I proposed conducting regional case studies of specific research projects to build on the experiences of individual researchers and investigate the research process in depth. This was not included in the scope of the final project, but as a future area of research could enhance understanding of the research-policy interface. This could include a document analysis exploring relevant background information on the research project, the community, stakeholder organizations, and the region as well as knowledge products resulting from the case study research project (e.g. publications, reports, training initiatives, outreach materials, etc.). This could be followed by focus groups that include key informants connected to the research cases with a particular emphasis on research users and decision makers.

7.5.6 Understanding experiences of early career researchers

Early career researchers (ECRs), including graduate students and post-doctoral fellows, experience the research ecosystem in a way that is quite different from their supervisors and established academics (Lafferty et al., 2022). With the goal of capturing the evolution of northern research and the impact of changing priorities and policies, I focused on established researchers. However, ECRs may experience challenges funding their travel or honoraria or have issues managing tensions between community and academic expectations. Discussions about community-research relationships could benefit from ECR perspectives, particularly as ECRs have demonstrated leadership in community engagement and communicating results (Bouchard et al., 2018; Pedersen et al., 2020; Tondu et al., 2014).

7.6 Moving forward and personal reflections

With this research, I aimed to develop an understanding of policies, programs, and practices that support the alignment of northern research with northern priorities. I sought to influence change in northern research including the work of practitioners, funders, and northern organizations. This thesis is a starting point, but to affect the changes identified through this research, the critical next step is to share the findings with appropriate audiences. This involves developing a range of communication products that share specific key messages with different actors, including northern organizations engaged in research, research funding organizations, and universities with northern research programs.

This thesis was sparked by my personal and professional interests in learning about - and improving - northern research processes to better address northern priorities. In undertaking this project, the need for research that answers local questions to strengthen the research-policy interface has been underscored and reinforced. In all aspects of my work, I was considering how northern governments and organizations could be better supported to access and integrate research to inform their policies and decisions. It is important to understand the evolution and current state of northern research in order to identify gaps and priorities. As a Yukoner, I will continue working with northerners, particularly Yukon First Nations, to conduct relevant research. I will also use my role at YukonU to support others in doing meaningful research. I continue to see value in asking questions about how we do research and who benefits. I hope that my thesis can contribute, in its own small way, to developing a vision for moving forward together so northern research contributes to the common good.

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Appendices

Appendix A: Co-authorship statements

The following statements were signed and submitted to Carleton University.

Gita Ljubicic, Supervisor

As co-author of 'Northern research policy contributions to Arctic sustainability' (Chapter 4), 'A comparative analysis of research trends across the Yukon, Northwest Territories, and Nunavut, 2005-2019' (Chapter 5), and 'The evolving role of northern partnerships in strengthening the research-policy interface' (Chapter 6), I, Gita Ljubicic, acknowledge Alison Perrin as the lead contributing author of these manuscripts. Alison designed and conducted the research, gathered and analyzed all the data, and wrote and revised the manuscripts.

I, Gita Ljubicic, have contributed to the papers in this thesis as supervisor of Alison Perrin during the doctoral program in geography. My contribution entailed discussion, advice, assistance, and editorial remarks related to the research design, analysis, and writing of this manuscript. My activities were entirely consistent with the role of thesis supervisor.

_____ _____

Gita Ljubicic Date

Aynslie Ogden, Committee Member

As co-author of 'Northern research policy contributions to Arctic sustainability' (Chapter 4), I, Aynslie Ogden, acknowledge Alison Perrin as the lead contributing author of this manuscript. Alison designed and conducted the research, gathered

and analyzed all the data, and wrote and revised the manuscript.

I, Aynslie Ogden, have contributed to the paper in this thesis as a member of Alison Perrin's academic committee during the doctoral program in geography. My contribution entailed discussion, advice, assistance, and editorial contributions related to the research design, data collection, analysis, and writing of this manuscript. My activities were entirely consistent with the role of thesis committee member.

Aynslie Ogden Date

Jamal Shirley, Co-author

As co-author of 'A comparative analysis of research trends across the Yukon, Northwest Territories, and Nunavut, 2005-2019' (Chapter 5), I, Jamal Shirley, acknowledge Alison Perrin as the lead contributing author of this manuscript. Alison designed and conducted the research, gathered and analyzed all the data, and wrote and revised the manuscript.

I have contributed to the paper in this thesis as the Director of the Nunavut Research Institute. My contribution entailed discussion, advice, assistance, and editorial contributions related to the research design, data collection, analysis, and writing of this manuscript, as well as providing access to the NRI's licensing data for Nunavut. My activities were entirely consistent with the role of project advisor.

Jamal Shirley Date

Appendix B: Research engagement summary

In developing this project, I conducted consultations with people involved in setting research policies, leading research programs, partnering on research, making decisions on research, funding research, administering research licenses, or benefiting from northern research (Section 3.2). The goal of these consultations was to identify research gaps, concerns, and knowledge needs around research policy for the North to inform the design of my research project.

Although my conversations with key stakeholders were informal, a number of common themes did arise. The main concepts and knowledge gaps that were identified and described by stakeholders are summarized below. These themes or issues were all identified by a few different people during the conversations, by some, or by many. For each main theme, I have summarized the opinions that I heard and included a question that arose from the conversations and informed the development of my research questions and interview questionnaire.

Knowledge transfer: There appears to be an abundance of research happening in the North but transferring that knowledge into sound decision-making is a challenge for a variety of reasons. Many stakeholders were concerned that governments may not have time and capacity to access and implement research results or may be unaware of relevant research. Other potential issues are that scientific products are inaccessible and research communication products are not culturally relevant. What is impeding the transfer of knowledge from research results to northern government decision-making?

Networked research: There were mixed concerns about networked research, with some stakeholders expressing an interest in developing a research network across the North that would maintain or build capacity in the North. Some stakeholders were concerned that big research networks (e.g. ArcticNet; IPY) may not have the same level of accountability to northern partners as some other research initiatives (e.g. NCP). Some stakeholders suggested that more coordination amongst Arctic science initiatives, whether through research networks or within the federal government, would improve science outcomes. The Old Crow project that arose from a collaboration of northern research chairs was provided as an example of how coordinated research can be accountable to northern communities. What role can research networks play in responding to northern research needs?

Partnerships: Many participants discussed the role of North-South partnerships in building research capacity in the North and improving the efficiency and effectiveness of conducting research in the North. Some organizations are using partnerships with universities to answer their questions or to fill knowledge gaps. Partnerships and collaborations with southern-based researchers are also being used to support educational programs at the northern colleges. How are research partnerships benefiting northern regions and how do those partnerships develop?

Northern-led research: Self-determination in research, particularly for Indigenous northerners, is being discussed and enacted by northern organizations (including

Indigenous governments or organizations) that are leading research. This leadership can happen in many ways, including through conducting their own research, deciding what research happens on their lands, having their own ethical review process, setting research priorities, or through creating policies and processes that guide how research is done. What is the role of research in the North and what does leadership in northern research mean?

Research relevance: Some stakeholders involved in northern governments expressed an interest in influencing decision-making around research topics and questions to ensure that relevant research is being done. Some northern Indigenous organizations and governments are publishing their priority research areas and questions to encourage researchers to answer those questions. Some stakeholders also discussed the challenges associated with sifting through available research to identify what is 'good' or relevant. How are decisions made around what research questions to focus on?

Research funding: A few stakeholders identified concerns around fragmentation in funding programs which can impact the production of and accessibility of data. This can particularly impact long-term programs and community-based monitoring, which often do not have sustainable ongoing funding or have data gaps from years where funding was unavailable. They referenced issues regarding the timing of funding calls and programs; short timelines can make it challenging to build meaningful partnerships and respond within the timeline. Some of the challenges that were discussed include the inability to fund travel

for southern-based researchers to scope projects with northern stakeholders and for communicating results back to northern regions. For a few participants, lack of funding for travel and certain activities limits the ability of northern communities to play a role in research development and uptake. Has there been funding available to support research partnerships?

Research trends: While many stakeholders had a sense of which topical areas were well-researched or under-researched, there is a lack of data demonstrating topical and geographical research trends. A few stakeholders expressed concern that because of that, research is being repeated. They were particularly concerned about this when it comes to consultant or government research that is not being published in scientific literature or recorded in existing research databases or compendiums. Some stakeholders expressed an interest in better understanding the current state of research in the North to advocate for better research and to avoid duplication. What are the topical and geographical research trends in the northern regions?

Research processes: There are different research licensing processes between the regions and within each region depending on subject areas. Many stakeholders discussed licensing and approval processes and issues around accountability in the process, specifically referencing that researchers or licensing bodies do not always follow up with results or end-products. Some stakeholders involved in the review of research license applications are concerned and frustrated that their comments on license applications are not

being addressed. Some Indigenous governments now have their own research protocols that set out requirements for researchers working within their traditional territory. What is the role of research licensing and is it effective? What is the role of a research agreement and are they effective?

Research benefits: While a couple of researchers have attempted to study the benefits of research to the North, there has not yet been a study that effectively tracks how much money from research projects gets spent in the North and who receives those financial benefits. It is also challenging to track how research results influence decision-making, or whether they are considered at all. Some stakeholders discussed capacity-building benefits built into research projects, such as outreach, training, or hiring community members. Local organizations may have records around these benefits, but they are not being tracked on a regional basis. A common observation was that communities and governments need to be involved from the onset of the project in order to benefit from the outcomes. Northern regions could potentially benefit more from research if there was a focus on applied research and better communication of results. What tangible results or outcomes has research had in northern communities?

Government research: Potential communication challenges were identified by a few stakeholders between academia and government. Not all government scientists are publishing and by not communicating their research to academia (i.e. through peer-reviewed journals) then they are missing out on an opportunity to help inform future research questions. A few stakeholders also expressed the

sense that government researchers sometimes felt the lack of support for and interest in science in their organization. Many felt that data scarcity in the North was a big issue that limits the ability of government decision-makers to engage in evidence-based decision-making. How are research results being incorporated in northern decision-making?

Data scarcity: As discussed above, data scarcity leads northern decision-makers to make decisions with limited evidence, relying more on experience and expert opinions. Some observed that long-term datasets can be rare and regional coverage spotty because there are limited resources. A few stakeholders also referenced the research that consultants and industry have done in the North, and the that there is a lot of data held by consulting firms that is inaccessible to academic and government researchers. Who owns data in the North and how can partnerships improve capacity to share data and inform decisions?

In these discussions with northern research stakeholders the same issues were often reiterated multiple times. Overall key overarching issues that were raised included: i) the research process is getting better but the institutions that fund and control research make it challenging to conduct research in a way that meets the needs of northerners and researchers; ii) there are institutional barriers to researchers based in the North which impede northern leadership in research; and iii) northern governments and organizations are advocating for improved research funding and decision-making but are lacking data and evidence beyond anecdotal stories on the current state of research.

Overall the stakeholders I consulted with were supportive of and interested in my research project. Their interests diverged depending on how they interacted with research, and from these conversations I realized that there were many different areas of research policy or decision-making that I could focus on in-depth (e.g. funding; licensing; community consultation). Another option was to capture a broader range of issues by focusing on individual cases with long-term experience with research in the North. I chose the latter and identified a multi-method approach to examine the current state of research from a few perspectives. These include analyzing research trends and gaps, examining the perspectives of both northern- and southern-based researchers, and exploring case studies through the viewpoints of researchers, communities, regulators, and research users. I am narrowing my focus to academic researchers and case studies. There are potentially more questions around the relevance and benefits of academic research because it is not necessarily linked directly to a policy or decision-making question in the way that consultant or territorial government research often is.

Appendix C: Recruitment materials and consent form

C.1 Recruitment email

Subject: Invitation to participate in a research project on northern research practice and policy

Dear <enter name>,

My name is Alison Perrin and I am a PhD student in the Department of Geography and Environmental Studies at Carleton University. I am working on a research project under the supervision of Prof. Gita Ljubicic at Carleton University.

I am emailing to invite you to participate in a study entitled "*Examining research policy and practice in Canada's North to support evidence-based decision-making*". For years both northerners and researchers have expressed the need for research that is relevant, engages northerners throughout the process, and brings benefits to the North. I am doing this project because I hope to learn how decisions are made about northern research, how research aligns with northern needs, and how research is impacting decision-making in northern and Indigenous governments and organizations. I am inviting you to participate because you have extensive experience conducting research and working in research collaborations in northern Canada.

I would like to speak with you about your experiences conducting research and working with visiting researchers [or: community members] in the North, and your personal insights on the benefits and impacts of northern research. The interview will take about 2 hours of your time. If you work independently and don't receive a regular salary, you will receive a gift card as an honorarium for your time.

I have attached a project overview to provide more information on the project. If you are interested in participating in this project or have any questions, please contact myself or my supervisor at the contact information below. Your contributions to this project will be so valuable. I look forward to hearing from you.

Kind regards,

Alison Perrin

Project Researcher
Alison Perrin
PhD Student, Carleton University
Geography and Environmental Studies
alison.perrin@carleton.ca
867-332-7136

Project Supervisor
Dr. Gita Ljubicic
Associate Professor, McMaster University
School of Earth, Environment & Society
gita.ljubicic@mcmaster.ca
289-659-2074

If you have any ethical concerns with this project (protocol #111293) contact the Carleton University Research Ethics Board-A (613-520-2600 ext. 2517 or ethics@carleton.ca) or contact) the McMaster Research Ethics Board (#5018) (905-525-9140 ext. 23142 or ethicsoffice@mcmaster.ca).

C.2 Project overview

Title: Examining research policy and practice in Canada's North to support evidence-based decision-making

Project Overview
I am currently conducting interviews with northern community researchers and academic researchers that have extensive experience conducting research and working in research collaborations in the Northwest Territories, Nunavut and/or Yukon. Results from these interviews will be shared in a summary report, policy recommendations, a graduate thesis, conference presentations, journal articles, and potentially some public communication products including a book, podcasts, and videos.

Project Goal
For years both northerners and researchers have expressed concerns about how research in the region happens, what topics it is focused on, who is involved, who makes decisions, and where the benefits and investments land. This project aims to provide evidence on the current state of research, how it has improved, and what still needs to be done to inform future research programs and policies.

The goal of this project is to understand:

- How are decisions made about research in the North?
- How does the practice of research align with northern and Indigenous research priorities and principles?
- How is research impacting decision-making in northern and Indigenous governments and organizations?

These interviews are one of four key approaches being used in this project:

- an analysis and regional comparison of northern research policy and guidance documents;
- an analysis and regional comparison of research trends based on the licensing databases from the Northwest Territories, Nunavut and Yukon;
- interviews with northern community researchers and academic researchers; and
- an examination of two case studies of northern research projects.

The Interview
Your participation in this project is voluntary, and there will be no consequences if you choose not to participate. If you agree to take part in this project, I would like to set up an interview with you to discuss your experiences with conducting research in the North.

- The interview will take about 2 hours of your time.
- This interview will take place in person, either in a public venue, at your workplace or home, on the phone, or by video-conference.
- With your consent, I would like to take some photographs, and record our conversation with audio and video, to be able to create valuable summaries and creative outputs to share results of this project.
- If we conduct the interview by video-conference, we will be using a software from a company located in the United States of America and subject to American privacy laws (e.g. Skype or Zoom).

Potential Risks
You will be asked to discuss your experiences conducting research and working with visiting researchers in the North, and your personal insights on the benefits and impacts of northern research. I will not be asking particularly sensitive questions, however, if you feel uncomfortable at any time you can take a break, skip a question, or stop the interview without consequences.

Compensation/Incentives
If you work independently and don't receive a regular salary, you will receive a gift card as an honorarium for your time.

Withdrawing from the Study
Your participation in this research is voluntary and you may withdraw from the study for any reason without penalty. If you withdraw your consent during the course of the interview, we will stop the interview and delete all recordings and photographs. After we complete the interview, you will receive a copy of the recording and transcripts to review. If you change your mind regarding your consent options or wish to withdraw from the study, you can do so within four (4) weeks of receiving your recordings/transcripts by contacting Alison Perrin by phone or email. Your information will be deleted or returned to you, according to your preference.

Confidentiality and Data
At the end of the interview you can choose if you would like to be identified to reflect your contributions to this project, or if you prefer that your name is not used. Photographs, and audio and video recording will only be used if you agree to be identified, and no information that discloses your identity will be released or published without your consent. All interview recordings and transcripts, including coded information, will be kept in a password-protected file on a secure computer, or on a password-protected external hard drive in a secure location. You can also choose how or if your information will be retained for future research use, or stored in an appropriate northern archive, once the project is complete. If you choose to have your data remain with an archive, it will be stored and used for future educational and research purposes according to the archive's policies.

Ethical Review: This project was reviewed and cleared by the Carleton University Research Ethics Board A (protocol #111293) and McMaster Research Ethics Board (#5018). If you have any ethical concerns with the project or the researchers involved, please contact the Chair, Carleton University Research Ethics Board at 613-520-2600 ext. 2517 or at ethics@carleton.ca, or McMaster Research Ethics Board at 905-525-9140 ext. 23142 or at ethicsoffice@mcmaster.ca.

Project Team
If you have any questions or comments, please contact:

Project Researcher
Alison Perrin
PhD Student, Carleton University
Geography and Environmental Studies
alison.perrin@carleton.ca
867-332-7136

Project Supervisor
Dr. Gita Ljubicic
Associate Professor, McMaster University
School of Earth, Environment & Society
gita.ljubicic@mcmaster.ca
289-659-2074

C.3 Consent form

I have been informed of what it means to participate in this project and I understand that information and opinions I share will be included in the results of this project and will be shared publicly in the form of reports, publications, a graduate thesis, and related project outputs (e.g. posters, presentations, news items, website postings, etc.). I agree to participate in an interview and that my contributions can be used in the project under the following conditions.

Identification: I remain the owner of the information and opinions I have contributed. For the publication of project results and sharing this information with others I wish to be identified in the following way:

☐ I DO want my name to be used, so that information I share is credited to me

☐ I DO NOT want my name to be used, but information that I share will be credited confidentially as agreed upon (example credits: "Indigenous Organization Staff Member", "University Professor", "Community Researcher")

Recording: I understand that photographs, and audio and video recordings of our conversation may be taken in order to create valuable summaries and creative outputs to share results of this project. Audio recordings are used to create a transcript of everything we talk about in the interview. Photos and videos are helpful to use in reports, presentations, and creative outputs. I agree to have my interview recorded in the following ways (check all that apply):

☐ Audio recording
☐ Photographs
☐ Video recording
☐ No recording, written or typed notes only

Photographs, audio and video clips may be used to create online podcasts and videos or to create a book for publication. You will have the chance to review and approve video, audio and print products before publishing. I agree to share my original recordings as indicated below (check all that apply):

☐ My audio clips can be included in a public podcast

☐ My video clips can be included in online videos

☐ My photographs can be included in a book, presentations, and other published material

☐ My interview information can be included in a book

I agree to archive interview materials for future use and learning opportunities (check all that apply):

☐ I would like to have my interview archived in a local community or First Nation repository

☐ I would like to have my interview archived in a regional or territorial archive

☐ I would like to have my interview archived at _____

Ethical Review: This project was reviewed and cleared by the Carleton University Research Ethics Board A (protocol #111293) and McMaster Research Ethics Board (#5018). If you have any ethical concerns with the project or the researchers involved, please contact the Carleton University Research Ethics Board-A at 613-520-2600 ext. 2517 or at ethics@carleton.ca, or McMaster Research Ethics Board at 905-525-9140 ext. 23142 or at ethicsoffice@mcmaster.ca.

Participant Consent: I understand the levels of consent provided here, and that I may change my levels of consent and/or withdraw my consent, within **four (4) weeks** of receiving my contributions and/or initial results for review, by contacting Alison Perrin. I have asked any questions I had, and I freely agree to participate in the project as outlined above.

Print Name	Signature	Date

☐ Verbal consent provided

Researcher Consent: I have explained the project, answered all of your questions, and provided you a copy of this consent form. I promise to respect the context of the knowledge and opinions you contribute to this project, and the terms of this consent form.

Print Name	Signature	Date

Project Researcher
Alison Perrin
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289-659-2074

Interview Participant

Name	File name
Affiliation to be listed with name (organization)	Role
Indigenous heritage	Home community
Address	
Email	Phone
Notes	

Appendix D: Policy documents included in analysis

Author	Year	Title	Website
Aarluk Consulting Inc.	2011	A retrospective on research licensing In Nunavut	NA
Aqqiumavvik Society	2020	ᐊᔨᖅᑎᒋᓂᓕᖅ Aajiiqatigiingniq an Inuit research methodology	https://b4be1162-391a-4a89-9354-530c0ff9b928.filesusr.com/ugd/1f7032_c2502caafc0746c98f59dedb87ed4ef2.pdf
Arctic Nations	2018	Agreement on enhancing international Arctic scientific cooperation	https://oaarchive.arctic-council.org/handle/11374/1916
Armitage, P., Kilburn, S.	2015	Conduct of Traditional Knowledge research: A reference guide	https://wmacns.ca/resources/conduct-traditional-knowledge-research-reference-guide/
Assembly of First Nations	2009	Ethics in First Nations research	http://www.afn.ca/uploads/files/rp-research_ethics_final.pdf
Assembly of First Nations	2009	First Nations ethics guide on research and aboriginal traditional knowledge	http://www.afn.ca/uploads/files/fn_ethics_guide_on_research_and_atk.pdf
ACUNS	2003	Ethical principles for the conduct of research in the North	http://acuns.ca/wp-content/uploads/2010/09/EthicsEnglishmarch2003.pdf
ACUNS	2017	Research excellence in Yukon: Increasing capacity and benefits to Yukoners in the social sciences, humanities and health sciences	http://acuns.ca/wp-content/uploads/2013/09/YUKON-ENGLISH-WEB.pdf
ACUNS	2018	Research excellence in the Northwest Territories: Holistic, relevant and ethical research in the social sciences, humanities and health sciences	http://acuns.ca/wp-content/uploads/2018/07/2018-NWT_English-Web.pdf
Aurora Research Institute	2019	Doing research in the Northwest Territories: A guide for researchers	https://nwtresearch.com/sites/default/files/ari_guide_to_research_2019_0.pdf
Brockman, A.	2010	Canadian Arctic Research Licensing Initiative: NWT research licensing workshop regional/community reviewers and health and social science regulators	NA
Brockman, A.	2010	Canadian Arctic Research Licensing Initiative: NWT research licensing workshop with land and water regulators	NA

CIHR, Institute of Aboriginal Peoples' Health, Institute of Nutrition Metabolism and Diabetes	2002	Health research needs North of 60: Northern town hall meetings, September 2001	https://publications.gc.ca/collections/collection_2016/irsc-cihr/MR4-51-2002-eng.pdf
Canadian Polar Commission	2014	The state of northern knowledge in Canada	https://churchillscience.ca/wp-content/uploads/2018/09/State-of-Northern-Knowledge-Canadian-Polar-Commission.pdf
Christensen, L.	2008	Health-research guidelines for Yukon communities: A discussion paper	NA
CIHR, NSERC, SSHRC	2019	Setting new directions to support Indigenous research and research training in Canada	https://www.canada.ca/content/dam/crcc-ccrc/documents/strategic-plan-2019-2022/sirc_strategic_plan-eng.pdf
Cirque Consulting & Communications	2009	Canadian Arctic research licensing initiative: Yukon	NA
Council of Yukon First Nations	2000	Traditional knowledge research guidelines: A guide for researchers in the Yukon	https://ethicshub.ca/wp-content/uploads/2020/05/10-Traditional-Knowledge-Research-Guidelines-A-Guide-for-Researchers-in-the-Yukon.pdf
Council of Yukon First Nations	2006	Ownership, control, access and possession of data (OCAP) resolution	NA
Council of Yukon First Nations	2018	Yukon First Nations' research protocol template	NA
Dehcho First Nations	2004	Traditional knowledge research protocol	https://dehcho.org/docs/traditionalknowledgeprotocol.pdf
Ferrazzi, P., Tagalik, S., Christie, P., Karetak, J., Baker, K., Angalik, L.	2020	Describing Aajiiqatigiingniq as an Inuit consensus methodology in health research	https://b4be1162-391a-4a89-9354-530c0ff9b928.filesusr.com/ugd/1f7032_c8d0c2f57e51488f937e5450e16fb0c5.pdf
First Nations Centre - National Aboriginal Health Organization	2005	Ownership, control, access, and possession (OCAP) or self-determination applied to research	https://fnim.sehc.com/getmedia/ed0e2951-1a08-433c-bcb0-3a2ec11e708d/OCAP_Critical_Analysis_2005.pdf.aspx?ext=.pdf
First Nations Centre - National Aboriginal Health Organization	2006	First nations conceptual frameworks and applied models on ethics, privacy, and consent in health research and information	https://fnim.sehc.com/getmedia/c3661ea5-f7a5-448f-84c4-6cdca22b5414/FNC_ConceptualFrameworksinHealthResearch_Report_2006.pdf.aspx?ext=.pdf

First Nations Information Governance Centre	2011	First Nations Regional Health Survey (RHS) - Best practice tools for OCAP compliant research	https://fnigc.ca/sites/default/files/RHSBestPracticeBooklet.pdf
First Nations Information Governance Centre	2014	Ownership, Control, Access and Possession (OCAP): The Path to First Nations Information Governance	https://fnigc.ca/wp-content/uploads/2020/09/5776c4ee9387f966e6771aa93a04f389_ocap_path_to_fn_information_governance_en_final.pdf
Gabor, A.	2013	Research and knowledge sharing in the North	http://yukonresearch.yukoncollege.yk.ca/resda/wp-content/uploads/sites/2/2014/07/DRAFT3-Knowledge-Sharing-Literature-Review.pdf
Gouvernement du Québec	2017	Québec research and innovation strategy 2017-2022	https://cdn-contenu.quebec.ca/cdn-contenu/adm/min/economie/publications-adm/politique/PO_SQRI_2017-2022_MEI_EN.pdf?1573053872
Government of Canada	2005	From opportunity to action: A progress report on Canada's renewal of northern research	https://www.nserc-crsng.gc.ca/_doc/Northern-Nordique/NorthRes_06-05_e.pdf
Government of Canada	2009	Canada's northern strategy: Our North, our heritage, our future	https://publications.gc.ca/collections/collection_2009/ainc-inac/R3-72-2008.pdf
Government of Canada	2010	Statement on Canada's Arctic foreign policy: Exercising sovereignty and promoting Canada's northern strategy abroad	https://www.international.gc.ca/world-monde/assets/pdfs/canada_arctic_foreign_policy-eng.pdf
Government of Canada	2011	Achievements under Canada's northern strategy, 2007-2011	http://publications.gc.ca/collections/collection_2012/aadnc-aandc/R3-150-2011.pdf
Government of Canada	2015	Polar Continental Shelf Program	https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/files/pdf/polar/PCSP-Brochure_eng.pdf
Government of Canada	2016	Arctic operations manual	https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/files/pdf/polar/pcsp_manual_eng.pdf
Government of Canada	2017	Building a strong Arctic together: Arctic Policy Framework discussion guide	https://www.rcaanc-cirnac.gc.ca/eng/1503687877293/1537887905065
Government of Canada	2018	Chapter 9: Research involving the First Nations, Inuit and Métis peoples of Canada	https://ethics.gc.ca/eng/tcps2-eptc2_2018_chapter9-chapitre9.html

Government of Canada	2018	Model policy on scientific integrity	https://www.ic.gc.ca/eic/site/063.nsf/eng/h_97643.html
Government of Canada	2019	Canada's Arctic and northern policy framework	https://www.rcaanc-cirnac.gc.ca/eng/1560523306861/1560523330587
Government of Nunavut	2011	Consolidation of Scientists Act	https://www.gov.nu.ca/sites/default/files/scientists_act.pdf
Government of the Northwest Territories	2004	Traditional Knowledge policy: Implementation framework	https://www.enr.gov.nt.ca/sites/enr/files/gnwt_traditional_knowledge_implementation_framework_-_2009.pdf
Government of the Northwest Territories	2004	Working together towards relevant environmental monitoring and research in the NWT	http://sdw.enr.gov.nt.ca/nwtdp_upload/Working_Together_FINAL_LR.pdf
Government of the Northwest Territories	2008	Summary of best practices for applying Traditional Knowledge in Government of the Northwest Territories programming and services	https://www.enr.gov.nt.ca/sites/enr/files/reports/tk_best_practices_summary.pdf
Government of the Northwest Territories	2009	Building a path for northern science: Government of the Northwest Territories' science agenda	https://www.ntassembly.ca/sites/assembly/files/09-11-03td40-164.pdf
Government of the Northwest Territories	2017	Knowledge agenda: Northern research for northern priorities	http://www.assembly.gov.nt.ca/sites/default/files/td_406-182.pdf
Government of the Northwest Territories	2019	Knowledge agenda: Action plan 2019-2024	https://www.enr.gov.nt.ca/sites/enr/files/resources/gnwt_knowledge_agenda_wr.pdf
Government of the Northwest Territories	n.d.	GNWT health and social services research agenda	https://www.hss.gov.nt.ca/sites/hss/files/resources/gnwt-health-and-social-services-research-agenda.pdf
GY, GNWT, GN	2005	Developing a new framework for sovereignty and security in the North	http://library.assembly.gov.nt.ca/2005/EX/a190390.pdf
GY, GNWT, GN	2016	A pan-northern approach to science	https://emrlibrary.gov.yk.ca/eco/pan-northern-approach-to-science-2016.pdf
Government of Yukon	1986	Yukon science policy	NA
Government of Yukon	2002	Scientists and Explorers Act	https://legislation.yukon.ca/acts/scex_c.pdf
Government of Yukon	2013	Guidebook on scientific research in the Yukon	http://www.tc.gov.yk.ca/publications/Guidebook_on_Scientific_Research_2013.pdf
Government of Yukon	2016	Science strategy	https://yukon.ca/sites/yukon.ca/files/eco/sciencestrategy_viewing_jan2016_online.pdf

Gwich'in Renewable Resource Board, Tait Communications and Consulting	2012	Research Priorities Workshop Report	http://grrb.nt.ca/pdf/Public registry/research/GRRB Research Prioirities final report 2012.pdf
Gwich'in Renewable Resources Board	2018	GRRB research and management priorities 2018-2023	http://grrb.nt.ca/pdf/Public registry/research/ResearchPriorities_2018_2023.pdf
Gwich'in Renewable Resources Board	2018	Research and management interests for the GSA	https://www.grrb.nt.ca/pdf/Public%20registry/research/Research%20Interests_2018.pdf
Gwich'in Renewable Resources Board	n.d.	Research	http://www.grrb.nt.ca/research.htm#communities
Gwich'in Tribal Council	2004	Traditional Knowledge policy	http://gwichin.ca/sites/default/files/gtc_final_tk_policy_2004.pdf
Gwich'in Tribal Council	2011	Conducting traditional knowledge research in the gwich'in settlement area: A guide for researchers	https://nwtresearch.com/sites/default/files/gwich-in-social-and-cultural-institute_0.pdf
Healey, G.K.	2007	Health research ethics workshop and community consultation	https://www.qhrc.ca/wp-content/uploads/2019/09/Summary_Notes_FINAL.pdf
Healey, G.K.	2008	Qaujigiartiit/Arctic Health Research Network - Nunavut: 2007-08 final report	https://www.qhrc.ca/wp-content/uploads/2019/09/Qaujigiartiit-Final-Report-2007-8-1_0.pdf
Healey, G.K., Butler Walker, J., Heron-Herbert, S.	2008	Health research ethics in Canada's northern territories	https://www.qhrc.ca/wp-content/uploads/2019/09/AHRN-Ethics-DEC-2008.pdf
IASSA	2020	IASSA principles and guidelines for conducting ethical research in the Arctic	https://iassa.org/about-iassa/research-principles
Ikaarvik	2018	ScIQ: Science and Inuit Qaujimajatuqangit - Research and meaningful engagement of northern Indigenous communities	https://ocean.org/wp-content/uploads/SciIq-Report-and-Recomendations-lores.pdf
Ile Royale Enterprises Ltd.	2016	The Canadian Network of Northern Research Operators Strategic Plan 2016-2021	http://cnnro.ca/wp-content/uploads/2016/11/CNNRO_STRAT_PLAN_2016-2021.pdf
Institute for Circumpolar Health Research	2015	ICHR strategic plan 2015-2020	http://ichr.ca/wp-content/uploads/2018/06/ICHR-Strategic-Plan-2015-2020.pdf

International Expert Panel on Science Priorities for the Canadian Arctic Research Initiative	2008	Vision for the Canadian Arctic research initiative: Assessing the opportunities	https://cca-reports.ca/wp-content/uploads/2018/10/2008-11-05-cari-report.pdf
Inuit Tapiriit Kanatami, Inuit Circumpolar Council Canada	2007	Building Inuit Nunaat: The Inuit action plan	https://www.itk.ca/wp-content/uploads/2016/07/Inuit-Action-Plan.pdf
Inuit Tapiriit Kanatami, Nunavut Research Institute.	2002	Negotiating research relationships: A guide for communities	https://www.itk.ca/wp-content/uploads/2016/07/Negotitiating-Research-Relationships-Community-Guide.pdf
Inuit Tapiriit Kanatami, Nunavut Research Institute	2007	Negotiating research relationships with Inuit communities: A guide for researchers	https://www.itk.ca/wp-content/uploads/2016/07/Negotitiating-Research-Relationships-Researchers-Guide_0.pdf
Inuit Tapiriit Kanatami	2008	An integrated Arctic strategy	https://www.itk.ca/wp-content/uploads/2016/07/Integrated-Arctic-Stratgey.pdf
Inuit Tapiriit Kanatami	2016	2016-2019 Strategy and action plan	https://www.itk.ca/wp-content/uploads/2016/03/English-2016-2019-Strategy-Plan.pdf
Inuit Tapiriit Kanatami	2016	Submission to the Naylor Panel for Canada's fundamental science review	https://www.itk.ca/wp-content/uploads/2017/03/ITK-Submission-to-the-Naylor-Panel-for-Canada’s-Fundamental-Science-Review.pdf
Inuit Tapiriit Kanatami	2018	National Inuit strategy on research: Implementation plan	https://www.itk.ca/national-inuit-strategy-on-research-implementation-plan/
Inuit Tapiriit Kanatami	2018	National Inuit strategy on research	https://www.itk.ca/wp-content/uploads/2020/10/ITK-National-Inuit-Strategy-on-Research.pdf
Inuit Tapiriit Kanatami	2018	Position paper: Development and implementation of the Arctic Policy Framework	https://www.itk.ca/wp-content/uploads/2018/11/2018-APFPolicyPositionPaper-FINAL.pdf
Inuit Tapiriit Kanatami	2019	Arctic and Northern Policy Framework: Inuit Nunangat	https://www.itk.ca/wp-content/uploads/2019/09/20190907-arctic-and-northern-policy-framework-inuit-nunangat-final-en.pdf

Inuvialuit Regional Corporation	2013	Guidelines for research in the Inuvialuit Settlement Region	https://nwtresearch.com/sites/default/files/inuvialuit-regional-corporation.pdf
Irlbacher-fox, S.	2018	Developing a sustainable knowledge economy in the Northwest Territories	https://nwtspor.ca/developing-sustainable-knowledge-economy-northwest-territories
Lichen Consulting	2018	Qaujigiartiit strategic plan 2018-2028	https://www.qhrc.ca/wp-content/uploads/2019/02/QHRC-Strategic-Plan-FINAL-OCT-2018.pdf
Métis Centre - National Aboriginal Health Organization	2007	Considerations and templates for ethical research practices	https://fnim.sehc.com/getmedia/209c3242-9e05-4ae3-877d-ff0912534ff7/Considerations_Templates_Ethical_Research_2007.pdf.aspx?ext=.pdf
Métis Centre - National Aboriginal Health Organization	2010	Principles of ethical Métis research	https://fnim.sehc.com/SEHCFnim/media/FNIM/resources/Métis Centre/2011_04_ethics.pdf?ext=.pdf
Métis Centre - National Aboriginal Health Organization	2010	What researchers need from Métis communities increasing Metis research	https://fnim.sehc.com/getmedia/ebbbb9b6-35bf-451e-9c48-48e7e62e454f/Metis-Research-Fact-Sheet.pdf.aspx?ext=.pdf
National Aboriginal Health Organization	n.d.	Interviewing Elders: Guidelines from the National Aboriginal Health Organization	https://fnim.sehc.com/getmedia/4d96230f-c8c8-4b6b-b2ba-73c755824e42/InterviewingElders-FINAL.pdf.aspx?ext=.pdf
Naylor, C.D., Birgeneau, R.J., Crago, M., Lazaridis, M., Malacrida, C., McDonald, A.B., Piper, M.C., Quirion, R., Wilson, A.	2017	Investing in Canada's future: Strengthening the foundations of Canadian research	http://publications.gc.ca/collections/collection_2017/isde-ised/Iu4-223-2017-eng.pdf
Northwest Territory Métis Nation	2016	Research in the South Slave of the NWT	https://nwtresearch.com/sites/default/files/northwest-territories-metis-nation.pdf
NSERC & SSHRC	2000	From crisis to opportunity: Rebuilding Canada's role in northern research	https://www.nserc-crsng.gc.ca/_doc/Northern-Nordique/crisis.pdf
NSERC, SSHRC, CIHR	2004	Dialogue on northern research: summary report	https://www.nserc-crsng.gc.ca/_doc/Reports-Rapports/northern_eng.pdf
Nunavut Research Institute	1997	Nunavut research agenda: Research policy and needs for Nunavut	https://www.nri.nu.ca/sites/default/files/public/files/researchagenda.pdf

Nunavut Research Institute	2010	Canadian Arctic Research Licensing Initiative (CARLI): Nunavut regulator consultation workshop	NA
Nunavut Research Institute	2018	Obtaining a research license under Nunavut's Scientists Act: A guide for applicants	https://www.nri.nu.ca/sites/default/files/public/files/Licence%20Application%20Guidelines_Feb2021.pdf
Nunavut Tunngavik Inc.	2013	Annual report on the state of Inuit culture and society	https://www.tunngavik.com/files/2014/02/2011-12-12-13-SICS-Annual_Report-Eng.pdf
Polar Knowledge Canada, Pitquhirnikkut Ilihautiniq/Kitikmeot Heritage Society	2016	A guidebook for research with Nunavut communities: Iqaluktuuttiaq (Cambridge Bay) edition	https://70ba67af-38ca-44d9-9ad3-1b20dd9086c5.filesusr.com/ugd/56a2ca_6de27f4ef7f34547ba4abde670d09c52.pdf
Polar Knowledge Canada	2017	Data management principles and guidelines for polar research and monitoring in Canada	https://www.canada.ca/en/polar-knowledge/publications/data-management-principles-and-guidelines-2017-may.html
Polar Knowledge Canada	2020	Science and technology framework 2020-2025	https://www.canada.ca/content/dam/polar-polaire/documents/pdf/science-technology-framework/science-technology-framework-2020-2025-EN.pdf
Polar Knowledge Canada	2020	Strategic plan	https://www.canada.ca/content/dam/polar-polaire/documents/pdf/strategic-plan/strategic-plan-EN.pdf
Purple Dog Consulting	2010	Canadian Arctic Research Licensing Initiative (CARLI): Researcher consultation	NA
Qaujigiartiit Health Research Centre	2019	Health research ethics checklist	https://www.qhrc.ca/wp-content/uploads/2019/09/Ethics-Review-Checklist-OCT-2019.pdf
Qaujigiartiit Health Research Centre	2019	Our research model	https://www.qhrc.ca/our-approach/our-research-model/
Sahtú Renewable Resources Board	n.d.	Research in the Sahtú Region	https://www.srrb.nt.ca/index.php?option=com_content&view=article&id=145&Itemid=649
Sambaa K'e Dene Band	2003	Policy regarding the gathering, use, and distribution of Yúndíit'óh (Traditional knowledge)	https://nwtresearch.com/sites/default/files/sambaa-k-e-dene-band.pdf
Science Council of Canada	1977	Northward looking: A strategy and a science policy for northern development	https://journalhosting.ucalgary.ca/index.php/arctic/article/view/65669/49583
Science Council of Canada	1991	Northern science for northern society: Building economic self-reliance	NA

Shirley, J.	2005	C-CIARN North - Nunavut community research needs survey: Summary report	https://www.nri.nu.ca/sites/default/files/public/files/c-ciarn_research_needs_survey.pdf
Simon, M.	2017	A new shared Arctic leadership model	https://www.rcaanc-cirnac.gc.ca/eng/1492708558500/1537886544718
Special Senate Committee on the Arctic	2019	Northern lights: A wake-up call for the future of Canada	https://sencanada.ca/content/sen/committee/421/ARCT/reports/ARCTFINALREPORT_E.pdf
Van Bibber, M., George, A.	2012	Doing good health research in northern Indigenous communities: A guide to research review	https://static1.squarespace.com/static/56afc7218259b53bd8383cb8/t/56be545240261d62779602f1/1455314018711/DoingGoodResearch2015_final.pdf
Wildlife Management Advisory Council (North Slope)	2008	Yukon North Slope research guide	https://wmacns.ca/resources/yukon-north-slope-research-guide/
Yukon Initiating Group	2017	Canadian Mountain Network Yukon Initiating Group discussion paper	NA
Yukon Native Brotherhood	1973	Together today for our children tomorrow: A statement of grievances and an approach to settlement by the Yukon Indian people	https://cyfn.ca/wp-content/uploads/2013/10/together_today_for_our_children_tomorrow.pdf
Yukon Research Centre	2012	Protocols and principles for conducting research with Yukon First Nations	https://achh.ca/wp-content/uploads/2018/07/Protocol_YukonFN.pdf files/YRC_FN_Initiatives_no_photos_inside_final_print_0.pdf

Appendix E: Policy analysis coding scheme

Parent code	Sub-codes
Research lifecycle codes	
Research process	
Research planning	Identify funding; Identify project priorities & goals; Preliminary engagement; Recruit project team
Research design	Choose methodology; Create timeline; Develop research question; Identify resource requirements; Literature-information search; Write proposal; Proposal review
Preparing for research	Acquire permits; Acquire research license; Ethical review process; Gain local context; Gain local permissions; Plan logistics
Conducting research	Analyze data; Collect data & information; Compliance requirements; Recording information; Storing data/ Validate results
Communicating research	Community reporting; Publications; Reporting; Sharing data; Writing results
Implementing research	Evaluation; informing policy-decision
Research concept codes	
Capacity building	Compliance capacity; Cultural competency; Funding stability; Governance capacity; Research capacity; Review capacity; Training
Communication and engagement	Authorship; Clear communication; Consultation-engagement; Language; Local hiring; Local knowledge; Methods of community engagement; Oral history; Plain language; Translation
Context	Academic standards; Advance northern scholarship; Colonial history of research; Community ignored; Cross-cultural context; Increase/decrease in research; Interdisciplinary; Knowledge network; New research paradigm; Research agenda
Definitions	Definition community; Definition data; Definition Indigenous knowledge; Definition north/Arctic
Ethical protocols	Informed consent; Local approval; Local protocol; Withdrawing from research
Indigenous knowledge	Documenting IK; Generational knowledge; Indigenous research methodologies; Indigenous worldviews; Integrating IK & science; Sacred knowledge; Traditions
Partnership	Accountability; Building relationships; Co-developing; Community needs; Northern participation; Research agreement; Research network; Researcher needs; Respect; Understanding
Place	Culture camp; Land claims; Mapping; Research burden; Traditional homelands-territories; Traditional place names;
Research role codes	
	Advisor-Mentor; Boundary organization; Client; Community; Coordinator; Elders; Funder; Guide; Legislator-Regulator; Local researcher; Participant; Partner organization; Principal investigator; Researcher; Reviewer; Student; Support staff-organization; Team member; Translator; User-Consumer; Videographer-photographer; Youth

Appendix F: Supplementary materials for chapter 5

Figure S5.1 Social science research licenses annually by territory, 2005-2019

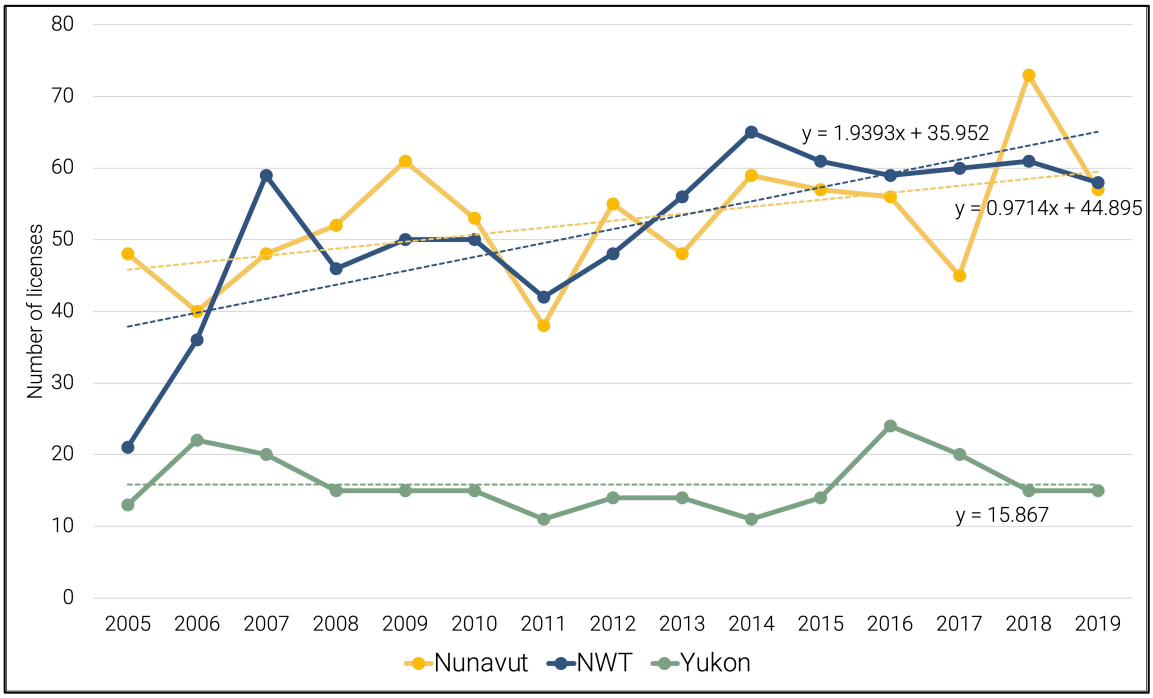


Figure S5.2. Physical science research licenses annually by territory, 2005-2019

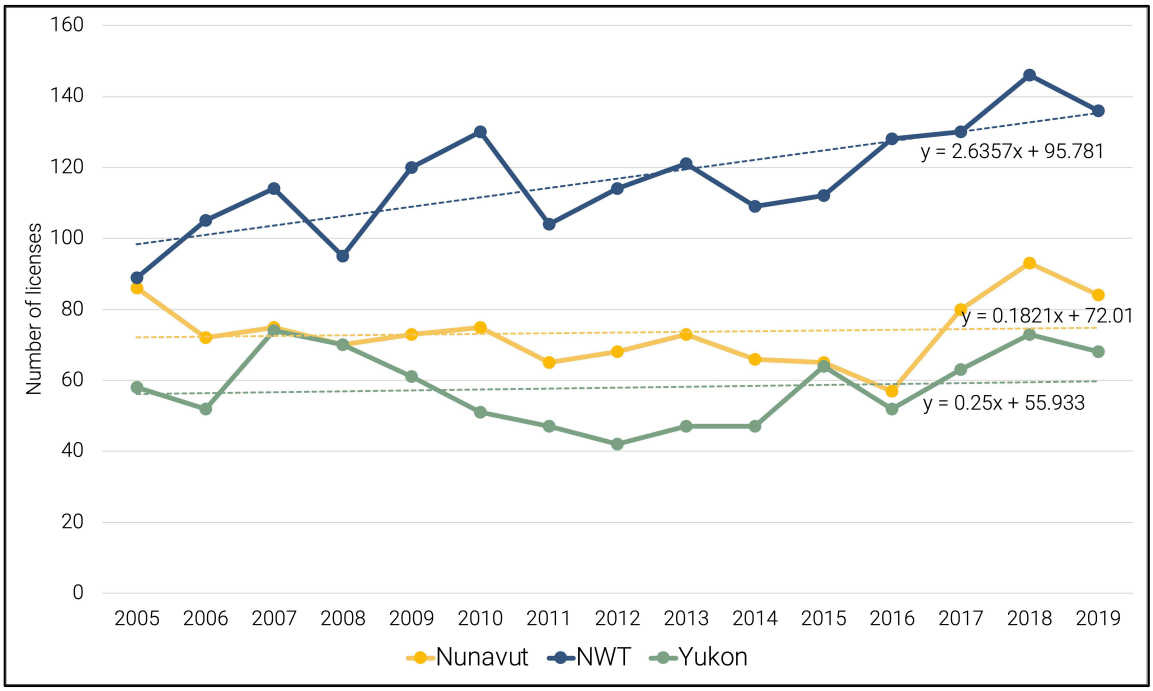


Figure S5.3. Health research licenses annually by territory, 2005-2019

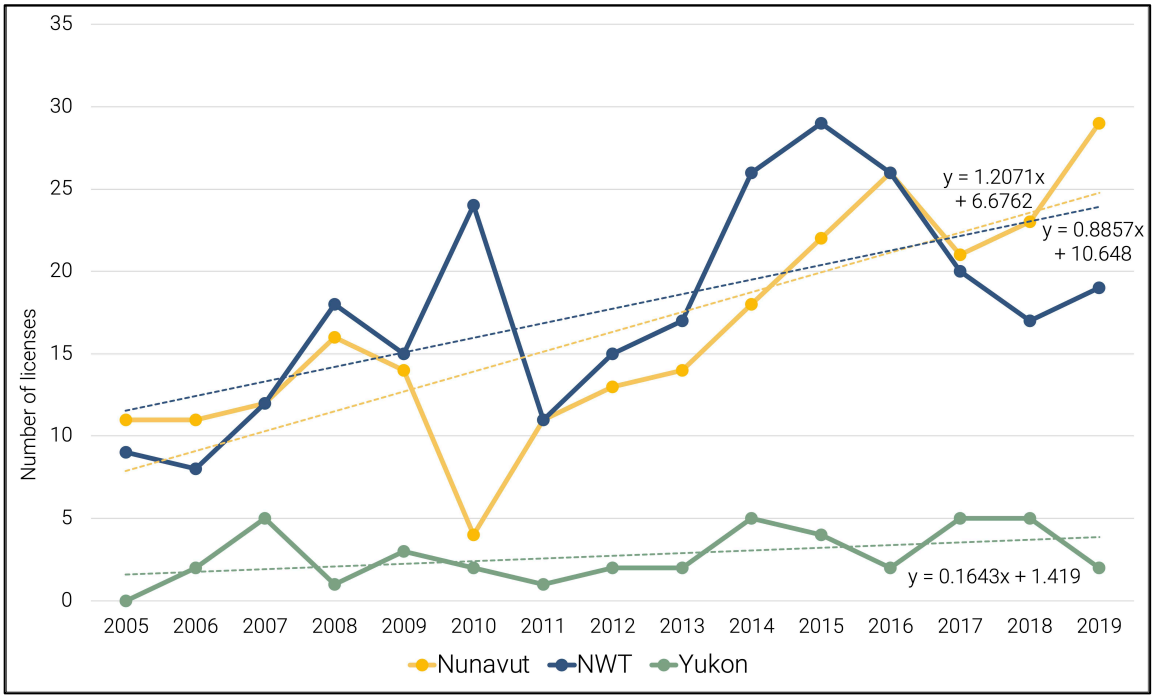


Figure S5.4. Proportion of research by affiliation type in Nunavut

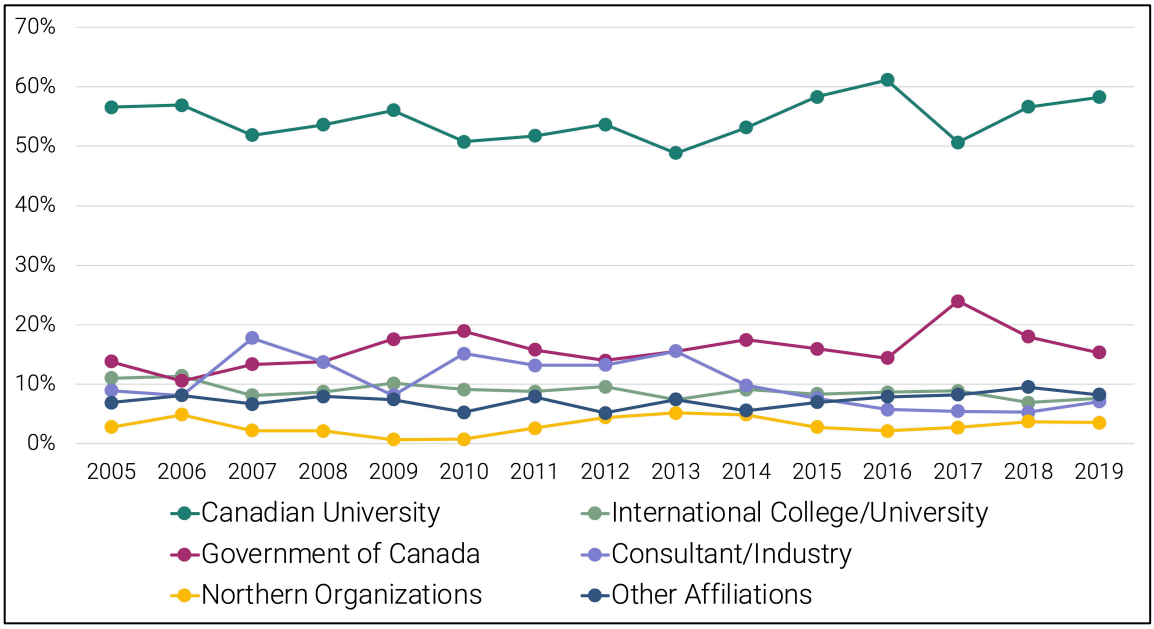


Figure S5.5. Proportion of research by affiliation type in NWT

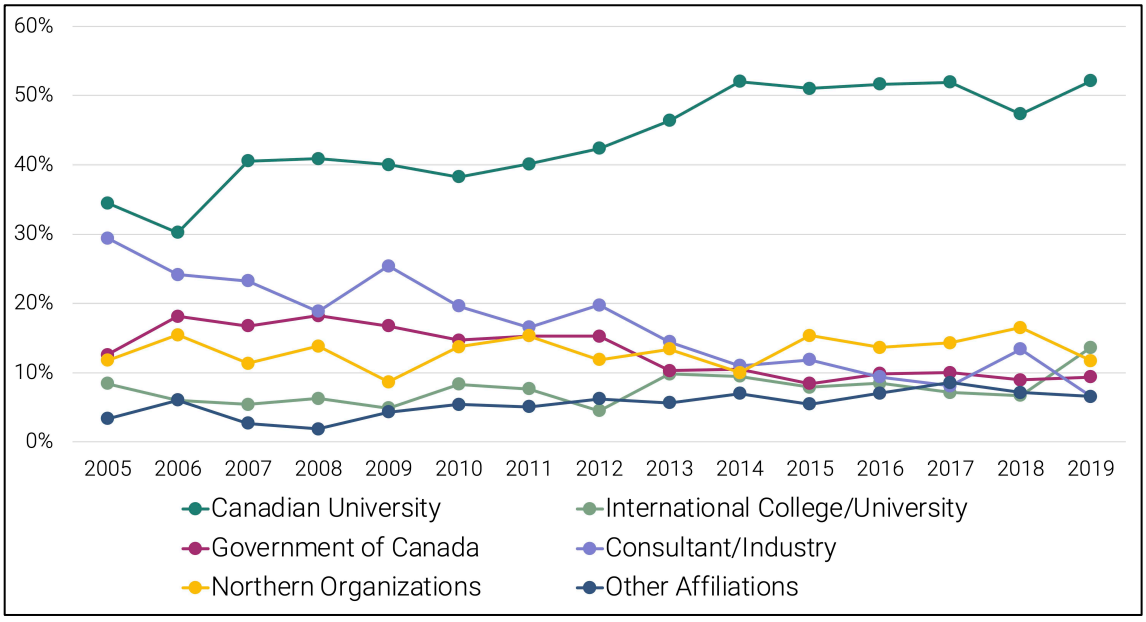


Figure S5.6. Proportion of research by affiliation type in the Yukon

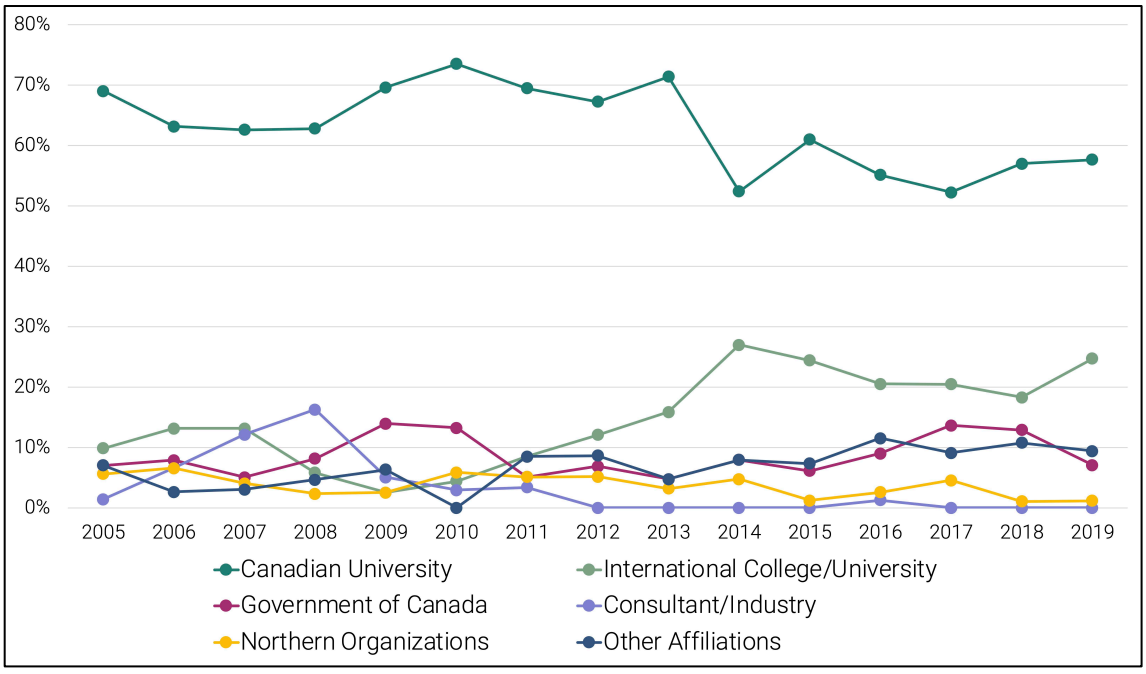


Figure S5.7. Pan-territorial research by affiliation and discipline

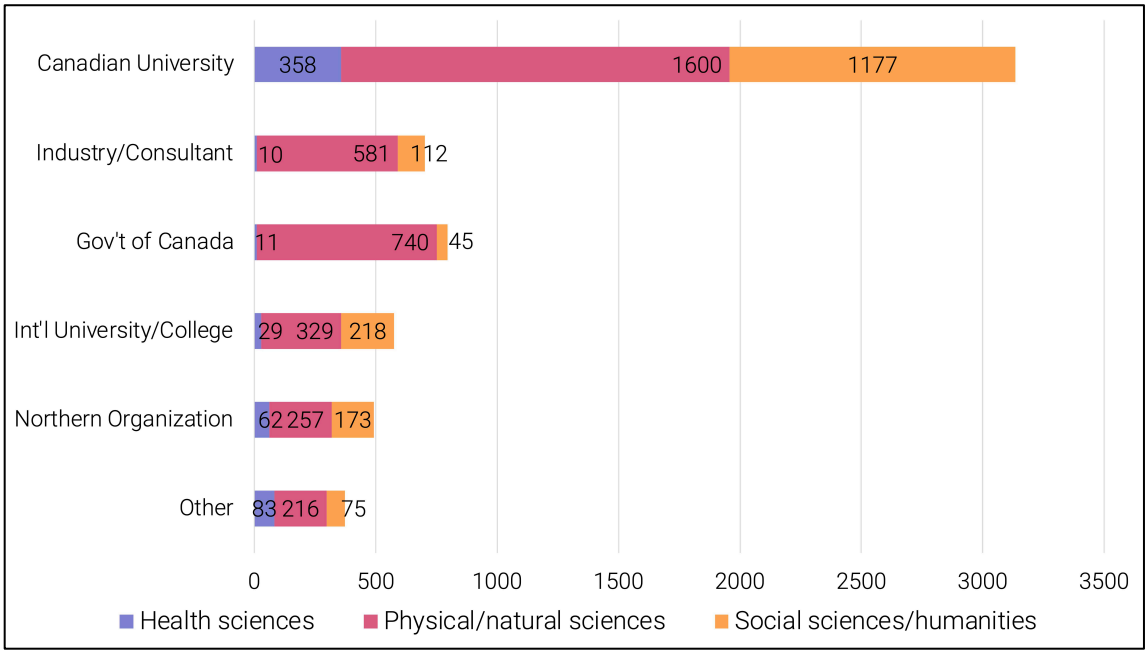
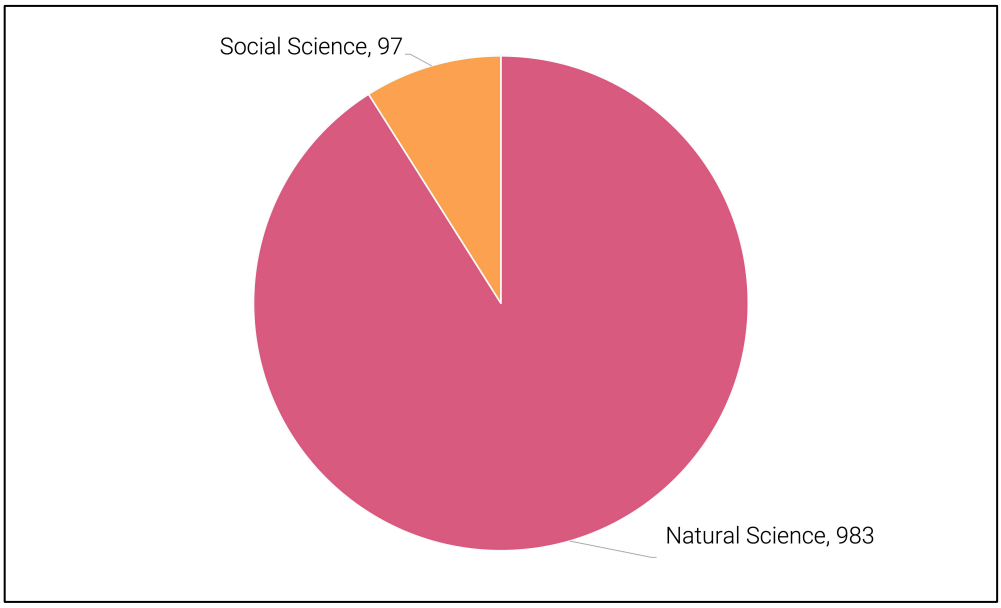


Figure S5.8. Government of Canada internal science spending in the three territories by discipline, fiscal year, 2004/05-2019/20



Note. Amounts are in millions, i.e., $97 million and $983 million

Appendix G: Interview guide

Background Information Questions

- Can you start by describing a bit about how you first got involved in research?
- Do you live in the North? Where do you live?
- When you hear the word "research", what comes to mind?
- How long have you been involved in northern research?
- *Have you been involved in research outside your home community?
- **Where has your research taken place in the North? In which communities/locations/regions?
- What types of research have you been involved in? (Follow-up: what subject areas and where?)
- Can you tell me about a research project that you really enjoyed working on and you were happy with the outcomes?
- Can you tell me about a project that didn't work so well?

Researcher Roles

- What roles have you played in research projects?
- What tasks have you mainly been responsible for?
- How have you participated in designing research projects?
- How have you participated in implementing or facilitating research projects?
- How have you participated in developing or communicating the final products?

Partnerships and Collaborations

- How do you decide what to focus your research on (or projects to be involved in)?
- **How do you decide to work in a particular location or community?
- Which organizations have you worked for?
- What kind of partnerships or collaborations have you been involved in?
- Which organizations have you partnered or collaborated with?
    a. How did those partnerships come to be?
    b. What kinds of partnership agreements have you engaged in?
- How do you decide to work with a particular researcher or research group?
- Who makes decisions around engaging in research projects in the organization/community/region where you conduct research (*in your organization/community/region)?
- Who makes decisions around research at the regulatory or policy level in the organization/community/region where you conduct research (*in your organization/community/region)?
- **(If you work in a community), what role do community members or local organizations play in your research?
    a. How do you go about seeking support or feedback on a project?

    b. Do you involve community members as local assistants or researchers (describe roles)?
    c. If so, how do they participate in:
        i. designing the research project?
        ii. the funding process (applying for, administering, and making decisions on funding allocations)?
        iii. conducting research?
        iv. compiling and analyzing the data and results?
        v. developing or communicating the final products?
- *(If you are a community researcher), how does your community find outside researchers to partner with?
    a. When is outside partnership needed or seen as beneficial?
    b. How do you get local support for the project or partner?
    c. Are there local organizations that are usually involved?
    d. If so, how do they participate in:
        i. designing the research project?
        ii. the funding process (applying for, administering, and making decisions on funding allocations)?
        iii. conducting research?
        iv. compiling and analyzing the data and results?
        v. developing or communicating the final products?
- What does collaboration in relation to research mean to you?
- What does partnership in relation to research mean to you?
- Tell me about a successful research partnership or collaboration?
- Tell me about a partnership or collaboration that hasn't worked so well?
- How have partnerships changed or improved?

Research Benefits

- What impact do you hope to have with your research (the research projects you are involved in)?
- Have you seen tangible results or outcomes from your research?
- How has the community/region benefited from your research?
- How have your research partners benefited from your research?
- What do you see as the broader benefits of your research?
- How do you communicate potential benefits in your research proposals and applications (e.g. funding proposals, license applications, etc.)?
    a. How do the actual benefits of projects compare?
- What does capacity-building in relation to research mean to you?
- Has local capacity-building been included in your research projects?
- *How have you or your community contributed to capacity-building for visiting researchers/students regarding cultural competency or the local environment?

- **Have you benefited from training or capacity-building efforts by the local community/local research partners in regard to cultural competency or the local environment?
- Tell me about a successful capacity-building exercise?
- Tell me about a capacity-building exercise that hasn't worked so well?

Knowledge Translation

- Who do you share your results with and in what format?
    a. Are there other types of products that you produce from your research?
    b. How are they produced and who is involved? (Follow-up: who makes decisions on this?)
    c. Are community researchers or northern partners involved as authors in your reports, publications, presentations, etc.? (Follow-up: how do you make decisions around who to involve in authorship?)
- How have the results of your research projects been shared with project partners and the community/region?
    a. Have you seen or heard of these having an impact in the community or region?
    b. Have you been in contact with decision-makers or people in government that could benefit from or use your research? If so, how did you identify these individuals, why did you feel they might benefit from your research, and how did you build relationships with decision-makers?
    c. How did you share your results with them? (Follow-up: what format or tools?)
- Have you experienced any challenges communicating results to different audiences?
    a. What do you feel have been effective approaches to sharing results with community members and northern partners and decision-makers?
    b. What does success mean to you in regard to communicating research? How do you work to achieve this?
- Have you worked with translators in conducting or communicating research? (Follow-up: what communities and languages?)
    a. Are the translators involved in developing or reviewing interview questions?
    b. How does translation impact the interview process or the quality of the research?
    c. How does it impact the kinds of questions that can be asked?
    d. Do you translate research results, presentations, or reports?
    e. How does translating results impact the community/region or the outcomes of the research project?

- How do you think research can impact local decisions?
    a. What needs to be changed to improve the impact of research for your community/partners/region?
    b. How do you evaluate the impact of research?

Research Guidelines and Regulations

- Are there are special considerations for doing research in the community/region where you work?
- Are there community-/region-specific research guidelines or ethical protocols that you apply to your research? (e.g. ITK/NRI's guide for researchers; YRC guide to doing research with Yukon First Nations, etc.)
- Do you usually enter into a research agreement with your research partners or the community you are working with?
- What do you think the role of a research agreement is? Are they effective?
- What has your experience been with research licensing in the region you work in?
- What do you think the role of research licensing is? Are they effective?
- Are you aware of any available research strategy, policy, or guiding documents for doing research in the community/region where you work? (e.g. pan-territorial approach to science, NISR, etc.)
    a. Have these influenced how you work, or what you focus on?

Research Programs and Funding

- What kind of research networks or funding programs have you been involved with?
    a. How have funding programs or strategic funding calls influenced your research focus or design?
    b. Have you been involved in large-scale research networks and/or programs? (e.g. ArcticNet, Resda, IPY, etc.)
    c. How have they influenced how you do research?
- Have you experienced challenges in getting funding for your research?
    a. Have there been certain aspects of your research that have been harder to fund? (Follow-up: preliminary meetings, communications, hiring community members, capacity-building, consultation, reporting visits?)
- Has there been funding available to support your research partners?
- Do you think that research funding has a role to play in improving how research can benefit northern communities/regions? (Explain)
- What percentage of your research funds (or projects you have worked with) would you estimate are going into the community/region where you work (i.e. hiring, meeting, staying, purchasing, paying honoraria, renting, etc.)?
- Have you been involved in reviewing research proposals?
    a. What are the key factors to successfully getting funded?
    b. How is northern participation in a project considered in these reviews?
    c. Has this process or who is involved changed over time?

Northern leadership

- What is the role of research in the North?
- What does research capacity mean in a northern context?
- What does northern leadership in research mean to you?
- What role did northern communities and regions play in leading northern research when you started doing research?
- How has northern leadership in research changed over time?
- What role would you like to see northern communities and regions play in research in the future?
- What would support greater leadership by the North?
- What subject areas or research approaches do you think are important in the community/region where you work? In the North generally?
- Are you aware of local or regional research priorities or needs? How are those identified and who is involved?

Future of northern research

- Do you have any recommendations for:
    a. changing northern research programs or processes?
    b. northern researchers to improve how they do research?
    c. northern communities in how they engage with researchers?
- Do you have any further comments or recommendations?

Appendix H: Interview analysis coding scheme

Topic	Main code	Sub-codes
Context codes	Definitions	Partnership; collaboration; research; capacity
	Negative impacts	Research burden; colonial history of research; environmental impact
	Changing context	Increase in research; new research paradigm
	Indigenous self-determination	Governance; leadership; land claims; community consent
Beginnings in research	Pathways to research	Student coming north; northern student; experiential ed; field assistant; interest in the north; mentor; luck/opportunity; calling from community
Research process	Identify topic	Curiosity; northern driven; northern priority; local issue; global issue
	Conducting research/considerations	Collecting data; validation; consultation; Timing; flexibility; local context; planning; logistics
Partnerships and collaborations	Types of partnerships	Academic; community-researcher; community-community; researcher-government; institution-institution; successful partnerships; failed partnership
	Partnership enablers	shared interest; shared responsibility; good relationship; consistent engagement; funding support
	Partnership barriers	Change in priority; change in capacity; turnover; funding challenges; timelines
	Research agreements	Formal agreement; information agreement; no agreement; contract; data sharing agreement; issues with agreement
Research benefits	Research impact	Desired impact; evaluating outcomes; community benefits; regional benefits; societal benefits; researcher benefits
	Capacity and growth	Community capacity growth; researcher capacity growth; graduate student mentorship; community youth mentorship; training; school engagement
	Communicating benefits	Funding call expectations; community expectations

Knowledge translation	Sharing results	Academic products; community engagement; public communication; policy communication; authorship; social media
	Informing policy-decisions	Local/regional policy impact; national/global policy impact
	Scientific impact	Academic HQP; northern scholarship
	Translation/interpretation	Roles of translators/interpretors; impacts of translation
Research guidelines and regulations	Regional licensing/approval	Role of licensing; licensing effectiveness; review challenges
	Local considerations	Local research protocols; research guidelines
	Ethical protocols	Ethics effective; ethics challenges
Research programs and funding	Funding programs	Funding barrier; funding enabler; lack of funding; funding for northern partners; unstable funding
	Institutional capacity	Policy barrier; supportive policies
	Research networks	Network influences; network challenges
	Reviewing proposals	Factors for success; changes in review; importance of northern participation
Northern leadership	Northern leadership	Community leadership; academic leadership; research champions; changing leadership; self-determination
	Research capacity	Local knowledge/expertise; organizational capacity; northern collaboration
	Capacity issues	Lack of internet; need infrastructure; lack of personnel
	Data	Data ownership; research archive
Role of research	Types of research	Applied research; basic research; co-production
	Research opportunities	Resource development; climate change; Covid-19 barrier; Covid-19 opportunity
	Indigenous knowledge	
	Future of northern research	Recommendations; important topics; important approaches

Appendix I: Limiting factors identified by interview participants in relation to research

Description	Participants	Participant examples
Administrative processes		
Research agreements not culturally appropriate	N03; N09, S03	University required a research agreement that protects the university's intellectual property and did not reflect the relationship between the partners.
Financial rules do not align with northern values/culture	N01; N03	Requiring SIN numbers and personal information from Elders receiving gift cards for participating in research.
Inflexible administrative processes	S02, S13, S15, S16, S28	Unable to access cash to pay expenses in northern community and challenges covering unexpected expenses when traveling to northern communities.
Contextual limitations (scope of research)		
Topic not relevant to community	S20	Researcher tried to hire local research assistants but no one was interested in the job..
Field site far from community	S21, S24, S29	Challenging to spend time and money in the community when doing extensive fieldwork without easy access; resulted in limited engagement with local community.
Regional or broad geographical scope of research (i.e., not community-based)	S20	Challenging to get local buy in for a research project focused on a territorial program.
Data or results not relevant	S20	Research was designed without partner input and the results were not useful for the partner because an important area was not included.
Funding		
Northern organization ineligible for grants	N02; N04; N06; N18	Researchers at northern organizations not eligible for Tri-council grants and using partnerships or adjunct status to access funding.
Northern organization ineligible for administrative overhead	N04; N06, N18	Tri-council grants do not include overhead so when funding is transferred from the university to the northern partner there is no administrative funding support
Lack of funding to engage before a project or report back afterwards.	S08; S12	In the past NSTP would not support travel to report back findings
Increasing cost of research in the North without associated increases in grant funding	N09; S13, S23	NSERC's Northern Supplement has not grown significantly along with increasing costs
Increase in targeted funding calls with limited topical or geographical scope	N06, N13	POLAR's early funding calls were limited to specific areas on a map and/or targeted to specific topics
Unable to fund certain positions	N09; S15; S26	Tri-council funds cannot always support northern researchers depending on how they're categorized – for example could not pay for Indigenous Guardian to help

Inflexible funding rules	N03; N09; N14; S15; S26	Cannot pay for specific expenses like honoraria. .
Complicated reporting processes	N14	Reporting to federal government departments on research funds ranged from overly complicated and time-consuming (POLAR & NRCan) to relatively easy (CIRNAC).
Timing of funding calls	S12	Calls for funding programs at inconvenient times (NCP & POLAR over Christmas when Indigenous organizations are closed) or too short to develop proposals with community partners.
Delayed funding announcements or cashflow	N21	Not being able to hire someone because funding was not received in time for field work.
Governance & leadership		
Changing organizational priorities	N04; N06; N21; S15; S20	Leadership change at a community organization led them to withdraw from a research project.
Lack of leadership or champion at community scale	N04; N06; N13; S20	Challenges working in a community without a local champion (organization or individual) resulted in moving the project to another community.
Disinterest in research	N04; N06; N13, S30	Community had a bad experience with a researcher and local leadership was no longer interested in partnering on research.
Individual skill & knowledge		
Lack of knowledge about socio-cultural/historical context	N06; N13, N18	Researchers were not following local customs; extra training was required to understand local context.
Lack of knowledge about community research protocols	S28	Researcher was unfamiliar with paying honoraria for local participation which led to an uncomfortable situation negotiating honoraria after an event.
Lack of research experience/skills	N04; N06; S20	Students were sent to community without supervisor and had no experience with community engagement; local researcher had to mentor them.
Mismatch between priorities & skills	N04	Partner is interested in research topic that does not match with researcher's skill set
Translation or interpretation not available locally	N02	Lack of trained or experienced interpreters/translators made it challenging to do a regional scale research project.
Infrastructure		
Lack of physical infrastructure in community	N06; S22	No office or private space available to conduct interviews.
Unreliable internet	N18; S22	Community members unable to participate in online training or workshops.
Institutional capacity		
Lack of safety protocols	N04	Female student working alone was harassed by a community member and felt unprepared to deal with the situation.

Northern partners lacking capacity to engage in research	N03; N06	Community organization lacking the administrative staff or time to manage and report on research funding.
Staff turnover	N06	Turnover in team member role led to months without good communication between team and northern partner.
Institutional Policies		
Multiple layers of approval and permitting which are sometimes conflicting	N03; N06; N21	Indigenous partner hesitant to ask for approval from territorial government to do research with their own community. Also issue with requiring approval from another Indigenous government because of overlapping traditional territories.
Slow approval process or lack of formal approval process	N06; N21; S02; S03; S08	Team missed applying for funding because it took too long navigating approval processes at northern Indigenous government (there was no clear process).
Lack of strategic priorities	N06	Organization agreed to a community-engaged research project when the topic was not a priority or of interest to the community which resulted in an unsuccessful project.
Relationship factors		
Lack of transparency	N06; S20	Not sharing how data or results will be published.
Not spending the necessary time to build a relationship	N06; N13; N16	Northern partner received a request for a letter of support with very little interaction beforehand and no time to build a relationship.
Prioritizing one partner's goals over the other(s)	N06; N13; S03; S20	Northern partner changed the focus of research making it challenging for the academic partner to meet their goals
Poor communication	N02	Using academic language and peer-reviewed articles to communicate with non-academic audiences.
Lack of accountability	N06; N13;	Partner organization not contributing the in-kind time they promised to a project.
Not having access to a network or colleagues	N03; N06; S20	Northern research felt isolated without access to researchers working on similar topics and worried it limited their access to funding.

Appendix J: YG Evidence Summary Tool

Purpose: This form is used to document the results of evidence analyzed for the purpose of developing, adapting or modifying policy. The purpose is to provide a consistent approach to communicating evidence to support decision-making in Government of Yukon. This form can guide the evidence search and analysis process and can be filled out at various stages in the process.

1. Title of policy initiative

2. Description of focus or research question: *describe issue and/or research question. Resources on how to formulate a research question are available here.*

3. Search methodology: *itemize/describe where you searched for evidence*

4. Sources consulted: *select most relevant types (based on relevance and robustness) and add additional information in the Appendix; quality refers to how relevant the source is and how robust or rigorous the evidence is; resources on how to find evidence can be found here.*

Name	Source type	Evidence type	Quality (relevance/robustness)
	Select…	Select…	Select…
	Select…	Select…	Select…
	Select…	Select…	Select…
	Select…	Select…	Select…
	Select…	Select…	Select…
	Select…	Select…	Select…

Comments:

5. Jurisdictional summary:
List the Canadian and international jurisdictions for which you found relevant information, a brief description of their approach, and an analysis of lessons learned (bullet points, plain language).

6. Evidence summary:
Provide overall summary of key findings from interpreting the evidence (bullet points; plain-language)

7. Knowledge gaps: *list any future research questions or evaluation needs*
Are there any important issues or questions that are not addressed in the available evidence?

8. Identify any constraints in the evidence and/or potential biases in selecting, synthesizing, and interpreting the evidence:
Is the evidence limited to a certain type or source? Are there differing interpretations of information in the evidence? Are there uncertainties in the results? Are there conflicts of interest with the sources of information?

9. What are your overall conclusions and to what extent does the research evidence support the recommended policy option(s)? *Discuss the outcomes of the evidence search, any overall constraints to your approach (e.g. time), and your general conclusions.*

Individual Evidence Summary Tool

Source & Date	Evidence Type	Study findings related to the policy issue	Study limitations*	Evidence quality**

* Limitations: drawbacks to the evidence (e.g. not relevant to the population of interest; important point is missed; limitations listed in study; uncertainty)

** Quality: Are arguments logical and coherent? Are there enough data to support conclusions? Are the methods and techniques used for analysis reliable? Is the source reputable? Is the information peer-reviewed?