On the role of research capacity in implementing Impact Assessment in Yukon Territory, Canada

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ACUNS	Association of Canadian Universities for Northern Studies
AO	Assessment Officers
CEAA	Canadian Environmental Assessment Act
CREATE EI	Collaborative Research and Training Experience Program (CREATE) Environmental Innovations (EI)
DO	District Office
EIA	Environmental Impact Assessment
EMR	Energy, Mines and Resources (a department of Yukon Government)
FNG	First Nations Government
GoC	Government of Canada
IA	Impact Assessment
IAA	Impact Assessment Act (Canada)
IAIA	International Association for Impact Assessment
INAC	Indian and Northern Affairs Canada
NSERC	Natural Science and Engineering Research Council of Canada
NSTP	Northern Scientific Training Program
MDO	Manager of District Office
MPY	Major Projects Yukon
PNA	Policy Network Approach
RRC	Renewable Resource Council
RPNM	Rapid Policy Network Mapping
TH	Tr'ondëk Hwëch'in
TK	Traditional Knowledge
UFA	Umbrella Final Agreement
YESAA	Yukon Environmental and Socio-economic Assessment Act
YESAB	Yukon Environmental and Socio-economic Assessment Board
YG	Yukon Government

Abstract

Environmental governance, including impact assessment (IA), involves complex interactions among diverse societal actors in the ongoing (re-)negotiation of social and political agendas. It therefore becomes an ideal space to re-envision the interaction between knowledge systems and worldviews (ontological pluralism) to support societal goals, such as sustainable development. An often acknowledged but rarely explored concept in these efforts is capacity – the ability of a system to adapt and perform through the evolution of attributes, capabilities and relationships – and the implications for process outcomes. In northern Canada, the term 'capacity' has been used to describe a major constraint to regional social and economic development, with little consensus on definitions or appropriate actions despite being named consistently as priority for public policy. With high potential for resource development and a small resident population where ontological pluralism is a critical objective, northern Canada offers a context where available capacity is limited and unevenly distributed amongst a diverse set of actors from multiple jurisdictions with a legislated space to participate in IA. This dissertation seeks to better characterize the role of northern research capacity, defined as the ability of an actor, organization or network to engage, produce, maintain and use knowledge through individual and collective development, in the implementation of IA and draw lessons that can inform application.

It begins with an interdisciplinary literature review on capacity, identifying four main types that are widely discussed in the environmental governance and capacity-related literature. Definitions of the term *research capacity* are described and the relevance of the concept to northern Canada identified. Building on this review, I present an embedded case study of IA in the Yukon Territory to explore the various roles of research capacity in a well-established northern IA process, where Indigenous and public participation are recognized as being vital. To do this, I first employ a policy network approach to examine the formal and informal connections among IA policy actors and identify sources and flows of knowledge. Results indicate that while research capacity is critical to well-functioning IA processes in northern Canada, the ability of the IA policy network to source, disseminate and engage new knowledge is limited. Important boundary spanning 'choke points' can act as both facilitators and barriers, based on the capacity of the knowledge brokers that occupy these spaces. Building on this analysis, key principles are drawn from existing capacity evaluation frameworks to identify the dimensions considered essential to

IA legitimacy and effectiveness at individual and organizational levels. These dimensions are then used to analyze the research capacity issues affecting Yukon's main IA body, the Yukon Environmental and Socio-Economic Assessment Board. Opportunities to better support the assessment body and individual assessors as they seek to balance technical and values-driven knowledge in IA processes are identified. Then, focusing on Yukon First Nations Governments, I further explore how research capacity affects the participation of First Nations in IA. Results suggest that Yukon First Nations have adapted their participation strategies towards the assertion of land rights and title and the implementation of land claims to offset the capacity limitations of other policy actors. Ultimately, the Yukon IA process can act as both a learning space for knowledge exchange and as a political tool, depending on the available research capacity of policy actors.

This dissertation offers empirical insights in support of re-envisioning IA as a primarily knowledge-based activity and a space to actively embrace the principles of pluralism. Supporting sustainable development through networked governance mechanisms, such as IA, has implications for policy in northern Canada and beyond. Addressing concerns related to public and Indigenous participation, as well as concerns of process legitimacy and effectiveness, in IA will require stepping outside of more familiar 'deficit model' interpretations of capacity building towards reflexive, inclusive and adaptable processes. By offering insights of relevance to larger conversations around the need for inclusion and the consideration of pluralism in environmental governance, this work contributes to an expanding conversation about interacting knowledge systems and worldviews in environmental governance mechanisms.

Résumé

La gouvernance environnementale, y compris l'évaluation d'impact (EI), implique des interactions complexes entre divers acteurs sociétaux dans la (re)négociation des agendas sociaux et politiques. Elle devient donc un espace idéal pour repenser l'interaction entre les systèmes de connaissance et les visions du monde (pluralisme ontologique) afin de soutenir les objectifs sociétaux, tels que le développement durable. Un concept souvent reconnu, mais rarement exploré dans ces efforts est la capacité – la capacité d'un système à s'adapter et à fonctionner grâce à l'évolution de ses attributs, capacités et relations – et les répercussions sur les résultats du processus. Dans le Nord du Canada, la capacité est depuis longtemps considérée comme une priorité de la politique publique et reconnue comme un obstacle majeur au développement social et économique régional. Avec un fort potentiel de développement des ressources et une petite population résidente où le pluralisme ontologique est un objectif critique, le Nord du Canada offre un contexte où la capacité disponible est limitée et inégalement répartie entre un ensemble diversifié d'acteurs de plusieurs administrations ayant un espace législatif pour participer à l'EI. Cette thèse vise à mieux caractériser le rôle de la capacité de recherche dans le Nord, définie comme la capacité d'un acteur, d'une organisation ou d'un réseau à mobiliser, produire, maintenir et utiliser les connaissances par le développement individuel et collectif dans la mise en œuvre de l'EI et tirer des leçons qui peuvent éclairer son application.

La thèse commence par une revue interdisciplinaire de la littérature sur la capacité, en identifiant quatre types principaux qui sont largement discutés dans la gouvernance environnementale et la littérature liée à la capacité. Les définitions du terme *capacité de recherche* sont décrites et la pertinence du concept pour le Nord du Canada est déterminée. En m'appuyant sur cet examen, je présente une étude de cas intégrée sur l'analyse d'impact au Territoire du Yukon pour explorer les divers rôles de la capacité de recherche dans un processus d'évaluation d'impact bien établi dans le Nord, où la participation des Autochtones et du public est reconnue comme essentielle. Pour ce faire, j'utilise d'abord une approche des réseaux de politiques pour examiner les liens formels et informels entre les acteurs des politiques d'EI et identifier les sources et les flux de connaissances. Les résultats indiquent que, bien que la capacité de recherche soit essentielle au bon fonctionnement des processus d'EI dans le Nord du Canada, la capacité des réseaux de politiques d'EI de trouver, diffuser et mobiliser de nouvelles connaissances est limitée. Les

« goulots d'étranglement » importants peuvent agir à la fois comme des facilitateurs et des obstacles, en fonction de la capacité des courtiers du savoir qui occupent ces espaces. En s'appuyant sur cette analyse, des principes clés sont tirés des cadres d'évaluation des capacités existantes pour déterminer les dimensions considérées comme essentielles à la légitimité et à l'efficacité de l'EI aux niveaux individuel et organisationnel. Ces dimensions sont ensuite utilisées pour analyser les problèmes de capacité de recherche qui touchent le principal organisme d'évaluation environnementale du Yukon, le Office d'Évaluation Environnementale et Socioéconomique du Yukon. Les opportunités de mieux soutenir l'organisme d'évaluation et les évaluateurs individuels dans leur recherche d'un équilibre entre les connaissances techniques et les valeurs dans les processus d'EI sont identifiées. Ensuite, en mettant l'accent sur les Gouvernements des Premières Nations du Yukon, j'explore davantage la façon dont la capacité de recherche influence la participation des Premières Nations à l'EI. Les résultats suggèrent que les Premières Nations du Yukon ont adapté leurs stratégies de participation à l'affirmation des droits et des titres fonciers et à la mise en œuvre des revendications territoriales afin de compenser les limites de capacité des autres acteurs de la politique. En fin de compte, le processus d'évaluation d'impact du Yukon peut servir à la fois d'espace d'apprentissage pour l'échange de connaissances et d'outil politique, selon la capacité de recherche disponible des acteurs des politiques.

Cette dissertation offre des perspectives empiriques pour repenser l'EI en tant qu'activité principalement fondée sur le savoir et un espace pour inclure activement les principes du pluralisme. Le soutien au développement durable au moyen de mécanismes de gouvernance en réseau, comme l'EI, a des répercussions sur les politiques dans le Nord du Canada et ailleurs. Pour répondre aux préoccupations liées à la participation du public et des Autochtones, ainsi qu'aux préoccupations relatives à la légitimité et à l'efficacité du processus, requerra des interprétations plus familières du « modèle déficitaire » du renforcement des capacités pour adopter une approche réflexive et des processus inclusifs et adaptables. En offrant des perspectives pertinentes à des conversations plus vastes sur la nécessité de l'inclusion et de la prise en compte du pluralisme dans la gouvernance environnementale, ce travail contribue à élargir la conversation sur l'interaction des systèmes de connaissances et des visions du monde dans les mécanismes de gouvernance environnementale.

Acknowledgements

"I'm not afraid of death. I'm not afraid of anything except the collapse of the imagination."
– Patti Smith

This work is dedicated to the memory of my uncle, Barry Kidd, who could build community like no other. His voice in my head reinforces my persistence and reminds me that smarts is not dependent on education. Use your smarts first.

Research, by its very nature, is a community building activity and the work presented here is no exception. I was asked in my comprehensive exam to describe my different communities; this question has followed me through the rest of my PhD as my membership in different communities waxed and waned. Make no mistake, my communities and their support are the only reason I am here now.

Contributions to knowledge

This research offers empirical and theoretical insights about the role of capacity in enhancing environmental governance towards sustainable development, with a focus on research capacity and impact assessment (IA) in northern Canada. Re-envisioning IA as a knowledge-based governance mechanism contributes to broader efforts to re-orient discussions of IA legitimacy and effectiveness towards addressing capacity constraints and embracing pluralism. The thesis is presented in manuscript format, so there is some unavoidable repetition between chapters.

Chapter 2

- Identifies multiple understandings of 'capacity' that have led to mixed interpretations and confusion across environmental governance and related fields.
- Identifies and characterizes theoretical relationships and interactions among five types of capacity commonly described by scholars in environmental governance- and capacity-related literature.
- Develops a refined interpretation of the term 'research capacity' for the context of northern Canada.

Chapter 3

- Applies policy network and knowledge network thinking in concert to assess constraints on movement towards pluralism in IA mechanisms.
- Identifies and differentiates perceived barriers and facilitators for promoting active pluralism in the Yukon IA network context with implications for policy.
- Identifies second order capacity needs within an IA policy network that has stable legislation, particularly with regards to the input of new knowledge into the network.

Chapter 4

- Identifies dimensions of research capacity, and relationships to other supporting capacities, specific to IA.
- Offers a refined framework for examining capacity in impact assessment bodies that better addresses the tie between individual and organizational-level factors affecting overall process effectiveness.

- Tests this framework in the context of IA in Yukon Territory, with results that underline the importance of IA-specific elements of capacity.

Chapter 5

- Contributes to a re-envisioning of IA as a knowledge-based activity and a space for social learning in the midst of land claims and modern-day treaties.
- Characterizes participation in the Yukon IA process as a means of enforcing modern day treaties by First Nations.
- Identifies opportunities to build capacity within the Yukon IA network to shift towards a space for knowledge coordination and exchange.

Author contributions

This thesis follows a manuscript-based format comprised of four manuscripts of which I am the primary author. Primary academic supervision and writing support was provided by Prof. Gordon M. Hickey (McGill University). Substantial academic, methodological, and theoretical support and intellectual input was provided by Prof. Blane Harvey (McGill University). Additional guidance and funding support was provided by Prof. Murray Humphries (McGill University) and Dr. Aynslie Ogden (Yukon Government). For each of the following manuscript-based chapters, the CReDiT author contribution statements are outlined below.

For Chapter 2, published in Arctic Yearbook (2018):

Samantha Darling: Conceptualization; Validation; Data Curation; Formal analysis; Investigation; Methodology; Project administration; Writing – Original Draft; Funding Acquisition.

Aynslie Ogden: Conceptualization; Writing – Review and Editing; Funding Acquisition.

Gordon M. Hickey: Conceptualization; Methodology; Project Administration; Resources; Supervision; Writing – Review and Editing; Funding Acquisition.

For Chapters 3, 4, and 5:

Samantha Darling: Conceptualization; Methodology; Validation; Data Curation; Formal Analysis; Investigation; Methodology; Project administration; Writing – Original Draft; Funding Acquisition.

Blane Harvey: Conceptualization; Methodology; Writing – Review and Editing.

Gordon M. Hickey: Conceptualization; Methodology; Project Administration; Resources; Supervision; Writing – Review and Editing; Funding Acquisition

Chapter 1. General introduction

1.1 Background

Environmental governance[1] mechanisms, including impact assessment (IA), involve complex interactions among diverse societal actors within evolving multi-level and multi-jurisdictional institutional[2] structures (Bodin and Crona, 2009; Hickey et al., 2013; Nicol, 2015; Slocombe et al., 2005). These interactions occur through governance networks that rely on a suite of different capacities to facilitate interactions and bring in a variety of perspectives for consideration (Brondizio et al., 2009; Meuleman, 2015; Ostrom, 2011). The inherent need to balance the ability of different groups to provide their perspectives and the ability of governance mechanisms to fully consider those perspectives is tenuous and in continuous flux (Ellis, 2005; Howitt et al., 2013; Howitt and Suchet-Pearson, 2006). However, ambiguity around the concept of capacity introduces additional challenges for refining governance mechanisms to be more inclusive, regardless of whether the approach is community or process based (Brinkerhoff and Morgan, 2010; Condell and Begley, 2007; Simmons et al., 2011).

In Canada, environmental governance processes have been moving towards co-management and similar networked models, where inclusion and the empowerment of communities are central mandates (Larsen, 2018; van der Molen, 2018). The foundations for success in such collaborative endeavors require further research to inform and facilitate strategies for sustainable development[3] and move governance mechanisms towards pluralism (Ellis, 2005; Howitt et al., 2013; Nadasdy, 2003). As a primary boundary spanning process in environmental decision-making, IA is considered a site of overlap between knowledge production, sustainable development, and governance activities (Lonsdale et al., 2017; Maag et al., 2018; Meuleman, 2015; Partidario and Sheate, 2013; Sheate and Partidário, 2010). As a space for interaction, IA has

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[1] Governance refers to public action where private- and voluntary-sector organizations are also involved in decision-making alongside public organizations (Bevir, 2013).

[2] Institutions are the formal and informal norms that constrain how actors behave during interactions, which include organizational, procedural, cultural and religious norms (Cashmore, 2012).

[3] Sustainable development is commonly defined in the seminal Brundtland Report (1987) as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*."

been thoroughly examined from both legal and institutional perspectives, where shortcomings in capacity and inclusivity have been identified, but rarely explored. Some have approached IA as a space for learning (i.e. Sánchez and Mitchell, 2017; Webler et al., 1995) and knowledge brokerage (i.e. Maag et al., 2018; Sheate and Partidário, 2010), where similar barriers of capacity are discussed but only rudimentarily explored. As governance scholarship and policy practice moves towards co-management models and more actively considering Indigenous worldviews, research capacity – the ability of an actor, organization or network to engage, produce, maintain and use knowledge through individual and collective development – offers a potentially useful lens for identifying and addressing specific capacity concerns, as well as re-orienting governance mechanisms towards pluralism.

1.1.1   A growing typology for capacity

In spite of the large volume of literature devoted to its clarification, theoretical understandings of capacity continue to rely on vague conceptualizations (Analoui and Danquah, 2017; Brinkerhoff and Morgan, 2010; Fowler and Ubels, 2010; Gadsby, 2011; Louafi, 2016; Raik, 2002; Simmons et al., 2011; Suarez-Balcazar et al., 2008). A commonly cited definition of capacity is, "… the evolving combination of attributes, capabilities, and relationships that enables a system to exist, adapt and perform" (Brinkerhoff and Morgan, 2010, pg. 3). Capacity can and often should be simultaneously built at multiple scales (individual, organizational, network), which contributes to conceptual ambiguity. Capacity building then comes to rest in "…a nether world between individual training and national development" (Morgan, 2003, pg. 1). Individuals, organizations, or networks also rely on multiple types of nested and interrelated capacities, which introduces the potential for a mismatch between the type of capacity being built and the tools for evaluation (Fawcett and Daugbjerg, 2012; Marsh and Smith, 2000; Morgan, 2006). In their attempts to address specific societal needs, scholars from a wide variety of academic disciplines have contributed to an extensive and growing typology of capacities (Harrow, 2001).

In environmental governance literature, capacity has been discussed under the umbrellas of adaptive capacity, governance or community capacity, and policy or institutional capacity (Chapter 2, Table 2-2). Each of these capacities have been well-studied, with corresponding frameworks that outline contributing dimensions specific to the type of capacity in question. Unfortunately, some types of capacity have been overlooked in these discussions despite the important roles they are often known to play, which adds to the convoluted nature of capacity

building (Darling et al., 2018). Interrelated and mutually supporting capacities can share dependencies, limitations, and solutions, so exploring these interactions can contribute to addressing fundamental shortcomings. Research capacity is one such dimension, often playing a supporting role for other types of capacity, while also reliant on still others (Howlett and Ramesh, 2015; Lalor and Hickey, 2014; Painter and Pierre, 2005; Riddell, 2007). As a distinct concept, research capacity has become an important economic and social consideration for regional and local development (Andrews et al., 2011; Chan et al., 2005). Work on network governance has also identified research capacity as being central to governance processes (Emerson et al., 2012; Wright, 2014) and other essential types of capacity, such as community and policy capacities (Al-Roubaie, 2010; Howlett and Ramesh, 2015; Lalor and Hickey, 2014; Painter and Pierre, 2005; Riddell, 2007). Research capacity and its development, then, has implications for knowledge-based governance mechanisms and the pursuit of societal objectives of pluralism.

1.1.2   Research capacity as a development goal

As a distinct concept, research capacity remains underdeveloped and under-utilized in environmental governance scholarship broadly and IA literature in particular, with a few notable exceptions (Emerson and Baldwin, 2019; Gustafsson et al., 2020; Howitt et al., 2013; Howitt and Suchet-Pearson, 2006; Natcher and Davis, 2007; Natcher et al., 2005; Spagnuolo, 2011). Seen as a 'fragile development goal' (Trostle, 1992, pg. 1322), research capacity has come to include knowledge production, engagement, dissemination and use, with implications for network function and outcomes (Cooke, 2005; Gadsby, 2011; Howlett and Ramesh, 2015; Marsh and Smith, 2000; Marsh and Stoker, 2010; Nchinda, 2002). With origins in international development (Brinkerhoff and Morgan, 2010) and health policy (Cooke, 2005; Gadsby, 2011), existing understandings of research capacity have been applied, and then modified, in other academic disciplines.

For the sake of implementation and analyses, capacity has been understood as being a combination of resources and skills or capability and competence, respectively (Howlett and Ramesh, 2015; Wu et al., 2015). Capability is the availability of appropriate resources for a particular problem, while competence is the knowledge and understanding necessary to utilize these resources (Marsh and Smith, 2000). For research capacity, capability begins with conventional resources like financial capital and extends to human resources, infrastructure and access to knowledge (Araral et al., 2015; Howlett et al., 2017; Howlett and Ramesh, 2015).

Competence, on the other hand, manifests as components like training, mentorship, and organizational culture (Armstrong et al., 2013; Cooke, 2005; Maag et al., 2018). Past research has focused on academic contexts, such as post-secondary education programs and local academic systems, and aspects of finance and infrastructure (e.g. Bisaso and Hölttä, 2017; Volmink and Dare, 2005). International development agencies tend to focus more on capability, since these challenges are often easiest to overcome, often through technology transfer and financial support (Analoui and Danquah, 2017; Lansang and Dennis, 2004).

More broadly, research capacity has been identified as an essential component of region- and nation-building (i.e. Barrett et al., 2011; Mugabo et al., 2015; Velho, 2004), where the role of local competence has been pushed to the forefront (Bockstael and Watene, 2016). The common approach to advancing competence is knowledge system development, seen as a major limiting factor for economic, social, and political development, even in developed countries (Lansang and Dennis, 2004; Leitch, 2009; Rooney, 2005; Segrott et al., 2006). There are several examples of capacity development based on competence in post-secondary contexts, mainly through training programs operated by the global north in the global south (Nchinda, 2002; Segrott et al., 2006; Zink, 2016). Other work has embraced a wider interpretation of research capacity that includes facets of knowledge management and mobilization, such as the ability to apply knowledge to practice or the ability to bridge knowledge activities and decision-making spheres (Enemark, 2005; Gadsby, 2011; Kislov et al., 2014; Lauzon, 2013). To date, research capacity has received the most attention in disciplines that rely heavily on knowledge mobilization, such as social work, education and nursing (Jackson, 2008; Kislov et al., 2014; Orme and Powell, 2008; Rees et al., 2007), perhaps because of a strong connection between research and practice in these fields, where knowledge translation is fundamental to daily operations. Regional research agendas, the accessibility of knowledge, and the application of results in decision-making have become established characteristics of this broader interpretation (Gadsby, 2011; Lansang and Dennis, 2004; Trostle, 1992).

In this dissertation, I argue that research capacity offers a useful lens through which the knowledge aspects of governance mechanisms could be considered, along with the possible implications for inclusive processes (Fellesson and Mählck, 2017; Maag et al., 2018). Given current conversations around power, knowledge, and decolonization, research capacity becomes a central consideration for re-orienting governance mechanisms towards societal goals of pluralism

(van der Molen, 2018). With this in mind, I adopt an inclusive interpretation of research capacity – the ability of an actor, organization or network to engage, produce, maintain and use knowledge through individual and collective development – in the context of IA, where a foundational principle is the active inclusion of multiple worldviews and associated knowledge systems (ontological pluralism) to facilitate knowledge exchange.

1.1.3 The 'myth of incapacity'

A dangerous assumption that must be identified from the outset is what Webster (1997) calls the 'myth of incapacity' where the underlying expectation is that capacity is completely absent. A related concern arises over attempts "to determine from the outside what constitutes a 'capable' subject," (Edmunds and Juncos, 2020, pg. 3). Earlier understandings of capacity building interventions tended to be based on a 'deficit model' which assumes complete absence rather than acknowledging existing, if limited, capacity in a community or an individual (Barrett et al., 2011; Howitt and Suchet-Pearson, 2006; van der Molen, 2018). This model negated the multiple understandings of what 'capacity' could entail and raised questions around the imposition of a dominant system (or worldview) on previously existing structures, with the potential to re-enforce pre-existing inequalities (Al-Roubaie, 2010; Craig, 2007; Howitt et al., 2013; Howitt and Suchet-Pearson, 2006).

Governance mechanisms, however, often require particular capacities to be present in the social network to ensure meaningful participation and if essential actors have limited levels of those specific capacities, existing power imbalances are accentuated (Emerson, 2011; Wright, 2014). Similarly, governance mechanisms rely on boundary spanning organizations, who can experience limited or misaligned capacity to fulfill this role, which limits the effectiveness of the process as a whole (Howitt and Suchet-Pearson, 2006). The early 2000s saw a shift from the dominant deficit approach towards capacity 'strengthening' or 'development', which looks to first assess then enhance existing capabilities and competencies (Al-Roubaie, 2010; Craig, 2007). This moved capacity building initiatives away from primarily providing funding towards assessing other factors, such as institutional context (Rahman et al., 2019); knowledge sources and flows (Beesley, 2004); and underlying ontological differences (Howitt et al., 2013; Howitt and Suchet-Pearson, 2006).

1.1.4   The rise of IA as an environmental governance mechanism in northern Canada

The IA process in Canada has been evolving from the direct application of biophysical science in the assessment of development projects toward a more holistic consideration of environmental, social, health and economic values, including local and traditional knowledge (Figure 1-1) (Arsenault et al., 2019; Morgan, 2012a; Udofia et al., 2017). Canadian provinces began implementing the practice of Environmental Impact Assessment (EIA) – now known as IA – in the 1970s as a "...process designed to aid decision making, through which concerns about the potential environmental consequences of proposed actions, public or private, are incorporated into decisions regarding those actions…," (Noble and Hanna, 2015, pg. 342). The Environmental Assessment Review Process (EARP) was put in place in 1972 to establish the federal position on impact assessment (Gibson, 2000; Noble, 2009). Immediately following, the Berger Inquiry of 1977 forced an increase in the consideration of social and economic impacts in the IA process at the federal level, including the acknowledgement of Traditional Knowledge (TK) as an important source of evidence (Berger, 1977; Burdge, 2002; Southcott et al., 2018). This brought IA in Canada into better alignment with sustainable development theory and practice and ignited a larger discussion about the role of local communities and TK (Bowie, 2013; Burdge, 2002; Joyce and MacFarlane, 2001; Nuttall, 2008).

The Berger Inquiry (1977), the signing of the *James Bay and Northern Quebec Agreement* (1975), and the subsequent land claims negotiations that resulted in the creation of Nunavut through the *Nunavut Land Claims Agreement* (1993) and the implementation of Yukon's *Umbrella Final Agreement* (1990), have centered IA as a meeting place of divergent development agendas and worldviews (Peters, 1992; Southcott et al., 2018). The EARP continued as a *Guideline Order* after 1984, until the *Canadian Environmental Assessment Act* (CEAA) passed into legislation in 1992, harmonizing the federal and provincial systems and extending impact assessment to regional contexts (Gibson and Klinck, 2005; Herring, 2005; Noble, 2009). The 1992 *CEAA* required assessments for federally endorsed projects, including those on federal land or engaging federal funding. The role of TK in federal processes is a matter of ongoing concern, with repeated calls for formal acknowledgement in processes as well as equal consideration alongside scientific data and experts (Arsenault et al., 2019; Paci et al., 2002; Sallenave, 1994; Stevenson, 1996; Udofia et al., 2017). A shift in Canadian IA away from 'minimal damage' towards the 'maximum desirable net gains' occurred in the late 1990s, where local sustainability became a federal focus, thus adding

Figure 1-1. A timeline of when various knowledge sources were acknowledged in IA.

Evolution of IA process and knowledge types in Canada
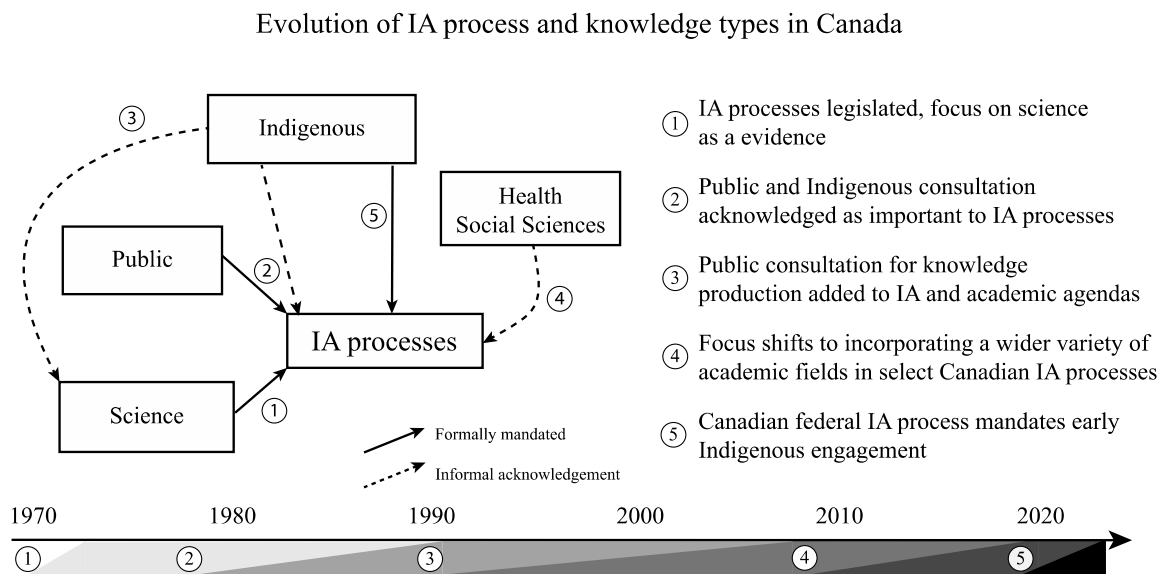
Figure 1-1 illustrates the progression of pluralism in the IA context, where additional forms of knowledge and evidence are formally recognized and informally acknowledged over time. Solid lines represent formal procedures for participation in IA legal mandates. Dashed lines are informal acknowledgement by IA processes and academic fields, where processes look to encourage participation and interaction, but are not legally bound to ensure space for it.

more local voice and more consideration of context to recommendations (Duerden and Kuhn, 1998; Gibson, 2000; Usher, 2000).

Amendments to the CEAA in 2012 had ramifications both federally and provincially/territorially (Gibson, 2012). A major change was the number and type of projects exempted from the IA process, with smaller projects excused from the previously required self-assessment. These changes were meant to free resources for larger strategic projects by shifting responsibility for major assessments to the provinces and territories, thus increasing the demand for corresponding capacity in the individual jurisdictions. During this period, the discussion on TK shifted from whether it should be included towards the logistics of how to equitably incorporate complementary ways of knowing (Baker and Westman, 2018; Bowie, 2013; Huntington, 2000; Raymond et al., 2010). In 2019, the CEAA was replaced by the *Impact Assessment Act* (IAA), marking a partial re-envisioning of the federal government's approach to IA, including core aspects of inclusion and Indigenous participation (Eckert et al., 2020; Fonseca and Gibson, 2020; Gibson, 2020).

As IA processes are enshrined in land claims in northern Canada, the social and economic development of northern Canada has been a major driver of demand for local capacity to fulfill institutional obligations. The ongoing development of primary industry in the three territories have bolstered discussion around northern sustainable development and associated governance mechanisms (Angell and Parkins, 2011). Several regionally specific impact assessment boards were established through federal legislation, including the Yukon Environmental and Socio-Economic Assessment Board (YESAB) in 2003 (Government of Canada, 2003; Government of Canada, 2015), the Mackenzie Valley Impact Review Board (Government of Canada, 1998) and the Nunavut Impact Review Board (Government of Canada, 2013). IA processes are thought to help local communities move towards regional sustainable development in northern Canada by increasing local control over development projects (McCrank, 2008). However, institutions and organizations established to accommodate local voices and TK have thus far failed to address the capacities needed for IA processes to fully pursue pluralism (Ellis, 2005; Slocombe et al., 2005).

1.1.5 *Pluralism in environmental governance*

Pluralism as a concept captures the "plurality of theoretical approaches for solving a problem, plurality of methodological procedures, and plurality of people who assess a phenomenon from different value perspectives," (Cape et al., 2018, pg. 32), going beyond the idea of diversity to

address how to actively engage the vast array of approaches to understanding the world in decision-making. As the societal goal of pluralism becomes increasingly central to governance in North America and elsewhere, addressing capacity challenges in the groups attempting to participate, as well as challenges in the governance mechanisms themselves, becomes fundamental to the legitimacy and effectiveness of those processes (Howitt et al., 2013; Howitt and Suchet-Pearson, 2006; van der Molen, 2018). However, there has been limited work to understand the role of research capacity in promoting pluralism in natural resource management generally, or the IA context in particular (e.g. Kirchhoff, 2006; Maag et al., 2018). Past applications of capacity building concepts to IA have instead used the more generic concept of capacity to identify legal and institutional shortcomings in less-established IA systems, with little acknowledgement of the more nuanced considerations of knowledge and pluralism (Cherp and Golubeva, 2004; Doberstein, 2003; Kirchhoff, 2006).

Thus far, pluralism and capacity have been mostly discussed separately in environmental governance literature, with a connection between the two often acknowledged, but not explored in depth, with some notable exceptions (e.g. Howitt et al., 2013; Sinclair and Diduck, 2017; van der Molen, 2018). Overall, Canada has been an active site for such discussions and the barriers that inhibit movement towards such goals (Bowie, 2013; Howitt and Suchet-Pearson, 2006; Larson and Soto, 2008; Morgan, 2012b; Sinclair and Diduck, 2017). In particular, capacity has been identified in studies on Indigenous participation in environmental governance mechanisms, such as IA, as being an important limitation on the effectiveness of such processes (Arsenault et al., 2019; Natcher et al., 2005; Udofia et al., 2017). In northern Canada, capacity generally has been acknowledged as an important factor affecting northern development outcomes since the 1970s (Buckler et al., 2009; de la Barre, 1979; Science Council of Canada, 1977; Science Council of Canada, 1991), but with little clarification about the specific types and sources of capacity limitations, particularly with regards to the knowledge aspects of governance mechanisms.

1.2   Research opportunity

There is a need for more empirical research on the different capacity issues affecting pluralism in the IA governance mechanisms that operate in northern Canada generally, and in the Yukon Territory in particular. A better understanding of the different dimensions of capacity, including the ability to accommodate and engage different knowledge systems and the specific impacts of

research capacity on the IA process, is needed. My research aims to respond to this need, with a view to better understanding the complex factors affecting research capacity in the Yukon Territory and its implications for the interaction among knowledge systems for the purposes of development decisions and the inclusivity of IA governance mechanisms. I do this by re-orienting my perception of IA from a primarily development and technical process towards a space for knowledge production, exchange, and interaction. Adopting a knowledge lens facilitates a view of IA as a process of inclusion and accommodation that requires specific types of capacity in order to fulfill this essential function.

1.3   Research objective and questions

The overall research objective for this work is to answer the question: *What is the role of research capacity in the implementation of impact assessment in the Yukon Territory?* In order to more fully develop an understanding of the relationship between IA and research capacity, each of the research chapters were guided by more specific research questions, as follow:

1) What is 'research capacity' in the context of environmental governance in northern Canada?
2) How does research capacity influence knowledge flow in the Yukon IA policy network?
3) To what extent does research capacity affect the organization of IA in Yukon Territory**?**
4) How does research capacity affect the participation of Yukon First Nations Governments in IA?

1.4   Theoretical approach

The theoretical foundations for this dissertation originate from understandings of *governance*, or how society makes decisions. Though governance manifests in three recognized modes (hierarchical, market, and network), network governance is of particular interest when approaching complex issues of collective importance involving a variety of divergent societal actors. The Policy Network Approach focuses analysis on network governance happening in specialized policy domains. The knowledge aspect of policy networks focuses on the knowledge exchange between actors in order to develop understandings how decision-making occurs. Engaging these theoretical lenses in concert allows a deeper understanding of how evidence-based decision-making can be better facilitated (Figure 1-2).

Figure 1-2. Diagram illustrating the interaction between policy network and knowledge network lenses, based on informal and knowledge networks, that contribute to network governance.
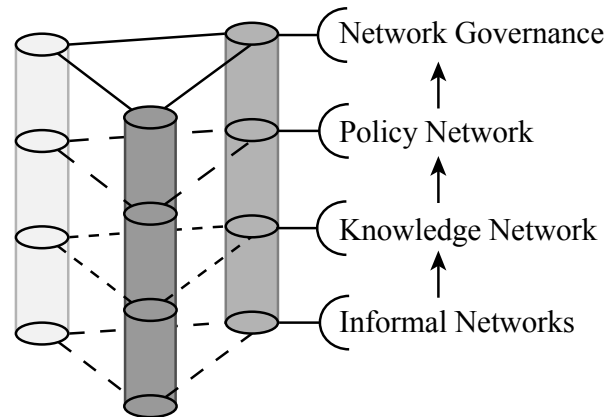
Figure 1-2 presents an overlay view of different networks and approaches to understanding them. Informal networks are the basis for social interaction, which build naturally into knowledge networks, where knowledge is passed among different actors. These knowledge networks can be organized around specific policy issues into policy networks, which contribute to overall network governance. The intersection between these visions of networks is with network actors, symbolized here by different shades of gray in the nodes, connected through interactions represented by dashed lines.

1.4.1 Network governance

Society makes decisions through a number of different mechanisms that can be formally or informally recognized. Governance and government conceptualize these mechanisms for analysis, acknowledging that they are intertwined and interact (Bevir et al., 2003). *Government* encompasses the formal institutions that dictate how different groups in society interact with the authority and force to make and enforce policy (Hughes, 2010; Kennett, 2008). *Governance*, in contrast, can be understood as decision-making beyond the formal institutions of the state – government – where public and private actors and institutions interact to achieve societal objectives (Bevir, 2004; Hajer, 2003; Hughes, 2010; Jessop, 2002; Kooiman, 2003; Swyngedouw, 2005; Young, 2017). Importantly, governance shifts large scale decision-making from government as the sole maker and enforcer of public policy to one of collaboration and partnership for negotiating divergent agendas towards common goals (Bevir et al., 2003; Brondizio et al., 2009; Kennett, 2008; Kooiman, 2002). Three modes of governance are often described: hierarchical, network and market modes (Bevir et al., 2003; Jessop, 2002; Klijn, 2010; Rhodes, 1996). Since it is not "possible to isolate social, economic, and political processes," (Poteete, 2012, pg. 43), most governance occurs as a hybridization of these three modes (Bevir, 2008). Network governance, in particular, looks to create a series of persistent connections among autonomous actors, including public government, to leverage collective expertise towards solving complex questions (Agranoff and McGuire, 2001; Jones et al., 1997).

The general theory of network governance originates from an organizational management perspective where organizations benefit from social contracts, such as reciprocal trust, that protect exchanges and interactions (Jones et al., 1997). One benefit of tackling complex problems as a collaborative network of groups with different expertise, agendas and values, is that no single actor or institution has sufficient capacity to solve most complex problems individually (Klijn, 2010; Kooiman, 1993). Forms of network governance have been successful in overcoming deficits in governance structures through innovation and cooperation (Biermann et al., 2007; Kamarck, 2007; Kaufmann et al., 1999; Moore and Hartley, 2010). However, the assumption that networks will automatically redistribute power away from government and therefore be more democratic does not take into account capacity inequalities among network actors (Hughes, 2010; Kamarck, 2007; Moore and Hartley, 2010; Pollitt, 2003). The ability of communities to actively participate in governance structures relies on their ability to engage with problems and solutions in a meaningful

way (Lansang and Dennis, 2004; Velho, 2004). For example, institutional strengthening in post-secondary education has been highlighted as a limiting factor for the ability of developing countries to actively participate in the global knowledge economy (Chan et al., 2005; Lansang and Olveda, 1994). In the Canadian North, capacity inequalities have been identified as a major limitation for fulfilling governance roles and economic development broadly (Abele, 2009a; Alcantara et al., 2012; Simon, 2017).

1.4.2   Policy Network Approach

Captured under the larger theoretical umbrella of network governance, the Policy Network Approach (PNA) narrows the focus of analysis to a particular policy domain shared by an interconnected group of state and non-state actors (Börzel, 1997; Klijn, 2010; Knoke, 2011; Rhodes, 2006). The term 'policy network' has been defined as "sets of formal institutions and informal linkages between governmental and other actors structured around shared if endlessly negotiated beliefs and interests in public policy making and implementation," (Rhodes, 2006, pg. 426). The criteria for inclusion for actors are based on shared common policy interests, but not necessarily agendas or goals. These actors exchange resources and information through formal and informal mechanisms based on institutions that dictate their interactions (Börzel, 1997; Klijn, 2010). The PNA highlights the interdependence between government and other actors in society (Fawcett and Daugbjerg, 2012; Knoke, 2011; Rhodes, 2006), allowing more structured examinations of the interactions amongst actors in a network and how these influence network outcomes (Daugbjerg and Fawcett, 2011; Klijn, 2010; Peterson, 2003; Provan and Kenis, 2008; Smith and Stacey, 1997).

   The PNA has foundations in institutional theory, which looks to understand variations in the rules and norms of a society (Scott, 2008; Sørensen and Torfing, 2016). Using networks as the unit of analysis, PNA seeks to analyze the relationships between the institutions, actors, and their resources holistically (e.g., power, trust, risk, legitimacy) (Börzel, 1997). Early critiques of the approach centered on that lack of theory building, managing complexity, and understanding network dynamics (Dowding, 1995; Klijn, 2010). In response, significant work has been done to build models, identify casual relationships and explore complexity (Bevir, 2013; Howlett, 2002; Howlett and Ramesh, 2015; Knoke, 2011; Ramesh et al., 2016; Turrini et al., 2010; Wu et al., 2015). The PNA has since considered aspects of network function, such as policy subsystems – groups of actors with particular policy interests or knowledge spaces in common (i.e. Howlett and

Ramesh, 2015) and 'boundary spanners' – actors who connect various agendas from different areas of a network – (de Leeuw et al., 2018; Haas, 2015; Howlett et al., 2017; McGee and Jones, 2019). A central component of these discussions has become the role of capacity in the development and function of policy networks (Howlett and Ramesh, 2015; Weible and Sabatier, 2005).

The dialectic model of policy networks proposed by Marsh and Smith (2000) is a PNA framework that considers networks as, "…the structuration of past conflicts and present organizational power," (p. 6), marrying the concepts of institutional theory with the structure of policy networks. The model identifies three reciprocal relationships affecting policy outcomes and their impact on network outcomes: structure and agency; network and context; and network and outcome. Within this model, the structural context and network structure reflect the "…institutionalization of power relations both within the network and within the broader socio-economic and political context…," (pg. 6). Membership in a network does not necessarily translate into influence on policy outcomes, often due to exogenous factors that make up the structural context. Central to the model is capacity, represented by an actor's capability (resources) and competence (skills). These can be considered at the individual or the organizational scale, both of which impact an actor's ability to participate in network interactions, thus impacting how the network functions. In my research, I use this dialectic model to identify scales of analysis that address my research questions and contextualize my findings in relation to the established understanding of the Policy Network Approach.

1.4.3   Knowledge networks

The knowledge network is another conceptual lens that has arisen from organizational and knowledge management fields, originally in the private sector (Johnson, 2009; Peña, 2002; Seufert et al., 1999). Marrying understandings of knowledge management and network theory, the knowledge network lens considers the inter-organizational interactions specifically centered on knowledge generation, accumulation, dissemination and utilization (Peña, 2002; Zhang and Dawes, 2006). Organizational learning and management literatures have explored knowledge flows and knowledge networks for the purposes of innovation and increasing the effectiveness of knowledge management through organizational culture (Conley and Zheng, 2009; Wang et al., 2018). Public management scholars have long acknowledged the role of knowledge in governance, policy and decision-making, but have had a plethora of other network-related topics to explore (i.e. Agranoff and McGuire, 2001; Zhang and Dawes, 2006). Others have focused on the connections

between academia and industry, describing knowledge brokerage relationships (Lam, 2000), concerns of knowledge legitimacy in network governance (Rahman et al., 2019), or acknowledging diverse approaches to knowledge management dependent on cultural contexts (Mohsin and Syed, 2018). Similar to perspectives on capacity, knowledge networks are acknowledged as multi-scalar, interacting between the individual, organizational and network levels of interaction (Beesley, 2004; Johnson, 2009).

In these contexts, distinctions are made between data, information, and knowledge to form a spectrum: data as raw description or observation; information as identifiable patterns in data; and knowledge as the outcome of processing by humans (De Long and Fahey, 2000; Partidario and Sheate, 2013). Knowledge management scholars have further identified categories of *explicit* – abstracted and storable – or *tacit* – experience-based, action-oriented – knowledge (De Long and Fahey, 2000; Lam, 2000). Underlying any conceptualization of knowledge, however, is an individual's fundamental perspective on the world, based on experience, that incorporates how an individual interprets and moves through the world and makes judgements about their reality (Castleden et al., 2009; Cobern, 1996; Vidal, 2008). A collective worldview expands this concept to encompass the shared "nonrational presuppositions," (Cobern, 1996, pg. 585), including the values of a group of people (Castleden et al., 2009). Scholars also draw clear connections between worldview and knowledge, in that how knowledge is understood, acquired and legitimized is fundamental to a worldview and vice versa (Castleden et al., 2009; Cobern, 1996; Vidal, 2008). Philosophy scholars have conceptualized this idea of 'worldview' as *ontological pluralism* – the active acknowledgement and engagement of the irreducible diversity of approaches to understanding the world that exist amongst humans (e.g. Coombes et al., 2013; Spickard, 2017; Yumatle, 2014). Environmental governance scholars, particularly in Australia and Canada, have approached ontological pluralism in their challenges on the assumptions around the origins of knowledge, human-environment interactions and conceptualizations of management and governance (Howitt and Suchet-Pearson, 2006; Natcher et al., 2005; Petrov, 2008). The knowledge network lens, and an understanding of ontological pluralism as an active goal of governance mechanisms, support my analysis of research capacity related to knowledge-based governance activities like IA.

1.5   Methodological approach

1.5.1   Case study research

This dissertation follows an exploratory case study research design to address research questions 2, 3 and 4 (Yin, 2009). The case study method is regularly employed in qualitative research to answer questions of 'how', 'what', and 'why' (Crowe et al., 2011; Yin, 2009; Schramm 1971). While other methods are used to make wide conclusions, the focus of case studies is depth in understanding context along with the phenomenon itself (Yin, 2009). Some view cases as 'bounded systems' for examining the reciprocal relationships between phenomena and context (Stake, 1995; Merriam 1998). By allowing an in-depth exploration of the dimensions of capacity at various scales using embedded cases, I am able to recognize the influence of the larger landscapes on embedded and dynamic interaction (Merriam 1998; Yin 2009). I follow the research design process outline by Yin (2009), wherein relevant literature is reviewed prior to data collection, but equally adhere to flexibility and refinement throughout the process identified by Stake (1995). Individual results chapters fully outline their associated methods.

1.5.2   Data collection

Qualitative data were primarily collected using key informant interviews and document analysis. Generally, the interview can be seen as "a basic mode of inquiry," (Seidman, 2013, pg. 8). Within the purview of qualitative research, the interview has the defined goal of capturing lived experience and personal interpretation for application to developing an understanding of a described phenomenon (Kvale, 1983). When discussing the semi-structured interview, it has been described as "neither a free conversation nor a highly structured questionnaire," (Kvale, 2006, pg. 174). The beauty of this rather vague definition is that it allows researchers to reach into other mediums beyond face-to-face dialogue in order to gather data, such as phone or web-based interviews (Meho, 2006), which is appealing when working in rural and sparsely populated areas where travel can be difficult.

Defining characteristics of the semi-structured interview include distinct, separate participants that do not interact with each other, reducing outside influence on responses (Meho, 2006). Focus instead rests on the relationship between the researcher and the participant, where "…qualitative interviewers entered into authentic personal relationships with their subjects," (Kvale, 2006, pg. 481). A good interview mimics dialogue, where the researcher establishes a

reciprocal exchange with the key informant (Winchester, 1996). In creating dialogue, the researcher gains trust and rapport with their participant, diminishing the impact of power dynamics on responses (Baxter and Eyles, 1999; Kvale, 1994; Kvale, 2006). However, key informant interviews provide one perspective on a phenomenon, and so maximizing the diversity of opinions is an essential component to ensuring rigor (Baxter and Eyles 1999).

A total of sixty-seven key informant interviews (n = 67) were conducted in 2018 and 2019 in person and over the telephone with a variety of actors related to the IA process in Yukon. The interview protocol was developed through iterative consultation to ensure cultural appropriateness and contextual relevance (Appendix 1). Interview questions were drafted using key capacity frameworks from Cooke (2005) and Maag et al. (2018), which were then refined after piloting with a selection of advisors from key demographics including a First Nations council member, a former well-established IA practitioner, and representatives from both the Yukon Environmental and Socio-Economic Assessment Board and Tr'ondëk Hwëch'in. The majority of interviews were conducted in Whitehorse, Yukon, and Dawson City, Yukon, the administrative and government capitals of the Yukon Territory and Tr'ondëk Hwëch'in government respectively, though some interviews were conducted in other communities and over the telephone. The semi-structured interviews lasted between 60 and 90 minutes, which allowed enough time to develop informant perspectives conversationally while maintaining a semi-formal structure (Seidman, 2013; Sovacool, 2010).

I used snowball sampling to leverage the informal relationships among actors for recruitment in lieu of formal advertisement (Creswell and Clark, 2007) so that "… the researcher relinquishes a considerable amount of control over the sampling phase to the informants," (Noy, 2008, pg. 332). Similarly, I was conscious of maximizing for variation in order to capture the largest diversity of related opinions possible (Baxter and Eyles, 1999). Pre-existing professional collaborations engaged 'seed' IA policy actors that then identified other potential participants. I confirmed former YESAB employees by drawing on publicly available YESAB annual reports produced since 2006. Participants also provided important connections to actors previously involved in IA activities in the Yukon. Where possible, these were contacted through publicly available government databases. Community saturation was achieved when the names suggested through snowball sampling were repeated by multiple actors independently. Recruitment was based on one of the following criteria:

1. Those who held positions directly related to the IA process for a minimum of one year at the time of interviews;

2. Those who had been involved in the IA process in the past, for a minimum of one year; or

3. Those who had been recommended by at least two other participants.

Data collection protocols were reviewed and approved by the McGill University Research Ethics Board (#127-0717) prior to data collection. The proper licensing was also obtained through the Yukon Scientist and Explorer's permitting process (license # 6800-20-1099) and research agreements were put in place with the Yukon Environmental and Socio-Economic Assessment Board and the Tr'ondëk Hwëch'in government.

Document analysis, a commonly engaged method in case study research, is used to accent key informant interviews in Chapters 3, 4, and 5 (Bowen 2009; Wach 2013). The method focuses on written text, often in the form of documents, from a variety of sources, which is then systematically analyzed using content and thematic analysis that goes beyond quantitative analysis of documents (Althiede, 2008; Bowen 2009; Wach 2013). The results are used to develop an understanding of the document and its corresponding context; supplement and verify findings from other methods; provide insight for new avenues for exploration; or trace the evolution of a topic (Bowen, 2009). For Chapter 3, document analysis includes public documents, legislation, policy instruments, and government websites related to the overall IA process in the Yukon between its inception in 2006 and ongoing implementation up until 2018. Chapter 3 applies a snowball technique to policy as a means of determining document inclusion, where a 'seed' policy document identifies pertinent legislation, policies and programs, which are then used to identify other policy instruments (Bainbridge et al., 2011; Farquharson, 2005). This technique allows the researcher to trace formal connections throughout the network (Bainbridge et al., 2011). Examining the connections and interactions between policy instruments and actors allows a better understanding of policy network interactions and resource dependencies. Similarly, Chapter 4 examines existing and operationalized capacity frameworks to solicit dimensions of capacity that are commonly shared between capacity building programs. These frameworks are outlined in program reports as well as journal articles, often citing fundamental frameworks from other fields. Finally, Chapter 5 uses some document analysis of the *Yukon Environmental and Socio-Economic Assessment Act* and the *Umbrella Final Agreement* as a basis for analyzing the key informant interviews.

1.5.3 Data analysis

All interviews were recorded, transcribed, and reviewed for accuracy before qualitative coding using the NVivo software, where individual key informants were assigned a random four-digit identifier to preserve anonymity. I engaged an inductive iterative coding process to identify emergent themes around the ability of actors and components of IA mechanism to interact with knowledge (Schmidt, 2004; Saldaña, 2015). Structural and pattern coding strategies were then used to refine and organize the major themes and identify broad patterns across the various perspectives (Saldaña, 2015). In Chapter 3, I employed Rapid Policy Network Mapping (Bainbridge et al. 2011) to aid in the organization and visualization of the connections between policy instruments and policy actors using CmapTools software (Fitzpatrick et al., 2010). Policy instruments and policy actors were categorized according to the method outlined by Bainbridge et al. (2011) to map the relationships between instruments and distinguish between explicitly identified and ephemeral relationships. In Chapter 4, I applied pattern coding to a series of capacity frameworks to identify the existing common characteristics. I then compared these to the mandates of the assessment board in order to further refine these characteristics for the IA context. The resulting characteristics were then used in an iterative coding process for the key informant interviews, by first applying structural coding to identify broad emergent themes in the key informant interviews, and then provisional coding using the refined IA capacity framework to examine perspectives on the various elements in terms of level of relevance (individual or organizational) and perceived magnitude (Saldaña, 2015). In Chapter 5, I employed content analysis to examine interview transcripts and key policy documents, a method that looks to infer "features of a non-manifested context from features of a manifest text" (Mertin, 1991, pg. 15). For this chapter, my iterative coding process started with open coding to identify broad themes from interviews, followed by concept coding to draw identified themes into two main concepts (Schmidt, 2004). I then used pattern coding to draw out specific nuances across perspectives, which added dimensions, depth and detail to the final analysis (Krippendorff, 2018; Saldaña, 2015).

1.5.4 Assumptions and limitations

Assumptions and limitations that underly the case study approach can be accounted for and mitigated (Yin, 2018). In semi-structured interviews, concerns around representativeness and

complexity are focused on personal experience and context over generalizable measurements (Baxter and Eyles, 1999; Kvale 1983). However, the expectation of generalizability is evolving, "being replaced by an emphasis upon the contextuality of knowledge," (Kvale, 1994, pg. 166). A power differential remains between the researcher, who is guiding the course of the research, and the participant, who is the vessel of knowledge (Baxter and Eyles, 1999; Kvale, 2006). Technology introduces a nuanced challenge, as information is lost, including body language, nonverbal cues and the lack of ambience that can affect rapport (Deakin and Wakefield, 2013). However, the advantages that technology bring to the interview method often overlap those in the traditional interview, making the method suitable for data collection in some remote areas where travel can be a limiting factor in data collection, and offers flexibility in terms of timing and location (Meho, 2006; Deakin and Wakefield, 2013. Interviews give people voice but the burden of ethical use of the information remains with the researcher (Winchester, 1996).

Yin (2018) outlines four aspects of case study validity: 1) construct, 2) internal and 3) external validity and 4) reliability. Triangulating multiple data sources is a common technique used to support construct validity. In chapters 3, 4, and 5, semi-structured interviews and document analysis were used as complementary methods to support the generalizable results, as well as maximizing the range of perspectives included in data collection (P. Baxter and Jack, 2008). Interview protocols were piloted with a group of advisors, including a current First Nation council member to ensure cultural appropriateness and enhance reliability (Appendix 1). To address internal validity, chapters 3 and 4 rely on pattern matching and explanation building throughout data analysis. These chapters look to identify and describe conditions of capacity in the IA context at different scales. Each of these chapters approach the data with conditions found elsewhere in the literature as a basis for pattern matching and later explanation building. Chapter 4, in contrast, focuses more on descriptive and exploratory aspects of the case, using primarily pattern matching to examine intent vs reality in an IA context. To address external validity for Chapters 3, 4, and 5, theory is engaged early and often in iterative analysis, drawing on existing theory in the fields related to capacity building, IA effectiveness, and the principles of IA. Reliability was ensured by documenting the case study protocols throughout and the maintenance of a case study database, to improve accessibility of raw data (Yin, 2018).

1.6 Research setting

Yukon Territory is 474,391 km^2 of land area located in the northwest corner of North America, bordered by Alaska to the west and the Northwest Territories to the east (Figure 1-3). Indigenous peoples of the region, now known as Yukon First Nations, have inhabited the region since ~24,000 years before present (Bourgeon et al., 2017). A variety of arriving groups, such as the Hudson's Bay Company and gold seekers of the Klondike Gold Rush, made resource management central to regional economic and political development (Sabin, 2016). The territory was established in 1898, after the influx of Klondike gold stampeders caused concern for Canadian sovereignty (Abele, 2009a; Coates, 1985). With the end of World War II and the advent of the Cold War, interest was renewed in the region as the United States established a military presence through the construction of the Alaska Highway and other U.S. military development projects (Abele, 2009b). Questions of northern sovereignty, economic development, and resident health and well-being continue capture the attention of southern Canada.

The 1977 Berger Inquiry marked a turning point for the Canadian approach to northern policy generally, and for Yukon in particular. In 1979, responsible government was granted to the territorial legislature. More recently, the Yukon Territory has had a growing population, with 41,352 people in 2019, ~23% of which self-identify as Indigenous (YG, 2020). In 1973, the Council for Yukon Indians (CYI, now Council for Yukon First Nations) chose to work with existing territorial structures for service support, while negotiating self-government agreements with the federal government (Abele, 1987). The political system established in the Yukon became a model for devolution in the Northwest Territories (Abele, 1987). Similarly, the *Umbrella Final Agreement* (1990), among the first comprehensive land claims, was the result of two decades of negotiations and includes a section specifically regarding development assessment – Chapter 12 – now known as impact assessment. There is an ongoing federal departmental presence through local offices for major departments, such as the departments of Fisheries and Oceans, Environment, Natural Resources, and, mostly prominently, Indigenous and Northern Affairs Canada, now Crown-Indigenous Relations and Northern Affairs Canada (Government of Canada, 2020; Minister of Aboriginal and Northern Development, 2015). Through the process of territorial devolution, responsibilities from many federal departments have been slowly taken over by corresponding territorial departments. The capacity of territorial departments to take over federal

responsibilities has been identified as one of the limiting factors on the effectiveness of northern governance structures (Abele, 2009b; Alcantara et al., 2012; Campbell and Cameron, 2016; Simon, 2017). Federal legislation also established the Yukon Environmental and Socio-Economic Assessment Board (YESAB) in 2006, which acts as one important site of interaction between federal, territorial, and First Nations governments.

The Yukon economy is a resource-based economy that depends heavily on the 'boom-and-bust' cycle of commodity prices (Petrov, 2010). In 2015, the mining and exploration industry (primary industry) was the third largest contributor to Yukon's GDP, after the federal and territorial governments, with 10.1% considered to be a low point in the last five years (YG, 2016). Huskey and Southcott (2016) examined Yukon's economy since the 1870s to articulate the relationship between primary industry and economic development. Their results show that resource-based economies, such as that seen in the Yukon, are often detrimental to economic development in the region, where many of the financial benefits are streamlined away from the region and there is a lack of local investment. Due to the impact of the highly variable mining sector, especially mine closures and low commodity prices, Yukon experiences variable annual economic outlooks (Conference Board of Canada, 2017; Tukker, 2016). The potential for development is partially controlled through the Impact Assessment (IA) process (Noble and Hanna, 2015). Yukon Territory therefore offers a prime case through which to examine the concept of research capacity and its contributions to the IA process in primary industry-based economies with complex jurisdictional landscapes (Figure 1-3).

The federally legislated *Yukon Environmental and Socio-Economic Assessment Act (YESAA)* also sets out the structure of the Yukon Environmental and Socio-Economic Assessment Board (YESAB), the specialized agency tasked with completing all assessments in the Yukon Territory. YESAB has legal jurisdiction over the entire territory and adopts a decentralized model in order to better embrace local contexts in their day-to-day operations. The Yukon Territory is divided into six assessment districts, with Designate Offices in major communities (Appendix 2). Each of the six Designated Offices has a Manager of the Designated Office, who is often oversees an Assessment Officer while also completing their own assessments. Designated Offices are responsible for projects up to a certain size and frame that occur within the associated district, while the Executive Committee is a separate group of Assessment Officers concentrated on larger development projects that may have specialized considerations (e.g., new technologies) or are

deemed to be potentially impactful to broader regional development, both economic and social. A Panel Review, which to date has yet to be engaged, can also occur when particularly important or controversial projects arise. YESAB operates under the guidance of Board that is mandated to include three representatives nominated by the Council of Yukon First Nations, two nominated by the Yukon Government, and two appointed by the Government of Canada through the Minister of the Environment (or equivalent).

1.7   Statement of positionality

I grew up very near to a small rural town in Alaska called Haines, Alaska. In 2021, that town went through a natural disaster of a magnitude I certainly never experienced but remember preparing for in childhood. Rainstorms, equivalent to three consecutive tropical storms, hit the region, causing landslides and slope instability that threatened the majority of the town. Haines is known for their community cohesion, where the physical and social gap between the white upper class and the lower non-white classes is smaller, but not less visible. Living in close proximity to our neighbours means that we witness and experience more of each other's worlds than big cities offer, particularly in times of crisis and collective trauma when the little town's cohesiveness shines. This is both a blessing and a curse. It means that we get the opportunity to share a common space and to see the best in people who do not share our backgrounds, our struggles, or our worldviews. These small towns, even with the politics and the divisiveness that can arise, offer a cross section of society with useful lessons for larger communities.

I am a non-Indigenous woman born and raised in northern territories, with parents who worked for the federal government and with ties to the mining industry. I am a physical geographer and a scientist, trained in a paradigm of objective truth, a perspective that has since evolved. I was raised to be a strong and independent woman and continue to surround myself with people with similar perspectives on inclusion and equity. My views on development are intrinsically tied to my background as a physical geographer, as well as my family's professional and personal connections to the presence of the federal government and an active mining industry in northern Canada. It is within this context that I started out on the PhD journey, covered in the 'veneer of best intentions' shared by many of my participants, colleagues, and neighbours. As a physical scientist, I was wholly unprepared for most of what awaited me when I began this foray into the social side of science. My perspectives on governance mechanisms and research have evolved over

the course of my program, through interactions with participants and through self-reflection. My status as a northerner has been questioned in a way I never anticipated, which resulted in critical reflection on research approaches and how to participate in multiple communities at once. The space I have come to occupy is near the middle of increasingly divisive conversations, in the midst of an increasingly divisive world at odds with my childhood conceptualization of cohesive communities.

In that light, I do not claim to be a political scientist, nor do I claim to be the voice of Indigenous peoples. Instead, my goal is to offer insight into how we understand capacity, knowledge distribution, and development mechanisms in order to better support the people (Indigenous and non-Indigenous alike) tasked with implementing not only the territorial/provincial/federal legislation, but also Yukon's modern-day treaties. Within the divisive conversations around development, my aim is not to break down barriers from outside, rather to weaken the internal structure of those barriers so that they are more easily dismantled. Ultimately, my aim is to bring the lessons of cohesive communities to larger governance mechanisms so that conversations of development can migrate towards inclusion and equity.

1.8   Organization of dissertation

As this dissertation is presented in a manuscript-style format, some unavoidable repetition between chapters is inevitable (Figure 1-4). Chapter 2 reviews the concept of 'capacity' which is plagued by a multitude of definitions and frameworks from across disciplines and identifies the central role of research capacity in IA governance. It has been published in the peer-reviewed journal *Arctic Yearbook* (2018). Results Chapters 3 to 5 focus on the case of IA in Yukon Territory in northern Canada, and progress through Marsh and Smith's dialectic model starting from analysis of the structural context and network level of analysis (Chapter 3) to the main site of interaction and coordination, the main assessment body (Chapter 4) and finally to the particular challenges experienced by a major policy actor (Chapter 5). In Chapter 3, I apply rapid policy network mapping to identify the sources and flows of knowledge commonly occurring in the Yukon IA network, refining understanding of the barriers to implementing pluralism in IA governance. This chapter will be submitted to the *Journal of Environmental Assessment Policy and Management*. Chapter 4 will be submitted to the *Journal of Environmental Management* and focuses on research capacity and YESAB, the main assessment body in the IA policy network, and a central 'choke

Figure 1-3. Collection of maps showing geological and jurisdictional context, with study sites identified.

Figure 1-3 presents a suite of three maps: i) the Yukon Territory in relation to the rest of Canada; ii) an overview of the traditional territories of Yukon First Nations that make up this multijurisdictional context, with study sites indicated by black squares (Crown-Indigenous Relations, 2004); iii) geological map of the western Cordillera, which includes British Columbia, Yukon Territory, and Alaska, illustrating the geological basis for resource potential in the region (Colpron et al., 2007).

point' identified in Chapter 3. Using a novel framework that addresses general capacity and specialized research capacity, I examine the constraints facing YESAB, the first time such an analysis has been conducted using a major northern assessment body. The result is an IA specific capacity framework that bolsters the perspective that IA is a boundary spanning activity that relies heavily on knowledge activities. Chapter 5 builds on this knowledge network perspective by exploring how First Nations Governments in Yukon are leveraging their participation in IA as a political tool, while lamenting the missed potential for IA to serve as a space for mutual knowledge exchange and learning. This chapter will be submitted to *Environmental Impact Assessment Review*. The final chapter, Chapter 6, draws the other chapters together to discuss the main research findings, articulate contributions to knowledge, offer insights for policy and identify future research directions.

Figure 1-4. Organization of thesis in relation to the policy network framework by Marsh and Smith (2000).
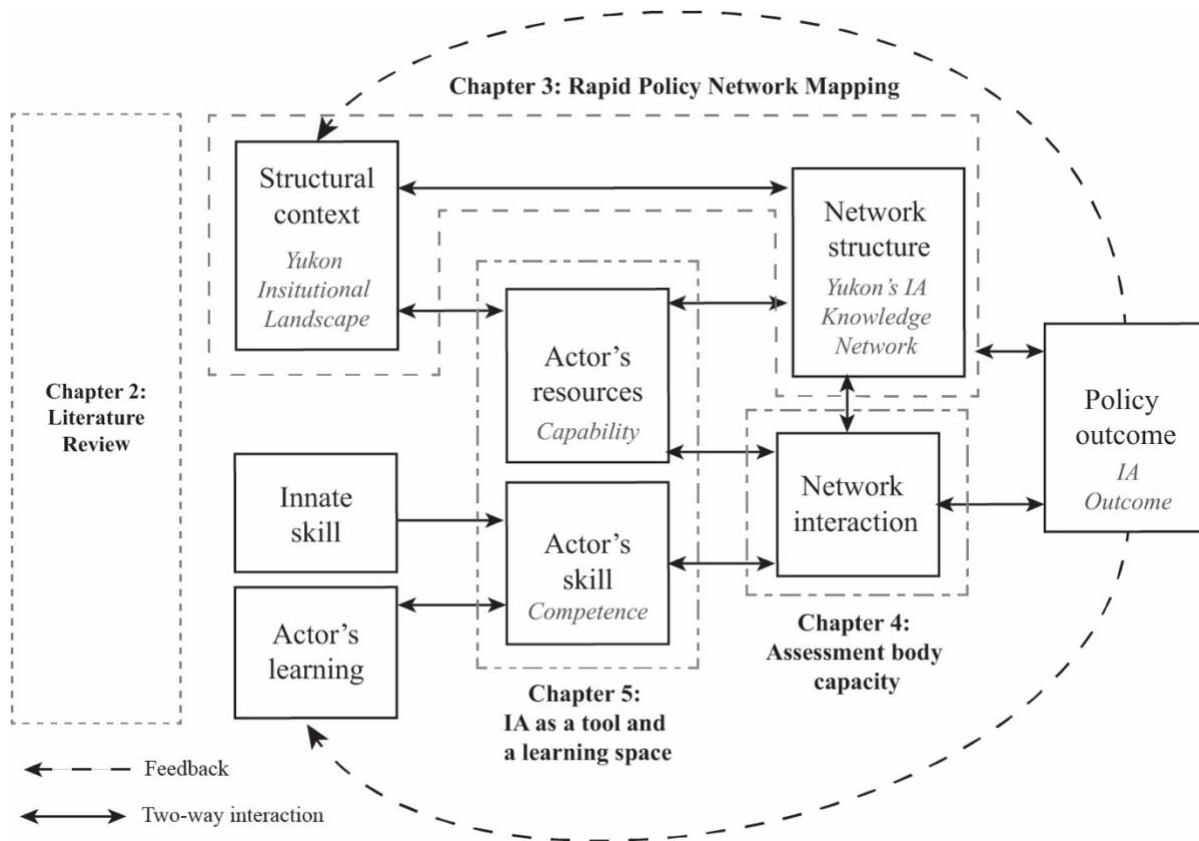
Figure 1-4 presents a visual outline of the thesis based on the Marsh and Smith (2000) model for policy networks. Individual chapters are connected through their position in the policy network. Solid lines with two arrows indicate two-way interaction between components of the model, while dashed lines indicate feedback from the policy outcome to the structural context and each actor's learning.

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Preface to Chapter 2

Chapter 1 outlines the need to address knowledge gaps concerning the role of research capacity in northern environmental governance mechanisms, particularly impact assessment (IA). Chapter 2 presents a literature review of capacity to identify how different disciplines have approached the topic and what can be learned in the context of environmental governance in northern Canada. It provides the necessary conceptual foundation from which to empirically examine research capacity issues affecting IA governance in Yukon Territory.

Chapter 2. Reviewing northern capacity for Impact Assessment in Yukon Territory, Canada

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Abstract

Northern 'capacity' has long been identified as a priority area for public policy in Canada and recognized as a major constraint to regional social and economic development. The concepts of capacity and sustainability often meet in impact assessment (IA) processes in Canada, which include environmental, social and economic aspects of development, and where there has been an important evolution in the role of both communities and science in decision-making. In Yukon, the Yukon Environmental and Socio-Economic Assessment Board (YESAB) is the legislated mechanism for impact assessments. The establishment of YESAB provided sites for the consideration of local perspectives and traditional knowledge; however, calls for enhanced northern research capacity to inform environmental assessment and associated decision-making remain prominent. This paper explores the concept of 'capacity' in its various forms and considers its core relevance to ensuring effective IA processes associated with northern development. Through a literature review, we find that the ambiguity surrounding the concept of capacity requires careful policy attention to more fully appreciate the conditions that prompt appeals for increased northern research capacity and help minimize confusion amongst different actors and institutions working to build northern capacity.

2.1   Introduction

The term 'capacity' is commonly identified as central to sustainable natural resource management and socio-economic development (Kolhoff, Driessen and Runhaar, 2018; Konovalova, Kuzmina, Hansevyarov and Persteneva, 2016). In Canada, capacity has been formally acknowledged as an important factor in northern development since at least the 1970s (Buckler, Wright and Normand, 2009; de la Barre, 1979; Science Council of Canada, 1977). However, the concept of capacity tends to be ambiguous in practice, despite attempts to develop coherent definitions and identify

common characteristics across disciplines (Brinkerhoff and Morgan, 2010; Condell and Begley, 2007; Simmons, Reynolds and Swinburn, 2011). This literature review seeks to unpack the concept of 'capacity,' and in particular 'research capacity' – on its own and as it relates to 'community capacity' and 'governance capacity' – in northern Canada using the case of Impact Assessment (IA) in Yukon Territory. It begins by outlining the broad connections between scholarship on capacity, IA and sustainable natural resource management in Canada, the northern territories, and Yukon; focuses on how capacity is conceptualized in key disciplines; and concludes with a discussion of future directions.

2.1.1 *Impact Assessment and sustainability in Canada*

The US Environmental Protection Agency (EPA) first initiated the practice of Environmental Impact Assessment (EIA) in 1970 as a "...decision tool employed to identify and evaluate the probable environmental consequences of certain proposed development actions," (Cashmore, 2004: 404). In Canada, The Environmental Assessment Review Process (EARP) was put in place in 1972 to establish the federal position on environmental impact assessment (Gibson, 2000; Noble, 2009). The importance of considering the socio-economic aspects of development in the IA process very quickly came to the fore with the Berger Inquiry in 1977, completed as part of the impact assessment of the Mackenzie Delta Pipeline (Berger, 1977; Burdge, 2002; Gamble, 1978). Similar discussions occurred in James Bay, northern Quebec, around the same time (Berkes, 1988). The EARP continued as a Guideline Order after 1984, until the Canadian Environmental Assessment Act (CEAA) passed into legislation in 1992. This legislation harmonized the federal and provincial systems (to varying degrees) and facilitated impact assessment at regional levels (Gibson, 2000; Herring, 2005; Hickey et al., 2010; Noble, 2009). The recognized need to incorporate local, regional and Traditional knowledge in Canadian IA processes (Paci et al., 2002; Sallenave, 1994; Stevenson, 1996) led to the adoption of more participatory and inclusive approaches (Burdge, 2002; Joyce and MacFarlane, 2001) and the inclusion of social impact assessments in larger processes as standard practice (Morgan, 2012).

Importantly, local capacity has become a recurring issue identified as challenging the transition towards more participatory and localized IA and sustainable development (Nuttall, 2002). Shifting accountability for IA processes to regional and local contexts was meant as a mechanism for encouraging regional development through local control over development projects (Angell and Parkins, 2011; Arctic Council, 2004; Armitage, 2005; Huskey and Southcott, 2016).

Concurrently, the shift away from 'minimal damage' towards 'maximum desirable net gains' requires project proponents to more explicitly consider local sustainability in their permit applications (Gibson, 2000). To a large extent, requiring community participation in the IA process has contributed to the popularity of co-management agreements and other local approaches to natural resource management in the circumpolar North (Barker, 2005; Ellis, 2005; Gibson, 2000; Joyce and MacFarlane, 2001; Robards and Lovecraft, 2010). However, barriers to the quality of available scientific knowledge, the recognition of traditional knowledge, differences in knowledge systems, assumptions of community homogeneity, and the 'insider-outsider dialectic' all contribute to the challenge of meaningful participatory assessment processes (Caine et al., 2007; Ellis, 2005; Greig and Duinker, 2011; Nadasdy, 2003; Natcher et al., 2005; Staples and Natcher, 2015). For example, Prno and Slocombe (2012) recognized a shift in decision-making towards community inclusion for northern mineral development, with implications for community ability to participate in decision-making processes. According to Raik (2002), the success of co-management and co-production relationships rely on the capacity of all participants, and so "…should be of keen interest for co-management," (Raik, 2002: 2). Similarly, Booth and Skelton (2011) considered First Nations participation in assessment processes in B.C. from industry and government perspectives, citing a lack of capacity as one of the major limitations. Calls for capacity building with regards to IA are commonly justified in the academic literature.

2.1.2 *Impact Assessment and capacity in the Canadian North*

The rapid and sustained social and economic development of the Canadian North continues to challenge the capacity of local actors to fulfill legislated obligations. The relationship between the territories and the federal government continues to evolve through the devolution of various responsibilities (Abele, 1987; Bielawski, 1984; Dacks, 2004; Hodgins, 2009). In 1979, the Science Council of Canada (SCC) argued that IA processes were identified as being under-supported by national capacity building programs (de la Barre, 1979). The pre-1990 politics of assimilation heavily influenced discussions of northern development in terms of giving a greater voice to local communities, but only through certain avenues (Angell and Parkins, 2011). Interestingly, the SCC recommendations were echoed by a House of Commons Standing committee in 1997, which underlined the development of territorial capacities as a requirement for future northern development and supported the argument that local voices have been purposely directed (Graham, 1997).

Since 1990, the discussion around sustainable development and local empowerment has changed considerably, particularly after the implementation of the Umbrella Final Agreement and the establishment of Nunavut (Angell and Parkins, 2011). In 2008, the Minister of Indian Affairs and Northern Development commissioned a review of northern regulatory systems. The resulting report pointed out that new regulatory bodies, such as those facilitating IA processes, were aimed at giving voice to local populations but lacked the corresponding increase in institutional, human, and research capacities (McCrank, 2008). Similar work done on boards established by land-claims, including wildlife and resource management boards, identified the ongoing presence of constraints on Indigenous participation in natural resource management (White, 2008). Research on the social impacts associated with increased research funding, a common capacity building strategy in northern Canada, has largely focused on economic impacts and community-researcher interactions, with little formal evaluation of local capacity outcomes (Abele, 2009; Brunet et al., 2014; Carr et al., 2013; Gearheard and Shirley, 2007; McCrank, 2008; Pfeifer, 2018). The research agenda for northern environmental assessment presented by Noble et al. (2013) included capacity for meaningful engagement as a major theme. Other work has focused on the incorporation of traditional knowledge, another aspect of research capacity, into the northern IA process either through proponent submissions or through public review, with mixed results (Angell and Parkins, 2011; Bowie, 2013; Usher, 2000). Research into, and evaluations of, the impact of capacity building activities on northern development continues to be limited (Angell and Parkins, 2011; Carlson, 2016; Pfeifer, 2018).

The economic development timelines associated with primary industries in northern Canada have often reduced the positive impacts of resource development on northern community capacity, leaving regions exposed to the variability of boom-and-bust economies (Banta, 2006; Leadbeater, 2007). For example, work done on the Mackenzie Valley Environmental Impact Review Board (MVEIRB) by Galbraith et al. (2007) identified limited capacity in the IA process as a major deficiency in the northern IA process. There have since been calls for a comprehensive federal northern policy that addresses this lack of capacity (Gilmore, 2016; Ogden et al., 2016; Simon, 2017), particularly as the effects of global climate change manifest at local levels. Local capacity to accommodate the opening of the Northwest Passage shipping route, and the regulatory need that will accompany it, or the degradation of permafrost resulting in increased mineral exploration, are of increasing policy concern (Barber et al., 2008; Fenge and Penikett, 2009). In response, the territorial governments and national organizations have released science agendas and

strategies to inform assessments and associated decision-making, underlining the need for northern research capacity (Table 2-1) (Territorial Governments, 2016).

Since 2011, various government departments and national organizations, including the Conference Board of Canada, through the Centre for the North, have attempted to address the questions of various northern capacities including labour force (Martin, 2011), economic potential (Auditor General of Canada, 2014b; The Canadian Chamber of Commerce, 2013), governance capacity (AANDC and CPC, 2013), and the ability of communities to participate in IA (Auditor General of Canada, 2014a). Another progress report on northern capacity was produced by the Canadian Polar Commission, focusing more on adaptive and community capacities and outlining shortcomings in labour force, forestry, and environmental monitoring (Canadian Polar Commission, 2014). Within this context, IA often serves as a connection between development, primary industry, and governance, acting as both an instrument for the empowerment of communities in decision-making, while also facilitating clashes between knowledge systems and political visions for development (Bowie, 2013; Morgan, 2012).

2.1.3 *Impact Assessment and capacity in Yukon*

IA in Yukon offers an interesting example of network governance with multiple actors interacting within a complex landscape of overlapping formal and informal authorities and responsibilities. The traditional territories of 14 First Nations often overlap with each other, as well as sharing interests with the Yukon and federal governments in some decision-making processes, including natural resource management in certain areas. The Yukon Territory was established in 1898, after the influx of Klondike gold stampeders caused concern for Canadian sovereignty (Abele, 2009; Coates, 1985). In 1979, 'responsible government' was granted to the territorial legislature. The Council for Yukon Indians (CYI, now Council for Yukon First Nations) at that time chose to work with existing territorial structures for service support, while negotiating individual self-government agreements between each First Nation and the federal government, that included the delineation of settlement lands (Abele, 1987). The IA process in Yukon was negotiated and established as part of the Umbrella Final Agreement, taking the form of federal legislation in the *Yukon Environmental and Socio-Economic Assessment Act* (YESAA) in 2006 (Noble, Hanna, and Gunn, 2013). YESAA federally established the independent Yukon Environmental and Socio-Economic Assessment Board (YESAB), through which all development projects in the Yukon are reviewed, including mining and infrastructure projects. First Nations interests and local public

Table 2-1. Northern Canadian science and research policy documents emphasize the need to develop capacity.

Title	Organization/Author	Year	Mentions of capacity
Building a Path for Northern Science	GNWT's Science Agenda	2009	11
A pan-northern approach to science	GNWT, YG, NT	2016	19
Government of Yukon Science Strategy	Government of Yukon	2016	6
Knowledge Agenda: Northern Research for Northern Priorities	Government of Northwest Territories	2017	8
National Inuit Strategy on Research	Inuit Tapiriit Kanatami (ITK)	2018	22

review are included in recommendations provided to the 'decision-body' who renders the final decision, which varies depending on the project. The Board of Directors for YESAB include an Executive committee, with representatives nominated by the Council for Yukon First Nations (CYFN) and Yukon Government, who then confer with the federal Minister of Environment to appoint a chair. Four additional board members are nominated as follows: two nominees from CYFN, one from Yukon Government, and one directly appointed by the federal Minister. District offices located throughout the territory are intended to engage with community contexts. Certain major projects are forwarded to an executive committee for assessment (Government of Canada, 2003). A comparison of territorial, provincial, and federal environmental assessment legislation shows that YESAA shared a very similar distribution of mandatory requirements with the federal CEAA (Hickey, Brunet and Allan, 2010).

With a resource-based economy that depends heavily on the 'boom-and-bust' cycle of commodity prices and rates of development, including the highly variable mining sector (Petrov, 2010; The Conference Board of Canada, 2017; Tukker, 2016), Yukon and First Nations governments rely quite heavily on the IA process to support and guide sustainable economic development (Noble and Hanna, 2015). In addition to labour shortages, changes to the CEAA in 2012 included amendments to YESAB operations and changes to assessment timelines which have stressed local capacity (Banks, 2014; Rodon and Therrien, 2015). International discussions around environmental, strategic, and health impact assessment and Aboriginal and public participation often include references to Yukon as a positive example of multi-governmental collaboration, but few academic publications have focused directly on the territory and its IA processes (Kwiatkowski, Tikhonov, Peace and Bourassa, 2009; Udofia, Noble and Poelzer, 2017). The context of Yukon Territory therefore offers an interesting landscape to further examine the role of research capacity in northern impact assessment processes, as the general need for capacity has been well outlined in government documents and popular media.

2.2   But what is capacity?

2.2.1   Defining 'capacity'

The concept of capacity has been identified as being overused and highly variable both within and between disciplines, despite considerable efforts to clarify the concept (Analoui and Danquah, 2017; Brinkerhoff and Morgan, 2010; Gadsby, 2011; Lauzon, 2013; Louafi, 2016; Raik, 2002;

Simmons, Reynolds, and Swinburn, 2011; Suarez-Balcazar, Balcazar, Iriarte, and Taylor-Ritzler, 2008). Contributing to the ambiguity of the term, capacity can be (and often should be) built at many scales, from individual to collective, occupying "…a nether world between individual training and national development" (Morgan 2003, as cited in (Brinkerhoff and Morgan, 2010)). Considering capacity development at the scale of individuals, organizations and institutions allows for a more systemic perspective, which can be useful for addressing development strategies that transcend scale (Brinkerhoff, 2010). Capacity as a goal and a concept has been examined in fields such as public administration, international development, education, health and agriculture, and is often tied directly to development goals and governance processes (Analoui and Danquah, 2017; Grindle and Hilderbrand, 1995; Ika and Donnelly, 2017; Selim Louafi, 2016; Wetterberg, Brinkerhoff and Hertz, 2015). Distinctions are broadly made across disciplines between adaptive, community, governance, policy, and research capacities, though they tend to overlap considerably in practice. This suggests the need for a more refined working lens specific to the capacities engaged in the context of IA in order to help assess and improve capacity building efforts (Kolhoff, Driessen and Runhaar, 2018).

2.2.2 The components of capacity

The term 'capacity', here understood to mean the ability of a system to function and adapt, often considers two components: capability and competence (Chaskin, 2001; Fowler and Ubels, 2010; Frank and Smith, 1999; Howlett and Ramesh, 2015; Morgan, 2006; Wu, Ramesh, and Howlett, 2015). Within this definition, capability is the availability of appropriate resources for a particular problem, while competence is the knowledge and understanding necessary to utilize these resources (Wu, Ramesh and Howlett, 2015). The concept of capability extends beyond conventional resources like financial and human to include resources such as access to knowledge and institutional authority (Araral et al., 2015; Howlett and Ramesh, 2015). For example, Chan, Kirsop and Arunachalam (2005) have illustrated how the capabilities of post-secondary institutions, including access to journal subscriptions, can affect regional economic and political development. International development organizations have often focused on the capability component of capacity, since these challenges can be the easiest to overcome, often in the form of technology transfer (Analoui and Danquah, 2017; Lansang and Dennis, 2004). There is, however, a general movement away from this approach towards more community-instigated capacity development strategies for growing local competence (Bockstael and Watene, 2016) through wider

knowledge system development (Lansang and Dennis, 2004), such as agricultural and health extension (Coutts and Roberts, 2003). It is broadly understood that the combination of competencies and capabilities will influence the overall capacity of any system at any level, from the individual to the network scale (Howlett and Ramesh, 2015; Van Loon, Driessen, Kolhoff and Runhaar, 2010).

2.2.3 Conceptual frameworks for understanding capacity

There are many conceptual frameworks available for understanding capacity. Potter and Brough (2004) offer a framework for systemic capacity building in the context of health policy that separated out four hierarchical types of capacity, including tools, skills, staff/infrastructure, and institutions. They then examined the interactions between nine sub-capacities that include: performance, personnel, workload, supervisory, facility, support service, systems, structural, and role capacities. Kirchhoff (2006) applies and expands this framework to the IA context in Brazil, using the systematic approach to add human, scientific, technological, organizational, institutional and resource capabilities to the previous findings. Fowler and Ubels (2010) review two of the leading frameworks for understanding capacity in international development: European Centre for Development Policy Management (ECDPM) with the 'five capabilities' framework; and Community Development Resource Association (CDRA), which identifies six elements of capacity. Gupta et al. (2010) approaches adaptive capacity through an institutional (social rule) perspective, identifying six dimensions to consider: variety; learning capacity; flexibility for self-initiated change; leadership; resource availability; and fair governance. van Loon et al. (2010) divide the capacity of IA into six capacities: institutional, organizational, human, scientific, technical, and resource. Kolhoff et al. (2018) applied this same division of capacities to IA organizations in the context of low- and middle-income countries (LMICs). Wu et al. (2015) provide a conceptual framework that addresses the analysis and measurement of policy capacity, describing a nested model of policy capacity that includes political capacity, analytical capacity, and operational capacity. These various frameworks identify multiple types of capacity that interact and build off of one another, but often use different terminology to describe similar concepts.

2.2.4 Interacting capacities

The classification of capacity into different types is one source of confusion that is not easily remedied as the terms tend to have definitions that overlap and interact, either as distinct types of capacity or as foundations for larger capacities. Fischer and McKee (2017) examine linkages between organizational, infrastructural and personal capacities, finding that community capacities and capitals interact; are key to understanding community situations; are understudied; can be negative, if not destructive, and present obstacles to overcome; and are heavily impacted by local engagement. Kolhoff et al. (2018) connect IA performance and capacity development, focusing on the assessment of key capacities for IA processes, including organizational, human, scientific, technical, and resource capacities. van Loon et al. (2010) build on concepts outlined in both Potter and Brough (2004) and Kirchhoff (2006) to establish a model of interacting 'sub-capacities' and discuss the potential effect of uncoordinated development of these capacities within an organization. They consider capacities in a hierarchical structure, where sub-capacities, such as research capacity, are foundational to the development of more complex capacities, such as governance capacity. This same breakdown of capacities was used by Kolhoff et al. (2018) to develop an assessment tool specifically for the IA process in LMICs.

In the context of IA in Yukon, the capacities at play generally include adaptive, community, governance, policy, research capacities (Figure 2-1). Definitions for each of these is explored further through the capacity literature presented in Table 2-2. Community and governance capacities interact to enable decision-making for large groups, which rely on the ability to gather and process information; the ability to make and implement policy; and the ability to synthesize information or knowledge into decision-making, or research capacity, policy capacity, and institutional capacity respectively. As a base contributing capacity, research capacity is an important foundation upon which other larger capacities often depend. IA sees the interaction of community and governance capacities, while performing the function of research capacity, providing recommendations after assessing available science, local and traditional knowledges. For the purposes of this paper, research capacity, captured by various terms in the frameworks previously mentioned, is defined as the ability of an actor, organization or network to engage, produce, maintain and use knowledge through individual and collective development (Cooke, 2005; Kaseje, Edwards and Mortley, 2016; Trostle, 1992). As a distinct concept, research capacity has become an important economic and social consideration for the development of governance

Figure 2-1. Interaction amongst five types of capacities involved in environmental governance.
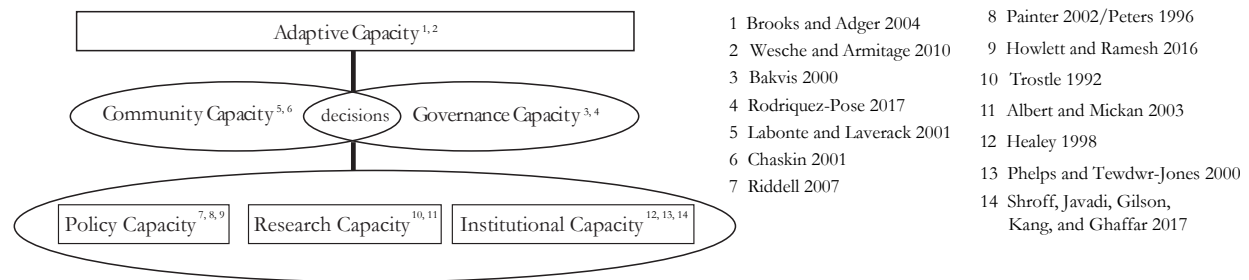
Figure 2-1 presents the relationships amongst the widely discussed types of capacity identified in environmental governance and Impact Assessment literature. Adaptive capacity is the overarching type, where the ability of a group to adapt determines the survival of that group, while community and governance capacity interact when groups make decisions. Policy, research, and institutional capacity interact to provide the means by which groups are able to make these decisions, and so are fundamental to both community and governance capacity.

and community capacities, including the empowerment of communities and the health and diversity of their economies (Andrews et al., 2011; Chan, Kirsop and Arunachalam, 2005; Cooke, 2005; Lansang and Dennis, 2004; Velho, 2004).

Research capacity has also been seen as necessary for the development of other larger capacities alongside policy and institutional capacities, contributing to community, adaptive and governance capacities (Howlett and Ramesh, 2015; Lalor and Hickey, 2014; Riddell, 2007). One strength of IA processes depends on availability and access to viable and pertinent knowledge and the abilities of participants to utilize that knowledge (Greig and Duinker, 2011). The connection among community, governance and research capacities is highlighted in the IA context, where community and public participation in the IA process generally improves assessments through the inclusion of more knowledge, as long as these groups have the means to do so. Calls for increased northern capacity, meant to provide an impetus for addressing capacity needs, often lack specificity with regards to the types of capacity needed. The importance of research capacity for the effective implementation of the IA process and for the development of larger capacities therefore deserves further exploration.

2.3   Avenues for future research

The Canadian IA process has evolved through three distinct phases: 1) the direct application of science to assess potential impact; 2) the inclusion of community consultation within the IA process; and 3) a movement towards community-based and participatory research. Movement into a fourth phase could be explored, where the development of research capacity and community capacity concurrently becomes a focus, allowing the community to set their own research agenda, then use the results of that agenda to more effectively engage in the IA process, and associated decision-making. Recently, there has been a general acknowledgement that northern researchers should, where appropriate, be consulting communities in how certain research is done and in co-designing the research agenda itself (Brunet, Hickey and Humphries, 2014). The development of a community's research capacity has the potential to benefit both local and research communities through a critical reflection on the roles and responsibilities in the research process. Likewise, the ability of IA processes to incorporate, interpret and apply traditional ecological knowledge to assessments is also a form of research capacity and represents an important component of the assessment process (Paci, Tobin and Robb, 2002). The fluidity of the concept of northern capacity

needs to be carefully managed in the development of IA in Yukon Territory to more fully appreciate the stresses that prompt local appeals for increased capacity and minimize confusion in the future (Black, 2015; Brinkerhoff and Morgan, 2010; Condell and Begley, 2007; S Louafi, 2016; Simmons, Reynolds and Swinburn, 2011).

More generally, the role of policy capacity in governance and community capacities has been well developed and there are hints at the role of research capacity in larger governance processes (Howlett and Ramesh, 2015; Marsh and Smith, 2000). However, further exploration into the relationships between research capacity and policy, institutional, governance and community capacities in the context of IA would be helpful. Potentially fruitful areas for future research include: 1) identifying the different dimensions of northern research capacity and their relation to IA-related policy, institutional, governance, and community capacities; and 2) examining the role of research capacity in the governance of Yukon Territory, where institutions and organizations have often been legislated, without adequate consideration of human, scientific and resource capacities to deliver. In order to achieve this, a better understanding of the different dimensions of research capacity, and how it interacts with other functions and capacities within a system, such as network governance, needs to be developed. Such an understanding would also help respond to wider calls for increased northern research capacity (Graham, 2016; Irlbacher-Fox and Gibson, 2010; Simon, 2017); the need for concrete assessments of the impacts of capacity building activities on northern natural resource governance (Angell and Parkins, 2011; Carlson, 2016; Noble and Hanna, 2015); and for enhancing the effectiveness of IA for sustainable development in the Yukon.

Table 2-2. Specification of defining characteristics for various types of capacity that appear in the wider literature

Capacity	Defining characteristics	Sources
Adaptive	- Collective ability to respond to environmental, economic, and social stress - Collective community resources and skills - Directly related to vulnerability and resilience	Brooks and Adger (2005), Gallopín (2006), Smit and Wandel (2006), Magis (2010), Wesche and Armitage (2010), Wamsler and Brink (2015)
Community	- Sustained collective ability to collaborate, problem-solve and function - Commitment, resources and skills for community engagement and the maintenance of community well-being - Empowerment and identity	Labonte and Laverack (2001), Chaskin (2001), Kwan et al. (2003), Smith et al. (2003), Craig (2007), MacLellan-Wright et al. (2007), Merino and de los Ríos Carmenado (2012), Matarrita-Cascante et al. (2016)
Governance	- Collective ability to make decisions and manage relationships - Includes political, economic, financial, technical, and managerial or organizational aspects	Woodhill (2010), Araral et al. (2015), Ramesh et al. (2016)
Institutional	- Ability to use appraise, synthesize and use evidence towards policymaking - Range, density, and collaborative ability of a network of organizations	Healey (1998), Phelps and Tewdwr-Jones (2000), Shroff et al. (2017)
Policy	- Ability to assess and make collective choices - Perform policy functions including knowledge acquisition, utilization, and implementation - Includes analytical, operational/managerial, and political capacities	Bakvis (2000), Riddell (2007), Howlett and Ramesh (2015), Angel (2015), Howlett and Ramesh (2015), Wu et al. (2015), Ramesh et al. (2016)
Research	- Ability to undertake high-quality research and produce, use, maintain and disseminate results and knowledge - Includes policy, resource, and program management	Crisp et al. (2000), Albert and Mickan (2003), Lansang and Dennis (2004), Velho (2004), Segrott et al. (2006), Condell and Begley (2007), Leitch (2009), Gadsby (2011), Kahwa et al. (2016), (Fellesson and Mählck, 2017)

2.4 Acknowledgements

2.5 References

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Preface to Chapter 3

Chapter 2 concludes with the acknowledgement that various types of capacity are interrelated, interacting, and nested. Building off this foundation, Chapter 3 adopts the IA policy network in Yukon Territory as the unit of analysis. Using the policy network mapping approach, it empirically examines the sources and flows of knowledge amongst actors in the IA network and identifies factors affecting research capacity.

Chapter 3. Supporting pluralism in environmental governance through research capacity: The case of complementary knowledge systems and Impact Assessment in the Yukon Territory, Canada

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Abstract

Impact assessment (IA) is a process through which political visions and knowledge systems interact in complex ways to facilitate sustainable development. Research capacity, the ability of a group to engage, produce, maintain and use knowledge, is of particular importance to movements towards pluralism – ontological, representational and procedural – in environmental governance. Northern Canada offers a unique context for exploring how IA moves towards pluralism amongst varying levels of research capacity in policy actors. Focusing on the Yukon Territory, this study employs Rapid Policy Network Mapping to explore how the IA process interacts with information and knowledge from multiple sources. Results show that while research capacity is central to realizing collective societal objectives in multi-jurisdictional decision-making contexts, there are also implications for advancing pluralism. With governance mechanisms shifting towards collaborative governance regimes, working towards pluralism as a societal objective is important to the overall effectiveness of such decision-making processes.

3.1 Introduction

At its finest, impact assessment (IA) supports democratic decision-making processes by negotiating a variety of political agendas towards common interests around regional and national sustainable development (Bowie, 2013; Larsen, 2018; Morgan, 2012). The mandate of this important environmental governance mechanism is generally to identify the positive and negative impacts associated with proposed development projects as identified by a variety of actors and recommend mitigations before regulatory permits are issued (Government of Canada, 1992). Inherently, IA fulfills a 'boundary spanning' role where data, information and knowledge are gathered from a variety of sources, then considered, interpreted, and applied in a process meant to

be transparent and participatory, making pluralism a critical objective for such processes (Cashmore, 2004; Kolhoff et al., 2009; Lonsdale et al., 2017; Nykvist and Nilsson, 2009; Partidario and Sheate, 2013; Wright, 2014). Cape et al. (2018, pg. 32) describe IA through a pluralist lens, in that there exists, "plurality of theoretical approaches for solving a problem [representational], plurality of methodological procedures [procedural], and plurality of people who assess a phenomenon from different value perspectives [ontological]," which align with academic philosophical understandings of *representational*, *procedural*, and *ontological pluralism* (Yumatle, 2014). With this in mind, expecting mechanisms like IA to bring equity to environmental governance simply by broadening the variety of participating actors tends to assume that working towards representational and procedural pluralism translates directly into a process equipped to pursue ontological pluralism (Emerson, 2011; Glucker et al., 2013; Hughes, 2010; Kamarck, 2007; Moore and Hartley, 2010; Pollitt, 2003). Misplaced focus on capacity 'deficits' in marginalized groups distracts from embracing principles of pluralism in the process itself (Howitt et al., 2013; Howitt and Suchet-Pearson, 2006). The ability of an actor, organization or network to engage, produce, maintain and use knowledge through individual and collective development – *research capacity* – and associated supporting rules and norms – *institutions* – therefore constitute multi-level constraints to the evolution of such processes towards fully embracing pluralism (Bond et al., 2018; Kolhoff et al., 2009; Loomis and Dziedzic, 2018).

Pluralism conceptualizes the active engagement of the diverse array of worldviews that exist, each with their own questions, approaches, challenges and solutions (e.g. Coombes et al., 2013; Spickard, 2017; Yumatle, 2014). Discussions in environmental governance contexts tend to focus on representational – broadly public participation – and procedural pluralism – merging the various conventional methodological approaches to understanding human and non-human systems (i.e., biophysical, environmental, social science) (e.g. Leuschner, 2012; Loomis and Dziedzic, 2018; Spagnuolo, 2011). However, debates around the distinction between representational and ontological pluralism have been woven through Canadian co-management literature for decades (e.g., Nadasdy, 2008; Natcher et al., 2005; Southcott and Natcher, 2018; Wong et al., 2020), where ontological pluralism requires the active engagement of fundamentally different understandings of the human-environment relationship (Howitt and Suchet-Pearson, 2006). Since IA is often positioned to contribute to knowledge production for decision-making (Hempel and Lammerant, 2015) and progressively greater emphasis is placed on Indigenous perspectives (Arsenault et al.,

2019; Udofia et al., 2017), ontological pluralism becomes particularly relevant. Even while the intent of IA practice is to draw on collectively built knowledge from multiple sources, IA literature has identified weaknesses in the ability of established processes to fulfill this goal (Table 3-1) (Fidler and Noble, 2013; Greig and Duinker, 2011).

In Canada, the argument for IA processes to more actively pursue pluralism in its various forms has become central to best practice guidelines, particularly in northern regions. For example, the Berger Inquiry (1974-77) was a landmark assessment of a proposed pipeline in the Mackenzie Delta of Northwest Territories that became foundational to the push towards ontological pluralism in Canadian environmental governance (Southcott et al., 2018). Increasingly, policy discussions have centered on improving the benefits of resource development for local communities by increasing public and Indigenous participation in IA processes in response to the impacts of institutional, disciplinary, and transactional 'silos' (Arsenault et al., 2019; Baker and Westman, 2018; Bowie, 2013; Larsen, 2018; Morgan, 2012; Noble and Hanna, 2015; Olagunju and Gunn, 2016; Udofia et al., 2017). In these contexts, there is potential, and often intent, for Indigenous knowledge, social sciences and conventional science to be engaged as complementary approaches, however, the active implementation of ontological pluralism has seen little success (Baker and Westman, 2018; Bond et al., 2018; Kwiatkowski et al., 2009; Paci et al., 2002; Southcott and Natcher, 2018). Challenges include access to Indigenous knowledge; misaligned expectations and perceptions; and larger social concerns, such as the legalities of Indigenous rights (Arsenault et al., 2019; Southcott and Natcher, 2018; Udofia et al., 2017).

In practice, pursuing different forms of pluralism in decision-making relies heavily on research capacity (Cooke, 2005; Kaseje et al., 2016; Kirchhoff, 2006; Trostle, 1992). The ability to interact with information and knowledge contributes to an actor's ability to represent their approach to a particular question, as well as effectively engage in discourses utilizing a variety of knowledge types. The modalities of knowledge production and implied power dynamics have gained attention and are thoroughly discussed elsewhere (e.g. Brunet et al., 2014; Howitt and Suchet-Pearson, 2006; Natcher et al., 2005; Rahman et al., 2019). As related to IA, power is of analytical interest for aspects of political legitimacy, participation as a form of democratic decision-making, and knowledge production and application (Cashmore et al., 2010; Emerson, 2011; Loomis and Dziedzic, 2018; Morgan, 2012; Sinclair and Diduck, 2017). While power is not the main focus of this paper, it is inherently part of IA practice and warrants mention.

Table 3-1. Constraints on effective IA as identified in literature, arranged chronologically.

Source	Type of IA	Constraint(s)	Type of Pluralism
Nykvist and Nilsson (2009)	IA	- Lack of clear priorities - Dominant cultures	Procedural Ontological
Kwiatkowski et al. (2009)	Health	- Tendencies towards assuming pan-Indigenous strategies - Internal capacity	Ontological
Cashmore et al. (2010)	Environmental	- Passive integration of IAs into decision-making - Neglect of the broad institutional context	Procedural Representational
Greig and Dunker (2011)	Environmental	- Quality of science used as input - Lack of support from outside IA process	Ontological Procedural
Soria-Lara et al. (2016)	Environmental	- Integration of non-science knowledge - Lack of engagement early in scoping phases	Ontological Representational
Lonsdale et al. (2017)	Environmental	- Lack of standardized approaches	Procedural
Udofia et al. (2017)	Environmental	- Lack of commitment to early engagement by proponents - Limited information about interest groups for proponents - Confusion around roles and responsibilities re: consultation	Ontological Procedural Representational
Arsenault et al. (2019)	Environmental	- Unrealistic timelines - Community capacity - Ineffective engagement and communication - Distrust	Representational Procedural
Kolhoff et al. (2018)	Environmental	- Insufficient consideration of capacities - Political system and context	Representational Procedural
Larsen et al. (2018)	IA	- Lack of support for possible rejection of project - Communities as providers of input, rather than decision-makers	Representational
Khosravi et al. (2019)	Environmental	- Characteristics of decisionmakers - Weak legislation - Lack of environmental awareness	Representational Procedural

To date, the main focus of IA research has been on project scale representational and procedural pluralism, with few studies considering overall IA processes, for example by using policy networks as the unit of analysis (Kolhoff et al., 2016; Loomis and Dziedzic, 2018). Key questions remain concerning the influence of various knowledge sources on IA outcomes and how to best pursue pluralism in practice (Loomis and Dziedzic, 2018; Pope and Morrison-Saunders, 2013; Soria-Lara et al., 2016). this paper focuses on network-level research capacity in a multi-jurisdictional Canadian IA context, namely the Yukon Territory, Canada. Our aim is to better understand the multi-level constraints affecting the quest for pluralism in IA processes by examining knowledge sources and flows throughout an IA policy network and identifying the state of research capacity for key actors (Figure 3-1).

3.2   Conceptual background

3.2.1   Research capacity

Research capacity is amongst a wide variety of capacities recognized as being ongoing constraints to regional development (Harrow, 2001; Lansang and Dennis, 2004; Lusthaus et al., 1999; Velho, 2004). The literature on capacity building has evolved primarily within the fields of international development and public administration since the 1970s, with an initial focus on using the 'deficit model', which assumes an absence of capacity (Brinkerhoff and Morgan, 2010; Kislov et al., 2014; Lusthaus et al., 1999). More recently, 'bottom-up' models acknowledge existing capacity with intentions of expanding it (Craig, 2007; Vasquez et al., 2013). Seen as a 'fragile development goal' (Trostle, 1992, pg. 1322), research capacity has come to include the ability to engage, produce, maintain, disseminate and use knowledge (Cooke, 2005; Gadsby, 2011; Howlett and Ramesh, 2015; Marsh and McConnell, 2010; Marsh and Smith, 2000; Nchinda, 2002). Some interpretations of the term focus on development of conventional post-secondary education programs locally and include finances, training and dissemination (e.g. Bisaso and Höltttä, 2017; Volmink and Dare, 2005). Others have broader interpretations that include regional innovation and accompanying local infrastructure built to support expanded knowledge economies (e.g. Barrett et al., 2011; Mugabo et al., 2015; Velho, 2004). These wider visions look to bridge knowledge generation and decision-making spheres (Enemark, 2005; Gadsby, 2011; Kislov et al., 2014; Lauzon, 2013). Regional research agendas, the accessibility of knowledge, and the application of results in decision-making have become established characteristics of these more generous

Figure 3-1 Yukon impact assessment process as a policy network.
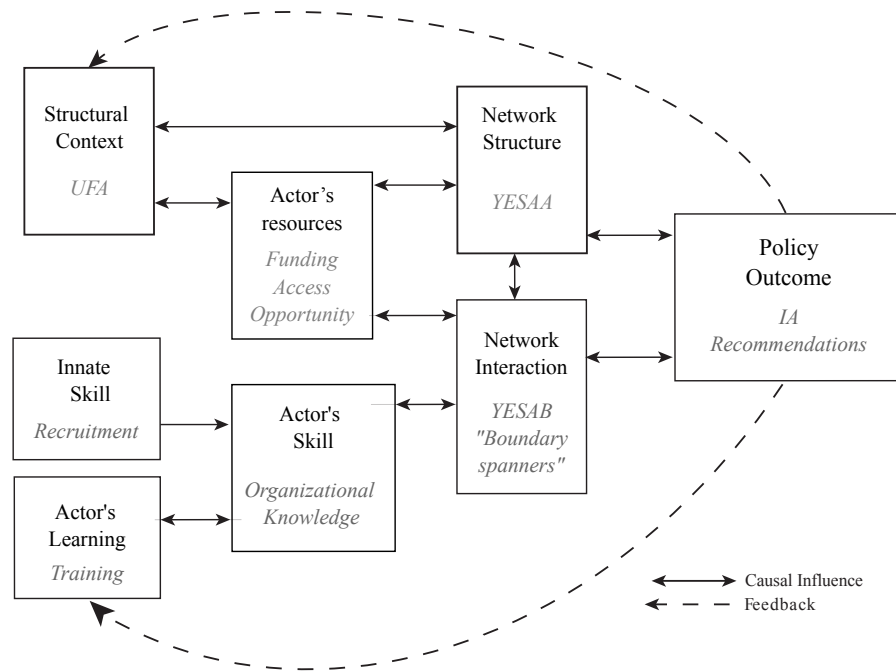
Figure 3-1 interprets the Yukon IA process as a policy network by overlaying elements of the process on the Marsh and Smith (2000) model. Solid lines indicate causal feedback, where interactions are either unidirectional or reciprocal. Feedback from policy outcomes adjust the conditions of an actor's learning (training) while the UFA provides a negotiated structural context tied to land claims.

conceptualizations (Gadsby, 2011; Lansang and Dennis, 2004; Trostle, 1992). In spite of these new approaches, capacity generally remains an ambiguous and hard to measure concept (Enemark, 2005; Gadsby, 2011; Kislov et al., 2014). Ultimately, research capacity offers a useful lens through which to consider the knowledge aspects of governance mechanisms, including the sourcing, exchange and flow of knowledge in and amongst an IA network by placing knowledge at the centre of analysis (Fellesson and Mählck, 2017; Maag et al., 2018).

3.2.2 Policy networks

The concept of policy networks falls under the larger theoretical umbrella of network governance as a way of narrowing the focus of analysis to a particular policy domain shared by an interconnected group of state and non-state actors (Börzel, 1998; Kickert et al., 1997; Klijn, 1996; Knoke, 2014; Rhodes, 2006). These interdependent actors generally share common policy interests, but not necessarily agendas or goals while maintaining formal and informal mechanisms for exchanging resources and information, an alternative to market and hierarchical governance structures (Börzel, 1998; Kickert et al., 1997; Klijn, 1996; Rhodes, 2006; Turrini et al., 2010). Early critiques of policy network research centered on a lack of theory building, managing complexity, and understanding network dynamics (Dowding, 1995; Klijn, 1996). In response, significant work has been done to build models of policy networks, identify casual relationships and explore complexity, where capacity has become a central influence on interactions (Bevir, 2013; Howlett et al., 2017; Howlett and Ramesh, 2015; Knoke, 2014; Ramesh et al., 2016; Turrini et al., 2010; Weible and Sabatier, 2005; Wu et al., 2015). The field of IA can learn valuable lessons from the application of policy network theory, where social learning, institutional arenas, 'boundary spanners' – actors who connect various agendas from different areas of a network) – and capacity are considered central to network interactions and outcomes (de Leeuw et al., 2018; Haas, 2015; Howlett et al., 2017; Howlett and Ramesh, 2015; McGee and Jones, 2019; Nykvist and Nilsson, 2009). In this study we consider IA as a policy network – a network of interdependent, multi-jurisdictional state and non-state actors interacting to influence policy outcomes related to development in northern Canada.

3.3   Study setting

The Yukon Territory shares borders with Alaska, British Columbia, and Northwest Territories, encompassing portions of the Rocky and the Mackenzie Mountain ranges, resulting in a unique regional culture, environment, and geology. Indigenous peoples of the region, now known as Yukon First Nations, have inhabited the region since ~ 24,000 years before present (Bourgeon et al., 2017). The arrival of a variety of groups looking to share the 474,391 km^2 land area, such as the Hudson's Bay Company and gold seekers of the Klondike Gold Rush, made resource management central to regional economic development and political debate alike (Sabin, 2016).

More recently, the Yukon Territory has had a growing population, with 41,352 people in 2019, ~23% of which self-identify as Indigenous (YG, 2020). In 1973, a delegation of the Council of Yukon Indians (now the Council of Yukon First Nations) ignited a land claims process for the region that led to the organization of Yukon Indigenous peoples into 14 distinct First Nations. Negotiations culminated in 1990 with the *Umbrella Final Agreement* (*UFA*), a modern-day treaty between Yukon First Nations, the Government of Canada (GoC) and Yukon Government (YG) (UFA, 1993). The *UFA* is a framework for negotiating individual self-government agreements and establishing First Nations Governments (FNGs), 11 of which had been signed as of 2017 and coordinated through the Council of Yukon First Nations (CYFN) (CYFN, 2020). Among other processes, the *UFA* outlines the specifics of the Yukon IA process with the expressed intention of encouraging regional sustainable development by giving local control over development projects and addressing environmental, social, and economic assessments holistically (Government of Canada, 2003; McCrank, 2008; UFA, 1993). The *Yukon Environmental and Socio-Economic Assessment Act* (*YESAA*) is the 2003 federal legislation that established the Yukon Environmental and Socio-Economic Assessment Board (YESAB), superseding other assessment authorities in the territory (Government of Canada, 2003).

It is worth pausing here to acknowledge the general interpretation of IA as a 'neutral process' or at least an objective examination of potential impacts of a development project and the limitation that this assumption introduces into value-oriented processes (Hempel and Lammerant, 2015). Most decision-making mechanisms resulting from land claims in northern Canada bear the markings of negotiation and compromise between Indigenous, federal, and territorial/provincial representatives, often erring on the side of more colonial structures, but with attempts to guarantee

inclusion and ensure community benefits (Caine and Krogman, 2010; Government of Canada, 2003; Natcher and Davis, 2007; UFA, 1993). Within this context, the *UFA* attempts to create a more supple relationship between conventional scientific knowledge and local and Indigenous knowledges, or at minimum space for the consideration of both in shared governance mechanisms (Huntington, 2018). Transitioning such processes towards more pluralistic approaches faces a major limitation in capacity, long central to broad discussions of regional development and natural resource management in Yukon Territory and the North. Rarely has a detailed analysis of the underlying mechanisms, logistics, and underpinnings of northern capacity building been undertaken (Abele, 2009; Angell and Parkins, 2011; Wong et al., 2020). The Yukon IA process has the potential to offer a range of capacity-related insights for IA processes internationally due to its foundations in co-governance, guaranteed space for participation and mandate to accommodate information and knowledge from multiple sources that include scientific, local and traditional knowledge (Cherkewich, 2010; Government of Canada, 2019a).

3.4   Methods

We employed Rapid Policy Network Mapping (RPNM) to identify IA related institutions and policy actors, which include legislation, governments and organizations, along with their resources and constraints. The broad Yukon IA network as the unit of analysis, rather than focusing on specific projects, as the RPNM technique considers network actors to include institutions (the rules of interaction) alongside network members (individuals and organizations), both of which impact network functions (Aligica, 2006; Bainbridge et al., 2011). We applied the following common elements of institutional mapping techniques: 1) the action arena, scale, or coverage of the institutions; 2) the actors involved in the Yukon IA process between 2017-2019 and their roles at that time; 3) the nature of the connections and interactions amongst the different actors; and 4) the influence each actor has on the overall process (Bainbridge et al., 2011; Ostrom, 2008).

3.4.1   Data collection

We started by examining public documents, federal and territorial legislation, policy instruments, and government websites related to the overall IA process in the Yukon between its inception in 2006 and ongoing implementation as of 2018, following a snowball technique. A 'seed' policy document was used to identify pertinent policies and programs, which were then used to identify

other policy instruments (Bainbridge et al., 2011; Farquharson, 2005). Rather than focus on specific projects that have navigated the IA process (e.g., Loomis and Dziedzic, 2018; Pope et al., 2013), our data collection looks to establish overall connections and interactions amongst policy instruments and actors to gain a better understanding of resource dependencies. Our chosen seed policy was the *UFA*, the foundational modern-day treaty.

To more deeply explore the resources and connections amongst identified actors, we also conducted sixty-seven key informant interviews (n=67) with Yukon IA practitioners between 2018 and 2019. Interviews were primarily conducted in Whitehorse, Yukon, and Dawson City, Yukon, the administrative and government capitals of the Yukon Territory and the Tr'ondëk Hwëch'in government respectively. We maximized for variation in order to capture the largest diversity of related opinions possible (Baxter and Eyles, 1999). Snowball sampling leveraged informal relationships to recruit beyond formal advertisement (Creswell and Clark, 2007) so that "… the researcher relinquishes a considerable amount of control over the sampling phase to the informants," (Noy, 2008, pg. 332). We confirmed former YESAB employees by drawing on publicly available YESAB annual reports produced since 2006. Participants also provided important connections to individuals who held positions not explicitly related to IA, but with pertinent perspectives. Community saturation was achieved when the names suggested through snowball sampling were no longer new to the researcher. Recruitment was based on one of the following criteria:

1. Those who held positions directly related to the IA process for minimum one year at the time of interviews;

2. Those who had been involved in the IA process in the past, for a minimum of one year, identified through snowball sampling; or

3. Those who had been recommended by at least two other participants.

The semi-structured interviews lasted between 60 and 90 minutes, which allowed enough time to develop informant perspectives conversationally while maintaining a semi-formal structure (Seidman, 2013; Sovacool, 2010). Semi-structured interviews relied on guiding themes drawn from research capacity evaluation frameworks to direct the conversation (Cooke, 2005; Maag et al., 2018). These themes included formal vs. informal connections; information and knowledge sources; collaboration and cooperation; and opportunities for knowledge exchange. Data collection protocols were reviewed and approved by the McGill University Research Ethics Board

(#127-0717) prior to data collection. Appropriate licensing was also obtained through the Yukon Scientist and Explorer's permitting process (license # 6800-20-1099) and research agreements were put in place with the Yukon Environmental and Socio-economic Assessment Board and the Tr'ondëk Hwëch'in of Dawson City.

3.4.2 Data analysis

Audio recordings of interviews were transcribed and then qualitatively coded using the analysis software NVivo. Interviews and policy documents were coded inductively following an iterative process to identify the main emergent themes concerning knowledge sources and flows. Structural and pattern coding strategies were then used to organize the emergent themes and draw out patterns of perspectives on knowledge dissemination throughout the IA network (Saldaña, 2015). These patterns were then used to apply templates by Bainbridge et al. (2011), mapping policy instruments and policy actors using CmapTools software (Fitzpatrick et al., 2010). We first categorized the instruments and actors to facilitate an examination of their role in knowledge distribution (Table 3-2) (Bainbridge et al., 2011). We then categorized policy instruments associated with Yukon IA vertically by scale of influence (Canada, Yukon, regional, YESAB Districts, and local) and horizontally using the following categories: General – YESAA; General – UFA; Environment; Land Use Planning; Economic Development; and Other (Table 3-3). We mapped the relationships between instruments and distinguished between explicitly identified and ephemeral relationships. We similarly mapped policy actors with vertical columns capturing scale of influence (Canada, Yukon, regional, YESAB Districts, and local) and horizontal rows capturing the policy actor categorization: Influencer (I), Owner/Decision Maker (ODM), Deliverer/Influencer (DI), Deliverer (D). Connections amongst actors were then identified based on reported knowledge flow. Any implied social hierarchy in either map is unintended.

3.4.3 Assumptions and limitations

This study assumes that policy instruments are connected and related through mutual referencing or reliance and that network members are similarly connected to other members through professional or personal contact, so that these connections can be traced as a means of mapping the institutional and relational landscapes (Farquharson, 2005; Scott, 1988). A limitation of using snowball sampling for policy documents relates to the accessibility of unofficial documents that are identified but have not been officially released. Due to the niche that IA occupies, potential

Table 3-2. Categorizations for instruments and actor (stakeholder) mapping.

Category	Role
Influencer (I)	Legally involved in the policy process and can affect policy outcomes through legitimate means
Owner/Decision Maker (ODM)	Has legal authority to make a decision that can affect policy outcomes
Deliverer/Influencer (DI)	Can affect policy outcomes through legitimate means, and provides actions, processes, or reporting in support of the policy process
Deliverer (D)	Cannot influence policy outcomes but provides actions, processes, or reporting in support of the policy process.

informants with perspectives on IA were not limited to holders of a specific position or educational background, making it possible to miss certain groups. IA practitioners were defined as those involved with the gathering, production, exchange and use of information and knowledge within the context of the IA process (Weaver et al., 2008). The longer that practitioners have been working in the Yukon Territory, the more interactions they will likely have had with a variety of other practitioners, making it reasonable to assume that most practitioners within the network are generally known to each other. However, there are also limitations around availability for interview due to time constraints, maintaining anonymity amongst a small population and the high turnover rates identified in professional positions. Semi-structured questions were adapted from research capacity evaluation frameworks proposed by Cooke (2005) and Maag et al. (2018) and then piloted with four local IA practitioners and two FNG representatives to augment reliability and mitigate potential researcher bias. Reliability and trustworthiness were enhanced through the discussion of broad preliminary findings with advising IA practitioners and FNG representatives, who were also participants, in order to gain broad feedback and provide member-checking (Yin, 2003).

3.5   Results

3.5.1   Institutional mapping

The Yukon IA process is directly linked to a variety of federal and territorial institutions based on a modern-day treaty negotiated between Yukon First Nations (FNG), Yukon Government (YG), and the Government of Canada (GoC). The *Umbrella Final Agreement* (*UFA*) plays the central role in the institutional map of the Yukon Territory regarding to natural resources, with subsequent federal legislation, the *Yukon Environmental and Socio-Economic Assessment Act* (YESAA), providing specific implementation guidelines. The *UFA* provides a formal basis for goals of ontological and representational pluralism in all of its associated processes, including IA, by establishing multiple mechanisms where there is an emphasis on engaging Indigenous worldviews in decision-making. *YESAA* approaches procedural pluralism by considering all impacts (e.g., environmental, social, health) together in one process. *YESAA* also outlines the required formal connections amongst the various network actors, include consultation and notification requirements. Other territorial and federal legislation become engaged depending on jurisdiction and existing regulations and thresholds.

Umbrella Final Agreement

The *UFA* outlines the roles and responsibilities held by the signing parties and establishes the context for *YESAA*. Both the *UFA* and the individual self-government agreements identify settlement lands and traditional territories, with varying degrees of control over development decisions according to the established categories, which include access, surface and subsurface rights. The individual Final Agreements are a balance of Indigenous rights and title that are maintained by the First Nation and those ceded to YG and GoC. There are three First Nations who have not signed onto the *UFA* and have not negotiated self-government agreements, and additional First Nations have inter-jurisdictional traditional territories that also fall in the Yukon Territory, but are not included in the *UFA*. This opens new lines of discussion around the roles of *YESAA*/YESAB and the space for interaction between unsigned First Nation and the IA process, which has been observed to be different than that of self-governing FNGs with clear and established positions. Direct connections between the policy instruments and institutions initiated by the *UFA* are clearly stated, such as the ties between IA, land use planning, and advisory boards, as well as adjacent land claims agreements (e.g., the *Inuvialuit Final Agreement*) (UFA, 1993). The IA process outlined by this treaty also explicitly *"provides for guaranteed participation by Yukon Indian People and utilizes the knowledge and experience of Yukon Indian People in the development assessment [IA] process"* (UFA, 1993, 12.1.1.2, pg. 101). By identifying and attempting to address these concerns, the *UFA* broadly recognizes the goals of ontological, representational, and procedural pluralism at the foundation of the IA process.

Yukon Environmental and Socio-Economic Assessment Act

The *Yukon Environmental and Socio-Economic Act* (*YESAA*) is federal legislation that outlines the impact assessment process in the territory and establishes the Yukon Environmental and Socio-Economic Assessment Board (YESAB), which takes on the evaluation of significant adverse effects of development projects within the territory (Government of Canada, 2003). By combining the various forms of IA into one process, YESAB approaches procedural pluralism holistically. Its jurisdiction covers the entire territory, but is divide into six districts, where designated offices are embedded in a community deemed relatively central to the district, encouraging movement towards representational pluralism in the process by embedding assessors in local contexts. This legislation took over all assessment responsibilities from the Canadian Environmental Assessment

Table 3-3. Key agencies in the Yukon IA network that play functional roles for the gathering, maintenance and distribution of knowledge.

RPNM class	Agency	Mandate	Role
ODM	Yukon Environmental and Socio-Economic Assessment Board (YESAB)	To provide a comprehensive, neutrally conducted assessment process applicable in Yukon	Responsible for the implementation of assessment responsibilities under YESAA
ID	Major Projects Yukon (YG)	Act as main point of contact for YG on matters relating to the YESAA	Coordinate YG departmental feedback for assessments Represent the government as the decision body on large development projects
ID	Northern Project Management Office (GoC)	To improve the timeliness, predictability and transparency of northern regulatory processes to foster a more stable and attractive investment climate in the territories	Coordinate federal efforts related to northern regulatory review processes Publicly tracks the progress of projects
ID	Natural Resources Department (e.g., Tr'ondëk Hwëch'in)	Responsible for managing land use on settlement lands including participating in IA and related processes	Coordinate FNG input into IA processes
D/I	Public Interests	Various inputs from interested actors (e.g., Renewable Resource Councils)	Provide input from diverse public and personal interests

Agency (CEAA) – now Impact Assessment Agency (IAA) – so that all development projects in the Yukon Territory, including those on federal lands, funnel through YESAA. In 2017, a memorandum of understanding was signed between Yukon First Nations, the GoC and YG to essentially "reset" the relationships between the parties and re-establish the IA process in the Yukon back to its original intent, after the ability of the process to fully embrace ontological pluralism was questioned by some Yukon First Nations (YG, 2017). An Oversight Group was established as part of the agreement, with the directive to review and make adjustments to the IA process as well as the resources for implementation available to Yukon First Nations. As of 2019, the Oversight Group was determining terms of reference and an agenda for future work. YESAB is regularly faced with the challenge of advancing visions of ontological, representational, and procedural pluralism in the face of legislated timelines and other operational constraints.

Other legislation

Associated federal and territorial legislation has limited direct influence on the IA process itself but provides thresholds and guidelines for impacts and mitigations. The two levels of legislation complement each other, with broad guidance from the federal government and locally developed guidelines from the territorial government. For example, the territorial *Fish and Wildlife Act* of 2009, informed by the *UFA*, interacts with the federal *Fisheries Act* of 1985. When territorial guidelines are deemed lacking or underdeveloped, federally established regulations are maintained. YESAB also connects with other review processes that build on the outcomes of an IA review. For example, the Yukon Water Board is another independent review board established in 2003 under the *UFA* and the territorial *Waters Act* of 2003 (Olynyk and Bergner, 2002). Development projects must obtain a water license when their project has the potential to impact water resources, which requires both an IA evaluation report and a decision document prior to the water licensing process. Other legislation, such as the *Heritage Resources Act* of 2002, are informed by the *UFA* but have limited connection to federal legislation. The federal government provides funding for public participation in IA through the Northern Participant Funding Program, but only for specified projects, such as reclamation of the Faro Mine or the Coffee Gold project (Government of Canada, 2019b). In combination, these various policy instruments work towards goals of ontological, representational and procedural pluralism, as each Act provides a mandate to their associated departments, though these can be at odds and in tension with one another.

3.5.2   Network actor mapping

Actors participating in the Yukon IA process fulfill functions of information and knowledge gathering, coordination, and interpretation, according to their role. Often government departments within the same organization will fulfill different roles, further increasing the complexity of the network (Figure 3-2). Focusing on research capacity at the network level, we see that the flow of information and knowledge originates at a limited number of sources and is directed through specific pathways, with actors in coordinating positions controlling the flow and filtration of information and knowledge. However, participant 1038 explained that *"… the ability to access is not consistent across assessment branches but from YG to YESAB to the people that are providing comments. They don't have access to the same research."* Knowledge sharing and exchange amongst actors is also limited, as participant 1038 identified when discussing the accessibility of government-generated results, stating, *"…they're not easy to find and they're not housed very well, and I don't think we have a really good body of research that is accessible to everyone…."*

Yukon Environmental and Socio-Economic Assessment Board

The Yukon Environmental and Socio-Economic Assessment Board (YESAB) is the central organization tasked with the day-to-day implementation of YESAA, including collecting, interpreting and considering information and knowledge from a variety of sources (Government of Canada, 2003). The seven-member governing board, comprised of nominated representatives from CYFN, GoC, and YG, is responsible for larger process governance and implementing principles of ontological and procedural pluralism. The Chair of the Board and two other Board members also serve on the Executive Committee, a team of dedicated assessors that performs assessments for large and potentially controversial projects that undergo a lengthier, more in-depth examination that includes more complex considerations and territory-wide implications. Between 2016 and 2019, YESAB completed one Executive Screening and undertook two assessments on large projects that were ongoing at the time of writing (2020) (YESAB, 2018; YESAB, 2019). The majority of projects are assessed through one of the six Districts Offices (DO), facilitated by a Manager of the District Office (MDO) and at least one Assessment Officer (AO). Between 2016 and 2019, DOs completed between 199 and 232 assessments, a third of which were consistently from the placer mining sector. As a consequence, Dawson City District Office completed between 34% and 38% of the assessments in the territory (YESAB, 2018; YESAB, 2019).

Figure 3-2. RPNM results for actor mapping of the Yukon IA network and the associated connections.

Figure 3-2 presents key insights from the RPNM. The difference between number of connections seen around the consultants when compared to the academics indicates that a large volume of new knowledge is entering the network through consultants, rather than through academia, as one might expect. Also, a limited number of boundary spanners filter information and knowledge from a variety of sources prior to providing input into the IA system, which means that the capacity of these boundary spanners determines the flow of knowledge through the network.

As the IA authority, YESAB functions as an impetus for knowledge gathering, the main coordinator of information and knowledge, and then as a repository for the results. As participant 0805 stated, *"...my sense is that there isn't a lot of interaction between the parties who are participating in an assessment process. I think they're relying a lot on YESAB to sort it out, figure out what's needed,"* which redirects accountability away from individual actors and their connections towards the central organization. With the authority to request additional information and knowledge to support their considerations, YESAB acts as the impetus behind increased territorial research capacity. Baseline requirements regularly lead to more funds becoming available for information and knowledge gathering activities that were not planned prior investments. A former consultant, participant 1003, confirmed this role, stating *"I think YESAB has definitely changed the landscape.... We actually have a consulting industry up here now that didn't exist before."* As a coordinating body, YESAB establishes spaces for collective knowledge to coalesce, gathered from a variety of origins that include local and Indigenous sources. Assessors in DOs and the Executive Committee Office act as individual boundary spanners and knowledge brokers on behalf of YESAB, facilitating passive knowledge coordination and resulting in the accumulation of knowledge in one place.

YESAB is the repository for information and knowledge gathered in support of past projects and has become a database of baseline information and local knowledge housed in the YESAB Online Registry. There is the perception that better knowledge management, such as accessibility, would enable coordination between projects, assessments, and research agendas. An FNG participant, 1239, summarized this perspective: *"... there's enough work for four or five people in that organization [YESAB] to solely look at taking all the research that's ever been done in the Yukon and put that into practice, into use."* The accumulated knowledge and information from over ten years of assessments is publicly available through the Online Registry, though not necessarily accessible in terms of format and with some exceptions, specifically traditional knowledge, which has specific procedural constraint regarding accessibility.

Interestingly, the types of information and knowledge YESAB assessors are allowed to actively use have potential legislative limitations with regards to public access. YESAB employee, participant 1355 explained: *"A potential issue around that that's never really been tested yet is to what level are we as an organization [YESAB] as assessors allowed to review and use third-party information like that [journal articles], because the basis for our assessments is that the*

information is public and publicly available and transparent." This question becomes important when scientific journals are being cited as part of proposals or comments and is a major limitation to the uptake of new academic information and knowledge into the process. FNG participants have noticed this trend, identified by participant 1239:

> *"when you're looking at the recommendation reports, for example, maybe the only reference or one of the only ones in there… let's say regarding Dall sheep is 'Flying in Sheep Country'[4]. That's policy within Yukon Government. But we know that over the years there have been many studies on Dall sheep that are not being used as references in these recommendation reports."*

This question concerning the public accessibility of published journal articles means that even if the information and knowledge does exist there may be a legal limitation on the applicability of academic papers.

First Nations governments

Each First Nations government (FNG) has a distinct structure and relationship with the other actors in the IA network, and so interactions vary according to the specific First Nation, as does the department or section that coordinates comments. The *UFA* explicitly guarantees FNG participation through funding support for one employee, usually a Development Assessment Officer. This funding is negotiated through the larger Financial Transfer Agreement (FTA) between the self-governing First Nations and the GoC (YG, 2017). The distribution of funding is negotiated collectively between the 11 self-governing FNGs, which leaves the three unsettled First Nations with ambiguous relationships with the IA process. As FNG participant 1239 explained:

> *That's a whole other big implication for [our FNG] because we have a traditional territory that's much larger than the YESAB recognizes…. And it's even harder to know how YESAB considers those comments because they tell us that technically under YESAB's legislation, [our First Nation] are not Yukon Indian people. So, it all falls under the 'interests of First Nations.'*

Adjacent First Nations and Inuit groups similarly claim traditional territories within the Yukon without the legal support of the *UFA*. For example, the traditional territory of the Taku

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[4] MERG (2002). *Flying in Sheep Country: How to Minimize Disturbance from Aircraft*, Mining and Environment Research Group, MERG 2002-6, Whitehorse, Yukon: Yukon Territorial Government, pp. 11.

River Tlingit extends into the Yukon from the south, though the majority of their lands rest in the province of British Columbia, where the British Columbia Environmental Assessment Office administers the IA process. Where their asserted traditional territory is in the Yukon, the relationship between YESAB and the FNG becomes murky. FNGs associated with the *UFA* are ensured the opportunity to participate in the Yukon IA process, but challenges remain for un-signed and non-Yukon First Nations.

FNGs are the source of Traditional Knowledge for IA, but face limitations around internal knowledge management. Participants identified a number of knowledge constraints including a need for appraisals of missing information and knowledge in their TT; a lack of programs designed to gather pertinent information and traditional and local knowledge, particularly Indigenous versions of baseline conditions; and a lack of internal knowledge management systems. Participant 1359 described the frustrations of limited and disjointed internal systems:

> *We don't have an organization-wide information management system. Everyone keeps their own systems. When I first started, I was heavily reliant on my fellow staff.... It's hard because you're reinventing the wheel each time. Citizens are getting asked the same questions. That's a really difficult aspect, especially if a project overlaps with a different project area that's already in assessment.*

FNG participants also made reference to boxes of old records and reports stored without appropriate organization or documentation, making it difficult to know if a report on a particular topic exists. Participant 1432 explained, *"...we also don't have some of the foundation pieces built that would take a lot of the pressure off."* These FNG knowledge constraints translate into limited ability to take full advantage of the guaranteed space for participation.

Yukon Government

Yukon Government occupies a variety of roles including: a decision body that considers the information and knowledge presented in YESAB recommendations, a regulatory body potentially enforcing YESAB mitigations, a proponent through activities such as infrastructure development, and as a primary source of publicly funded information and knowledge. The same organization fulfilling multiple roles simultaneously leads to disjointed internal coordination and discordance among departments with diverging mandates, reinforcing existing silos. There are also instances

where a single department is required to fulfill multiple roles, further convoluting the process and potentially limiting the engagement of new knowledge.

Major Projects Yukon (MPY) branch, housed in the Executive Council Office, and the department of Energy, Mines, and Resources (EMR) most often act as decision bodies, and a number of branches across multiple departments are consistently proponents. MPY coordinates comments from YG and acts as the decision body for large-scale, multi-year projects evaluated for Executive Committee assessments. MPY therefore acts as a boundary spanner encouraging procedural and ontological pluralism by collecting and interpreting knowledge and information internal to YG. For example, the departments of Environment and EMR can hold different perspectives with regards to conservation and their comments would reflect this potential disagreement, which MPY would have to reconcile in order to provide one coherent position. The other frequent decision body, the department of EMR, houses the branches of Land Management and Mineral Resources, which regularly take on decision body, regulatory and proponent roles, and potentially multiple roles on the same project. These departments are primarily associated with mining, land use and infrastructure development. For example, Land Management oversees the permitting, leasing, subdivision and sale of land parcels primarily from public land for the purposes of infrastructure, residential and agricultural development. Mineral Resources is responsible for issuing permits and enforcing regulations particular to mining, including placer and quartz (hard rock) mining. Other frequent proponents support infrastructure development for municipalities and transportation. The Community Operations Branch provides and maintains infrastructure in cooperation with municipal governments, while the Department of Highways and Public Works coordinates the regulatory applications for new roads, maintenance, and supporting infrastructure. These departments are often also regulators in these contexts, responsible for enforcement. With the variety of departments, branches, and programs involved in IA through multiple, sometimes conflicting roles, the network can become convoluted very quickly.

Yukon Government is also a primary source of information and knowledge through various branches and departments and has multiple sites of internal knowledge coordination that work to counteract interdepartmental silos, forming a knowledge sub-network operating to support IA. Due to the variety of research activities, YG has become a primary source for IA input: *"Now with conventional science, most of that is coming from YG…"* (participant 1038). The Department of Environment is one of the main information and knowledge gathering sources and houses the

Environmental Affairs branch, which articulates all biophysical research activities, particularly wildlife and water, into a cohesive position. Internal research activities make up the bulk of their argumentation, as explained by participant 2258, *"...most of the input we generate here [YG] is from our own regional biologists or research scientists."* In the natural sciences, the Yukon Geological Survey produces primary research on hard rock and surficial geology, including permafrost, providing regular updates on the mining activities and mineral potential. The Heritage Resources Branch houses the Yukon Archaeology Program, whose mandate includes the management of archaeological resources on non-settlement land, coordinating archaeological and heritage related activities among agencies and providing relevant IA comments. For social impacts, Health and Social Services has one position dedicated to coordinating input from the health perspective. With multiple programs looking to produce relevant information and knowledge to support IA, there are knowledge brokers in each department, whether they are formally designated with this role or not.

When knowledge generation activities have been successful, departmental silos and purposefully limited knowledge sharing has arisen as a challenge, where *"... in the past data was very guarded by the branches or governments or NGOs that owned it,"* (Participant 1038). Another YG participant, 2205, also pointed to limited accessibility of existing information and knowledge where, *"...one of the barriers is just not knowing what's out there and where to draw upon it."* The multiple layers of boundary spanners within the organizations appears to have created some frustration, where knowledge sources provide input that is not adequately reflected in the final YG position and therefore the IA recommendations. Participant 2258 explained, "*You can collect a lot of good information and have pretty good scientific rationale and partnerships, but you see a lot of variability in how that information affects the outcome of a project review....*" Even when the information and knowledge exist, is accessible and is used properly, knowledge flow through internal knowledge brokers can impact which and how information and knowledge are introduced into the larger IA network. Our results show that the individual motivation of IA practitioners heavily influences knowledge exchange, as noted by participant 2205: *"It often comes down to the individuals and what networks they have. And so, if an individual leaves a position, I think some of those networks can suffer."* The presence of silos among departments compounds existing logistical concerns, such as access to remote geographical areas and variable research capacity among departments, all acting to constrict the generation of public information.

Public advisory boards

A number of public advisory boards in the Yukon were established by the *UFA*, with Renewable Resource Councils (RRCs) explicitly providing a space for local voices in IA. Ten RRCs have been established and were functioning at the time of writing (2020), with regional coverage associated with traditional territories and staffed by volunteers from First Nations and non-First Nations communities, often with non-technical backgrounds (UFA, 1993). The main mandate of the RRCs is to provide local information and knowledge to regulators, land use planning and IA processes (UFA, 1993; YFWMB, 2013). A YG employee, participant 1510, emphasized that *"... the Renewable Resources Councils in the communities have been really key for us. They are very active in the comments period for assessments."* However, this perspective appears to be highly variable, depending on the region, as explained by participant 1239: "*I know that the local RRCs are to meet with them [Gwich'in Tribal Council], I think, on an annual basis at the minimum or maybe quarterly. But that doesn't happen either, so they're really in the dark there.*" When approached directly, certain RRCs identified that volume and timelines limit their ability to provide input: *"It's hard to take them [assessments] all on. We look for ones that take up lots of access or they're in a certain summer range or winter range of some wildlife,"* (participant 0909). For example, RRCs meet every two weeks and the comment period is also two weeks, so projects whose timelines overlap directly can go unnoticed and un-commented. Overall, the capacity limitations internal to RRCs limit their influence as a knowledge source and conduit for the IA process.

Consultants

The expansion of the consultancy sector has helped to fulfill specialized gaps in information and knowledge and, in some cases, fulfill an interpretation role. Our results clearly show that all other actors in the network rely on consultants as a knowledge source, including large and small proponents, FNGs, YG and YESAB alike. The private consultant industry has flourished due to the demand for knowledge gathering and generation services in support of IA proposals, so that the category of professional, scientific and technical services represents ~2.9% of territorial GDP 2016 – 2018 (YG, 2019). However, while larger proponents have the financial backing to conduct the required baseline studies, smaller proponents often lack the finances and in-house expertise to facilitate information and knowledge gathering activities.

Results also suggest there is limited capacity of consultants to interact with other worldviews or the specific legislative context of the Yukon. Four FNG representatives spoke to the idea that their own capacity was further constrained with the use of consultants. According to participant 1239, *"It's just a matter of the issue of time. What we're finding with our external supporters or consultants is that we spend a considerable amount of resource time here explaining what we need done to the consultants."* This sentiment was shared by participant 1432, *"...And we find that time and again, where we hired consultants to do a project, spoon fed them the information and they still didn't get it."* So, while consultants are an important source of the information and knowledge input to IA, there are unique limitations to the use of consultants in the context of Indigenous knowledge.

Academics

When probed about the use of academics as a source of information and knowledge, most participants had limited interactions with academia and limited exposure to the results of academic research, with some exceptions. Those who did have relationships were heavily involved with research and acted as conduits for partnerships among FNGs, YG, and universities. Participants indicated a limited or lack of connection between the scales of studies required by IA and those of academic research. One participant articulated the disconnect between academic projects and their IA counterparts: *"They may have an applied component, but they're not directly feeding into an environmental impact assessment on any given project at any given time."* Another concern was the technical accessibility of academic research results. As one FNG practitioner related, *"I would love to be able to integrate some of this newer research into the comments that we are using in our comments to the assessment process…. but sometimes the products are really technical, difficult to distill down to the level that would be useful…"* This participant went on to describe a range of materials returned to the community by researchers, from raw data in Excel sheets to complete academic theses, neither of which were described as being useful for informing potential IA input. Accessibility, in this case, is limited by the format of the research results being shared. With IA practitioners operating as generalists, highly technical or theory-driven research results are rendered inaccessible without the involvement of specialists, which means that they are seldom accessed to support decision-making.

3.6 Discussion

Amongst the various challenges that IA processes and policy networks share, interactions with information and knowledge are fundamental to meaningfully acknowledging the different pluralities involved in governance mechanisms (e.g., Bond et al., 2018; Emerson, 2011; Howitt et al., 2013; Pope et al., 2013). The legislated mandate of YESAB and the intent of YESAA broadly seeking to advance representational, procedural, and ontological plurality but there remain barriers when considering day-to-day operations. Some commonly identified limitations have been addressed using specific solutions, such as mandates that aim towards representational pluralism, including federally funded IA positions in FNGs (Arsenault et al., 2019; Larsen, 2018). In this light, the Yukon IA process provides lessons for other contexts looking to re-orient similar mechanisms towards inclusivity, while also revealing some common secondary capacity challenges that arise.

This analysis identified that new information and knowledge is introduced to, and distributed through, the Yukon IA network via very specific entry and dissemination points, emphasizing the disparate research capacity of the various policy actors who occupy these positions. The challenges associated with the research capacity of the IA policy network can be summarized as relating to time, knowledge existence, knowledge accessibility, and knowledge coordination (Table 3-4). Where common IA capacity challenges appear to have been identified and addressed in previous research, examining these underlying causes of both initial and secondary challenges could help to inform far-reaching solutions.

3.6.1 Time

Time is the main underlying constraint to the overall goal of pluralism identified by our participants. The challenges of timely decision-making have been alluded to, but not characterized fully in the IA literature, relating mostly to discussions of facilitating participation (Arsenault et al., 2019; Southcott and Natcher, 2018; Udofia et al., 2017). In the context of YESAA, separate timelines for Executive Committee and District Office level projects are enforced and rarely altered. There is also tension related to timing among proponents (as the primary Influencer), knowledge gatherers (Deliverers/Influencers), and YESAB (Owner/Decision Maker), as the proponents push for enforcing strict timelines for operational purposes and knowledge gatherers push to provide appropriate and sufficient perspectives in the face of large volumes of assessment

information. With staffing limitations in many of the key dissemination and coordination points and reliance on specific sources for certain types of information and knowledge, the issue of time becomes exacerbated and accentuated.

3.6.2 Existence of relevant knowledge

The existence of sufficient and relevant baseline scientific information and local knowledge is a common concern in IA networks (Loomis and Dziedzic, 2018), corresponding to the production and maintenance aspects of research capacity. The project-based approach to baseline information and knowledge that is characteristic of current IA practice in the Yukon and elsewhere tends to reflect a narrow, compartmentalized, site-specific focus for assessments and therefore accepted baseline studies. This translates to repeated investments of time and resources toward often concurrent baseline studies for adjacent sites and limits the flexibility of the process to address cumulative effects in a meaningful way. Our results show superficial connections between the main assessment board and a diverse set of potential knowledge sources, particularly academia and government – FNGs, YG, GoC – a stark contrast to the deeper connections we might expect from the central 'boundary-spanning' role of the IA process (Lonsdale et al., 2017; Partidario and Sheate, 2013), instead indicating limited knowledge exchange across the disciplinary agency divides (Olagunju and Gunn, 2016). This can lead to a repetition of research activities, which further compounds constraints on time and resources, re-routing already sparse capacity.

A main focus for capacity building efforts in northern Canada has been around knowledge gathering in the academic context (Abele, 2009; Angell and Parkins, 2011), but the role of consultants and the private knowledge economy in governance mechanisms has had little recognition (i.e., Petrov, 2008). Criticisms of the consulting industry in IA expressed by Greig and Duinker (2011) and Kolhoff et al. (2009) were mirrored by the IA practitioners participating in our study, including perceptions of low legitimacy and high bias in consultant-sourced results. Participants identified concerns around how these common criticisms are reflected in network outcomes, where trust in consultant-derived knowledge comes into question. Particular to the FNG participants, a criticism of consultants is a limited ability to effectively interact with Indigenous knowledge and worldviews in support of providing input to the IA process. Similar concerns around attempting to translate Indigenous knowledge into "usable" evidence have been articulated in broader environmental governance literature (Howitt et al., 2013; Howitt and Suchet-Pearson, 2006). Despite these concerns, there remains a heavy reliance on the consultant sector as the

primary source of new knowledge and information supporting IA in the Yukon, in part due to the underlying time constraints. While the knowledge production and gathering functions of the policy network have evolved, our participants generally felt that further development is needed to address increasing IA knowledge demands, particularly as assessments move towards better considering cumulative effects and more fully embracing pluralism.

3.6.3   Accessibility of information and knowledge

Once information and knowledge have been produced or gathered, mitigating the concern of existence, accessibility becomes the next major limitation, which impedes the encouragement of representational and ontological pluralism through knowledge maintenance and dissemination. Access to existing information and knowledge can manifest in a variety of ways, including storage, file format and "usability", which influences participation and relates to the engagement and use aspects of the policy network's research capacity. The quality of science available for IA processes has been a common topic of discussion (Greig and Duinker, 2011), while other barriers, such as file format and "usability", are rarely addressed. Our results show that the ability of IA practitioners to access information and knowledge is a nuanced and complex capacity concern. Access to Indigenous and local knowledge has been well studied in Canada (Arsenault et al., 2019; Booth and Skelton, 2011; Larsen, 2018; Udofia et al., 2017), but rarely has the discussion moved beyond broad identification towards specified limitations and a 'deficit framing'. Our results identified the ability of FNGs to internally organize and maintain their information and knowledge as a more specific limitation. A common thread among research participants was a sense that people know of reports existing but are unable to access those reports, which are either locked in the computers of former employees or remain uncurated in hard-copy storage. This was felt to cause previously conducted studies to be redone, considered an expensive and time-intensive activity. Similarly, public advisory bodies, such as Renewable Resource Councils established with the specific intent to provide local knowledge to IA processes, are often faced with position turnover, chronic vacancies, and mis-matched timelines, which can limit access to local knowledge for decision-making.

The Yukon IA process has sought to address concerns related to public accessibility by legislatively enforcing the availability of all information and knowledge associated with a development proposal via YESAB's online registry, with the exception of Traditional Knowledge which is protected under a separate set of policies and procedures. Substantial effort has been put

Table 3-4. Knowledge sources for IA input related to the capacity constraint and component of research capacity.

Knowledge Source(s)	Knowledge Type	Capacity constraint	Research Capacity Component
Consultants	Science Social Science Economic Health Traditional Knowledge	Time Access Coordination	Maintain Disseminate
Academia	Science Social Science Economics Health	Time Existence Access Coordination	Produce/gather Maintain Disseminate
Government Departments	Science	Existence Access Coordination	Produce/gather Maintain Disseminate
	Social Science	Existence Access	Produce/gather Maintain
FNGs	Traditional Knowledge	Time Access Coordination	Maintain Disseminate
	Local Knowledge	Time Coordination	Disseminate
Public Advisory Boards	Local Knowledge	Time Coordination	Disseminate

into gathering information and knowledge around particular concerns for each project, the results of which are then made publicly available in PDF format. This file format can make the use of the available information and data challenging for others who may wish to use them when preparing new development proposals, information requests and comments, including proponents, FNGs, and public advisory boards. An example was offered to us by a consultant working on behalf of a proponent, who employed multiple summer students to copy and paste data from the PDF files to make the data usable for a similar project proposal, while YESAB makes the point that other file formats leave the potential for alteration. File formats can seem trivial, but if information is to be useful beyond individual projects, including for cumulative effects assessment and strategic or regional environmental assessment, it is a concern worthy of further examination.

3.6.4   Coordination of knowledge exchange

The theme of coordination impedes movement towards pluralism in IA in two ways, namely around the facilitation of knowledge exchange (e.g., Partidario and Sheate, 2013) and the presence of silos (e.g., Olagunju and Gunn, 2016). In the context of YESAA, our results suggest that the ability of the policy network to facilitate information and knowledge exchange amongst its members is challenged by intra- and inter-organizational coordination issues, even when key forums for knowledge exchange exist. These forums were viewed favourably by research participants, with the caveat that low attendance due to available time limited benefits. Previous research suggests that the maintenance of dedicated spaces for knowledge exchange and relationship building among practitioners facilitates coordination and benefits overall IA outcomes (Olagunju and Gunn, 2016, Udofia et al., 2017). While YESAA provides some guaranteed spaces for IA exchange, consultation and participation, the expansion and management of these spaces requires more attention and maintenance.

Our results also suggest that organizational 'silos' are negatively affecting the Yukon IA policy network structure despite attempts to establish boundary spanning institutions to address such concerns. In FNGs the role of boundary spanner has been formally delegated to federally funded positions and in the Yukon Government through designated branches that gather and articulate the perspectives of their organization members on proposed projects which are then collected by the YESAB assessor for formal consideration. Similar initiatives have been established elsewhere in Canada and internationally with some success (e.g., Booth and Skelton, 2011; Partidario and Sheate, 2013). The Yukon Government has departmental divisions which

form a knowledge network operating in support of the IA process, including branches tasked with knowledge gathering and articulation. For example, Environmental Affairs coordinates input from their experts into the comments submitted to Major Projects Yukon, who accumulates knowledge and information gathered by all departments and then articulates the collective position of the government, with the perspectives of the regulators in mind. Assessors in District Offices and the Executive Committee Office then act as boundary spanners on behalf of YESAB, where the information and knowledge combine for consideration. How information and knowledge filters through the network for final consideration depends heavily on how the boundary spanners fulfil their knowledge coordinating roles. Reliance on the motivation of individuals acting as 'boundary spanners' is recognized as a constraint on network function in policy networks (de Leeuw et al., 2018; Haas, 2015). Adding pressure in the Yukon IA network, these individual positions often experience high rates of staff turnover, which can impede the quality of connection among organizations, reducing the overall research capacity of the policy network.

Time, alongside the existence, access, coordination of knowledge and information directly shapes the overall pursuit of pluralism in governance by constraining the research capacity of the IA policy network. These limitations span the levels of capacity building - individual, organizational, and network – that need common and coordinated interventions (Kislov et al., 2014). Our results suggest that the established institutions designed to support pluralism by encouraging Indigenous and local capacity for participation in IA processes have addressed some, but not all, research capacity concerns. Those that have been successful, such as funded boundary spanners and dedicated spaces for knowledge exchange, have produced additional research capacity limitations. Efforts to develop knowledge exchange and knowledge coordination mechanisms seem likely to alleviate the acknowledged time and resource limitations of policy actors and help shift understandings of representational pluralism. Mechanisms to support aspirations of pluralism through the development of capacity in IA warrant further research and policy attention.

3.7   Conclusion

Applying the concept of policy networks to the context of IA narrows the focus of discussions around pluralism as a societal goal to a particular sub-set of policy actors involved in advancing sustainable development. Questions concerning how best to incorporate the variety of

methodologies available to IA into a single process – procedural pluralism – and how to better adapt environmental governance mechanisms to more actively accommodate other worldviews and knowledge systems – ontological and representational pluralism – remain relevant internationally. In the context of Yukon Territory, Canada, the IA policy network has supported research capacity for environmental and natural resource issues by guaranteeing spaces for Indigenous and public representation, including financial support for boundary spanning and knowledge brokering roles; and establishing sufficient demand for an expanded knowledge economy, though this mainly falls back to the private sector in practice.

Overall, there remains room for improving network-level research capacity, mainly the production/gathering of more information and knowledge to offset clear gaps; improving maintenance and dissemination of information and knowledge by addressing accessibility constraints; and coordinating knowledge gathering and exchange activities to make better use of available resources, including time and staffing. Within the network, some actors will have internal constraints that impede their participation in network activities, such as internal knowledge management and relationship building mechanisms that require maintenance or reform. Institutional constraints include: 1) limited sources for new knowledge/information into the IA process; 2) particular types of knowledge being constrained to certain actors and sources; and 3) the stability of positions designated as boundary spanners and knowledge brokers impacting the distribution of information and knowledge and, therefore, network function. Each of these constraints require further research and policy examination in order to further societal goals of pluralism in IA processes, while also facilitating the development of capacity throughout the IA policy network.

3.8   Acknowledgements

3.9 References

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Preface to Chapter 4

Chapter 3 examined the network level of capacity in the Yukon IA context, identifying knowledge sources and flows, as well as capacity-related constraints that create 'choke' points interrupting the flow of knowledge. Chapter 4 build on this analysis, focusing in on the central actor, and a major choke point, in the Yukon IA policy network – the main assessment organization, and its assessors to identify a novel research capacity framework for the northern IA context.

Chapter 4. On the interrelation of organizational and individual capacities supporting Impact Assessment: The case of the Yukon Environmental and Socio-Economic Assessment Board

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Abstract

Impact assessment (IA) in Yukon Territory, Canada, relies on the capacity of the assessment board and its assessors to shape network outcomes, determined by interacting external and internal factors. We examine the Yukon Environmental and Socio-Economic Assessment Board (YESAB) as a specialized organization with employees whose capacity to interact with knowledge – research capacity – determines process effectiveness and legitimacy. Using primary data and drawing on common principles from capacity frameworks, this research explores dimensions of capacity required by an impact assessment body and its employees. Results show that while some dimensions of research capacity are common across knowledge-based disciplines, such as sufficient resources (i.e. financial support), there are others unique to IA, like contextual understanding, that require further examination as potential sites for building capacity in IA. Finding the balance between technical and value driven knowledge is essential to IA processes, and assessment bodies and assessors alike need support to develop and maintain the ability to navigate this balance.

4.1 Introduction

Impact assessment (IA) is a widely adopted environmental governance mechanism that engages a variety of diverging perspectives and knowledge to identify potential positive and negative effects of a proposed development project (Noble and Press, 2011; UNEP, 2018). IA processes are generally organized through a designated primary assessment organization, which can be a centralized government agency, a sector-based agency, or a dedicated assessment board (UNEP, 2018). More decentralized models of IA generally utilize assessment boards as a boundary spanning organization tasked with negotiating a variety of agendas into recommendations for

development projects (Meuleman, 2015; Partidario and Sheate, 2013). However, the capacity of these bodies, including the capacity of their individual assessors, to undertake the required network management tasks heavily influences the effectiveness and legitimacy of the overall process (Bond et al., 2018b; Howlett and Ramesh, 2015; Marsh and Smith, 2000; Pope et al., 2013). IA boards are generally responsible for gathering, interpreting and considering evidence from a variety of knowledge sources to formulate recommendations prior to regulatory approval (Bond et al., 2018a; Noble and Press, 2011; UNEP, 2018). As such, assessment bodies depend heavily on research capacity – understood here as the ability of an actor, organization or network to engage, produce, maintain and use knowledge through individual and collective development (Cashmore, 2004; Kolhoff et al., 2009; Lonsdale et al., 2017; Nykvist and Nilsson, 2009; Partidario and Sheate, 2013; Wright, 2014). Long discussed in professional fields that rely heavily on knowledge mobilization management and brokering, such as public health and international development (e.g. Cooke, 2005; Maag et al., 2018; Mugabo et al., 2015), research capacity is generally alluded to, but rarely engaged directly, in environmental governance broadly (e.g. Gustafsson et al., 2020; Rahman et al., 2019; van der Molen, 2018) or impact assessment in particular (e.g. Bond et al., 2018a; Darling et al., 2018).

In northern Canada, the importance of equal consideration of diverse worldviews into development activities has been highlighted, with particular focus on IA as a mechanism to ensure inclusion in decision-making (Sabin, 2016; Southcott et al., 2018; UFA, 1993). Pluralism – the active engagement of the multitude of worldviews, approaches and solutions to societal problems – is a major consideration in IA, with a variety of theoretical, methodological and representational perspectives included in assessment processes (e.g., Cape et al., 2018). Yet, little empirical work has been done to evaluate the extent to which assessment boards have the capacity necessary to realize desired outcomes, namely the active engagement of a plurality of worldviews to the benefit of sustainable development. In this paper we present the case of the Yukon Environmental and Socio-Economic Assessment Board (YESAB) as a specialized organization with employees whose capacity to interact with knowledge determines IA process effectiveness and legitimacy. In what follows we review the concept of capacity and present the conceptual framework that guides our analysis. We then describe the case study setting and the research methods employed, followed by the results and a discussion of their implications for IA policy and practice.

4.2 Conceptual framework

Capacity building (often termed capacity development or strengthening) is a longstanding and complex endeavour that remains ambiguous in practice, despite the variety of disciplines working to develop the concept and its application. The concept of 'capacity' is broadly defined as the evolving combination of competencies (skills), capabilities (resources), and relationships that enables a system to exist, adapt and function (Brinkerhoff and Morgan, 2010). Capacity exists at multiple levels (individual, organizational, network) that interact and influence one another, serving to enhance or limit capacity at other levels (Howlett and Ramesh, 2015; Marsh and Smith, 2000). Recognizing the breadth and ambiguity of the concept, Potter and Brough (2004) suggested that it is "as diagnostically useful to say, 'there is a need for capacity building' as to say, 'this patient is unwell'." A solid grounding for the concept of 'capacity' therefore remains elusive in scholarship and application, with numerous calls for further clarification and refinement for particular contexts (Boyd et al., 2013; Darling et al., 2018; Harrow, 2001; Howitt and Suchet-Pearson, 2006). Recognizing the multi-faceted, multi-scalar and interrelated nature of the different types of capacity when utilizing the concept is of particular importance when these frameworks are applied across disciplines and institutional contexts (Gadsby, 2011; Harrow, 2001; Nuyens, 2005).

4.2.1 Interrelated capacities

Across academic disciplines, scholars have identified and categorized an assortment of types of capacity to try to add clarity for capacity building efforts and address specific societal objectives (Darling et al., 2018; van der Molen, 2018). In environmental governance literature, the most widely discussed types of capacity in this broad context relate to *adaptive capacity* – associated with the ability of a group to be resilient to changes in their environment (i.e. Gupta et al., 2010); *governance and community capacity* – the ability of a group to make decisions and function (e.g. Laverack and Labonte, 2000; Matarrita-Cascante et al., 2017); and *policy and institutional capacity* – the ability to provide legitimacy and support for governance functions in a group (e.g. Krishnaveni and Sujatha, 2013; Ramesh et al., 2016; Woodhill, 2010), which were drawn together by van der Molen (2018) under headings of adaptive, integrative and regulatory capacity in environmental governance. However, despite increasing emphasis on the need and intent to accommodate and consider different knowledge systems in environmental governance, little

research has fully developed the knowledge dimensions of capacity, known elsewhere as *research capacity* (Emerson and Baldwin, 2019; Gustafsson et al., 2020; Howitt and Suchet-Pearson, 2006; Natcher et al., 2005a; Spagnuolo, 2011). Research capacity relates to the other supporting capacities that influence the function of environmental governance mechanisms and is often identified as a sub-capacity that supports national and regional development (Al-Roubaie, 2010; Andrews et al., 2011; Chan et al., 2005; Velho, 2004). For example, Howlett and Ramesh (2015) and Howlett et al. (2017) outline the dimensions of policy capacity that relate directly to knowledge as 'knowledge system capacity.' When governance mechanisms rely heavily on evidence and knowledge, the research capacity of boundary spanning organizations can have an important influence on network-level outcomes (Howlett and Ramesh, 2015; Marsh and Smith, 2000; Velho, 2004). Within IA networks, assessment boards serve in the role of boundary spanner and interact intensively with a variety of knowledge sources, which requires certain competencies and capabilities particular to the IA context that can be applied to other governance mechanisms filling similar roles (e.g. Bond et al., 2018a; Maag et al., 2018; Partidario and Sheate, 2013). Assessment boards generally gather input beyond the technical specifications of a proposed development project, including public comments and local and Indigenous knowledge. This requires a high degree of both individual and organizational research capacity, with direct implications for the performance of IA processes and outcomes. As a result, there is a need to better understand the dimensions of research capacity in IA bodies tasked with the coordination and interpretation of supporting evidence and knowledge to inform best practices (Bond et al., 2018b; Kirchhoff, 2006; Loomis and Dziedzic, 2018; Scott, 2011; van Loon et al., 2010)

4.2.2 *Evaluating capacity in IA*

Evaluating the state of capacity relies on frameworks often applied across disciplines to identify potential gaps in individual or organizational abilities and then develop strategies to fill those gaps through interventions (Boyd et al., 2013). Generic capacity frameworks face the challenge of conceptual ambiguity and vagueness, leading to mismatched or imprecise goals and minimal intervention success when applied across widely varying contexts (e.g. Biesta et al., 2011; Boyd et al., 2013; Gadsby, 2011; Harrow, 2001; Nuyens, 2005). These generalized capacity evaluations have already been applied to environmental IA systems, identifying larger systemic issues in developing countries where national governments are largely in control of IA processes and the process itself is often not well established (Doberstein, 2001; Khosravi and Jha-Thakur, 2019;

Kirchhoff, 2006; Kolhoff et al., 2018; Kolhoff et al., 2009; van Loon et al., 2010). Specialized frameworks have tended to concentrate on individual and organizational levels of capacity, but rarely connect the two (e.g. Gupta et al., 2010; Gustafsson et al., 2020; Hamel and Schrecker, 2011). The range between nuanced qualitative elements and highly specific quantitative components makes balanced evaluations that appropriately address both the measurable aspects, such as financial support, and the hard-to-capture elements, such as mentorship, rare (Figure 1). The result is lopsided emphasis on the more measurable elements of capacity (Armstrong et al., 2013; Bates et al., 2006; Cooke, 2005; Howlett and Oliphant, 2010; Kislov et al., 2014; Maag et al., 2018). In Canada, there is also growing emphasis on societal goals of pluralism, in particular the inclusion of different ontological regimes, in decision-making which will require the development of the qualitative dimensions of capacity, as individuals and organizations will have to better understand concepts that are not quantifiable, such as the sense of place or understandings of sanctity (Arsenault et al., 2019; Udofia et al., 2017). As a result, there is a clear need for a refined understanding of the interrelation among capacities particular to IA.

We reviewed and compared 24 frameworks drawn from six disciplines, with an emphasis on those specific to environment and research capacity, in order to identify common elements and then customize for IA in northern Canada (Appendix 3). Using pattern coding, we identify common characteristics among frequently used and cited capacity frameworks (Appendix 3 and Figure 4-1). When the principles of IA are taken into account, the suitability of these foundational aspects of capacity for application in IA is limited to the standard operational aspects, as their interpretations tend to leave dimensions of capacity particular to IA unacknowledged (Boyd et al., 2013). In order to refine these characteristics and add to them for the IA context, we looked back to the foundational principles behind IA, where context, meaningful consideration, and participation are key elements (Natcher et al., 2005b; Noble and Hanna, 2015; Udofia et al., 2017). We identify three broad themes to incorporate both common and IA specific capacity constraints: infrastructure, administrative support, and knowledge demand. These higher order themes are supported by sub-capacities that are also interrelated, where more obvious components, like financial and human resources, co-exist alongside more distinctively IA components, such as disciplinary versatility and contextual understanding. In what follows we examine these themes in more detail using a case study of the IA assessment board in the Yukon Territory, Canada.

Figure 4-1. Comparison of components of select capacity frameworks as explained in their original publication, presented on a spectrum of qualitative to quantitative.
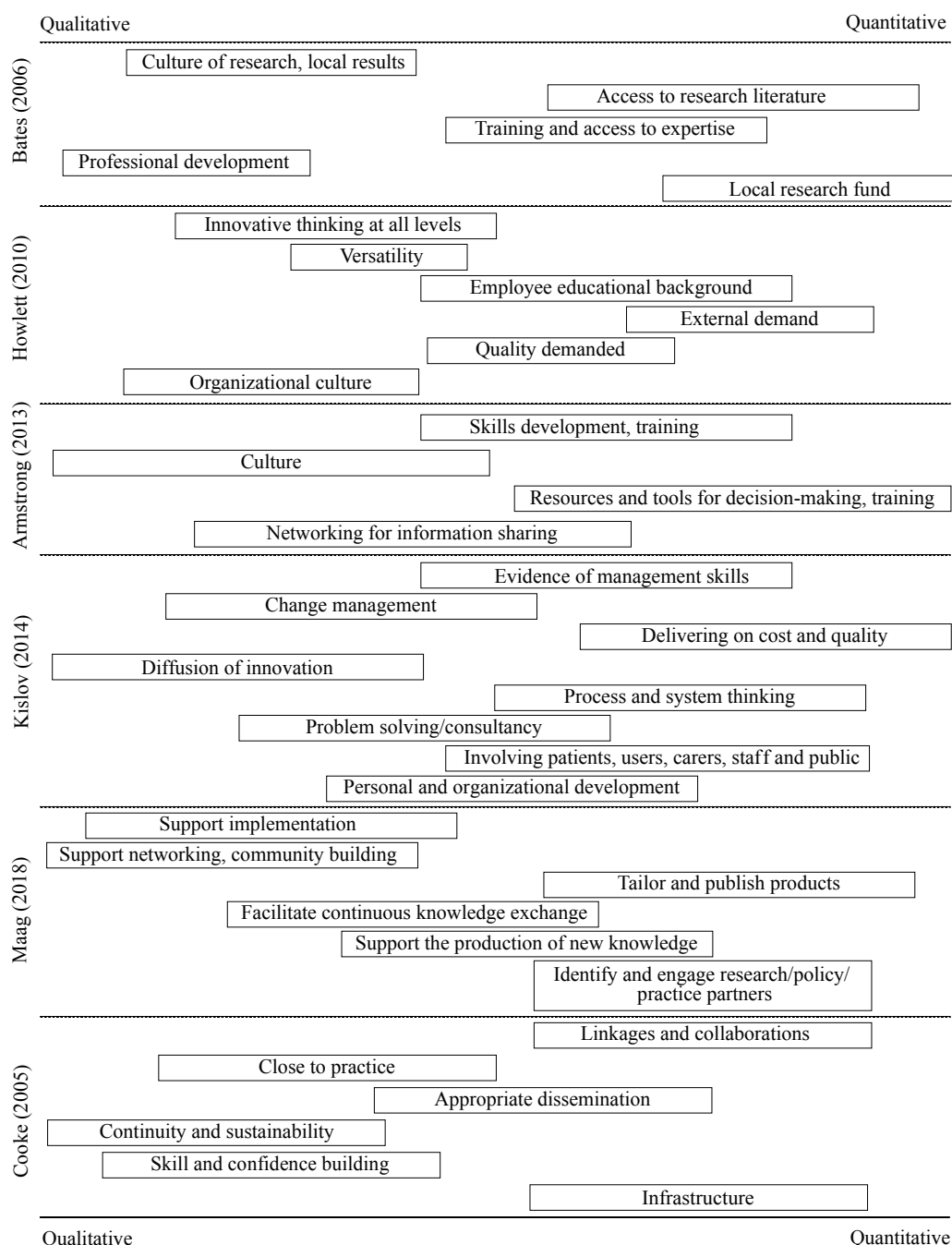
Figure 4-1 presents a spectrum of qualitative (to the right) and quantitative (to the left) components of select capacity frameworks, showing that common characteristics arise regardless of the discipline. Qualitative components are harder to delineate, while quantitative components have distinctly measurable outcomes.

4.3   Study setting

The Yukon Territory rests at the apex of the Rocky Mountains at the junction between the Canadian Shield and the Pacific tectonic plate, which allows for a wide variety of geological formations, and therefore unique resource opportunities, in close proximity to each other. The first inhabitants of the area, now known as the Yukon First Nations, arrived ~24,000 years before present (Bourgeon et al., 2017). They remain a driving force behind the political and economic evolution of the territory, making up ~23% of the 41,352 people in 2019 (YG, 2020). Located in the northwest corner of Canada, between Alaska, Northwest Territories and British Columbia, the Yukon shares peoples, cultures and language groups with other modern jurisdictions. Land claims and self-government agreements, established under the context of an Umbrella Final Agreement in 1990, form the fabric and foundation of Yukon governance mechanisms, including interactions between the territorial and federal governments. Wildlife, lands, heritage, and resource management comprise a large part of these agreements, looking to establish greater local control over movement towards regional economic development (UFA, 1993).

A major component of the overarching "nation-to-nation" agreement, the *Umbrella Final Agreement*, is Chapter 12, which establishes the impact assessment process (referred to as development assessment) and outlines the connections among regional and territorial advisory and review boards as well as connections with complementary processes such as land use planning. The result is a federally legislated decentralized impact assessment process under the 2003*Yukon Environmental and Socio-Economic Assessment Act* that supersedes other similar processes, with jurisdiction over all projects undertaken in the territory (Government of Canada, 2003). The Yukon Environmental and Socio-Economic Assessment Board (YESAB) was subsequently established in 2006 as a specialized assessment body, with assessment officers (AO) embedded in local contexts by dividing the territory into six districts with local district offices (DO) assessing small-scale projects. Larger development projects of a certain scale, complexity and political consequence are assessed by the Executive Committee (ExComm) office, usually large multi-year projects with potential for territory-wide social and economic impacts.

4.4 Methods

4.4.1 Data collection

We conducted twenty-seven key informant interviews (n=27) with former and current YESAB assessors throughout the Yukon Territory. We maximized for variation in order to capture the largest diversity of related experiences and perspectives possible (Baxter and Eyles, 1999). Potential key informants were identified first by using the existing organizational directory, with additional key informants identified through publicly available annual reports, in combination with snowball sampling. Snowball sampling takes advantage of informal relationships amongst key informants to identify additional potential participants, thereby shifting some control over sampling towards participants (Creswell and Clark, 2007; Noy, 2008). Potential informants were invited to participate if they were employed by the assessment body for more than one year. Community saturation was considered fulfilled once all current assessors had been approached for an interview and no additional key informants were being identified through snowball sampling. Semi-structured interviews lasted between 60 and 90 minutes, allowing informant perspectives to develop conversationally while maintaining a semi-formal structure (Seidman, 2013; Sovacool, 2010). Well-developed frameworks specific to evaluating research capacity at the individual and organizational scales provided the broad guiding themes to direct the conversation (Cooke, 2005; Maag et al., 2018). Prior to data collection, the McGill University Research Ethics Board reviewed and approved all data collection protocols (#127-0717). The Yukon Scientist and Explorer's permitting process also reviewed and approved data collection activities (license # 6800-20-1099) and a research agreement was put in place between the first author and the Yukon Environmental and Socio-Economic Assessment Board.

4.4.2 Analysis

Interviews were transcribed based on audio recordings, then coded iteratively using the qualitative analysis software NVivo, with individual participants assigned a random four-digit identifier to preserve anonymity. First, structural coding was used to identify potential overarching themes with regards to research capacity, knowledge management, and assessor perceptions. Then, provisional coding was applied using the common capacity framework characteristics identified in existing evaluation frameworks (Appendix 3). Based on a combination of elements drawn from both broad capacity and research capacity frameworks, the data were then re-examined for element presence,

scale of relevance (individual or organizational), and the perception of their existence in those contexts (Saldaña, 2015). Elements that appeared repeatedly, but were not included in the existing frameworks, were noted for later examination. Finally, the most relevant quotations from participants were identified to illustrate perceptions and element presence.

4.4.3   Assumptions and Limitations

This study assumes that former and current AOs are known and identifiable to each other. There are, however, limitations because of the relatively small and dispersed nature of YESAB as an organization, which limits the potential sample size of former and current employees and board members (27 current and 60 former). As such, our main focus was on current AOs that had been employed for at least one year, to ensure a minimum amount of experience within the organization. Data collection protocols, in the form of semi-structured questions, were piloted with one former and one current AO to minimize potential researcher bias and enhance reliability. Similarly, preliminary findings were discussed with a sub-group of advising IA practitioners, particularly those who were current and former YESAB AOs, to further enhance the reliability and trustworthiness of our analysis through member-checking (Yin, 2003).

4.5   Results

There are many ways to organize the different dimensions of capacity for analysis, but previous frameworks limit their acknowledgement of the interconnectedness of the different elements and their qualitative aspects (Boyd et al., 2013). Often one aspect of capacity (research or otherwise) at the individual scale is directly related to and impacted by organizational or network scale limitations (Howlett and Ramesh, 2015). The following analysis does not aim to be a comprehensive evaluation of the assessment body, but rather focuses on the strengths and challenges as identified by key informants, using the guiding elements of IA-specific capacity illustrated earlier. Interconnections among different dimensions and with other capacities are acknowledged where possible and explored where necessary, but for clarity and concision we focus primarily on the dimensions presented in Table 4-1 – infrastructure, administrative support, and knowledge demand. Similarly, the analysis prioritizes challenges, if only to offer potential solutions, even while there are well-established areas at YESAB that can be drawn out as examples of strong research capacity.

Table 4-1. Definitions of refined dimensions of capacity framework for IA based on comparison of existing frameworks.

Infrastructure		Organizational scale components, including physical infrastructure
External Coordination (relationships)		Mechanisms, institutions and policies that support interaction with other organizations and stakeholders, also includes aspects of physical infrastructure outside of YESAB purview
Internal Coordination		Connected to organizational culture - Mechanisms, institutions and policies that support interaction between AOs, DOs, and the Board, includes aspects of organizational knowledge and continuity through turnover. Also includes digital and physical mechanisms to facilitate the introduction of new knowledge, including subscriptions to journals, internal library resources, past consultant reports, etc.
Finances		Sufficient financial budget to maintain infrastructure, including competitive salaries, office needs, training opportunities, etc.
Legitimacy	Internal (cohesive vision)	Mechanisms, institutions and policies that support a cohesive understanding of the legislation and mandate of the organization, meant to address internal biases
	External (perception)	Mechanisms, institutions, and policies in support of minimizing perceptions of organizational bias
Knowledge Demand		Skills and knowledge required for an individual AO to be able to complete assessments
Technical Expertise		Knowledge and understanding of the science and technical aspects of a project
Project Management		A generic skill set associated with time management and relationship coordination
Versatility (Multi-disciplinary)		An ability to engage with a variety of disciplines and types of knowledge including quantitative and qualitative data, local and Indigenous knowledge, and concepts from sciences, social sciences, health, and economics.
Contextual Understanding		An understanding of the legislative and institutional context within with assessments are completed.
Administrative Support		Components that relate to the daily operations that incorporates both individual and organizational aspects
Mentorship		The availability and ability of supervisors and colleagues to mentor new and inexperienced assessors
Opportunity		The availability of opportunities for professional development (i.e., training, workshops) and internal advancement (i.e., promotions, more responsibility)
Dedicated time		Time devoted to accessing new knowledge, broadening understanding and analysis of different knowledge types
Culture		Organizational institutions that develop into daily common practice, where knowledge sharing and innovative thinking from all employees is normalized and encouraged.

4.5.1 Infrastructure

We use the term 'infrastructure' to describe dimensions of capacity that are primarily organizational that support research capacity in the IA context. This includes themes of external and internal coordination, as well as perceptions of legitimacy to operate. Coordination of any kind is a shifting challenge across scales and actors, as resources and connections fluctuate and as perceptions of legitimacy, including 'acceptable' evidence, evolve. These components require adequate policy and procedural capacity, as well as knowledge management structures, to be fully realized.

External coordination

External coordination for YESAB is multi-faceted, approached through both physical and digital infrastructure that relies on capacity at both the individual and organizational levels. YESAB has a decentralized model for their physical infrastructure, where district offices are established in communities central to the district with the intent of embedding AOs in the local context and facilitating external coordination and outreach. The decentralized model introduces both advantages and challenges into YESAB's overall operations. For example, situating AOs in communities does make them more accessible to the local community and the proximal First Nation, which facilitates the maintenance of external relationships through established lines of communication and outreach activities. The reliance on face-to-face and informal communication with outside organizations makes district offices the most viable option for maintaining the local area network and ensuring the local connections are made and maintained. Participant 1214 described the advantages of being embedded in a community: *"There's so many local keepers of knowledge that to have the [District Office] in that area aids in information sharing…. It's nice to just be in the community and be known and people are more comfortable sharing that information."* However, maintaining a presence in smaller communities has limitations associated with external factors, such as housing availability or long-term employment for spouses, which leads to challenges with filling AO positions. Participant 0901 summarized: *"We have staff that have lived out of tents and in the back of their cars. We do also get complaints sometimes about 'you're hiring all these new people right out of school with no experience' and frankly, sometimes, I feel like saying, 'Yes, we're lucky we got anybody'."* The external factors were seen as limiting

the number of applicants for available positions; the candidates that eventually accept the positions and how long they stay; and was considered particularly relevant in the more rural communities.

Generally, participants felt that YESAB had limited interaction with the public beyond infrequent public meetings and the comments received in the official 'Seeking Views and Information' phase of assessments. Participants described this passive approach to outreach as being a challenge, where interactions with the public are mainly through individuals coming into the DO, formal public open meetings, open houses, and notifications for public comment posted at the grocery store or post offices. On a few occasions, short courses that introduced the legislation and process have been presented to First Nations governments and the public, but these one-time events are based on the stability, availability and the motivation of individual AOs. Participant 1248 described the challenge of communicating with the public regarding their comments: *"A lot of the time, people will have these comments, and we can't take them into account for whatever reason because of the act or a technicality, and there's no way to really interact with those people to let them know, and so the learning opportunity is not there."* Many participants felt that increased outreach might help with concerns around legitimacy as well by clarifying the role and mandate of YESAB and also the quality and usability of submitted comments.

On a related note, comments received from different actors in the IA network are often based on the work of consultants. This can lead to what participant 1006 termed the "dueling consultant problem," where First Nations and proponents both hire consultants to address the same topics and present opposing conclusions which then translates to difficulties for AOs in terms of interpretation. As participant 1006 explained: *"There's no linking together and saying, 'Okay, how can we get not only the better bang for our buck? Are we asking the same questions? Are we actually talking about apples instead of apples and oranges?'"* YESAB was seen as potentially holding a unique position to contribute to the facilitation of resource coordination among external parties while also benefitting from this developed functionality.

Another aspect of external coordination is the dissemination of information and knowledge related to project applications. The YESAB Online Registry (YOR) is an online database of all past and current applications for development projects along with the supporting correspondence, information and knowledge, and the public comments submitted for consideration as part of the assessment. One main intent behind the YOR is to make all information and knowledge associated with assessments publicly available to enhance the transparency of the process, but limitations

have been identified. As of 2019, YESAB was working to resolve aspects of this acknowledged shortcoming, confirmed by participant 0901, *"We're in a process of creating a new online registry which will allow us some better search functions, things like that."* Changes to the YOR were made in response to public and proponent feedback to resolve some challenges regarding knowledge exchange among projects and among members of the IA network. Past variations of the YOR were criticized for having inaccessible file formats which limited cross-application between similar projects. In response, a re-developed version of the YOR was released in 2019 with major changes to search capabilities and file formats. With the heavy reliance on previous assessments and the associated information and knowledge possessed by AOs, this upgrade was viewed as having the potential to increase knowledge exchange, as well as better supporting cumulative effects assessment.

One exception to the view that more knowledge exchange is better is with respect to Traditional Knowledge, which often contains sensitive information such as the location of sacred sites and traditional hunting grounds. These types of submissions have specific confidentiality policies and procedures to maintain a respectful approach to interactions with First Nations cultural heritage. Limiting access to sensitive information was thought to have created tension with proponents, who have expressed frustration in their lack of access to many of the participants.

Internal coordination

Internal coordination was identified as an ongoing struggle at all levels of the organization, from AOs to management to board members, mainly centered on data management. Participant 1439 summarized these challenges: *"Often I'll be working on policy issues and I'll go to do some word searches on our 'G' drive, and I'll be like 'holy crap. This is what we're trying to fix. We already did this in 2015 [...] We had a bunch of meetings and this was the outcome, but it hasn't been built into our current [operations].'"* More established respondents generally felt that time was often spent revisiting solutions that have already been considered and discarded, which they felt led to wasted time, energy, and resources.

Better internal corporate knowledge management has the potential to facilitate internal policy development, maintain external relationships, and support knowledge mobilization. The digital and administrative infrastructure required to support policy work was generally seen as lacking, as summarized by participant 1302: *"YESAB hasn't been very good at documenting*

Figure 4-2. Refined components of a capacity framework specific to Impact Assessment and the scale at which they are found (individual or organizational).

Qualitative   Quantitative

Infrastructure

| I | External coordination |

| O | Internal coordination |

| O | Finances |

| O | Legitimacy |

Knowledge Demand

| I | Technical Expertise |

| I | Project Management Skills |

| O | Versatility |

| I | Contextual Understanding |

Admninistrative Support

| O, I | Mentorship |

| O | Opportunities |

| I | Dedicated Time |

| O, I | Culture |

Qualitative   I - Individual scale   Quantitative
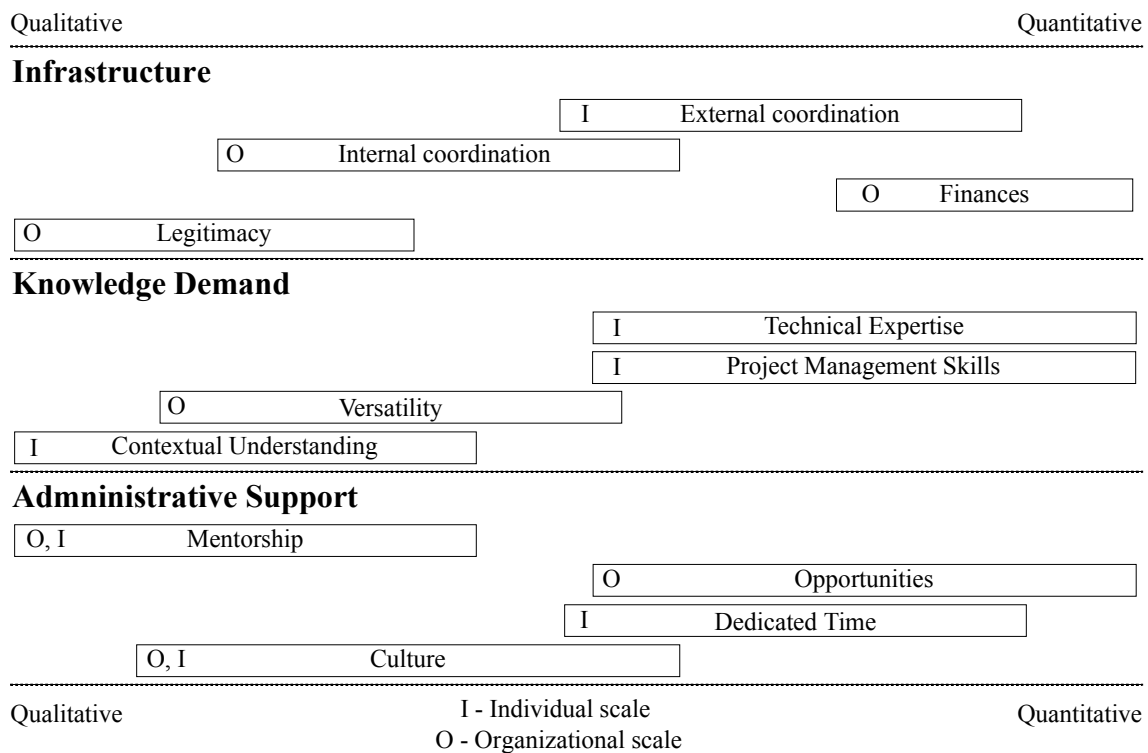
O - Organizational scale

Figure 4-2 illustrates the components of the proposed IA-specific capacity framework, based on common characteristics from existing capacity frameworks in Table 4-1 and Figure 4-1, along a spectrum between qualitative and quantitative forms of assessment and identified at the individual (I) and organizational (O) scales.

operational practice, and that's really what people need to know to do their jobs." The organization added a policy-specific position in 2011 and another in 2016, a move that some participants saw as a positive partial solution, though AOs still maintain policy responsibilities. The other major challenge concerning internal knowledge management was staff turnover, particularly when knowledgeable AOs exit positions or take leaves of absence. Numerous participants identified that an ideal part of training new AOs would involve some overlap with the exiting AO so that the incumbent could provide context and introductions to the major actors in a community, but this is often not possible. Participant 1248 describes the need for more formalized knowledge management: *"it's more of a hope that the knowledge has been transferred enough… I don't think that people are being tapped as resources effectively when they're leaving."* Mentorship around the generic components of the assessment process can come from other offices, but without the local overlap, previously established relationships are restarted. This can lead to wasted resources, as initiatives or projects proceeding without adequate contextualization can revisit previously identified problems that went undocumented. Participant 1214_1 articulates: *"Every time someone leaves, there is a lot of information that leaves with them and the history, because that doesn't get captured anywhere, the history of why we do things the way we do."*

Respondents also described a reliance on previous assessments as a major knowledge source, with limited new knowledge being introduced over the course of new assessments. Access to new knowledge was seen as restricted by the amount of dedicated time AOs have to search out new relevant resources and the availability of 'outside' knowledge. As previously identified, the internal knowledge management system that does exist was seen as having limited utility in the day-to-day operations of an AO. For example, a small internal repository of useful resources relies on individual AOs for contributions. Participant 1248 remarked on the state of the repository, *"Our library needs to be fed into. It's not really being fed into that much."* Participants reported having little dedicated time to identify pertinent and up-to-date resources. Instead, there was a reliance on previously completed assessments to provide the basic resources for assessments and training. There was also a reported tendency to rely on maintained informal connections to former AOs. Participant 1248 pointed out that this is not a guaranteed resource by saying, *"I think there's this weird idea that when the people are gone, you can call them for information…."* In a sense, there is an assumption that the corporate knowledge is not lost but has transferred elsewhere within the broad informal IA network, and is therefore still accessible to the assessment board. Many former

AOs have moved on to positions in the Yukon Government or one of the First Nations governments, and so this assumption is not completely false. However, an over-reliance on accessing previous employees potentially diminishes the impetus to develop appropriate corporate knowledge systems.

Another concern relates to the public availability of academic studies that are housed behind publisher paywalls. In the mandate of YESAB, it is clear that all information used in assessments should be publicly available, which leaves academically published research in a questionable position. Participant 1355: *"A potential issue around that that's never really been tested is to what level are we as an organization, as assessors allowed to review and use third-party information like that, because the basis for our assessments is that the information is public and publicly available and transparent."* With a large portion of academic literature held behind paywalls and therefore unavailable for public consumption, the argument could be made that this should limit how much those knowledge sources should be engaged. The perceived result is a reliance on previous assessments and comments for the majority of the knowledge supporting assessment recommendations.

Financial resources

Respondents identified financial resources as a strength of YESAB, with AOs being well supported to pursue professional development and attend meetings and conferences. The assessment body receives full financial support from the Government of Canada, as part of the *Umbrella Final Agreement*, administered by the Yukon Government. Accessing training and professional development funds is a common element in nearly all capacity frameworks, and YESAB appears to have the financial resources to support their AOs. However, financial resources alone can't guarantee functionality, as participant 0901 explained: *"You can't just throw money and more staff at it, because well there aren't really more staff out there and there's no housing. You have to continue to look for more longer-term sustainable solutions, and that usually comes down to how you work."*

Legitimacy

Questions of legitimacy were seen as an ongoing challenge for YESAB. Numerous participants identified the perception of neutrality (or lack thereof) as both an external and internal challenge

that has ramifications for the legitimacy of the process. External perceptions of bias were discussed from the perspectives of proponents, specialized interest groups, and First Nations governments. As participant 1006 articulated: *"If they [the public, proponents, First Nations] think that staff is undertrained, inexperienced, biased, or using technical information or research to further their own goals, then that's not helping the organization at all."* Some of these viewpoints can be managed by establishing and reiterating a clearer understanding of roles and responsibilities of YESAB and more specifically the AOs. Externally, transparency has been established by making assessment documents publicly accessible. Questions of consistency between AOs and District Offices have been addressed by developing and publishing organizational methodologies and procedures for approaching the various phases of the IA process. Concerns around assessments completed in non-local District Offices have been raised and are acknowledged by YESAB as an ongoing concern, which they are looking to address through increasing transparency and providing deeper explanations around methodology.

Ensuring AOs maintain a clear understanding of their role in the context of IA was seen as essential to maintaining organizational legitimacy in the eyes of the public. One participant identified this as being particularly challenging in the early days of IA, when industry had the longstanding view that AOs held a decidedly environmental protectionist approach to development. Participant 1006 explained: *"...an assessor years ago, who would say to people, 'Well, it's my job to make sure there's not another Faro [late 1970s lead-zinc mine operating in the Yukon].' No, it isn't. That is not your job at all. That's where you get the perception of bias."* This has led to the development of public documents and internal discussions about maintaining an air of neutrality amongst AOs and YESAB. Participant 1006 continued: *"The organization tries to, certainly through ongoing conversations and training, say 'This is supposed to be independent, unbiased, review of the facts.'"* This conceptualization of neutrality does not fully acknowledge that the process maintains conventional understandings of bias, evidence, facts, science and knowledge.

4.5.2   Knowledge demand

Respondents reported a suite of demands being placed on the organization and the individual AOs directly related to knowledge. The most obvious is the demand for technical expertise around environmental constraints, thresholds and regulations, followed by project management skills. Under-acknowledged in both implementation of assessments and in research capacity frameworks

are versatility – necessary in a multidisciplinary context – and contextual understanding – particular to research capacity in IA. A combination of organizational and individual-level research capacity is therefore required to meet the knowledge demands placed on an assessment board.

Technical expertise

The major knowledge demand placed on the assessment board, from an organizational perspective, is to maintain a suite of AOs with the collective technical expertise to broadly understand the specifications of any application that is submitted, along with an understanding of the contextual factors. This can create difficulties when intersected with other challenges associated with filling and maintaining AO positions, such as housing and living in remote communities. The majority of AOs who participated in our research reported having science-related backgrounds that lend well to the environmental aspects of assessments. However, the skills and experience needed to interact with the more qualitative and Indigenous knowledge aspects of IA were seen as needing further development. The result is an unintentional focus on the environmental aspects of assessments, according to participant 1302: *"I think the environmental components often overshadow the social and economic unless the projects are occurring in a really, really sensitive area or if it's going to have really major impacts."* The focus generally remains on more quantitative aspects of assessments with rare exceptions.

From the individual perspective, the AO's reported focusing on generalizable skills, with the ability to interpret the knowledge and information presented to them. Participant 1302 explained: *"We're not experts and we don't know what areas were used historically for cultural purposes, for example. That information, the cultural impacts, the social impacts on First Nation communities for projects — We just don't generate that internally ... we try to go local and get it, but there's no experts within YESAB who are generally qualified to speak on those issues."* The reliance on local organizations and the local public as the source for contextual knowledge regarding potential impacts can be problematic, especially when local organizations experience their own research capacity challenges. Similarly, public input connects with outreach activities and public awareness about the process, ongoing projects, and their role in the process.

Project management

Participants identified individual AOs as being responsible for coordinating the acquisition, documentation, and eventual interpretation of the information and knowledge for the assessments assigned to them. This requires more generic skills associated with project management, including timeline management and general administrative tasks such as coordinating meetings and outreach that are the basis for relationship building. In particular, the relationship-building and maintenance aspect was seen as central to the AO position. Participant 1302 explained: *"I think the real skill that people need to have working for YESAB is the ability to generate and maintain informal relationships because there's really not a lot of formal opportunities for information sharing and relationship building outside of a specific project."* This was a particular concern when internal or external staff turnover occurs without overlap, as those relationships then need to start anew.

Versatility (multidisciplinarity)

Another important skill that AOs were seen as needing to develop related to 'versatility,' meaning the ability to fluidly interact with both quantitative and qualitative disciplines, skills that have been under-acknowledged both in IA and in research capacity contexts. Participants referred to themselves as generalists, or knowledge brokers, and that this role comes with challenges that can be met by developing an individual's versatility. AOs are required to develop, with minimal direct training, the ability to engage and interpret different forms of knowledge, such as health and social aspects of a project, as well as perform qualitative analysis of the public and interest group comments in order to identify the major valued components. Participant 1038 acknowledged the challenge: *"we want to call it [IA] science but it's like an art… And it's a real struggle because it's a very different form of learning from the traditional [forms]."* Some DOs have approached this challenge by attending workshops led by First Nations and similar offerings from other sources that introduce different worldviews and ways of identifying community values. There appears to be room to expand the spaces for AOs to explore their own biases and develop versatility both among disciplines and worldviews that would facilitate their interactions with, and interpretations of, qualitative data and Indigenous knowledge beyond understanding the context of land claims and self-governance.

Another under-acknowledged skill connected to disciplinary versatility was the ability to communicate in diverse ways to diverse audiences, including clear argumentation alongside lay-

person interactions. The interpretation of evidence was seen as fundamental to assessments and transparency around the process, as recommendations are founded on the information and knowledge submitted for consideration. As expressed by participant 1355: *"What we always have to come back to as assessors is: based on the information you have, is your conclusion supported through your argument? If it is, then that's fine."* In the same instance, the AO is also the public face of the assessment board in the community, fulfilling an outreach role. As expressed by participant 1733: *"We are expected to communicate with external stakeholders, with organizations and we are expected to maintain these relationships, and that's explicit in both [AO and MDO] job descriptions."* The ability to shift between the formal writing and argumentation and informal community interactions is an important knowledge brokering skill that individual assessors develop to support YESAB's research capacity.

Contextual understanding

The physical infrastructure of YESAB is designed to embed AOs in the community in closest proximity to the projects being assessed. The intent behind this structure is to provide space for AOs to more thoroughly connect with and better understand local values and potential impacts of projects. Participant 1355 identifies the (rare) AO who has returned to the community after leaving for post-secondary education as *"…good ones to have because they know the communities, they're part of the communities, they would like to stay part of the communities."* Tension was reported between the level of personal involvement AOs want in their communities and not overwhelming community organizations with contact. Participant 0901 framed it as a potential criticism either way: *"You always hear this; you should be more involved in the community but [...] they also don't want you bugging them all the time."* AOs who strike this balance are often more successful at building and maintaining community relationships, but many AOs also acknowledged that this requires concentrated individual effort with varied success.

The challenges around contextual understanding connect back to infrastructure, workload, and turnover. Community infrastructure in the smaller communities, most notably housing, exemplifies challenges felt in other dimensions, where contextual understanding is fostered through living in a community, but limited by the ability to maintain a presence in the community. Workload is a similar impediment, as participant 1_1439 explained: *"… we have the busy assessment season that can inhibit our assessors' time to contribute to going out and doing YESAB*

one-on-ones or attending conferences...I think that's a barrier for generating and sharing knowledge." A related challenge connects back to the previously raised issues associated staff turnover, which also limits contextual knowledge transfer.

4.5.3   Administrative support

Administrative support refers to the organizational and individual abilities to contribute to day-to-day organizational functions. Factors related to this aspect include reliance on mentorship as the main training mechanism and opportunities for professional development as well as for career advancement within the organization. Dedicated time to access new knowledge and the development of an organizational culture of knowledge exchange are also part of the administrative support aspect.

Mentorship

Mentorship was reported to play an important role in YESAB, acting as the primary training mechanism for new AOs. When a new AO is hired, the main avenue for training the new recruit is through mentorship under the guidance of the manager of the district office (MDO). The type and amount of training received is highly variable and heavily dependent on the availability and management experience of the individual MDO. Participant 1302 explained: *"... it's just an ad hoc approach to how they're being trained. Some people are just getting thrown into the fire. Some people it's more methodical and they're starting at the beginning, looking at the context and how it [YESAB] was created. Others are just going right into doing assessments and just learning as they go. Not a very consistent approach."* Relying on mentorship as the primary orientation mechanism was seen as introducing inconsistency across the organization and the individual AO development, which is then perpetuated as those AOs go on to mentor others, as pointed out by Participant 0301_1439: *"If there were issues in how those [previous assessments] were done, they can carry into people's future practice."* With such reliance on mentorship for maintaining operational continuity, support for mentorship work as part of a position's responsibilities becomes especially important. Participant 1449 articulated: *"We have a lot of trouble, I think, with getting people up to snuff in terms of really understanding what it is they're doing…. There is quite little support for staff in training other staff, at present."* When training and mentorship are combined with their other duties, including completing their own assessments, reviewing all assessments administered by their office and potentially policy development work, the ability of MDOs to

fulfill all these roles becomes strained. As participant 1038 pointed out: *"...if someone is floundering, I'm not sure that... there's anybody to catch them."* Without organizational support or formalized training, turnover becomes more likely. Many participants identified that the effort and time for an AO to become fully and independently functional is extensive, so to lose a potential long-term employee due to a lack of initial support was viewed as being costly to the organization and mission as a whole.

Professional development opportunities

Organizationally, YESAB is well-structured to provide support for training opportunities to bolster individual expertise, such as workshops, meetings, short courses, and conferences. Participant 1248 noted: "*they're really doing a good job of pushing different training opportunities, and there's a budget for it."* However, it is on the individual AOs to self-identify gaps in their knowledge-base and seek out the means to fill those gaps. Participant 1214_2 pointed out: *"the HR department has all the training that people have gone to, but me as an employee, I can't see what the people have done, ... so I can't ask them questions."* While there are mechanisms for sharing back to colleagues after external training experiences, these were characterized as limited in their utility. The main avenues for capturing the information gained through individual training was presenting back to the main group of AOs and completing a short form that is then stored on a shared drive. Some participants expressed frustration with this, such as participant 1248: *"...it's not useful to be growing people individually if they're not sharing it when they come back."* The connection to internal dissemination and knowledge sharing becomes important, as the opportunities afforded to employees in terms of outside training could have broader collective utility in support of overall research capacity.

Providing opportunities for employees goes beyond training and professional development, particularly the opportunity for career advancement and individual challenge. YESAB is a relatively small organization with a flat hierarchical structure, so there is limited room for an employee to advance professionally in their communities and beyond. For example, in a district office, there are only three levels of employment: the administrative assistant, the assessment officer, and the manager. Participant 1214_1 explained: *"If there's already a manager that's there for a long time, there is no opportunity to move up unless you move out or go to Whitehorse and then become an Ex-Comm assessor..."* The prospect of staying in the AO position with little chance

for promotion left some participants feeling as though they became stagnant in terms career development and cited this as a reason for seeking out other opportunities. The importance of having upward mobility was underlined by Participant 1038: *"I looked around and I had no mentors… ultimately, I felt like this was it, it was me…. I plateaued. There's no place else to go."* The connection to organizational culture supports the development of a challenging, yet supportive environment, as does the connection to mentorship.

Dedicated time

A dimension that underlies most of the other dimensions is the idea of dedicated time for the required aspects of the various positions. In other contexts, this would refer to time that is strictly reserved for research activities. In the context of IA, this would refer to time for expanding individual and organizational knowledge bases, explicitly built into job descriptions and implementation, but perhaps lacking because of operational constraints. Participants identified that mentorship, external relationship-building and policy work were built into their job descriptions. For example, participant 1449 remarked: *"…on my annual performance review, there's a line about advancing our understanding of assessment and internal capacity…. Most senior staff are working on these projects."* However, limited dedicated time is afforded to the development, documentation, and upkeep of guidance for new and returning AOs, which extends time spent on orientation. Much of this limitation stems from the volume of assessments that a limited number of assessors are completing annually, which then limits the time available to devote to non-assessment work. Participant 1439 expressed: *"I don't think we always have a ton of time to do self-reflection and [evaluation report] audits,"* while participant 1214_2 pointed out that *"usually, it's your manager who is your source of guidance."* Without dedicated time to develop broad guidance documents, there are few mechanisms other than having AOs resort to asking their MDOs directly for guidance.

Organizational culture

Many capacity evaluation frameworks reference the development of an organizational culture that leads to information and knowledge exchange that then fosters creativity and problem solving, along with supporting the development of organizational knowledge. Overall, participants agreed that YESAB fosters such an environment, where the main force behind internal exchange was

asking questions, but there were few formal processes and limited documentation. Participant 1439 articulated: *"YESAB has a pretty open-door policy. All the managers, if you have questions or you need to sit down and work through something with someone, they're usually pretty available and don't always have the answer but give you some direction and some key points to consider in making your decision."* This connects to the dimension of mentorship, where the availability of managers impacts the culture of exchange, making support for individual mentors central to how the organization functions. The other aspect is fostering an environment where AOs feel supported and comfortable interacting with their colleagues and supervisors. Participant 1248 described the environment as: *"you have different tangents that you can go on that people will follow you, rabbit holes that I think will be really helpful."* These explorations help develop both the individual AO's ability to perform assessments and organizational knowledge, as different issues are brought to the forefront for discussion and multiple perspectives on said issue can be explored collectively.

The converse of this dimension is that the need to ask questions is compounded by limited documented guidance for AOs. Participants identified that the process for documenting internal procedures were limited and under-utilized, which can lead to inconsistencies, misunderstandings, and increased demand for training and mentorship. As participant 0301_1439 described: *"I've heard clearly from day one that there's a lack of guidance. Even if people go away for a year […] and come back, it's like what's changed?"*

4.6   Discussion

In examining the interrelated capacities affecting YESAB, the main assessment body in the Yukon Territory, a variety of challenges related to general capacity building appear to have been met, while others particular to IA and societal goals of pluralism have arisen. This leads us to identify some insights we consider relevant to IA more broadly. The interaction between individual capacity and organizational capacity are intertwined in a way that makes developing research capacity a complex balance between investing in individuals and investing in organizational supports. This finding supports the previous research on capacity building generally, where multi-scalar development is considered a necessity to establish long-lasting sustainable change (e.g. Velho, 2004). For example, without improved internal knowledge management infrastructure, the individual dimension of 'disciplinary versatility' we have identified, known elsewhere as 'close to practice' (Cooke, 2005) or 'evidence management skills' (Kislov et al., 2014), would not easily

contribute to organizational knowledge. Similarly, organizational culture oriented towards the continuous acquisition of new knowledge, including facilitating the pursuit of pluralism by engaging multiple knowledge systems, is only useful in so far as the individual assessors participate. In the case of Yukon Territory, reliance on past assessments for access to relevant information and knowledge is being perpetuated by perceived necessity, as workload constraints diminish the time available for assessors to seek out new approaches, information and knowledge. The idea of 'dedicated time' is captured in research capacity frameworks to support the acquisition of new information and knowledge (e.g. Hamel and Schrecker, 2011; Maag et al., 2018). Building organizational infrastructure to support 'dedicated time' can improve 'disciplinary versatility' by increasing the diversity of knowledge being accessed during an assessment. Our findings also highlight that AOs are regularly being exposed to complementary knowledge systems beyond more accepted and familiar technical considerations, which can contribute to external perceptions of legitimacy and boundary spanning (Bond et al., 2018a).

'Contextual understanding' is central to the consideration of multiple knowledge systems, since IA is inherently situated in a project's environmental, social and economic context locally, regionally and nationally (Scott, 2011). The intent of YESAB's district office structure is to embed AOs in local contexts so that they will be better placed to understand local community issues. This strategy contributes to overall assumptions that a process guaranteeing the inclusion of Indigenous and local knowledge will be more equitable (Emerson and Baldwin, 2019; Glucker et al., 2013; Hughes, 2010; Kamarck, 2007; Pollitt, 2003), and/or less colonial (Howitt and Suchet-Pearson, 2006), two assumptions being continuously questioned similar contexts. Due to the small size of both the assessment board itself and the communities in which AOs are situated, the research capacity of individual AOs will be central to the effectiveness and legitimacy that Yukon's 'guaranteed inclusion' policy strives for, as the AOs become the local 'face' of the assessment board. Kirchhoff (2006), in a framework specific to IA capacity, refers to relationship-building and maintenance aspects of an AOs work as 'network and linkages' while Cooke et al. (2005), a more general research capacity framework, references 'linkages and partnerships.' These are also variants of what Howlett and Ramesh (2015) called 'organizational political capacity,' in this case referring to the status of the assessment board amongst the network of organizations working towards development decisions. Not only are AOs tasked with maintaining the assessment board's presence in local communities, they are also performing the actual assessments, underlining their

role as a knowledge broker (Maag et al., 2018) and the need to develop their individual ability to interact with multiple knowledge systems. Here, administrative supports can help AOs establish and maintain external relationships, including initial orientation and ensuring adequate time for relationship maintenance and the development of individual contextual understanding.

We found that AOs are responsible for maintaining their individual technical and non-technical expertise, but the growth and diversification of individual skills are reliant on available time; their academic and professional backgrounds; their exposure to and understanding of the specific context within which they are working; and their understanding of the concept of pluralism and multiple knowledge systems. Most capacity frameworks refer directly to the individual skills of practitioners and the ongoing development of those skills through the organization (Cooke, 2005; Doberstein, 2001; Hamel and Schrecker, 2011). Individual and organizational capacity are therefore interlocked and reciprocal, particularly in contexts with high staff turnover and where 'contextual understanding' is considered central to the organizational mandate. While keeping administration informed by practice is an ideal, resources are necessary to support organizational evolution and knowledge management (Howlett and Ramesh, 2015). Our results suggest that individual AOs can contribute to the development of YESAB policy and procedures to a limited extent, with most of their time being spent on the main mandate of completing assessments. This may have slowed the evolution of internal organizational policy, which our participants identified as limiting the overall research capacity of the assessment board. A partial solution has been the expansion of the employee base to include policy analysts to support and guide overall organizational development, though AOs are still involved.

As IA processes move towards full inclusion of Indigenous peoples and complementary worldviews in decision-making processes, lessons can be drawn from the research capacity challenges facing YESAB. Overall, YESAB has built broad internal research capacity sufficient to operationalize IA legislation on a daily basis, though there are spaces requiring organizational attention. They have built a culture of information and knowledge sharing, with spaces for interaction among individuals and district offices. However, this has translated into a reliance on individuals for knowledge management in lieu of more fully developed organizational mechanisms. Notably, there appears to be a heavy reliance on mentorship for initial training and orientation of new AOs, where participants identified inconsistencies between DOs.

Here, we have applied the lens of research capacity to an environmental governance

context, so that the capacity of IA practitioners and bodies can be re-envisioned with knowledge as the primary focus. Navigating the balance between the technical and value-driven knowledge required to fully identify and appreciate potential impacts is a multi-scalar and -dimensional task (Bond et al., 2018a). AOs and IA processes alike occupy roles as knowledge broker for communities and governance mechanisms, respectively, with implications for broader governance mechanisms (Meuleman, 2015; Pope et al., 2013). As such, developing their research capacities not only improves the effectiveness of IA practice (Maag et al., 2018), but contributes to the perceived legitimacy of the overall process (Kirchhoff, 2006) and ensures inclusivity in support of pluralism (Cape et al., 2018). Future research could further explore the inter-institutional intricacies of interrelated capacities and knowledge systems in other environmental governance contexts, expanding on international work such as Rahman et al. (2019). Understanding IA as a science-policy interface could also lead to further theory building in support of process legitimacy and transparency, as well as provide insight into bolstering process effectiveness. For Canada, further empirical exploration of possible paths towards pluralism is needed. Applying the evaluation framework outlined here in a comparison of IA jurisdictions would provide further refinement of the suite of capacities relevant to IA.

4.7 Conclusion

IA requires capacity development in support of the main intent of the process, that is, to negotiate multiple perspectives towards evidence-based decisions around development. This main objective has implications for assessment procedures and assessor capacity, as well as perceptions of legitimacy and effectiveness. In the Yukon, IA was established with the mandate to consider multiple knowledge systems, particularly local and Indigenous knowledge, in impact assessment as part of land claims agreements with Yukon First Nations. With this context in mind, the research capacity of the assessment body and its employees is central to development decisions, in accordance with modern-day treaties. Drawing on broad capacity and research capacity frameworks, we have presented a suite of dimensions particular to the IA context and then applied these to an analysis of YESAB and its AOs.

Results show that YESAB has fostered an overall culture of knowledge exchange within their organization and encouraged external engagement maintained through informal relationships. However, there is reliance on the individual motivation of the AOs to build and maintain both

internal and external relationships, including the mentorship of new AOs and the dissemination of new knowledge through the organization. There are constraints on the mechanisms supporting organization knowledge documentation, so that when well-established AOs move on to external positions, there is limited retention of their expertise. Organizationally, YESAB has benefited from regular and coordinated training for AOs and dedicated policy positions. Pathways forward could include an allocated mentor position, increased dedicated time for accessing new and updated knowledge sources, and finding opportunities for AOs to experience new methods and complementary worldviews. Paying closer attention to research capacity has the potential to facilitate inclusive IA processes that acknowledge and actively use complementary knowledge systems.

4.8 Acknowledgements

4.9 References

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Preface to Chapter 5

Chapter 4 identified some dimensions of capacity that are likely specific to IA and go beyond the common characteristics captured in other capacity frameworks. Chapter 5 looks to re-orient the perception of IA-related capacity challenges in Yukon Territory by exploring how Indigenous groups offset capacity limitations by leveraging IA as a both a political tool and a learning space.

Chapter 5. From 'stakeholders' to rights holders: how research capacity affects Indigenous participation in Impact Assessment in the Yukon Territory, Canada

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Abstract

Participation in Impact Assessment (IA) has been an ongoing and important topic for scholars, with specific emphasis on public participation and, more recently, Indigenous consultation. While specific barriers for Indigenous participation have been identified, little work has been done on how IA has been engaged by Indigenous peoples to support the assertion of their land rights and title. Here, we take the case of the Yukon Territory, where specific capacity constraints have been at least partially addressed through land claims and legislation, such as guaranteed participation and IA-specific funding for First Nations Governments. Based on 17 semi-structured interviews with IA practitioners representing First Nations Governments, we find that the particularities of the Yukon IA process have forced Indigenous groups to adapt their strategies for engagement in unexpected directions, using the IA process as both a tool for enforcing modern day treaties and as a space for learning that has become exhausting. With regards to implementing the assertion of Indigenous rights and title, the challenge for IA in northern Canada remains not 'if' but 'how.'

5.1   Introduction

Nearly 20 years ago, Paci et al. (2002) wrote, *"Much needs to be written about the shortsightedness of state governments that continue to ignore Indigenous rights and title and the perils that await them,"* (p. 111). Since that time, Indigenous rights and Indigenous knowledge (and its various permutations) have been increasingly acknowledged as essential components of sustainable development, environmental governance and decolonization efforts writ-large (e.g. Booth and Skelton, 2011; Ellis, 2005; Howitt and Suchet-Pearson, 2006; Jay et al., 2007; Von der Porten et al., 2015). Actively engaging citizens and rights holders in the development and implementation of governance mechanisms is considered fundamental to creating more equitable interactions (e.g.

Agrawal and Bauer, 2005; Natcher and Davis, 2007; Saarikoski, 2000; Sinclair and Diduck, 2017). However, policy efforts continue to stall due to systems that are unsupported, unable or unwilling to acknowledge Indigenous knowledge or Indigenous rights and title (Howitt, 2012; Howitt and Suchet-Pearson, 2006; Merino, 2018). For example, Impact Assessment (IA) was introduced as a mechanism through which development decisions could be negotiated by engaging various perspectives on proposed development projects in order to identify potential positive and negative impacts and make recommendations on mitigations prior to project initiation. This process should, and often does, include Indigenous and local knowledge, but with relatively little success thus far, according to Indigenous groups (Arsenault et al., 2019; Larsen, 2018; Udofia et al., 2017; Von der Porten et al., 2015). Ellis (2005) specified a set of limitations to Indigenous participation early on that Yukon IA legislation attempts to explicitly address (Table 5-1).

IA requires particular capacities to be present to ensure meaningful participation, and if essential policy actors have limited capacities, existing power imbalances can be accentuated (Booth and Skelton, 2011; Emerson, 2011; Wright, 2014). Similarly, the organizations responsible for coordinating and guiding IA can exhibit limited or misaligned capacities to accommodate different knowledge systems (Al-Roubaie, 2010; Craig, 2007; Ellis, 2005; Howitt and Suchet-Pearson, 2006). An important assumption that must be confronted from the outset is what Webster (1997) calls the 'myth of incapacity' where the underlying expectation is that a certain capacity is completely absent. Related to this concern are attempts "to determine from the outside what constitutes a 'capable' subject," (Edmunds and Juncos, 2020, pg. 3). Earlier understandings of capacity 'building' interventions tended to be based on a 'deficit model' which assumes a complete absence rather than acknowledging existing, if limited, capacity at community and individual levels (Barrett et al., 2011; Howitt and Suchet-Pearson, 2006). In contexts where fundamental IA operational capacity needs are being met (e.g., finances, legislation, etc.), nuanced challenges tend to arise over how IA includes Indigenous groups situated in complex multi-jurisdictional contexts with varying levels of capacity amongst actors. Research capacity is defined as the ability of an actor, organization or network to engage, produce, maintain and use knowledge through individual and collective development. In IA, which has the consideration of multiple perspectives as one its core principles, research capacity becomes a central issue, particularly in contexts where multiple worldviews interact. With this in mind, IA has been adapted to be a political tool (e.g., Merino,

2018) and a learning space (e.g., Sánchez and Mitchell, 2017; Wiklund, 2005) where actors come together with a variety of intents and agendas.

A perception of neutrality is fundamental to the rationality of existing IA processes, which largely ignores the inherently political nature of the interactions occurring among participants (Cashmore and Axelsson, 2013; Cashmore and Richardson, 2013; Hempel and Lammerant, 2015). In practice, IA has been described as a tool for 'deliberative democracy' (Fitzpatrick et al., 2010; Wiklund, 2005), and as "a site for the contestation of power and authority" (Cashmore and Richardson, 2013, pg 84), where Foucault's concept of governmentality is applied to IA as a mechanism within which authority is granted to technical expertise. This situation has raised concerns when jurisdictions are shared with Indigenous peoples, and questions concerning what constitutes evidence and the validity of different forms and sources of knowledge arise (Meuleman, 2015). In response to these challenges, many Indigenous groups have been moving towards utilizing legal avenues for asserting both their land rights and the validity of their knowledge in IA-related decision-making processes (Howitt and Lunkapis, 2010; Maclean et al., 2015; Merino, 2018). This situation has become increasingly common among Indigenous and non-Indigenous people in Canada, where a lack of relationships, trust, and collaboration have been identified as shortcomings of IA (Arsenault et al., 2019; Booth and Skelton, 2011; Udofia et al., 2017).

Despite the challenges, IA has also been characterized as a 'learning space' with high potential for knowledge exchange and social learning dynamics that can contribute to larger governance processes (Meuleman, 2015; Sánchez and Mitchell, 2017; Sinclair et al., 2008). Social learning involves the achievement of three criteria: 1) demonstrated changes in understanding that 2) occur through social interactions among individuals, and 3) result in wide-spread behavioral and system change (Reed et al., 2010). In this conceptualization, the formal and informal interactions among actors become spaces for reciprocal learning, steering the process towards a 'knowledge-based approach' where knowledge exchange is a multi-directional endeavour (Assuah and Sinclair, 2019; Ensor and Harvey, 2015; Sánchez and Mitchell, 2017). Not surprisingly, such learning spaces can become warped by power imbalances, particularly with regards to marginalized groups (Ensor and Harvey, 2015; Saarikoski, 2000) or can have extended timelines for perceived influence to manifest in action (Jones and Morrison-Saunders, 2017). As a result, Sánchez and Mitchell (2017) propose that *"learning be treated as a purposeful – not as an*

Table 5-1. Limitations to effective Indigenous participation and inclusion and the approach taken by Yukon IA legislation to address them.

Ellis (2005)	Definition	Yukon IA Legislation
Specialization of environmental decision-making	Reliance on technical expertise, which limits the backgrounds of potential practitioners	Emphasis on relationship building skills in assessor job descriptions
Importance of language and translation	Accessibility of technical jargon, multi-cultural and -lingual settings potential for meaning to be lost in translation	Assessors with a variety of academic and professional backgrounds
Role of metaphor	Differences in cultural communication style (i.e., metaphor, storytelling, etc.) (e.g., Bielawski, 2003; Nadasdy, 1999)	Emphasis on communication skills in assessor job descriptions
Scientization of Traditional Knowledge	Traditional Knowledge "legitimized" only by adaption to science discourses or confirmation by scientific studies	- Comments accepted in oral and other formats - Specialized procedures for Traditional Knowledge - Specialized training for assessors - Comments accepted 'as-is' for consideration
Appropriation of Traditional Knowledge Research	Traditional Knowledge studies tend to reflect research needs and agendas of industry, academia, government	Specialized procedures to preserve the confidentiality of Traditional Knowledge designated comments
Capacity Building	Research activities provide opportunity for internal gathering of important cultural knowledge, inter-generational knowledge transfer, and empowerment of younger Indigenous peoples	- Federal funding for an IA practitioner for each FNG - Federal funding available to support comments on particular projects

accidental – outcome of IA" (pg. 195), a recommendation that is highly relevant to Canada, where Indigenous ways of knowing and Traditional Knowledge have been established as necessary considerations in IA processes, but which continue to see little traction in the outcomes of such processes (Ellis, 2005; Nadasdy, 2008; Natcher et al., 2005; Udofia et al., 2017).

Building on previous studies on the role of IA in discussions of Indigenous rights and title (e.g. Fidler, 2010; Merino, 2018), we examine the situation in Yukon Territory, Canada. The Yukon Territory, like much of northern Canada, has relatively long-standing and advanced land claims agreements in place, which has created a complex tapestry of jurisdictions in a region with high mineral potential (Huskey and Southcott, 2016; Sabin, 2016). In the *Umbrella Final Agreement* (UFA)*,* the overarching framework for Final Agreements between individual Yukon First Nations and the Government of Canada, Chapter 12 is devoted to IA or 'development assessment' and provides a space for guaranteed participation. Each First Nation with traditional territory in the Yukon has a unique experience and relationship with the Government of Canada, Yukon Government and the *UFA*, and yet common experiences arise. The discussions happening in these contexts are therefore more concerned with the implementation of *Final Agreements*, rather that the granting of rights and title over land, which has largely been settled. That is not to say that there are not challenges, but the land claims negotiated between 1973 and 1993 have withstood tests in the Supreme Court of Canada on a number of occasions (e.g., *Bill S6* (2014), *Bill C69* (2019)). Within this complex governance setting, this study examines the role of research capacity in Yukon First Nations participation in IA. Ellis (2005) points out the broad challenge: "initiatives to incorporate traditional knowledge into environmental decision making can be effective only if they strive to address this problem by adapting conventional environmental decision making to aboriginal ways of knowing and doing, rather than the conventional converse" (pg. 74). For IA in Yukon Territory, the question is not 'if' or 'when' but 'how'?

5.2   Methods

5.2.1   Data collection

We conducted key informant interviews (n=17) with former and current First Nations representatives from a variety of Yukon First Nations and other relevant organizations. We paid special attention to maximizing variation so that a large range of opinions were included (Baxter and Eyles, 1999). Our focus was on the Tr'ondëk Hwëch'in whose traditional territories overlap

much of the historic and current Klondike gold fields in central-west Yukon. A research agreement was put in place at the outset of the project, with additional key informants then identified through snowball sampling. Additional key informants were also recruited from other FNGs, focusing on those involved directly with IA or designated as the development assessment officer. Snowball sampling engages informal relationships among participants to identify other potential key informants, thereby relinquishing a degree of control over the sampling process to the participants (Creswell and Clark, 2007; Noy, 2008). Additionally, the people responsible for IA may not hold that specific title, and so there is some reliance on snowball sampling as a means of identifying the person with the responsibilities we are looking to learn from. Semi-structured interviews lasted between 60 and 90 minutes to allow for a semi-guided conversation with opportunities for key informants to expand on points they deemed important (Seidman, 2013; Sovacool, 2010). Community saturation was achieved when all identified positions were contacted, and the names suggested through snowball sampling were no longer new to the researcher. Data collection protocols were reviewed and approved by the McGill University Research Ethics Board (#127-0717) prior to data collection. Licensing was also obtained through the Yukon Scientist and Explorer's permitting process (license # 6800-20-1099) and a research agreement with the Tr'ondëk Hwëch'in government. Data collection protocols were piloted with a former FNG development assessment officer and reviewed by a current First Nation council member to enhance reliability and for cultural appropriateness. Similarly, preliminary results were discussed with advising First Nations representatives that are currently involved with development assessment to establish reliability and trustworthiness and provide member-checking (Yin, 2003).

5.2.2 Data analysis

Interviews were transcribed based on audio recordings, then coded iteratively using the qualitative analysis software NVivo. We employed content analysis on the transcripts and associated documents, which looks to infer "features of a non-manifested context from features of a manifest text" (Mertin, 1991, pg. 15). Using initial or open coding to start, we identified broad emergent themes, paying particular attention to the topics repeatedly developed by multiple key informants. Based on these themes, concept coding was used to draw together themes into two cohesive ideas, while pattern coding drew out the specific characteristics of the different themes, adding dimension, depth and detail to the analysis (Krippendorff, 2018; Saldaña, 2015).

5.2.3   Assumptions and limitations

With the use of snowball sampling, we make the assumption that former and current development assessment officers interact, are interconnected, and are involved in the Yukon IA process. There are, however, limitations associated with the number of First Nations governments we were able to connect with. We initially reached out to development assessment officers in all 14 Yukon First Nations but received limited responses. As such, the potential sample size of former and current development assessment and associated practitioners in First Nations governments is limited. We do not claim that the results presented in this paper represent a comprehensive documentation of any particular First Nation's position on impact assessment in the Yukon, but rather look to identify the IA process from a variety of perspectives, including signed and unsigned Yukon First Nations.

5.3   Results

Impact assessment provides a space for interactions among governments, including First Nations Governments, and is a federally legislated process in the Yukon, as part of the *UFA*. Each First Nation with traditional territory in the Yukon has a unique experience and relationship with the Government of Canada, Yukon Government and *UFA*, as well as their individual Final Agreements if they have them, and yet common experiences, while embedded in this multilayered context, arise.

5.3.1   A 'cultural disconnect' and lost learning opportunities

Yukon First Nations have established worldviews that are well-documented on a variety of publicly available platforms, supported by the legal framework of the *UFA,* and further protected in their individual Final Agreements. It is worth noting here that three First Nations do not have signed Final Agreements, and that one of these nations is actively disengaged from the Yukon IA process. The two others interact with the IA process, but experience distinct challenges. Many of the key informants from FNG described a one-way exchange, where the multi-directional learning one might expect from a social learning space is lacking or completely absent. A recurring experience described by participants included explaining the ontological and legal position of the FNGs to Yukon Government employees, project proponents, and Yukon Environmental and Socio-Economic Assessment Board officers. Participant 1432_2 described this as a "*cultural disconnect*" tied to familiarity with the political and social context of the Yukon, where IA

becomes a space for learning for non-FNG practitioners, rather than a space for social learning. This is described as often accompanied a lack of willingness to adjust individual worldviews to be more inclusive. Frequently these experiences were reported to be with YESAB and Yukon Government employees new to the territory, but not always, which leads to ongoing frustration in FNGs, as *"…it should be on people to find it out rather than First Nation Governments constantly having to remind everyone that we're here, and there are rights associated with being a self-governing First Nation that need to be upheld,"* (participant 1359). Participants generally lamented the time and energy devoted to explaining and re-explaining their worldview, which seems to have led to an 'explanatory fatigue' where, as participant 0858 articulates, *"… we're not going to educate other governments or individuals on their own colonial past. Too many resources and too much effort."* Others pointed to certain components in the generalized process of IA as troublesome, as Participant 1432_2 pointed out: *"the whole process is geared to identifying values and that is foreign to the First Nation."*

The 'cultural disconnect' was seen to be a main reason behind the limited progress with procedures in support of First Nations worldviews in the IA process, such as confidentiality policies and the acceptance of formats other than written documents. While YESAB has specified procedures for Traditional Knowledge and sensitive information, there is a tension that accompanies these procedures and perceptions of transparency. Taken from one view, transparency in the process relies on making all materials used for decision-making publicly accessible, but this can be problematic when some essential materials are confidential and intellectual property, such as Traditional Knowledge and site-specific knowledge which can include harvesting patterns and medicinal plants. Based on our interviews, this tension can manifest in two ways: documentation and consideration. Participant 1432_2 explained, *"this is one thing that YESAB and some of the decision bodies have pushed us on, is asking for 'well, you provide really general terms about there being an important thing in this area. Have you really documented it?'…we're tired of having to justify what we said."* Participants attributed a lack of documentation partially to a lack of time and capacity, and partially a reticence to share sensitive information with the process, as articulated by participant 0858: *"they [community members] don't know how it's being used or whose hands it's in."* Participant 1239_1 provided another perspective, where *"Yukon Government always encourages us to just put everything and anything in the YESAB assessment, both Traditional Knowledge related and not."* An unintended effect of adhering to the

idea of public transparency has been that FNGs are cautious about what to include in their submissions, which somewhat negates the intent of guaranteed inclusion.

From a social learning perspective, this shows the limited extent of behavioral and systemic change one might come to expect from a social learning context. Participants described weighing the risk of exposing confidential TK to the public against the possible influence of that TK in the IA process for that particular project. Some participants also referred to instances where submissions could be declared confidential, but with what Participant 1239_2 described as *"limitations as to how that information can be used in the Executive Committee screening,"* and *"... they gave us strong indications that if we did allow it to be uploaded on the YESAB Online Registry, they could use it [the traditional land-use study] to the fullest extent."* This reveals a tension between the sanctities of the sensitive and confidential nature of Traditional Knowledge and the transparency of the IA process in the eyes of the public. Reduced trust in the IA process from all parties also reduces the reciprocity, thereby limiting the social interactions among parties and crippling the potential for social learning.

Participants also acknowledged that FNGs experience their own challenges associated with gathering, preserving, and engaging local and traditional knowledge, which can exacerbate the situation. Participant 8_1335 explains: *"there's definitely a greater awareness on YG's part and maybe even the 'Feds' [Government of Canada] about the importance of incorporating, or at least acknowledging the value that TK could offer, but the actual practical aspects of incorporating it are not there...if we're struggling in-house [within the FNG] to do it, how can we expect folks outside [the FNG] to do it well?"* One way that the *Yukon Environmental and Socio-Economic Assessment Act* attempts to address this concern is by embedding YESAB assessors in the community, which can present challenges, as explained by Participant 0858: *"a lot of folks don't know what it's like to live in a small community of 100 people or First Nations community... and sometimes walk in with other expectations."* In combination with other challenges, such as housing and organizational demands (see Darling et al, Submitted), embedding assessors locally is only a partial solution. Respondents also expressed hesitations around how the information will be received by the process, as Participant 1432_1 says, *"even if you do [articulate the worldview], will the people who need to hear it like YESAB, and more importantly the other decision makers, understand it? Probably not...because the thing is you can't put it into words in a short enough format that they're actually gonna read it."*

5.3.2 Being seen as rights holders

It is relatively common, according to participants, for FNGs to return to their Final Agreements in order to enforce the consideration of their views, comments, or even rights and title, in the Yukon IA process. The Umbrella Final Agreement is a modern-day treaty and the framework under which the individual Final Agreements are negotiated between the Government of Canada and each First Nation. Chapter 12 of the Umbrella Final Agreement also instigated the federal legislation that established *YESAA*, with the legal parameters that dictate the broad aspects of the IA process in the Yukon and accentuated by explicit connections to land use planning and other advisory boards, such as the Yukon Water Board. The Final Agreements signed separately by eleven individual Yukon First Nations, where the rights and title for designated lands are outlined. These agreements serve as a guiding document when interacting with IA processes. *YESAA* and the IA process have come to be a space where FNGs can and will fall back to their Final Agreements, where they exist, in order to solidify their positions as legal rights holders. Holding the other actors accountable to these established agreements has become a foundation to interacting with the IA process for some, as Participant 4_1335 explained*: "... a lot of our comments were also rights based and focused around our legal position around things. We worked really closely with a legal counselor on our approach to environmental assessment."*

Several participants referred to the idea that the Yukon Government relies on the IA process as a primary form of consultation on development-related matters, a role for which it was not necessarily intended. This presents what Participant 1359 described as *"a tricky balance, if activities are on Crown land, of how much we need to rely on other parties to help us protect rights versus how much other parties are just consulting us to make sure our rights aren't infringed on."* The implementation of the Final Agreements is an evolving challenge that all governments are learning to navigate, often through trial and error, and FNGs are forced to consider who amongst the actors involved are engaged with the implementation of the land claims agreements and to what extent that helps or hinders the FNGs position for that project. Participant 1359 goes on to describe the IA process as one mechanism for *"... getting stuff on the record, sharing information and general awareness about what infringements there might be on treaty rights."* In these cases, the IA process becomes a legal mechanism through which FNGs enforce the Umbrella Final Agreement and their individual self-government agreements.

For un-signed First Nations, the lack of a legal document to be enforced leaves their position in relation to the IA process undefined, unclear, and potentially unfunded. Without such guidance, Participant 1239_2 explains the different experiences as *"...when YESAB is conducting the assessment and looking at [an unsigned First Nation] and seeing that 'oh, they don't have a final agreement,' and then looking at a First Nation that has a final agreement. They might flip to [the chapter on lands and resources], and say, 'OK, this says that.'... So, whatever is in the Final Agreement is what they have to work with."*

For some, stepping away from the IA process entirely has been the answer, while others continue to engage in the process as a mechanism for asserting their Aboriginal rights and title in their declared traditional territories. This includes First Nations who have traditional territories in the Yukon, but who aren't acknowledged as Yukon First Nations by the Umbrella Final Agreement, as Participant 0905 explained, *"we're not funded to participate and that's a big part of our...capacity challenge."* This has led to a perceived mismatch in roles for IA, as Participant 0905 explained, *"the YESAB process is just essentially an environmental assessment process and the [FNG's] issues were partly environmental, but very much around rights and title, that's [FNG] unceded lands. [The response] was like, 'We appreciate where you're at, but that's outside of our scope.'"* Participant 1310 supported this impression, stating: *"I don't think YESAB has a process to deal with those [First Nations rights]..... They're supposed to be incorporated, but they tend to fall back on just the science."* For the First Nations without the legal clarity offered by a Final Agreement, building relationships can be difficult and often the remaining option, after pursuing other avenues for consultation, is court involvement, as Participant 1239_2 points out, *"...outside of initiating a judicial review, we're still at a loss for how to proceed with our attempt at building a good relationship with YG ...."*

5.3.3   Hope for the future

Even while participants pointed out areas in the IA process needing improvement, they were generally supportive and hopeful in the trajectory of its evolution and the evolution of FNGs approaches to participation. Participant 1017 expressed this hope: *"I think it comes down to us getting better and better at articulating what we want to see in the process. ... [Changes] happen, but I think it's just getting better and better at providing our information in a way that's understandable, that can be meaningful into the process."* The focus on asserted rights and refining how Final Agreements are implemented was underlying many participants' comments,

such as 8_1335, who stated: *"… we've got all these inherent rights and responsibilities, which are outlined in various Final Agreements and other documents. But the actual on the ground implementation is still not as clear. So, I think that's a big motivation…. Everything we do, ultimately, should stem from there."* Focusing on the progress made, Participant 1017 reflected: *"if you look 20 years ago when it was Yukon Government and the Feds [Government of Canada] versus now, I think self-governing First Nations have changed the landscape drastically. It's just not in the same landscape of governance, and the ability of First Nation governments to create these checks and balances."*

Results here show that First Nations Governments (FNGs) have a particular perspective on how these processes unfold, with particular attention paid to what is meant by 'consideration' in these contexts; perceptions of neutrality within the process and what that means for consultation; and treaty rights. The concerns brought up by participants centre on the consideration of FNG perspectives that are meant to be a fundamental component of the process, according to the *UFA*. The most consistent concerns, regardless of the particular relationship to the *UFA*, circle around the ideas of educating other governments, and the tension created by process transparency. Many of these topics are intertwined and contribute to one another, as well as contributing to the overall perception of legitimacy for the Yukon IA process.

5.4 Discussion

The most consistent concerns raised by participants from Yukon First Nations match themes of self-determination and knowledge appropriation raised elsewhere in Canada (e.g., Ellis 2005, Von Der Porten 2015) and globally (e.g., Howit and Suchet Pearson, 2006). The ideas of IA as a reciprocal learning space have been discussed broadly in the literature (Sanchez and Mitchell 2017), as have the roles of Indigenous and public participation in adding legitimacy to IA processes (Arsenault et al., 2019; Udofia et al., 2017), however the legal enforcement of Aboriginal rights and title through participation in the IA process has received less attention. These ideas coalesce around tangible and intangible contributions of IA towards sustainable development aims that include Indigenous perspectives and acknowledging their legal position as rights holders.

5.4.1   IA as a learning space

A tangible contribution of IA to discussions of Indigenous rights and title in the Yukon Territory is that a formal 'common forum' with guaranteed financial support for Indigenous participation is enshrined in Canadian federal legislation and Chapter 12 of the *Umbrella Final Agreement*. Ensuring the opportunity to participate in IA processes has long been recognized as essential for learning in IA (Arsenault et al., 2019; Booth and Skelton, 2011; Fitzpatrick et al., 2010), and is an established part of the Yukon IA process. Sánchez and Mitchell (2017) discussed the broader public acceptance of projects founded on reciprocal learning, advocating for a learning-based approach, where IA is "driven by a spirit of enquiry," p 202. The Yukon case presents an instance where the intent for a learning-based approach is outlined in the *UFA* and *YESAA* itself, however, rights holders in the process perceive this approach to be hamstrung by a lack of reciprocity. Our results suggest that the assessment board may have fallen into the common trap of what Sánchez and Mitchell (2017) identify as a 'knowledge-based approach' where knowledge transfer becomes one-way, in this case transferring from the First Nations to the process, with minimal understanding of the significance associated with the Traditional Knowledge and worldviews being presented.

Turning to the criteria for social learning outlined by Reed et al. (2010), it appears as though two of the criteria are being met on an ad-hoc basis in the Yukon. Established assessors have extended exposure to other worldviews, which have a perceivable change in attitude in individuals (criterion 1). There is minimal, yet noticeable, change in the systems beyond these individuals, which speaks to the influence of social learning in the wider community of practice (criterion 2). The social interactions among actors here play a major role in influencing changes in individual and collective behaviours, where the greatest potential for changes in understanding and attitude are through informal interactions. In this sense, IA in the Yukon has the potential to act as a space for social learning around Indigenous rights and title, in that the informal exchanges that could and often do accompany the IA process are a mechanism for attitude and behaviour change. Limitations on learning spaces also manifest with power imbalances. For example, Saarikoski (2000) described a generic power imbalance in IA, where "the weaker groups' limited ability to produce information which could have backed up their case and given it more credibility." This situation was described by a number of our participants, where comment submissions to YESAB go unacknowledged because they are based on new or outside ideas. These experiences speak to

what Saarikoski (2000) identifies as a bias against new ideas originating from marginalized groups. In approaching the same question from another angle, Jones and Morrison-Saunders (2017) look to the learning done by proponents over time, where proponent behaviour is internally modified by the requirements of IA. While Saarikoski (2000) and Jones and Morrison-Saunders (2017) are not directly referring to Indigenous contexts or Traditional Knowledge, Howitt et al. (2013), Fitzpatrick et al. (2010) and Ellis (2005) have drawn similar conclusions in the context of IA and environmental governance mechanisms, respectively, looking to incorporate and meaningfully consider Indigenous knowledge. We are aware that there are ongoing efforts in the Yukon towards utilizing the IA process as a training ground for proponents and governments alike, using the legal framework as a means to enforce changes in behaviour and build what Howitt (2013) calls 'intercultural competency.'

Ellis (2005) and Howitt et al. (2013) also discuss barriers that arise in the meaningful incorporation of Indigenous knowledge using the Northwest Territories, Canada, as a case, with the conceptual barriers Ellis (2005) describes, and the 'ethical competencies' Howitt et al. (2013) describe aligning well with the concerns outlined by our research participants. The perceived inability to conceptualize Indigenous worldviews into productive understandings of concerns within the IA process was considered a major barrier, often leading to reliance on the legal aspects of Final Agreements for clarity. For example, one participant spoke to using the language of the final agreement in their comments to maintain a clear linkage between submitted comments and the agreement. Further, both Ellis (2005) and Howitt et al. (2013) describe political barriers enmeshed in the empowerment of Indigenous peoples over their traditional territories and traditional knowledge and the potential to become entrenched in the dominant view of development. Peeling back what Ellis (2005) refers to as 'a veneer of best intentions,' the Yukon context embodies IA as a learning space that has shifted towards a political tool being engaged to enforce the Indigenous rights and titles encapsulated in modern day treaties.

5.4.2   *IA as a political tool*

Much attention has been devoted to determining the effectiveness of IA in different contexts, based on ideas of legitimacy and participation (e.g. Bond et al., 2018). Conceptualizing effectiveness in this way can add to the refinement of IA processes establishing their procedural precedents. In IA processes that have been implementing suggestions of guaranteed, supported participation, more nuanced elements of legitimacy and participation turn to the quality of consideration and the role

of the IA process in larger jurisdictional discussions. In this way, IA becomes a political tool that acts as a site for clarification of meaningful consultation and interaction between traditional knowledge and dominant environmental governance systems, as well as an instrument of enforcement for Indigenous rights and title.

Merino (2018), in reference to IA processes in Peru, identified that a "paradoxical multiplication of weak participatory channels" (pg. 75) limits Indigenous and community voices to project-specific comments and influence on development decisions. In the case of Yukon Territory, where participatory channels are made explicit through modern-day treaties, we found that Indigenous voices are also being limited to project-specific decisions, mainly because processes such as land-use planning are slow or have stalled, leaving IA as the major space for Indigenous influence on development. As a result, the IA process is being co-opted out of political necessity, recognizing that Indigenous groups are not stakeholders but rights holders, with the associated responsibility and legal backing. For example, study participants expressed frustration that IA becomes a main space for consultation around development, which forces both signed and unsigned First Nations to tailor their comments to address both project-specific concerns and larger concerns of rights and title simultaneously. With modern-day treaties already in place, IA in the Yukon Territory serves as a mechanism for the enforcement of certain rights and responsibilities and an important space for political influence.

These 'new' challenges facing IA processes are more nuanced and concentrate on institutional interactions in multi-jurisdictional contexts based on formal legal precedents and court decisions, rather than the governmentality proffered by Cashmore et al. (2015), who looked to "governing through guidance." While guidance is a strategy employed by the Yukon assessment board to solve some of the concerns expressed by Indigenous groups, our participants indicated that the legally fortified Final Agreements become the foundation for their IA interactions. These conditions create an element of interpretation in the role of the IA process that can create confusion and ambiguity around the purpose, and therefore confound measures of effectiveness. Unsigned First Nations utilizing the political aspects of the IA process have limited recourse outside of the IA process, and have elements in common with other areas of Canada (Arsenault et al., 2019; Booth and Skelton, 2011; Udofia et al., 2017).

Ellis wrote in 2005, "While policies advocate that traditional knowledge and governance structures include aboriginal participation, true power remains concentrated in Euro-Canadian

bureaucratic structures, and Euro-Canadian values remain the primary basis for action." Written over a decade ago, this sentence encapsulates the overwhelming sense from participants that, as much as IA in the Yukon context has acknowledged and attempted to address elements of empowerment for Indigenous and local people, there remains a long way to go. While Udofia et al. (2017) and Arsenault et al. (2019) have already identified a number of enduring challenges for IA in Canada, our research adds that second-order challenges can arise from the next stages of multi-jurisdictional interaction, requiring an evolution of strategies within the IA process that appeared to be stalled at the time of the study. For the Yukon Territory, it is becoming clear that even with guaranteed opportunity and support to participate, fundamental underlying challenges with Indigenous involvement arise from the origins of the process itself.

5.5   Conclusion

Impact assessment has been shown to have potential as both a political tool and a space for mutual and reciprocal learning, particularly in multi-jurisdictional and multi-cultural contexts and given the proper supports. This study has shown that with basic capacity requirements met, such as finance and legislative foundations, Indigenous groups are still forced to adapt their participation to the IA process, so that their input is utilized more as a political tool for enforcing their Final Agreements than as a space for social learning re-adjusts attitudes in other actors. Notably, the ongoing acknowledgement of First Nations worldviews and land rights in the context of development was identified as a major point of frustration, as was how the process has adapted (or not) to Indigenous perspectives beyond a seemingly piecemeal consideration. Participants described a circular and often repetitive one-way knowledge exchange. With legislation and funding meant to support guaranteed participation, First Nations reported acting as facilitators of learning based on their legal positions, rather than moving on how to best present and accommodate Indigenous knowledge for consideration. Yukon First Nations appeared to have adjusted the framing and language they use in the IA process to establish and maintain their positions with regards to land rights and other land claims conditions.

Many international discussions around Indigenous rights and title are still focused on the "should we?", while in northern Canada this conversation has moved on to the "how do we?" Further research is needed on the barriers to evolution within established IA processes and how implementing existing land claim agreements can be made to complement broader IA objectives,

such as addressing cumulative effects and facilitating sustainable development. By adjusting the perception of IA as being a method of evaluating positive and negative impacts and making the appropriate adaptions to support such an evolution, IA processes in Yukon Territory have the potential to become a space for inclusive learning and knowledge exchange for better development decision-making.

5.6 Acknowledgements

5.7 References

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Chapter 6. General discussion and conclusion

6.1 Introduction

Through this dissertation, I refine the current understanding of IA capacity using a knowledge network lens and explore different dimensions of capacity constraints and successes at a variety of level to answer the main research question: *To what extent have policy initiatives enhanced northern research capacity for impact assessment in the Yukon Territory?* I carried out this work in an established IA system in northern Canada in order to move past established constraints around legislation and participation and capture more complex and nuanced challenges.

6.2 Major findings

IA has the potential to contribute to sustainable environmental governance by developing a space for negotiating agendas and bringing a variety of perspectives together. As a result, understanding the key dimensions of capacity that affect IA processes at multiple scales can reveal broader lessons for governance. In particular, the ability of IA processes to incorporate, interpret and apply diverse knowledge types, such as traditional ecological knowledge, in decision-making processes requires research capacity and represents an important component of the governance system (Paci et al., 2002). Viewing IA as a knowledge-based activity allows specific limitations and constraints impeding the pursuit of pluralism to be identified.

Research question: How is the term 'research capacity' understood in the context of environmental governance in northern Canada?

Chapter 2 reviewed the conceptual ambiguity associated with 'capacity,' with multiple definitions and frameworks identified across disciplines. This ambiguity has often led to misalignments between capacity building goals and corresponding initiatives. In particular, the challenges associated with using frameworks without an understanding of the contextual implications limit success. A typology of capacity is presented in the context of environmental governance, including adaptive, governance or community, policy and research capacities. The fluidity of the concept of 'capacity' needs to be carefully managed in the development of governance mechanisms, such as IA, to more fully appreciate the stresses that prompt local appeals for support (Black, 2015; Brinkerhoff and Morgan, 2010; Condell and Begley, 2007; Louafi, 2016; Simmons et al., 2011).

Through this literature review, I refine our understanding of the term 'capacity' in the context of IA in northern Canada and clarify the relationships among different types of capacity. I also identify the central role played by research capacity in successful environmental governance processes (Howlett and Ramesh, 2015; Marsh and Smith, 2000). There is a need for further research on the relationships between research capacity and policy, institutional, governance and community capacities in the context of IA. This would usefully contribute to wider calls for increased northern research capacity (Graham, 2016; Irlbacher-Fox and Gibson, 2010; Simon, 2017); evaluations of capacity building activities supporting natural resource governance mechanisms (Angell and Parkins, 2011; Carlson, 2016; Howitt and Suchet-Pearson, 2006; Noble and Hanna, 2015); and for enhancing the legitimacy and effectiveness of IA for sustainable development (Bond et al., 2018; Meuleman, 2015; Pope et al., 2013).

Research question: How does research capacity influence knowledge flow in the Yukon IA policy network?

In Chapter 3, I applied Rapid Policy Network Mapping to clarify the sources and flows of knowledge common to the Yukon IA policy network and identify the barriers to pursuing pluralism in IA governance. The findings show that network-level research capacity in Yukon's IA system has a number of areas that are ripe for improvement. The production and gathering of new baseline and site-specific information and knowledge is limited to particular sources, despite clear gaps in the knowledge base. Capacity constraints related to knowledge coordination at key 'choke' points in the network serve to inhibit knowledge exchange and dissemination. These constraints include time, accessibility, and stability. Additionally, the expected knowledge sources were not necessarily found to be the sources being engaged in the process. Many of the constraints around knowledge gathering and production are associated with the high volume of assessments being done and the limited time available for individuals to undertake knowledge coordination activities.

Within the IA network, actors identified context-specific impediments, such as internal knowledge management and relationship building mechanisms that require maintenance or reform. While some coordination of knowledge gathering and exchange activities occurred among actors, these were mostly informal and unplanned, dependent on individual motivation and capacity. Establishing more social connections, formal and informal, among actors could make better use of available resources. Overall, the network level analysis shows that research capacity

at individual and organizational levels impact overall network function, supporting the idea that policy initiatives need to take into account the multi-scalar nature of capacity (Brinkerhoff and Morgan, 2010).

Research question: To what extent does research capacity affect the organization of IA in Yukon Territory?

Chapter 4 turns the attention to Yukon's main assessment body, a major information and knowledge choke point identified in Chapter 3, an organization that has been overlooked in other examinations of IA capacity constraints. It establishes a set of IA-specific dimensions of research capacity. Findings indicate that commonly understood dimensions, such as financing, are necessary, but that current IA capacity frameworks overlook dimensions such as the contextual understanding and disciplinary versatility necessary to apply the tenants of sustainable development to development projects. This IA-specific capacity framework bolsters the perspective that IA is a boundary spanning activity that relies heavily on knowledge activities. In particular, navigating the balance between the technical and value-driven knowledge required to more fully identify and appreciate potential impacts is a multi-scalar and -dimensional task (Bond et al., 2018; Cape et al., 2018). As individual assessors and the assessment organization occupy important roles as knowledge brokers and boundary spanners in the IA process, developing their research capacity can improve the effectiveness of IA practice (Maag et al., 2018), contribute to the perceived legitimacy of the overall process (Kirchhoff, 2006) and advancing inclusivity in support of pluralism (Cape et al., 2018). For YESAB, identified areas for attention include the development and retention of individual assessors and organizational knowledge infrastructures. This analysis contributes a new perspective to existing understandings of IA as a science-policy interface, leading to substantive theory building in support of process legitimacy and transparency, as well as providing insights of practical relevance to bolstering IA process effectiveness.

Research question: How does research capacity affect the participation of Yukon First Nations Governments in IA?

Building on the previous research findings, Chapter 5 considers how First Nations Governments in Yukon are both leveraging IA as an important political tool and lamenting the missed potential for IA as a prime space for social learning. It is already well understood that IA has positive

potential as both a political tool and a space for mutual and reciprocal learning, particularly in multi-jurisdictional and multi-cultural contexts and given the proper supports. My research adds detail to this understanding, in particular that even with basic capacity requirements met, such as guaranteed space for participation, Indigenous groups in Yukon Territory are still being forced to adapt their participation in the IA process to accommodate misinterpretations of established land claims agreements. Findings indicate that Yukon FNGs generally utilize the IA process primarily as a political tool for enforcing modern-day treaties, particularly when there is high turnover in the representatives of the other policy actors. Simultaneously, IA becomes a misaligned space for social learning, in that FNGs spend resources "re-educating" other actors in the policy network about the institutional context of decision-making in the Yukon, a distinctly uni-directional activity. FNGs reported acting more as facilitators of learning based on their legal positions, rather than progressing towards how to best gather, present and accommodate Indigenous knowledge for consideration in the process. This is an important finding in the context of realizing the potential for IA to serve as a mutual and reciprocal learning space, where knowledge exchange is multi-directional and mutually beneficial.

Yukon FNGs appear to have adjusted the framing and language they use in the IA process to establish and maintain their positions with regards to land rights and other aspects related to land claims. However, translating best intentions (and mandates) into meaningful consideration is challenged by the ability of the process to support practitioners in the adaptation towards new and different understandings of capacity. With multiple knowledge systems existing across Canada and internationally, there is a wealth of perspectives waiting to inform IA practice and the resulting decisions taken in Yukon Territory. Respectfully negotiating this variety into a coherent consensus on pathways forward becomes the challenge, particularly in contexts of colonialism.

6.3   Contributions to theory

This research contributes to broader efforts to re-envision environmental governance mechanisms, in particular IA, in support of sustainability by approaching capacity concerns from a knowledge perspective. By applying a research capacity lens to actors in the Yukon IA network, the results contribute to the development of more systemic self-reflection and flexible governance systems. Each results chapter explores the three main units of analysis commonly considered for capacity (individual, organizational and network) and explicitly connect the role of research capacity and

knowledge interactions to the roles of boundary spanners and knowledge brokerage in IA. The main contributions to theory can be summarized as follows:

- As theory-building has been identified as a short-coming in IA literature (Biesta et al., 2011; Gadsby, 2011; Harrow, 2001), a deeper understanding of capacity specific to IA relating the fundamental components to IA best practice contributes to providing theoretical relevance to practical applications and providing clarity and direction for future theory-building activities (Chapters 4 and 5).

- Previous examinations of IA-related capacity issues have generally concentrated on legitimacy and effectiveness, primarily through legislation and public participation mechanisms, with capacity rarely identified as a limitation (Bond et al., 2018). Chapters 3 and 4 deepen our understanding of capacity in the context of IA by acknowledging the interrelated nature of the various types of capacity at various scales in the governance system. Notably, Chapter 3 focuses on potential knowledge sources, flows and barriers to identify particular capacity needs.

- To our knowledge, a network approach or network level analysis has not been previously applied to the IA context in Canada. Chapters 3 and 5 consider the ramifications of uneven capacity distribution amongst actors in the IA network, rather than the legislative and institutional contexts, which are commonly the focus of such analyses (i.e. Khosravi and Jha-Thakur, 2019; Kolhoff et al., 2018; Kolhoff et al., 2009; Kolhoff et al., 2016).

- Similarly, capacity frameworks previously applied in the IA context have been relatively broad and generic, identifying broad capacity concerns, but limited in their examination of specific challenges for practitioners. My applied work offers a more refined understanding of the capacity dimensions specific to assessment bodies and their assessors, drawing on both the theoretical foundations of IA and capacity-related literature from other disciplines. This framework is then tested on a well-established assessment body, with results that support the implications of IA-specific capacities.

- This research also provides further clarity on how IA governance mechanisms are being engaged by Indigenous governments and groups in practice, going beyond the intent laid out in legislation and modern-day treaties. As this research has shown, viewing Indigenous groups as rightsholders instead of stakeholders contributes to legitimacy and effectiveness

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of IA mechanisms, a discussion that has been hitherto unaddressed in IA literature. The findings support calls for theoretical reform that have become pervasive in the IA literature (i.e. Bond et al., 2018; Pope et al., 2013).

6.4   Insights for policy

Ellis (2007) writes, "while policies advocate that traditional knowledge and governance structures include aboriginal participation, true power remains concentrated in Euro-Canadian bureaucratic structures, and Euro-Canadian values remain the primary basis for action." Written over a decade ago, this sentence captures the ongoing concern that, as much as IA and environmental governance mechanisms have attempted to acknowledge and address the empowerment of Indigenous and local people, little actual progress has been made towards developing the ability of the IA network and its actors to be meaningfully considerate of non-technical perspectives. Acknowledging the connections between types and sites of capacity will refine these initiatives to be more strategic and focused. To this end, a number of important policy insights arise from the work presented in this dissertation:

- Capacity building, as a mandate and as a call to action, should be carefully considered in its orientation and application so that associated initiatives are strategic and focused. This is important from two perspectives:
    - Identifying the type of capacity required; and
    - Reflecting on where the capacity needs to be built. Are there changes to the governance mechanism itself that would ease a capacity constraint elsewhere?
- Supporting reflexivity in governance mechanisms at the individual and organizational scales will likely bolster efforts to re-orient these processes to become more inclusive. For example, it is worth pausing to consider the 'deficit model' in reverse and evaluate the resources and skills internal to the responsible organization (authority). In addition, adjusting the way governance mechanism approach Indigenous groups from viewing them as stakeholders towards viewing them as rightsholders will benefit the potential for social learning in co-management contexts.
- Knowledge coordination is a fundamental component of environmental governance that requires capacity and cooperation across organizations and disciplines. Capacity initiatives

would benefit from reducing silos within and among government agencies and encouraging the shared development of systemic knowledge management. This could include specialized support for developing internal management systems.

- Of particular relevance to northern Canada is that reliance on highly competent individuals in key positions can cause structural instability when these individuals leave. As a network, IA in the Yukon has the opportunity to consider the knowledge supports currently in place and how to better facilitate knowledge flow amongst knowledge sources and IA practitioners in order to offset potential disturbances.

6.5 Future research directions: pursuing pluralism in environmental governance

Land is considered central to discussions of colonialism and Eurocentricity for multiple reasons, including as a source of economic wealth, control and power (Paci et al., 2002). Environmental governance, therefore, becomes an ideal space to re-envision and re-negotiate how our cultures interact, our common goals, and how to evolve and adapt the implementation of land claims and other modern-day treaties. As more jurisdictions look to the North and Canada for insight on how to interact with different ways-of-knowing, now is an appropriate time to examine what is working well and what is not, then bring those lessons to the attention of researchers and policymakers at different scales.

6.5.1 Knowledge networks and coordination

The distribution of knowledge, data, and information across Yukon Territory, and northern Canada more broadly, is disjointed, with areas of high coordination and other areas where coordination is non-existent. This situation leads to the repeated expenditure of limited resources on the reconstruction of datasets and studies crucial for decision-making. Future work could examine the attitudes, structures, and mechanisms that encourage or obstruct the flow of knowledge, data and information among the various actors that engage with research results and approach possible adjustments to those flows. Examining the effectiveness of specific capacity building initiatives related to First Nations research agendas and identifying needs through more participatory approaches would also be valuable. There is also a need to re-examine the policies and practices affecting knowledge sharing and knowledge accessibility and consider how the information, data,

and knowledge produced or gathered in the territory can be accessible to everybody, particularly local communities.

6.5.2   *Capacity in support of pluralism*

Further empirical exploration of paths towards societal goals of pluralism in governance mechanisms in Canada is needed. Twenty years into the implementation of the *Umbrella Final Agreement*, Yukon Territory has seen various successes and challenges in the re-envisioning of governance mechanisms to embrace principles of pluralism and acknowledge other worldviews, particularly with regards to Indigenous ways-of-knowing. Current processes in the Yukon Territory and beyond could benefit from further, more in-depth conversations around existing capacity (skills and resources) developed by the networks formally and informally engaged in environmental governance. Understanding IA as a science-policy interface could lead to further theory building in support of process legitimacy and transparency, as well as provide insight to bolstering process effectiveness. Applying the evaluation framework outlined here in a comparison of IA jurisdictions could provide further refinement of the suite of capacities relevant and specific to IA in different contexts. More work is also required to explore the types of existing capacity in other established environmental governance processes that could be leveraged towards being more flexible, agile, and inclusive in their pursuit of pluralism, particularly Indigenous worldviews. In other words, how do we adjust established governance processes to accommodate other ways-of-knowing by building the capacity of those implementing the processes?

6.5.3   *The evolution of attitudes and competencies*

The Yukon Territory, much like other regions in Canada and internationally, has a long-standing, if tumultuous and tenuous, history of negotiation between environmental and resource development perspectives. The evolution of this relationship could be further explored using the concept of 'environmentality,' which looks to explain the transition towards more environmentally conscious attitudes through engagement with environmental governance mechanisms. How this translates into interactions with Indigenous peoples and the development of social responsibility in small-scale mining and development would be a future research path of interest. The Yukon's unique governance landscape also provides a space for an evolution in Indigenous-settler relationships facilitated and enforced by legislated imperatives. The normalization of awareness around Indigenous relations and issues that is considered part of the fabric of Yukon communities,

and how settler systems have incorporated and adjusted to these conditions would be relevant to both Indigenous and non-Indigenous governance activities.

The concept of collaborative competence, born out of health care research (e.g., Lingard, 2012), would be another interesting direction for applied research. For example, examining localized (individual) interactions and considering the suitability of the individuals representing groups such as Renewable Resource Council meetings, Water Board hearings, and other governance activities could yield novel insights. Building from the idea that the people in the room have a distinct influence on the outcome of interactions could contribute to core aspects of governance such as consultation and participation, as well as the broad understanding of how processes like IA unfold in practice. Essentially, what are the individual characteristics that facilitate the exchange of ideas and sound decision-making for environmental governance?

6.6   General conclusion

Impact assessment is commonly touted as a space to bring together a variety of perspectives on development projects founded on the tenants of sustainable development. As a specialized governance mechanism, IA is seen as a social learning space, engaging in group learning through knowledge sharing, and as a legal mechanism through which Indigenous and public voices can be heard in development decisions (Diduck et al., 2012; Sánchez and Mitchell, 2017). Indeed, it is a relatively straightforward alignment between the tenants of IA (sustainable development) with the tenants of the seventh-generation rule, held by some Indigenous groups, and other similar beliefs (Audouin and de Wet, 2012). Modern environmental governance mechanisms are transitioning towards becoming more inclusive and tapping into the wealth of perspectives available to inform decision-making, which necessitates a corresponding transition towards processes that can be evaluated and adapt accordingly (Larsen, 2018). In order for this transition to be seen as successful, governance mechanisms will have to support their organizations and individual employees in making this pivot, by identifying strengths and limitations and providing pathways to develop the necessary resources and skills, or capacity. One important type of capacity that has been hitherto overlooked is research capacity – the ability of actors to produce and interact with knowledge to identify and achieve collective objectives based on a variety of knowledge sources and approaches, including complementary worldviews. This dissertation demonstrates the value of using research capacity as a lens for thinking about the ability of knowledge-based environmental governance

mechanisms, such as IA, to accommodate and more fully consider a variety of knowledge types and sources, including qualitative modes of research and Indigenous and local knowledge. What is limiting the potential of IA now is the ability of established processes to empower Indigenous and local knowledge in the development discussion.

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Appendices

Appendix 1. Interview guide for semi-structured interviews

Research capacity pre-interview document and semi-structured interview guide

Pre-interview document

The role of capacity in Canada's northern futures

Thank you for agreeing to participate in this study. I appreciate any contribution you can make.

Background

My research focuses on the role of research capacity in IA, which includes the distribution of research capacity amongst participants in, for example, the process laid out by the Yukon Environmental and Socio-Economic Assessment Act. Many groups are legislated to participate in the process, however, the individual group's ability to participate is not always the same. I am interested in both in the research capacity* that exists and the implications this unequal distribution of capacity might have on the final outcomes of the IA process. I am also interested in the connections between the different groups, how these are maintained, and how knowledge flows between groups.

Various frameworks provide detailed structures to help evaluate and explain common elements across capacity-related fields (e.g. higher education, international development, community development). Most frameworks follow broad themes of scale, competence and capability to address overall capacity and measure progress towards capacity development without relying solely on traditional measures, such as the number of peer-reviewed publications. The framework laid out by Cooke (2005) is specific to health research capacity building but provides a good foundation for examining research capacity in other fields, such as environmental governance. Maag et al. (2018) developed a set of indicators for the contribution of individual knowledge brokers at the interface between research, policy and practice. This interview modifies and combines these two frameworks to be used to assess research capacity in the context of natural resources in Yukon Territory, Canada.

Cooke (2005)		
- Skill and confidence building	-	Appropriate dissemination
- Close to practice	-	Continuity and sustainability
- Linkages and collaborations	-	Infrastructure

Elements of Maag (2018)		
- Identify and engage research/policy/practice partners	-	Facilitate continuous knowledge exchange among research/policy/practice partners
- Support the production of new knowledge	-	Support implementation
- Tailor and publish products	-	Support networking, community building, and capacity building among KBs

The results of this exploration will be published as part of four peer reviewed papers that will make up the core of my doctoral thesis. The final thesis will be made publicly available. Data gathered during this research may also be used in additional publications and/or used as guidance for policy development.

Definitions

*Research capacity: the ability of an actor, organization or network to engage, produce, maintain and use knowledge through individual and collective development (Cooke, 2005, Kaseje et al., 2016, Trostle, 1992).

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Research capacity and Impact Assessment (IA)
Semi-structured interview guide

Interview guide

Thank you for agreeing to participate in this study. I appreciate any contribution you can make.

The results of this exploration will be published as part of four peer reviewed papers that will make up the core of my doctoral thesis. The final thesis will be made publicly available. Data gathered during this research may also be used in additional publications and/or used as guidance for policy development. You will have the opportunity to review and comment on the transcribed interview.

Respondent information

Respondent Information	**Organizational Information**
Name	Name
Highest degree completed	Size
Position	Age
Time position held	Mandate
Qualifications required for position	

Capacity
This section is meant to address the broader questions of how capacity is understood and how the northern research landscape is impacted by variation in research capacity.

What is your impression of the state of the current research landscape in the Yukon?
What is your organization's understanding of qualifications?
What is your organization's approach to capacity and capacity building? How could it be better?
How does your organization contribute to capacity enhancement in the territory?

Individual
This section focuses on the individual scale, where respondents reflect on their personal research experiences in the context of their position.

Main question: What are the biggest motivators and challenges to the enhancement of research competency and capability for you as an individual in your current position?

Sub-questions
How does you interact with research in your position?
What kind of research partnerships have you developed in your position?
How is any original research you might do disseminated, both locally or in academic contexts?
How is continuity and sustainability maintained for your research in your position?
What mechanisms (e.g. policies and procedures) are in place to support research by individuals in your organization?

Organizational
This section addresses the organization as an actor, looking at the policies, procedures, mandates, and stand-points from an organizational perspective.

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Appendix 2. Organizational structure of the Yukon Environmental and Socio-Economic Assessment Board as of 2019.
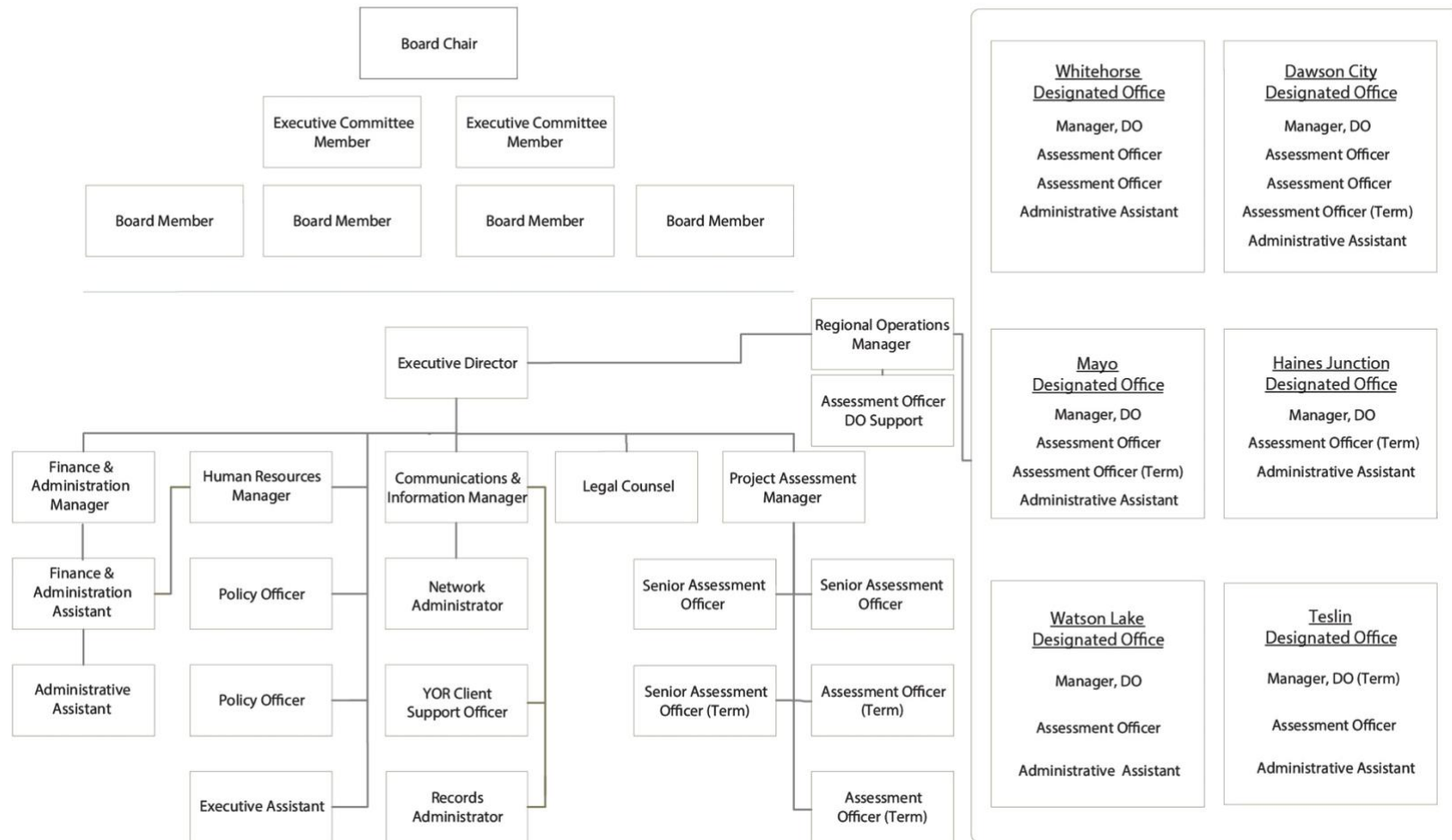
Appendix 3. Comparison of 24 capacity frameworks commonly used in the fields of environmental impact assessment, health, and education, among others.

Author	Year	Discipline	Scale	External Coordination (relationship)	Internal Coordination	Finances	Legitimacy Internal (cohesive vision)	Legitimacy External (perception)	Technical Expertise	Project Management	Versatility (Multi-disciplinarity)	Contextual Understanding	Mentorship	Opportunity	Dedicated time	Culture
Hek	2008	agriculture policy	organization	x												
Gupta	2010	climate change	organization	x	x	x		x	x		x					
Lim et al.	2011	education	individual	x	x	x			x	x				x		x
Doberstein	2001	EIA	system	x		x		x								
Khosravi	2019	EIA	system	x	x			x	x							
Kirchoff	2006	EIA	organization	x	x			x	x			x				
Kolhoff	2016	EIA	system	x		x			x							
VanLoon	2009	EIA	organization													
Janicke	2004	environmental policy	organization/ network	x	x	x			x							
Maag et al.	2018	environmental science	individual	x	x	x			x	x		x				x
*Thornhill et al. / Ugolini and Lewis / Kothari and Edwards	2009	health	organization													
Minja et al.	2011	health	organization/ individual	x	x	x			x	x		x		x		x
Mugabo	2015	health	individual	x	x	x	x		x	x			x	x	x	
Albert and Mickan	2003	health care	individual	x	x	x			x	x				x		
Bates et al.	2006	health care	organization/ individual			x			x					x		x
Cooke et al.	2005	health care	organization	x	x	x	**x**		x	x			x	x	x	
Golenko et al.	2012	health care	individual	x	x								x			x
Hamel et al.	2011	health care	organization	x	x	x			x							x
Kislov et al.	2014	health care	organization	x	x	x								x		x
Pager et al.	2012	health care	individual			x			x						x	
Gustafsson	2020	IPBES	system	x	x	x			x	x						
Howlett and Oliphant	2010	political science	organization		x				x		x					x
Armstrong et al.	2013	public health	organization	x	x	x										x