

**“MORE PRECIOUS THAN GOLD”: INDIGENOUS WATER GOVERNANCE IN THE
CONTEXT OF MODERN LAND CLAIMS IN YUKON**

by

Nicole J. Wilson

B.A., University of Calgary, 2006

MS, Cornell University, 2012

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

in

THE FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES
(Resource Management and Environmental Studies)

THE UNIVERSITY OF BRITISH COLUMBIA
(Vancouver)

April 2018

© Nicole J. Wilson, 2018

Abstract

Water governance is a priority for Indigenous peoples, whose complex relationships to water are essential to material and cultural well-being. Indigenous water governance refers to Indigenous modes of interacting with and decision-making processes about water including ontologies, epistemologies, and forms of governance distinct to a given people and adapted over time. Indigenous peoples around the world are presently struggling to protect the waters within their territories against unprecedented changes occurring as a consequence of global environmental change and unsustainable resource development. This dissertation empirically investigates how Indigenous water governance is shaped by the Modern land claims in Yukon, Canada focusing on four of fourteen Yukon First Nations (Carcross/Tagish, Kluane, Tr'ondëk Hwëch'in and White River); the challenges of navigating complex water governance landscapes where historical and ongoing colonialism shape Indigenous water rights and access; Indigenous approaches to water governance as they are informed by specific water ontologies and forms of governance; and the novel approaches to water governance Indigenous peoples are engaging as informed by their relationships to water and strategic engagement with colonial water frameworks. Chapter 2 engages with the ontological politics of water and water governance. It examines how ontological politics inform water conflict between Indigenous and settler governments and the ways Indigenous views of water as a living entity might come to inform more just and sustainable alternatives. Chapter 3 contributes theory and empirics to the study of Indigenous-state water co-governance in Yukon through an examination of the benefits, challenges and future opportunities with the water governance system, shaped by Modern land claims. Chapter 4 engages with the unique opportunity for Yukon First Nations to develop water

legislation and explores the implications of engaging “state-like” forms of governance for Indigenous water governance. Chapter 5 seeks to expand understandings of Indigenous peoples’ roles in Community-Based Monitoring from one of ‘knowledge input’ to an emergent water governance strategy engaged to protect the waters within their traditional territories.

Lay Summary

Water governance is a priority for Indigenous peoples, whose complex relationships to water are essential to material and cultural well-being. Indigenous peoples around the world are presently struggling to protect the waters within their territories against unprecedented changes occurring because of global environmental change and unsustainable resource development. This dissertation investigates how Indigenous water governance is shaped by Modern land claims in Yukon, Canada; the challenges of navigating complex water governance landscapes where historical and ongoing colonialism shape Indigenous water rights and access; Indigenous approaches to water governance as they are informed by specific relationships to water and forms of governance; and the novel approaches to water governance Indigenous peoples are engaging as informed by their relationships to water and strategic engagement with colonial water frameworks. This includes the development of Indigenous water legislation and engagement in community-based water quality monitoring.

Preface

Chapters 2, 3, 4, and 5 of this dissertation are intended to be published in academic journals as discrete manuscripts. They are therefore intended to stand alone, which results in some repetition of the research context and methods across the chapters. Chapter 2, 3, and 4 relate to research conducted in partnership with four Yukon First Nations (Carcross/Tagish, Kluane, Tr'ondëk Hwëch'in and White River) and the Yukon River Inter-Tribal Watershed Council. Chapter 5 is based on a separate study of the Indigenous Observation Network – an Indigenous-led grassroots Community-Based Monitoring program that involves Alaska Native Tribes and First Nations from Yukon and British Columbia in water quality monitoring of the Yukon River Basin – conducted in partnership with the YRITWC.

This dissertation is, in part, based on interviews collected during a community-based research project conducted by the YRITWC from 2012-2013 in partnership with the same four Yukon First Nations. Jody Inkster, Dr. Ryan Toohey, and Dr. Shannon Donovan were involved in the development and implementation of that project. I conducted all the interviews as an employee of the YRITWC in 2012. Jody Inkster also helped to conduct a small portion of these interviews. These interviews were conducted one year prior to the commencement of my doctoral studies in 2013. I received permission from my Yukon First Nation research partners and the YRITWC for their use.

I conducted all of the interviews reported on in this dissertation with some field support.

Logistical support in identifying interview participants was provided by Deborah Baerg

(C/TFN), Geraldine Pope (KFN), Kate Van Ballegooyen (KFN), Angie Joseph-Rear (THFN), Darren Taylor (THFN), Jody Beaumont (THFN), and Janet Vander Meer (WRFN). Yukon First Nation youth research assistants Colesen Ford (KFN), Heather Johnson (KFN), Ryan Johnny (WRFN) and Tanisha Lowe-Bain (C/TFN) accompanied me during some of the interviews. Data analysis in this dissertation was also largely my own work. My advisor, Dr. Terre Satterfield, played an important role throughout the process. However, with the exceptions described below, all the work described in this dissertation was my own. The use of existing data sources and the fieldwork I conducted both in Yukon and Alaska was approved by UBC's Behavioural Research Ethics Board (H13-02577). This research was also permitted under the Yukon Scientists and Explorer's Act (S&E license numbers: 14-40S&E; 15-12S&E; and 17-02S&E).

Chapter 2 has been submitted for publication in a peer-reviewed journal. I am the lead author and wrote the first draft of this paper in its entirety. Jody Inkster (co-author) contributed conceptually to the paper and to the process of revising it in preparation for submission for publication.

Chapter 5 has been published in the *Journal of Environmental Management*. I am the lead author and wrote the first draft of this paper in its entirety. Edda Mutter contributed logistical support in the field to identify and connect me with ION water quality samplers. Three co-authors, Edda Mutter, Jody Inkster and Terre Satterfield, all contributed conceptually and to the revision of the manuscript in preparation for publication. The full citation for this publication is as follows:

Wilson, N.J., Mutter, E., Inkster, J., Satterfield, T., 2018. Community-Based Monitoring as the practice of Indigenous governance: A case study of Indigenous-led water quality monitoring in the Yukon River Basin. *Journal of Environmental Management* 210, 290–298. <https://doi.org/10.1016/j.jenvman.2018.01.020>

Table of Contents

Abstract	ii
Lay Summary	iv
Preface	v
Table of Contents	vii
List of Tables	xii
List of Figures	xiii
List of Abbreviations	xiv
Glossary	xv
Acknowledgements	xviii
Chapter 1: Introduction	1
1.1 Dissertation Goals	2
1.2 Theoretical Framework.....	2
1.2.1 Indigenous Water Governance	3
1.2.2 Critical Indigenous Studies	6
1.2.3 From Co-management to Co-governance	9
1.2.4 Political Ecology of Water	14
1.2.5 Community-Based Monitoring.....	18
1.3 Research Setting.....	19
1.3.1 Modern Crown-Indigenous Agreements and Water Governance	20
1.3.2 Biophysical Stressors to Water Quality, Quantity and Rate of Flow	24
1.4 Overview of Research Methods and Approach	26

1.4.1	Positionality.....	33
1.5	Chapter Overviews	34
1.6	Dissertation Summary	37
Chapter 2: Respecting Water: Indigenous Water Governance, Ontologies and the Politics		
of Kinship on the Ground..... 39		
2.1	Introduction.....	40
2.2	Theoretical Considerations: What <i>is</i> Water?	43
2.3	Situating Research: Setting, Methods and Positionality.....	46
2.4	Respecting Water and the Politics of Kinship	52
2.5	The ‘Political Ontology’ of Water Governance in Yukon.....	60
2.6	Ontological Pluralism and ‘Refusing’ Settler Views of Water.....	66
2.7	Conclusion	70
Chapter 3: Querying Water Co-Governance: Yukon First Nations and Water Governance		
in the Context of Modern Land Claim Agreements 72		
3.1	Introduction.....	73
3.2	Research Setting.....	76
3.3	Research Methods and Approach.....	85
3.4	Results & Discussion.....	87
3.4.1	Multi-level Water Rights and Authorities.....	87
3.4.1.1	Assessment Phase: YESAB.....	90
3.4.1.2	Regulatory Phase: Yukon Water Board.....	91
3.4.1.3	Operation: Water License Compliance and Inspection.....	94
3.4.2	Yukon First Nation Critiques of the Water Co-Governance System	97

3.4.2.1	From Co-management to Co-jurisdiction	98
3.4.2.2	Procedural Rights.....	102
3.4.2.3	Implementation of Agreements	104
3.4.2.4	Authorities of Yukon First Nations with Unceded Territories.....	107
3.4.3	Opportunities for Improving Co-governance.....	108
3.5	Conclusion	113
Chapter 4: “Seeing Water Like a State?” A Critical Analysis of the Legal Opportunities		
Enabled through Yukon First Nation Self-government Agreements..... 117		
4.1	Introduction.....	118
4.2	Theoretical Considerations: “Seeing Water Like a State”?	119
4.3	Research Setting: Yukon First Nation Self-Government	125
4.4	Research Methods and Approach.....	130
4.5	Legislating Indigenous Water Governance.....	133
4.5.1	Existing Self-Governing Yukon First Nation Legislation	136
4.5.2	“Treatment as State”	145
4.6	Discussion and Conclusion.....	149
Chapter 5: Community-Based Monitoring as the Practice of Indigenous Governance: A		
Case Study of Indigenous-led Water Quality Monitoring in the Yukon River Basin 155		
5.1	Introduction.....	156
5.2	Research Setting.....	160
5.3	Methods	163
5.4	Results.....	165
5.4.1	Responsibility and Kinship Motivates CBM	166

5.4.2	Improving Linkages Between Indigenous CBM and Water Governance	168
5.4.2.1	Data Quality and Credibility	168
5.4.2.2	Trust and Legitimacy	170
5.4.2.3	Relevance to Decision Context.....	173
5.5	Discussion	176
5.5.1	Indigenous-led CBM.....	177
5.5.2	Networked Governance and Capacity	177
5.5.3	Integration of Governance Strategies with CBM	180
5.6	Conclusion	182
Chapter 6: Conclusion		184
6.1	Findings and Implications.....	187
6.2	Limitations	190
6.1	Reflections on Community-Engaged Scholarship	191
6.2	Future Research Directions.....	192
References		196
Appendices		217
	Appendix A Elder Interview Consent Form.....	217
	Appendix B Elder Interview Protocol.....	220
	Appendix C Water Expert Consent Form	224
	Appendix D Water Expert Interview Protocol	227
	Appendix E CBM Technician Consent Form	229
	Appendix F CBM Technician Interview Protocol.....	231
	Appendix G CBM Other Stakeholder Consent Form	242

Appendix H CBM Other Stakeholder Interview Protocol 244

List of Tables

Table 1.1 Timeline and locations for dissertation fieldwork.....	29
Table 1.2 Overview of interviews conducted with Elders, representatives from four Yukon First Nation Governments (Carcross/Tagish First Nation, Kluane First Nation, Tr’ondëk Hwëch’in First Nation and White River First Nation) and other water experts.....	31
Table 1.3 Summary of interviews conducted with Water Quality Samplers and Other Stakeholders in Canada and the USA.	32
Table 2.1 Interviews conducted with Elders and First Nation government staff from Carcross/Tagish, Kluane, Tr’ondëk Hwëch’in, and White River First Nations between 2012 and 2017.....	49
Table 3.1 Timeline outlines evolving legal and policy framework affecting Yukon First Nation roles in water governance.....	81
Table 3.2 Overview of interviews conducted with Elders, representatives from four Yukon First Nation Governments (Carcross/Tagish First Nation, Kluane First Nation, Tr’ondëk Hwëch’in First Nation and White River First Nation) and other water experts	86
Table 3.3 Yukon First Nation Chapter 14 roles with respect to water licensing territory.....	93
Table 4.1 Overview of interviews conducted with Elders, representatives from four Yukon First Nation Governments (Carcross/Tagish First Nation, Kluane First Nation, Tr’ondëk Hwëch’in First Nation and White River First Nation) and other water experts.....	132
Table 4.2 Comparison of existing legislation created by three SGYFNs.....	139
Table 5.1 Summary of interviews conducted with Water Quality Samplers and Other Stakeholders in Canada and Alaska, USA.	165

List of Figures

Figure 1.1 Typology of governance arrangements involving Indigenous peoples	4
Figure 1.2 Map of Yukon depicts the nested governance system, where First Nations maintain title and greater water rights on Settlement Lands but continue to have a say in water governance within their broader and overlapping traditional territories	22
Figure 2.1 Map of Yukon First Nation overlapping Traditional Territories, Settlement Lands and Administrative headquarters for four Yukon First Nation research partners.....	48
Figure 3.1 Map of Yukon depicts the nested governance system, where First Nations maintain title and greater water rights on Settlement Lands but continue to have a say in water governance within their broader and overlapping traditional territories	78
Figure 3.2 Water governance system can be depicted through the multi-stage process of decision-making about water and mining in Yukon, which includes mine approval, operation and closure. Yukon First Nations can assert their Chapter 14 rights throughout each phase of this process. ..	89
Figure 4.1 Map of Yukon First Nation overlapping Traditional Territories, Settlement Lands and administrative headquarters for four Yukon First Nation research partners.....	127
Figure 5.1 Typology of CBM program design compared to a typology of governance arrangements involving Indigenous peoples. Each depicts increasing levels of Indigenous leadership or control.	158
Figure 5.2 Map of ION water quality sites within the YRB	161
Figure 5.3 Water Quality Sampling for the ION takes place in several states including sampling, training, laboratory analysis, and returning the data to communities.....	162

List of Abbreviations

CBM	Community-Based Monitoring
CBPR	Community-Based Participatory Research
EMR	Energy, Mines and Resources
IK	Indigenous Knowledge
ION	Indigenous Observation Network
SGYFN	Self-Governing Yukon First Nation
TAS	Treatment as State
UFA	Umbrella Final Agreement
US EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WQS	Water Quality Standards
YESAA	Yukon Environmental and Socio-Economic Assessment Act
YESAB	Yukon Environmental and Socio-Economic Assessment Board
YRB	Indigenous Observation Network
YRITWC	Yukon River Inter-Tribal Watershed Council
YWB	Yukon Water Board

Glossary

Decolonization – Decolonization involves “more than a struggle against power and control; it is also the imagining and generating of alternative institutions and relations” (Walia, 2013). It is a process that simultaneously seeks to understand the impacts of colonialism on Indigenous peoples and “draws upon a notion of authenticity, of a time before colonization in which we were intact as indigenous peoples” (Smith, 1999, p. 25). Engaging the notion that tradition is not static, Indigenous peoples seek to decolonize by remembering Indigenous institutions, principles, and values and adapting them to the present context.

Indigenous Governance – Indigenous governance refers to the innumerable ways that Indigenous peoples have governed themselves and continue to do so despite historic and ongoing colonialism, which continues to profoundly affect Indigenous peoples’ ability to protect the lands and waters that are important to their ways of life, health, and culture

Indigenous Peoples – Indigenous peoples is an inclusive reference to those communities that claim a historical continuity with their traditional territories (Corntassel, 2003). Indigenous peoples of Canada include First Nations, Métis and Inuit people.

Indigenous Water Governance – Indigenous water governance refers to Indigenous modes of interacting with and decision-making processes about water including ontologies, epistemologies, and forms of governance distinct to a given people and adapted over time.

Ontology & Epistemology – Ontologies are ways of being and defining what something *is* and epistemologies are ways of knowing. As fundamental ways of understanding the world, ontologies are systems of identification and classification that define the boundaries between self and otherness and “serve as a point of reference for contrasting forms of cosmologies, models of social links, and theories of identity and alterity” (Descola, 2013). Simply put, ontologies might be thought of as the basic conceptual underpinnings of the meaning, purpose, and identity of a thing and where it belongs in the larger social order of relations, obligations, and origin (Descola, 2013).

Settlement Lands – Settlement Lands refer to the lands (~ 10%) in Yukon Territory to which Yukon First Nations, with land claim agreements, retain title. There are three types of Settlement Lands: Category A, B, and Fee simple.

Settler – A person who has or whose family has immigrated to Canada in the past few centuries; a non-Indigenous person. The term ‘settler’ can be used as an adjective that modifies a noun. For example, ‘settler government’ (the governing body) or ‘settler state’ (the political power) because these governing institutions and powers are largely a product of settler colonialism. I also use ‘settler’ to refer to non-Indigenous people to draw attention to patterns of thought or action that are shaped by settler colonialism and the potential for decolonizing these patterns of thought and action.

Settler Colonialism – A form of colonialism in which colonizers desire and dispossess Indigenous peoples of their land for settlement and resource development. Although both

colonialism and settler colonialism are based on domination by an external power, only settler colonialism seeks to replace Indigenous peoples with a settler society. While initial dispossession is carried out with physical force, various technologies are used to maintain this dispossession (e.g., maps, laws, and numbers), and both are legitimated, justified, and reinforced through ideology and discourse about identity (Harris, 2004).

Traditional Territory – The geographic area within which Indigenous peoples have claim to historical use and occupancy.

Water Governance – Water governance refers to the set of regulatory processes, institutions and informal mechanisms through which political actors, including communities, influence environmental decisions, actions, and outcomes.

Acknowledgements

I am deeply indebted to my research partners Carcross/Tagish, Kluane, Tr'ondëk Hwëch'in and White River First Nations as well as the Yukon River Inter-Tribal Watershed Council. I strive to live up to the example set by your passion and devotion to water stewardship. To the Elders and First Nation government staff who selflessly shared their time and knowledge: you have made more of a difference than you will ever know. I am especially grateful to Geraldine Pope, Kate Van Ballegooyen, Deborah Baerg, Darren Taylor, Jody Beaumont, Glen Stephen Sr. and Janet Vander Meer for the research support they provided. I would also like to thank my colleagues at the YRITWC and USGS (past and present) including Edda Mutter, Jody Inkster, Neil McGrath, Nicole Herman-Mercer, Ryan Toohey, and Shannon Donovan. I am also grateful to the water quality samplers from the Indigenous Observation Network from Alaska, Yukon and British Columbia who took part in this study. Finally, this research was deepened by the knowledge of water governance shared by interviewees from a variety of government departments and co-management boards in Yukon. I would specifically like to thank Heather Jirousek from the Water Resources Branch of Yukon Environment for her comments. Thank you. *Mähsi' cho* (Hän). *Máhsin cho* (Northern Tutchone). *Shāw nithän* (Southern Tutchone). *Tsin'jj choh* (Upper Tanana). *Gùnèlchish* (Tagish). *Gunalchîsh* (Tlingit).

I am deeply grateful to my advisor Terre Satterfield. Her unwavering support and continual encouragement, integrity, and patience were truly exemplary. The existence of this dissertation is a testament to her steadfast and inspiring mentorship. I also extend my sincere appreciation to

Leila Harris, Jordi Honey-Roses and Glen Coulthard who have provided great insight, enthusiasm, and inspiration throughout this process. Thank you and *Mahsi Cho*!

I owe much of my intellectual and personal development to my fellow students at the Institute for Resources, Environment and Sustainability. I would like to thank the members of the Satterfield Lab and the EDGES research group for their inspiration, support and feedback on my work. I am particularly thankful to Rosie Simms, Sameer Shah, Lucy Rodina, Kiely McFarlane, Graham McDowell, Scott McKenzie, Johnnie Manson, and Maggie Low.

This research was made possible by the generous funding provided by the Vanier Canadian Graduate Scholarship, Killam Doctoral Fellowship, UBC Four Year Doctoral Fellowship, the Northern Scientific Training Program, the Social Sciences and Humanities Research Council (SSHRC Insight grant “Environmental meanings and ecosystem services: the social risks of ecological change” UBC Number F12-04439). I would like to thank the Gibson-Tyler family for their friendship and for kindly allowing me to stay in their homes during my time in Yukon.

Last, but not least, I owe a special thanks to the friends and family members, too numerous to name, who have supported me throughout this process. I would not be the person I am today without my grandmother, Dorothy Barbour. Thank you for always believing in me. To my partner, Gwen Haworth, I could not have done this without your love, patience and steadfast support. Thank you!

Chapter 1: Introduction

Water is a priority for Indigenous peoples around the world who have been governing their territories since time immemorial.¹ While these systems of governance have shifted and been disrupted by colonial forms of governance, knowledge of these systems, nevertheless, endures in practice and oral history (Borrows, 2002; Napoleon, 2013). Water governance refers to the set of regulatory processes, institutions, and informal mechanisms through which political actors, including communities, influence environmental decisions, actions and outcomes (Bakker, 2003a).

Indigenous water governance, however, specifically examines Indigenous modes of interacting with and decision-making processes about water including cultural values, knowledge, meanings, legal traditions and forms of governance distinct to a given people and adapted over time (Simms, 2014; N. J. Wilson, 2014). This includes an engagement with Indigenous legal and governance systems as well as relationships to water as a living entity or more-than-human persons (Craft, 2017; McGregor, 2014) and the ways that various colonial socio-political and environmental pressures affect their ability to protect the waters within their traditional territories including the effects of historical and ongoing settler colonialism, global environmental change and resource extraction industries. This dissertation contributes to scholarship on Indigenous

¹ The term Indigenous refers to those communities that claim a historical continuity with their traditional territories (Cornthassel, 2003). It is used as an inclusive term to refer to Canada's First People including First Nations, Inuit and Métis peoples.

water governance by identifying, characterizing and anticipating the benefits and challenges associated with Indigenous expressions of water governance.

1.1 Dissertation Goals

The purpose of this dissertation is to provide insight on: 1) the implications of historical and ongoing colonialism for Indigenous peoples, their relationships to water and forms of governance; 2) the opportunities and challenges presented by existing legal and governance structures; 3) the novel approaches Indigenous peoples are engaging to work through these challenges.

More specifically, I aim to understand how the water governance system shaped by Modern land claim agreements in Yukon, Canada creates and constrains spaces for the expression of Indigenous forms of water governance. This includes an analysis of whether the governance arrangements created through land claim and Self-government agreements go far enough to acknowledge Yukon First Nations' rights and authorities in relation to water and the cultural implications of taking on the new forms of governance that resulted from these agreements.

1.2 Theoretical Framework

I engage with several literatures to develop a theoretical framework. In what follows, I describe the specific fields that contribute to my thinking on water governance including Indigenous

water governance, critical Indigenous studies, co-management, political ecology of water, and Community-Based Monitoring.

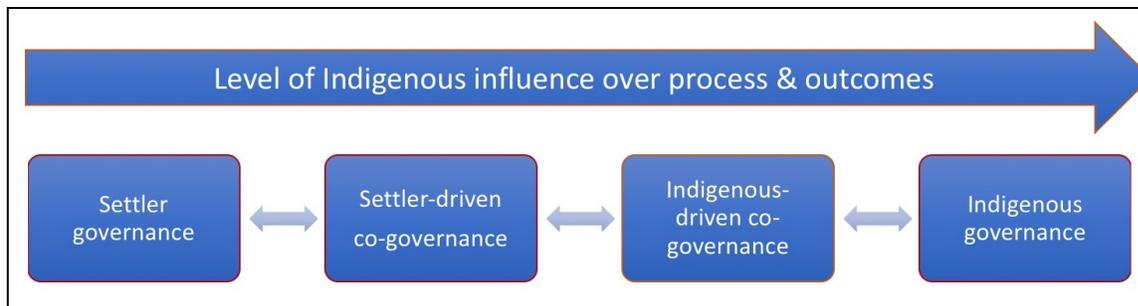
1.2.1 Indigenous Water Governance

Indigenous water governance represents a growing field of inquiry and is the central topic of this dissertation. The literature on Indigenous water governance has frequently pointed to the reluctance of settler governments and legal systems to acknowledge Indigenous peoples' substantive water rights and authorities (Babidge, 2015; Barbera-Hernandez, 2005; Boelens et al., 2012; Boelens and de Vos, 2006; Cremers et al., 2005; Morgan et al., 2004). This reality is mirrored in the persistent failure of provincial and federal governments across Canada, with the exception of Modern land claim agreements, to acknowledge Indigenous water rights, which have neither been recognized nor disproven through the courts (Laidlaw and Passelac-Ross, 2010; Phare, 2009). To an extent, the exclusion of Indigenous peoples is a direct result of the fragmented nature of Canada's water governance system (Bakker et al., 2018).² Adding to this complexity, Indigenous peoples must frequently engage in transboundary water governance, since settler-defined political borders rarely correspond to Indigenous territories or hydrologic scales (e.g., watersheds or aquifers) (Norman, 2014; Norman and Bakker, 2017; Phare, 2013).

² The Canadian Constitution divides responsibility for water between the federal government and provincial/territorial governments. Provincial governments, and territorial governments, like Yukon, that have undergone devolution, have responsibility for most aspects of fresh water management. Provincial and in the case of Yukon territorial, legislative powers include, but are not restricted to: water supply, pollution control, hydroelectric development, flow regulation, and authorization of water use. The federal government has jurisdiction over fisheries, navigation, federal lands and Indian reserves (including drinking water supply on reserves), and international relations, for the most part related to management of boundary waters shared with the U.S (Bakker, 2007; Boyd, 2003).

Overall, these conditions have meant that Indigenous peoples are forced to navigate a complex and unequal settler colonial water governance system in their efforts to protect the waters within their territories.

Figure 1.1 Typology of governance arrangements involving Indigenous peoples



There is a spectrum of governance arrangements involving Indigenous and settler governments in water governance. These governance arrangements are informed by three possible types of jurisdiction: “Crown” or settler jurisdiction, co-jurisdiction, and Indigenous jurisdiction (Hill et al., 2012; Kotaska, 2013a) (Figure 1.1). On one end of the spectrum, settler colonial governance refers to Crown-implemented governance frameworks. On the other end of the spectrum, Indigenous governance is often used to refer to governance arrangements where Indigenous peoples hold title and jurisdiction over their territories. Indigenous jurisdiction and title are critical factors enabling Indigenous peoples to decide how the land and water within their territories are used including the extent to which responsibility for these is delegated to other governments (Kotaska, 2013a). At the same time, Indigenous peoples have governed themselves and continue to do so despite historic and ongoing colonialism and recognition of title or jurisdiction by settler governments (Borrows, 2002). Co-governance is situated between settler

and Indigenous governance. It is broadly described as a governance model through which Indigenous and settler governments share jurisdiction over areas or resources that Indigenous peoples have consented to share with non-Indigenous peoples. Co-governance takes place in a context where Indigenous nations have title to land and settler governments might have title to land, depending on the arrangements determined by these governments. Co-governance arrangements can vary greatly and has been much debated within the literature (Kotaska, 2013a). Indigenous governance and co-governance are understood as two possible arrangements for decolonized governance (Ibid.). In the instances where Indigenous peoples are explicitly engaged in water governance processes, they are most frequently seen as “stakeholders” rather than governments (von der Porten and de Loë, 2013b). In this sense, these governance approaches tend to reinforce existing colonial relationships as one jurisdiction, generally, a colonial government, holds all decision-making power and delegates prescribed administrative activities to the others (Simms et al., 2016). For example, with few exceptions, Canadian settler governments maintain “crown” jurisdiction over water (Bakker, 2007; Boyd, 2003).

Indigenous water governance is a common thread throughout this dissertation. Each chapter builds on existing literature in the field to explore issues of Indigenous peoples’ jurisdiction and authority in water governance and to examine the broader importance of developing water governance systems that reflect Indigenous relations to water and forms of governance. I explore these themes in Yukon, Canada (Chapter 2, 3, and 4), and in the context of Community-Based Monitoring in the transboundary watershed of the Yukon River Basin (British Columbia, Yukon, and Alaska) (Chapter 5).

1.2.2 Critical Indigenous Studies

Engagement with the field of critical Indigenous studies facilitates a robust connection between water governance and debates in Indigenous governance. Critical Indigenous studies is a field committed to the politically engaged study of Indigenous peoples being, knowing and governing as well as the legacies of colonialism (Alfred, 2005; Corntassel and Witmer, 2008; Coulthard, 2014; McGregor, 2014; Simpson, 2014). Critical Indigenous scholars argue that contemporary Indigenous-state relationships are shaped by colonial dispossession of Indigenous land for use by settler states, communities, and the capitalist economy (e.g., Alfred, 2009; Alfred and Corntassel, 2005; Coulthard, 2014; Simpson, 2014). Settler colonialism is fundamentally about access to ‘territory’ including land or in this case water, which is gained through various means including treaties or simply taking possession (Wolfe, 2006). As such, settler colonial governance structures constrain Indigenous peoples’ ability to maintain their territories and the lands, water, and animals within them, which are fundamental to sustaining material needs as well as for identity formation, and enacting physical, communal, and spiritual relationships (Coulthard, 2014).

Scholars within critical Indigenous studies explore and unpack colonial conceptualizations of sovereignty and its implications for Indigenous governance. Colonial understandings of sovereignty presuppose that states, and states alone, exercise the ultimate authority over a given territory (Shaw, 2008). This is an assumption that Indigenous studies scholars continually encounter, despite the increasing acknowledgement that absolute sovereignty is a myth due to increasing connections between domestic and international politics (Ibid.). For example, Section

35(1) of the Canadian Constitution (1982) upholds Canada's supreme sovereignty over land and recognizes Aboriginal right and title to this land (Borrows, 1997). It is not a recognition of Indigenous sovereignty, but of Indigenous rights and title to the land based upon Indigenous peoples reconciliation of the pre-existence of Aboriginal peoples with the sovereignty of the crown land (Borrows, 1997). Alfred (2001, 2006), argues that sovereignty should not be the goal of Indigenous peoples because it a colonial concept rooted in "adversarial and coercive notions of power" that depends on recognition from colonial states (2006, p. 325). Indigenous resurgence scholars argue that these politics of recognition perpetuate dependent and reactionary Indigenous-state relationships (Alfred, 2001, 2006; Coulthard, 2014). Yet, sovereignty has been "rearticulated" in ways that are meaningful to Indigenous peoples, in spite of this colonial legacy (Barker, 2005). In this way, Bruyneel (2007) refutes state definitions to define sovereignty as the "ability of a group of people to make their own decisions and control their own lives in relation to the space where they reside and/or that they envision as their own" (23). Mohawk scholar Audra Simpson (2014) articulates the concept of "nested sovereignty" or the idea that "sovereignty may exist within sovereignty. One does not entirely negate the other, but they necessarily stand in terrific tension and pose serious jurisdictional and normative challenges to each other" (p. 10).

While state conceptions of sovereignty fully intrude on the lives of Indigenous peoples, Indigenous peoples continually resist these impositions and assert their own understandings of sovereignty. Indigenous peoples strategically engage multiple state and non-state strategies to assert their sovereignty. While critiques of sovereignty raise important issues about the need to develop Indigenous alternatives without dependence on or reference to colonial states or agendas

(Coulthard, 2014), Simpson (2011) notes that Indigenous sovereignty is achieved through the pursuit of state recognition while at the same time building Indigenous alternatives. Critical Indigenous scholars have shown regardless of the ways that settler states apply concepts of sovereignty to subdue Indigenous peoples, these nations simultaneously engage their own relational forms of governance to maintain their culture and distinct societies (Alfred, 2009; Coulthard, 2014; Rifkin, 2010; Simpson, 2014). These relational forms of governance are based on Indigenous understandings of reciprocal relationships between humans, more-than-human persons including animals, plants and, in this case, water and the spirit world and are substantiated through protocols that explain the expected roles of Indigenous peoples and are enacted through ceremonies and treaties (Atleo, 2004; Simpson, 2008). These protocols are articulated in Indigenous oral traditions and can be seen as enactments of Indigenous legal systems (Borrows, 2002; Napoleon, 2013), which remain central to contemporary Indigenous governance (Coulthard, 2014; Manson, 2015; Simpson, 2014). Contemporary enactment of these protocols can be found in state-based assertions of Indigenous sovereignty (e.g., First Nation governments based on clan systems) and in the resurgence of Indigenous governance traditions (e.g., ceremony, land-based practices and protest camps. Coulthard, 2008; Coulthard and Simpson, 2016; Norman, 2017).

I apply Indigenous theories of governance to better understand Indigenous forms of water governance and the effect of colonial Indigenous-state relations on Indigenous peoples' ability to enact their sovereignty in contemporary water governance contexts. I engage theories and concepts from the field of critical Indigenous studies to overcome the limitations of colonial concepts and theories for understanding Indigenous water governance. I first engage with this

literature in Chapter 2 as I explore the ways that Indigenous and settler ontological politics of water in Yukon frequently conflict. I ask how conflicting views of water as a resource or a living entity, that needs to be respected, are reflected in approaches to water governance? More specifically, how do understandings of water as a resource inform settler water governance and constrain Indigenous peoples' ability to protect water according to their distinct views of water as a living entity? In Chapter 3, I engage critical Indigenous governance literature to examine the water governance arrangements created through Modern land claim agreements in Yukon. I ask whether this governance system goes far enough to acknowledge Yukon First Nations' authority with respect to water? And, whether the governance processes and structures involved in decision-making about water adequately reflect First Nation relationships to water and forms of governance? In Chapters 4 and 5, I ask how critical Indigenous studies can contribute to understanding the novel forms of governance developed by Indigenous peoples including the potential to develop Indigenous water legislation through the inherent powers of self-governance acknowledged in Yukon First Nation Self-government agreements (Chapter 4) and the use of CBM programs to protect their relationships to water (Chapter 5). In sum, the critical Indigenous studies literature is fundamental to conceptualizing Indigenous water governance as insights from this field guide critiques of settler water governance and inform alternative approaches that seek to address these concerns.

1.2.3 From Co-management to Co-governance

Co-management has been primary in discussions of Indigenous peoples' participation in environmental decision-making and debates from within this literature contribute critical insights

to the study of Indigenous water governance. This is particularly so in the Canadian North because the co-management boards created through comprehensive land claim agreements were designed to bring explicit Indigenous influence to bear in key decision-making processes about land, water, fish, wildlife and more (e.g., Berkes, 1994; Nadasdy, 2003a; Natcher, 2013; Natcher et al., 2005; Stevenson, 2004, 2006; White, 2009a). Co-management is generally defined as the institutional arrangements developed to facilitate power-sharing between governments and resources users in decision-making about a specific resource (e.g., water, fisheries, lands, wildlife etc., (Berkes et al., 1991; Pinkerton, 1992; Stevenson, 2006)). Co-management generally emerged in response to critiques of state-led centralized, top-down models of environmental management, which are poorly suited to community participation and often blamed for increasing the vulnerability of Indigenous and other resource-dependent communities (Berkes, 2010). Proponents describe a range of benefits associated with co-management including the ability to create more equitable decision-making processes, foster conflict resolution, and empower communities through encouraging stakeholder engagement (Armitage et al., 2007; Caruso, 2011).

Co-management has been critiqued extensively for opening communities to the abuse of state power, stifling opposition through inclusion in decision-making and compelling engaged parties to conform to bureaucratic processes and thought (Nadasdy, 1999, 2005; Natcher and Davis, 2007; Stevenson, 2004). Goetze (2005) notes, that power-sharing arrangements in co-management differ dramatically with regard to the authority of Indigenous nations in decision-making processes. In fact, with few exceptions within Canada (e.g., Yukon Water Board), most Indigenous peoples have an “advisory” role because co-management bodies lack substantive

(legally binding) authority in decision-making processes. Beyond critiques of explicitly defined power-sharing arrangements, Nadasdy (2005) contends the institutionalization of co-management also has unintended political consequences as it extends bureaucratic management and control through the integration with state management rather than developing truly alternative forms of management that address political and ethical concerns. In this sense, co-management is often a technical, rather than a political, process, often focusing on how to ‘integrate’ traditional knowledge into management processes, and in so doing failing to develop meaningful alternatives.

Recent literature calls for a move beyond collaborative or co-management to a focus on Indigenous governance and co-governance (Bowie, 2013; Feit, 2005; Simms et al., 2016; Takeda and Røpke, 2010). This call signals the importance of Indigenous jurisdiction and control and the need to move beyond a limited engagement in the technical exercise of management. As defined above, co-governance occurs when two or more self-governing parties agree to share authority or jurisdiction within decision-making processes (Kotaska, 2013a). Co-governance differs substantially from co-management, where one jurisdiction holds all decision-making power – or the ability to make and impose choices – and merely delegates prescribed administrative activities to the others. Indigenous peoples frequently make co-management about co-governance by contesting jurisdictional arrangements that fail to acknowledge their substantive authorities (Feit, 2005). Clark and Joe-Strack (2017) theorize, the trend towards co-governance likely “stems from growing recognition that even at its fullest expression, co-management is still only a part of what’s required to realize the vision of self-determination that land claim

agreements were intended to move society towards” (p. 73). Co-governance, then, is understood as providing a meaningful path forward in shared Indigenous-state decision-making processes.

Collaborative consent has been proposed as one approach to developing co-governance arrangements between Indigenous governments and settler states in Canada (Ishkonigan Inc. et al., 2015; Phare et al., 2017). Collaborative consent has been defined as:

an ongoing process of committed engagement between Indigenous and non-Indigenous governments— acting as equal partners, each with their asserted authority—to secure mutual consent on proposed paths forward related to matters of common concern and all aspects of governance. (Phare et al., 2017, p. 1)

Through long-term engagement, collaborative consent can be applied to change how decisions at all levels are made: ranging from local projects all the way to policy and law (Ibid.). For instance, collaborative consent was first applied in the Northwest Territories to describe shared decision-making and co-drafting policies used by territorial and Indigenous governments in the development of the Mackenzie River Basin Bilateral Management Agreements as well as recent legislation and plans (Ishkonigan Inc. et al., 2015; Phare et al., 2017).

There is a significant legal basis for the collaborative consent model in Canada. The Canadian federal government has committed to implementing the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), which requires “free, prior and informed consent” (see Articles 10, 19, 28, and 29 of UNDRIP). Furthermore, Section 35 of the Constitution Act, 1982, recognizes and affirms existing Aboriginal and treaty rights. The Courts have held that Section 35 is grounded in the “Honor of the Crown” – or the requirement for the Crown to act honorably

in dealings with Indigenous peoples - and creates the duty of the Crown to consult and accommodate potential or established Aboriginal or treaty rights where a proposed activity could adversely impact those rights (*Delgamuukw v. British Columbia*. 3 S.C.R. 1010, 1997, *Haida Nation v. British Columbia (Minister of Forests)* 3 S.C.R. 511, 2004 SCC 73, 2004, *Tsilhqot'in Nation v. British Columbia* 2014 (SCC 44), 2014). Collaborative consent is not new, but closely corresponds to the principles and processes that are a normal part of “cooperative federalism,” or the ways that federal, provincial, and territorial governments engage in shared decision-making at consensus-based tables on issues of shared importance (Ishkonigan Inc. et al., 2015; Phare et al., 2017).

The many critiques of co-management and calls for a shift towards co-governance and Indigenous governance in this context make this literature critical to the study of Indigenous water governance. I first engage the co-management literature in Chapter 2, where critiques of co-management in Yukon are extremely useful in teasing out the ontological politics of water and the ways differing water ontologies inform governance processes and contribute to water conflict. I again take-up this line of inquiry in Chapter 3 with the question: What can we learn from the water governance system in Yukon, structured by Modern land claims, as a system of co-governance? Co-management boards in Yukon have been the subject of an extensive body of research (e.g., Nadasdy, 2003a; Natcher et al., 2005; Stevenson, 2006), but what can we learn through an analysis of Indigenous water rights, jurisdiction and authority within this system? What challenges do Yukon First Nations face in asserting their rights and authorities within this system? What opportunities remain for improvement?

1.2.4 Political Ecology of Water

The study of the political ecology of water engages themes and concepts critical to the theorization of Indigenous water governance. Political ecology of water begins explicitly from the understanding that nature, technology, and society are intrinsically connected and these relations establish how water is distributed (Ahlers and Zwarteveen, 2009; Bakker, 2003b; Birkenholtz, 2008; Boelens, 2009; Boelens et al., 2016; Budds, 2004; Loftus, 2009; Swyngedouw, 2005). It is the study of the ways the distribution of water is shaped by power relations and in turn shapes those relations. As water embodies and expresses social relations it becomes central to the production and reproduction of power across scales—locally, regionally and globally. Political ecology is generally understood as “an approach to environmental politics that allows the successful integration of political analysis with the formation and dissemination of understandings of ecological reality” (Forsyth, 2003, pp. 20–21). Political ecology takes a fundamentally normative approach (Robbins, 2011) and is said to have emerged in response to “apolitical ecology” that ignored the political dimensions of human-environment relations (Forsyth, 2003). Political ecology is particularly useful in characterizing the politics and ecologies of everyday life in which “non-human actors play an important political role in explanation” (Robbins, 2003, p. 643). Although approaches within political ecology are diverse, broadly speaking, human and nonhuman communities are viewed as contingent constructions that develop or emerge from ongoing interaction (Sundberg, 2011).

The political ecology of water has been strongly characterized by the study of hydrosocial politics, where water is understood to be engaged in a “hydrosocial cycle”: a socio-natural

process whereby water and society continuously remake each other and the social, political and biophysical dimensions of water become inseparable (Bakker, 2002, 2012; Linton, 2010; Linton and Budds, 2013, 2013, Swyngedouw, 2004, 2009). In this sense, water is understood as a ‘hybrid’ entity rather than a material substance or H₂O alone (Swyngedouw, 2004). The hydrosocial seeks to reposition water as explicitly political (Linton, 2010; Linton and Budds, 2013). It seeks to “draw attention to water’s social context and dynamics, and to reposition water as inherently political” (Linton and Budds, 2013, p. 175) and expose the ways that some hydrosocial relations are privileged over others. According to Linton and Budds (2013, p. 179), their “hope is that, by revealing the ways in which social inequalities and injustices become produced and sustained through water, the hydrosocial cycle might be useful in promoting more equitable hydrosocial relations.” For example, colonial state hydrosocial relations are often privileged over Indigenous and local hydrosocial relations (Boelens, 2014; N. J. Wilson, 2014). The study of “hydrosocial territories” seeks to conceptualize the hydrologic dimensions of territorial politics and governance, which are understood as hybrid socio-political and natural spaces that are created and recreated through interactions between diverse actors with divergent interests, material flows, and hydrologic technologies within socio-economic and political practices, structures and institutions (Boelens et al., 2016; Duarte-Abadía et al., 2015; Hommes et al., 2016; Perramond, 2016; Seemann, 2016). Boelens et al. (2016) argue that “processes of territorialization around water are intrinsically linked to different and often divergent water governance systems and their contestation” (p. 1). Scholars have shown that dominant conceptualizations of hydrosocial territory envision relations between society and nature that correspond to particular truths and knowledge claims about water (Boelens, 2014; Boelens et al., 2016; Duarte-Abadía et al., 2015; Perramond, 2016; Romano, 2016; Zwartveen and Boelens,

2014). These “powerful hydrosocial territories envision to position and align humans, nature and thought within a network that aims to transform the diverse socionatural water worlds into a dominant governance system” (Boelens et al., 2016, p. 6). ‘Dominant’ or mainstream forms of governance are frequently characterized by scientific modernist conceptions of water (at times referred to as “Modern Water,” e.g., Linton 2010). As defined by Foucault (1991), such territory-building projects aim to “conduct the conduct” of specific populations thereby producing new “water governmentalities” that (re)pattern hydrosocial territories in ways that conflict, compete and align to reinforce dominant claims to water (Boelens et al., 2016; Zwarteveen and Boelens, 2014). These governmentalities impinge on the sovereignty of local and Indigenous communities and create political arrangements that make these spaces “legible” and therefore exploitable and controllable (Bebbington and Bury, 2013; Francisco and Boelens, 2015; See also: Scott, 1998).

Despite the hegemony of mainstream approaches to water governance, the potential for achieving legal and ontological pluralism has been a common theme among scholars of the hydrosocial (Boelens et al., 2007; Boelens and Vos, 2014; Roth et al., 2005; N. J. Wilson, 2014; Zwarteveen et al., 2005). The creation of state water legislation and the formalized water rights granted to extractive industries frequently encroach on Indigenous peoples’ “customary” water rights and legal systems. The hydrosocial draws attention to the existence of these divergent legal systems as multiple normative orders within the same political space as well as the ways these normative orders interact and are shaped by power relations as ‘dominant’ water governance systems privilege some normative orders over others (Benda-Beckman, 1997; Roth et al., 2005). Legal and ontological pluralism open up space to acknowledge hydrosocial multiplicity in a manner that affirms Indigenous laws, customs and knowledge in relation to

water (N. J. Wilson, 2014). At the same time, this study also critically analyzes the ways that colonial laws and institutions can destabilize or distort the functioning of Indigenous legal systems and customary management institutions (Bassi, 2010; Boelens et al., 2007; D'Andrea, 2012; Gupta et al., 2014; Zwarteveen et al., 2005). Overall, the political ecology of water helps to clarify water conflicts as more than just a battle for water as a material substance. While material inequities including uneven access to water quantity and quality (Harris et al., 2017) are core themes and concerns invited by political ecology, the field simultaneously engages the meaning and importance of struggles over ontologies, epistemologies, identity, authority and discourses for Indigenous and other marginalized communities.

This dissertation engages with the broad themes, concepts and theories of the political ecology of water to advance the theorization of Indigenous water governance. I first engage with this literature in Chapter 2, which examines the ontological politics of water governance in Yukon including competing understandings of water as a “more-than-human person” and Modern Water or “water as a resource.” While Indigenous peoples have long acknowledged water’s meaning and constitution as more-than-human (Anderson et al., 2013; Craft, 2014; LaBoucane-Benson et al., 2012; McGregor, 2012, 2014; Zoanni, 2017) the political ecology of water is useful for exposing the social and political context of water and water governance. In Chapter 4, I engage insights from the literature on hydrosocial territories to examine potential unintended consequences the “state-like” governance arrangements developed through Modern land claim and Self-government agreements may have for Yukon First Nation hydrosocial relations. Specifically, I engage with the potential to promote particular “water governmentalities” and ways of “seeing” water through the creation of Indigenous water legislation.

1.2.5 Community-Based Monitoring

This dissertation engages with Community-Based Monitoring (CBM) as a novel strategy of Indigenous water governance. CBM is a process where parties “collaborate to monitor, track and respond to issues of common community concern” (Whitelaw et al., 2003, p. 410). Globally, a large majority of CBM programs involve “citizen volunteers” of settler origin, but there are a growing number of CBM programs involving Indigenous peoples. Such programs can be found in Canada (Berkes et al., 2007; Gearheard et al., 2011; Kotaska, 2013b; Parlee et al., 2012); the USA (Johnson et al., 2015); Australia (Wiseman and Bardsley, 2016); and New Zealand (Harmsworth et al., 2011). There are also a significant number of CBM programs across polar regions of North America and beyond, due to the disproportionate effects of global environmental change at high latitudes (Alessa et al., 2015).

Indigenous peoples are generally viewed as ‘knowledge holders’ in the CBM literature. The value of Indigenous Knowledge (IK) for understanding environmental change, especially in response to a changing climate, has been widely acknowledged (e.g., Reidlinger and Berkes 2001, Nichols et al. 2004, Herman-Mercer et al. 2011, Wilson et al. 2015). Berkes and others (2007) suggest that involving Indigenous ‘stakeholders’ in CBM can “bring a wider range of knowledge to understand ecosystem change” (p. 145). IK is considered beneficial to CBM program as it improves understanding of environmental change and increases the benefits of CBM for communities (Johnson et al., 2015; Wiseman and Bardsley, 2016). The inclusion of Indigenous knowledge is certainly a priority for Indigenous peoples. However, conceptualizing Indigenous peoples as ‘knowledge holders’ alone misses critical dimensions of their engagement

with CBM. Indeed, Indigenous peoples are seldom referred to as governing their traditional territories; thus the potential for CBM as a tool for asserting Indigenous sovereignty has rarely been explored (c.f. Parlee et al. 2012, Kotaska 2013).

I primarily engage with the CBM literature in Chapter 5 where I explore the linkages between Indigenous governance and CBM. I ask what a governance lens can tell us about how Indigenous peoples view their engagement with CBM? How do Indigenous conceptualizations of the environment and governance differ from settler understandings? What actions could be taken to better link CBM to governance processes pertinent for Indigenous peoples? In sum, this chapter seeks to challenge the idea that Indigenous peoples' role in CBM is one of knowledge input alone rather than an emerging expression of Indigenous governance itself.

1.3 Research Setting

This research was conducted in Yukon, Canada and the broader Yukon River Basin. There are two reasons that make Yukon, Canada an important context for the study of Indigenous water governance. First, Modern land claim and Self-government agreements uniquely acknowledge Indigenous water rights and therefore create distinct water governance arrangements. Second, Yukon First Nation have substantial concerns about the cumulative impact of multiple biophysical stressors (e.g., resource development and climate change) on the waters within their territories. The following sections explore these two elements in detail.

1.3.1 Modern Crown-Indigenous Agreements and Water Governance

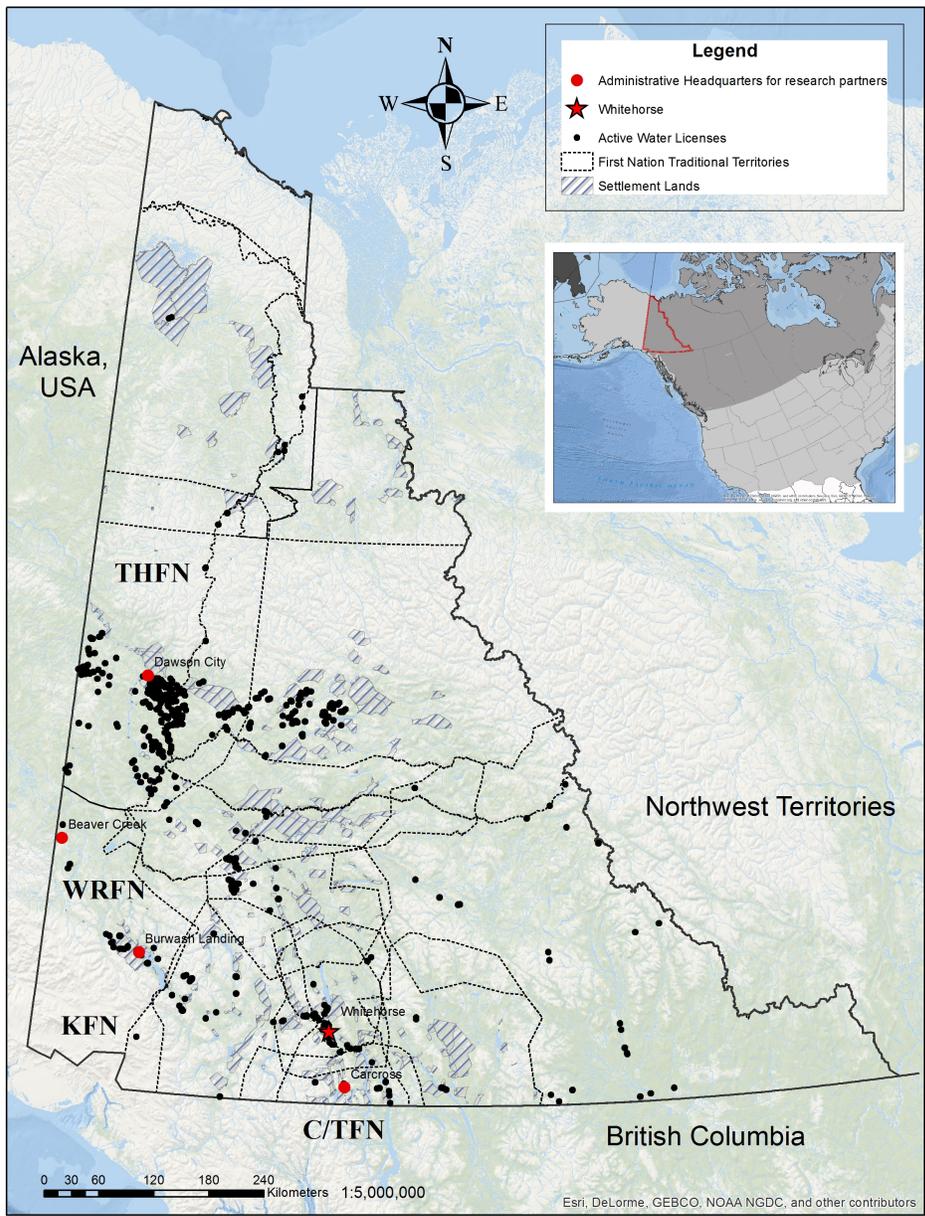
Yukon Territory is an important setting in which to investigate Indigenous water governance because Modern land claim agreements between Yukon First Nations and settler governments are among the first Crown-Indigenous agreements in Canada to explicitly acknowledge Indigenous water rights. The Canadian federal and provincial governments have failed to acknowledge Indigenous water rights in most jurisdictions in the country (Laidlaw and Passelac-Ross, 2010; Phare, 2009). However, Modern land claim agreements contain an entire chapter on water management (“Chapter 14”). For instance, Chapter 14 states, a Yukon First Nation “has the right to have water which is on or flowing through or adjacent to its Settlement Land remain substantially unaltered as to quantity, quality and rate of flow, including seasonal rate of flow” and “...to use water for a traditional use in the Yukon.” Modern land claim agreements also acknowledge the rights of Yukon First Nations to have a say in decision-making about water in Yukon including the ability assert their Chapter 14 rights in various co-management processes such as water licensing decisions by the Yukon Water Board.

In 1993, following twenty years of treaty negotiation, First Nations agreed to retain Aboriginal rights and title to Settlement lands, which represent less than 10 percent (41,595km²) of the lands within their traditional territory, in exchange for a partnership in the governance of all Yukon lands and resources including water (Figure 1.2). This included the Umbrella Final Agreement (UFA) (1993), which created a framework to negotiate Modern land claims in Yukon. Land claims in Yukon are classified as Comprehensive land claims because they are based on the assertion of Aboriginal rights and title that have not to date been the subject of treaty or other legal means (Hurley,

2009). In 1982, “existing and aboriginal treaty rights” gained protection under Section 35 of the Constitution Act (1982). The Constitution Act was amended in 1983 to explicitly extend protection to the rights acknowledged within Modern land claim agreements (subsection 35(3)) (Hurley, 2009).

Both Modern land claim and Self-government agreements are tripartite agreements between a First Nation, the Government of Canada and Yukon Government. Eleven of 14 Yukon First Nations have completed these agreements. Three Yukon First Nations, including White River First Nation, Liard First Nation, and Ross River Dena Council ratified the UFA but ultimately opted out of land claims. These First Nations retain Aboriginal title to their traditional territories and remain Bands under the federal *Indian Act* (1985) (Yukon Government, 2016). Since 2014, White River First Nation, Kaska Dena Council, and Liard First Nation, have been negotiating reconciliation agreements with Yukon Government aimed at taking a proactive approach to relationships between these governments in the absence of comprehensive land claims agreements. These agreements will address shared priorities including consultation and resource management processes; economic and capacity development; and revenue sharing. Negotiation is ongoing. These agreements have the potential to clarify unsigned First Nations’ roles in decision-making about water and to increase their capacity to participate in decision-making by creating access to some of the opportunities that signatory First Nations have had, without the high cost of surrendering Aboriginal title to their territories (Alcantara, 2008).

Figure 1.2 Map of Yukon depicts the nested governance system, where First Nations maintain title and greater water rights on Settlement Lands but continue to have a say in water governance within their broader and overlapping traditional territories. This map also illustrates the distribution of active water licenses across Yukon First Nation Traditional Territories and Settlement Lands. The vast majority of these water licenses granted to mining operations (placer mining operations ~68 percent and hard rock mining ~2 percent).



Modern land claim and Self-government agreements acknowledge Yukon First Nations as an order of government in Canada with jurisdiction over clearly defined territories.³ They describe the nature of government-to-government relations among signatory governments and grant Yukon First Nations the powers of self-government including a role in the management of lands and resources upon which their people have long depended (e.g., through co-management boards). As a result, First Nation governments in Yukon and across the Canadian North have emerged as significant players in regional politics. These governance arrangements represent a significant improvement over previous arrangements because life under the colonial federal Indian Act provides for almost no say in their own governance or the management of their lands and resources (Nadasdy, 2017). Indeed, the conclusion of eleven land claim and Self-government agreements in Yukon has been called a “monumental achievement” (*Beckman v. Little Salmon/Carmacks First Nation*, 2010 SCC 53, [2010] 3 S.C.R. 103, 2010). These agreements have without a doubt facilitated a significant shift in Indigenous–state-relations in this context and invite further investigation of the unique influence they have had on water governance in Yukon.

³ Self-governing Yukon First Nations are responsible for resource management and land use planning on Settlement lands throughout Yukon. Through these responsibilities, Yukon First Nations have a range of authorities including legislative authority to enact laws pertaining to their Settlement Lands. These First Nation laws and decisions can supersede Federal or territorial legislation. In Yukon, this is enabled through the Yukon First Nations Self-Government Act (1994a). Under Self-government agreements, Yukon First Nations are considered governments rather than bands under the Indian Act (*Indian Act, RSC 1985, c I-5*, 1985). For a more detailed account of First Nation self-government arrangements in Canada see Coates and Morrison (2008) and Morse (2008). These agreements do not contain a comprehensive account of jurisdictional arrangements. Instead, they tend to list those areas of governance over which First Nations can assume control and the process for doing so if they choose to do so.

1.3.2 Biophysical Stressors to Water Quality, Quantity and Rate of Flow

Yukon First Nations' interest in water governance is motivated by concerns about the cumulative impacts of various stressors on the water as resource extraction and other changes in land and water encroach on their relationships and ability to assert their sovereignty according to these relationships. In 2012, Community-Based Research conducted with my Yukon First Nation research partners (Carcross/Tagish First Nation, Kluane First Nation, Tr'ondëk Hwëch'in First Nation and White River First Nation) identified many concerns about water quality, quantity and flows within their traditional territories. These specifically include the combined impacts of climate change, mining exploration and development, infrastructure (e.g., sewage lagoons and landfills), hydro-electric development including potential new hydro projects and upgrades to existing facilities (e.g., Yukon Energy's proposed project to raise the winter water levels in the Southern Lakes), and legacy contaminated sites (e.g., contaminated sites such as those associated with past military activity such the construction of the Alaska Highway and legacy mines such as Faro mine) (Wilson et al., 2013a, 2013b, 2013c, 2013d). Indeed, the cumulative impacts of climate change and other anthropogenic stressors have resulted in biophysical changes including quantifiable levels of contaminants in surface waters and fish tissues, disease in human and fish populations, changes in surface water hydrology and shifts in biogeochemical loads in the Yukon River Basin (Dubé et al., 2013b, 2013c, 2013a; Toohey et al., 2016). Among these many concerns, Yukon First Nations identified mining impacts as a top priority (Wilson et al., 2013a, 2013b, 2013c, 2013d).

Mining is the predominant industry in Yukon. As identified in Figure 1.2 (above), the vast majority of the water licenses in Yukon are granted to mining operations (placer mining operations ~68 percent and hard rock mining ~2 percent). Specific impacts to water quality include the effects of chemicals used in hard rock mining processes, acid rock drainage, and increased sediments released by placer mining operations (Nahir et al., 2006; Richards, 2009). While low population density and the limited presence of industries such as agriculture curtail water use demand in Yukon, there are specific contexts where water quantity and flows are of concern. For example, THFN recently conducted a study of the cumulative impacts of mining operations on water quantity in some heavily impacted watersheds within their traditional territories. Their analysis shows that the total amount of water allocated to placer mining operations is greater than the total flows in the watershed. In other words, if all of the placer operations in these watersheds were to withdraw the total volume of water allocated through their water licenses it would completely dewater the stream (Summit Environmental Consultants Inc., 2014). The sensitivity of operational and abandoned mines to climate-induced hydrologic change also creates the potential for climate change to compound existing mining-related threats to water (Pearce et al., 2011). For example, heavy rain, that exceeded predicted rainfall based on seasonal averages, forced Minto mine to release untreated water from tailings ponds into the Yukon River. These unplanned releases posed potential negative impacts to fish and wildlife and the people who depend on them for subsistence (Pearce et al., 2011). The significant and ongoing impacts of legacy mines, such as acid rock drainage from Faro Mine, also heavily shape present concerns about mining (See Nahir et al., 2006). It is not the purpose of this dissertation to provide an overview of the biophysical impacts of mining on water in Yukon. However, Yukon

First Nation concerns about mining fundamentally motivate this research and are understood as central to water conflict in Yukon.

1.4 Overview of Research Methods and Approach

This section provides an overview of the research methods employed in this dissertation. These methods are again described within specific substantive chapters. This research was designed using an approach known as Community-Based Participatory Research (CBPR), which focuses on issues of real importance to communities, involves community members in all phases of the research process and centers on the goal of social change (Minkler and Wallerstein, 2008).

CBPR is not a research method in itself, but an ethical philosophy that promotes shared decision-making power and ownership over the research process, co-learning, the co-creation of knowledge and its dissemination in a mutually beneficial manner (Castleden et al., 2012).

CBPR has been used for its potential to decolonize conventional relationships between university researchers and Indigenous communities (Castleden et al., 2008) to avoid reproducing the negative histories of research between Indigenous peoples and external researchers (Denzin et al., 2008; Smith, 1999; Wilson, 2009). Indigenous peoples are developing their own protocols to protect their communities and Indigenous Knowledge systems that build on the core principles of CBPR (the “four Rs”) including respect, responsibility, reciprocity, and relevance (Diver and Higgins, 2014; Kirkness and Barnhardt, 1991; Wilson, 2009). In Canada, the National Aboriginal Health Organization has developed the OCAP (Ownership, Control, Access, Possession) principles, which represents an ethical framework “developed by First Nations to bring self-determination into the realm of research and information management” (National

Aboriginal Health Organization, 2007, p. 4). As described below, this research seeks to live up to the principles and ethical standards set by these protocols including the traditional knowledge policies developed by my partner Yukon First Nations.

The use of CBPR was facilitated by long-term relationships with the YRITWC (since 2009), and individual Yukon First Nations (Carcross/Tagish, Kluane, Tr'ondëk Hwëch'in and White River First Nations) (since 2012, prior to the start of my doctoral studies). My research topic and questions were formed over the course of years of engagement with my research partners. Two specific events shaped my interest in Indigenous water governance and the research trajectory that followed: First, while completing my M.S. research with Ruby Tribal Council in Alaska, I did an internship with the Yukon River Inter-Tribal Watershed Council (YRITWC). At the time, The YRITWC had recently initiated a project that brought together legal experts from the United States and Canada to characterize the state of Indigenous water rights in the Yukon River Basin. This work on Indigenous water rights and the idea of creating a legally enforceable approach to protecting the waters within their traditional territories and the broader YRB was a major theme at the YRITWC biennial Summit in Ruby, Alaska (2011) and subsequent summits that I have attended (Mayo, Yukon 2013, Minto, Alaska 2015, Carcross, Yukon 2017).

Second, Community-Based Research conducted in partnership with Yukon First Nations (Carcross/Tagish First Nation, Kluane First Nation, Selkirk First Nation, Teslin Tlingit Council, Tr'ondëk Hwëch'in First Nation and White River First Nation) between 2012 and 2015 also fundamentally informed my research interests and questions (Wilson et al., 2013a, 2013b, 2013c, 2013d). My relationships with these Yukon First Nations began in 2011. During open floor

discussions at the YRITWC biennial Summit in Ruby, Alaska (2011) Yukon First Nation representatives raised concerns about the impacts of climate change and contaminants on the health of the waters within their territories. They called on the YRITWC staff to assist them with conducting research to assess and monitor climate change and contaminants impacts within their traditional territories. In response, we initiated a research project, funded by Health Canada, to characterize the effects of climate change and contaminants on their communities and relationships to water. We conducted water quality monitoring at key sites of concern identified through focus groups and traditional knowledge interviews. I began my doctoral studies at UBC in 2013. At that time, four Yukon First Nations (Carcross/Tagish First Nation, Kluane First Nation, Tr'ondëk Hwëch'in First Nation and White River First Nation) who were involved in previous research agreed to continue our research partnership and to allow me to use existing interviews as part of my doctoral research.

Research for this dissertation was thus conducted between 2012 and 2017. Table 1.1 provides an overview of the timeline for the research conducted as part of this dissertation including a description of the dates and locations of the fieldwork conducted.

Table 1.1 Timeline and locations for dissertation fieldwork.

Research Activity	Location	Dates
YRITWC Community-based research project with four Yukon First Nations prior to beginning my doctoral studies	Beaver Creek, Yukon Burwash Landing, Yukon Dawson City, Yukon Carcross, Yukon Tagish, Yukon	August 2012 to March 2013
Scoping interviews with other water experts	Whitehorse, Yukon	August 2014
YRITWC Biennial Summit hosted by Native Village of Minto. Interviews with ION water quality samplers and other stakeholders	Minto, Alaska	July 31 st to August 2 nd , 2015
Interviews conducted with other water experts	Whitehorse, Yukon	August 7 th to September 16 th , 2015
Interviews with Kluane First Nation citizens	Burwash Landing, Yukon	August 10 th – 13 th , 2015
Interviews with White River First Nation members	Beaver Creek, Yukon	August 18 th to 20 th , 2015
Interviews with Tr'ondëk Hwëch'in First Nation	Dawson City, Yukon	August 25 th to 27 th , 2015
Interviews with Carcross/Tagish First Nation	Carcross, Yukon Tagish, Yukon	September 3 rd to 15 th , 2015
Alaska Tribal Environmental Management Conference. Interviews with ION water quality samplers and other stakeholders	Anchorage, AK	October 25 th to October 31 st , 2015
Community presentation on CBM research at YRITWC Biennial Summit hosted by Carcross/Tagish First Nation	Carcross, Yukon	August 1 st to 3 rd , 2017
Community presentation at Kluane First Nation annual harvest camp	Clear Creek Campground, Yukon	August 7 th to August 8 th , 2017
Community presentation at White River First Nation Chief and Council meeting.	Beaver Creek, Yukon	August 8 th to 11 th , 2017
Community presentation to Tr'ondëk Hwëch'in First Nation held at Dänojà Zho Cultural Centre	Dawson City, Yukon	August 13 th to 16 th , 2017
Meeting with C/TFN Citizen	Carcross, Yukon	August 24 th , 2017
Community presentation to Carcross/Tagish First Nations' Land Management Board	Carcross, Yukon (Conference Call)	October 16 th , 2017

Table 1.2 provides an overview of the interviews conducted with Yukon First Nations (Carcross/Tagish, Kluane, Tr'ondëk Hwëch'in and White River) and other water experts in Yukon between 2012 and 2017. These interviews serve as the empirical basis for Chapter 2, Chapter 3, and Chapter 4. The interviews were conducted between 2012 and 2017 with thirty-three Yukon First Nation government employees and nine other water experts from Yukon Government, YWB, and YESAB. These interviews include the interviews conducted in 2012 as part of a community-based research project with the YRITWC prior to the start of my doctoral studies. Working closely with First Nation governments and their staff, thirty-three Elders were recruited to participate in interviews. Elders were given honoraria of (\$100 to \$200) to acknowledge their expertise and to thank them for sharing their time and knowledge. Although using the names of Elders and other experts can be understood as a form of citation, with a few exceptions, the names of Elders are not used in this work following Yukon First Nations' Traditional Knowledge Policy requirements for confidentiality (Carcross/Tagish First Nation, 2009; Kluane First Nation, 2012a; Tr'ondëk Hwëch'in First Nation, 2012).⁴ Several interview participants were interviewed more than once to gain insight on how things had changed over time. Interviews were transcribed and thematically coded using NVivo. In 2017, research results were shared with and validated by participating Yukon First Nations through discussion at

⁴ Some interview participants expressed the desire to have their names associated with this work. With permission, I developed updated consent forms with a waiver of confidentiality that would allow for the use of Interview participants names in this work (found in Appendixes A and C). During fieldwork and community presentations in August 2017, I was able to complete updated consent forms with four Elders from C/TFN and THFN who expressed a particular interest in waiving their confidentiality. Their names appear in the text of this dissertation where they are directly quoted. Both KFN and WRFN noted that they would prefer not to have Elder's names associated with quotes at this time.

community presentations and discussion of plain language reports. Finally, all interview audio and transcriptions were returned to First Nation archives for future use at their discretion.

Table 1.2 Overview of interviews conducted with Elders, representatives from four Yukon First Nation Governments (Carcross/Tagish First Nation, Kluane First Nation, Tr’ondëk Hwëch’in First Nation and White River First Nation) and other water experts.

First Nation	C/TFN	KFN	THFN	WRFN
Agreements	Final (2005a) & Self-government (2005b) agreements	Final (2003a) & Self-government (2003b) agreements	Final (1998a) & Self-government (1998b) agreements	No treaty. Reconciliation agreement in progress
Languages Spoken*	Tlingit and Tagish	Southern Tutchone	Hän Hwëch’in “People of the River”	Northern Tutchone and Upper Tanana
Citizens**	633	154	770	247
Elders	7	6	9	5
Total Elders	27			
First Nation Government	5	13	8	7
Total First Nations	33			
Other Expert	9			
TOTAL	69			

* All partner Yukon First Nations, except C/TFN, belong to the Athabaskan-language group. Tagish Athabaskan peoples were the original inhabitants of the area. This region later became home to Inland Tlingit peoples who traveled to the area from Southeast Alaska for reasons of trade about 200 to 300 years before contact.

** Statistics compiled by Council of Yukon First Nations Self-Government Secretariat based on 2011 National Health Service data. WRFN recognizes 247 members, while only 149 of these are registered under the Indian Act. <http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/aprof/index.cfm?Lang=E>
<https://sgsyukon.ca/infographics/demographics/>

Table 1.3 summarizes the interviews conducted with First Nation and Alaska Native Tribal water quality samplers as part of a sub-project to evaluate the Indigenous Observation Network (ION). These interviews serve as the empirical basis for Chapter 5 of this dissertation. Samplers were provided a gift card (valued at \$30 CAD) to thank them for their participation. Semi-structured interviews were also conducted with other stakeholders, which included YRITWC staff and Executive Council members as well as USGS staff. Interviews were conducted between August and December of 2015. Interview participants were recruited in a targeted manner by using the list of current samplers. The lead author interviewed samplers who were present at two events including YRITWC’s Summit in Minto, Alaska in August 2015, the Alaska Tribal Conference on Environmental Management Water Quality Training (ATCEM) in October 2015 in Anchorage, Alaska. To increase the number of samplers from Yukon and British Columbia, interviews were conducted in their communities or by telephone between August and September 2015. Samplers from the same community were often interviewed together. A total of 20 samplers and ten stakeholders were interviewed. Interviews were audio-recorded, transcribed and coded using Nvivo, utilizing thematic qualitative coding techniques (Saldaña, 2013).

Table 1.3 Summary of interviews conducted with Water Quality Samplers and Other Stakeholders in Canada and the USA.

Region	Canada (YT and BC)	USA (Alaska)
Samplers*	7 (57%)	13 (43%)
Other Stakeholders	6	4
Sub-Total	13	17
Total	30	

*Interviews were conducted with a subset of the thirty Tribal and First Nation samplers who were active in 2015 (4 of 7 Yukon and British Columbian First Nations and 10 of 23 Alaska Native Tribes). Percentages were calculated after adjusting for cases with more than one interview per community.

1.4.1 Positionality

I am a scholar of settler origin. I was born in Calgary, Alberta in Blackfoot territory (Treaty 7). I have been working in the Yukon River Basin in collaboration with the YRITWC – a grassroots treaty-based organization with 73 signatory Alaska Native Tribes and Canadian First Nations (Yukon and BC) – since 2009, when I partnered with the organization for my M.S. research while a student at Cornell University. My doctoral research grew out of a three-year (2012 – 2015) research project aimed at the development of a community-based climate change and contaminant monitoring network with four Yukon First Nations (Carcross/Tagish, Kluane, Tr’ondëk Hwëch’in and White River), all of whom are also research partners on this project.

This research took place within an ongoing personal process of learning about settler colonialism and decolonization. For settlers, decolonizing is often an unsettling experience that requires vulnerability, humility, and a willingness to risk their comfort and their understandings of themselves, their ancestors, the stories they have been told, and their privilege (Regan 2010, Barker 2010). Reflexivity informs my understanding of the ways my settler identity conditioned and affected this research. For example, my Euro-settler origin not only limited the kinds of knowledge and teachings that were shared with me but also my ability to understand and interpret this information. At the same time, there are limits to the value of settler reflexivity for decolonization. As Andrea Smith (2013) discusses, white settler self-reflexivity alone cannot lead to “liberation.” Rather, decolonization occurs not through individual acknowledgement of privilege and positionality but requires Indigenous processes, institutions, and structures that transform the systems that enable these privileges (Ibid.). It is “more than a struggle against

power and control; it is also the imagining and generating of alternative institutions and relations” (Walia, 2013). Thus, while reflexivity is important for locating myself in relation to my research topic and my research partners (Yukon First Nation and YRITWC), this alone fails to contribute to decolonization. Decolonization is a broader process led by Indigenous peoples and involves ongoing commitment and long-term relationships. Thus, the research methodologies I engage are informed by a political and ethical commitment to Indigenous research methods and practices that support Indigenous sovereignty and self-government, such as those outlined in OCAP principles.

1.5 Chapter Overviews

I situate my dissertation in the field of Indigenous water governance. Each of the chapters detailed below approach this topic in the context of Yukon Territory or the broader Yukon River Basin.

Chapter 2, *Respecting water: Indigenous water governance, ontologies and the politics of kinship on the ground* examines the ‘political ontology’ of water by drawing on insights from the fields of critical Indigenous studies, post-humanism, and water governance. In the water governance context created by Modern land claims in Yukon, I ask the question what *is* water for Yukon First Nations? What do Yukon First Nations’ calls to ‘respect water’ tell us about their conceptions of water? How do settler water ontologies, informed by the idea of water as a resource, affect Yukon First Nations’ ability to engage in water governance? And, what alternate forms of governance might exist to ameliorate these conflicts? Findings suggest that water

conflicts in Yukon are, in part, rooted in ontological conflicts between settler and Indigenous conceptions of water. Furthermore, Indigenous water ontologies can inform alternate modes of governance that promote ontological pluralism and re-affirm Indigenous ontologies, epistemologies and modes of governance.

Chapter 3, *Querying Water Co-Governance: Yukon First Nations and water governance in the context of Modern land claims and Self-government agreements* seeks to contribute to the study of Indigenous-state water co-governance. I explore this topic through an empirical case study of the unique water governance landscape of Yukon, as shaped by Modern land claim agreements. Unlike other jurisdictions across Canada, Modern land claims in Yukon explicitly acknowledge First Nation water rights and authorities. Within this context, I ask what changes or transformations have Modern land claims brought about in relation to water governance and Indigenous-state relations, more broadly? What problems still exist in this system despite the explicit acknowledgement of Indigenous water rights? What opportunities remain within this system to better protect the waters within Yukon First Nation territories? Findings suggest that while Yukon First Nations water rights and authorities have significantly expanded as the result of these agreements, limitations remain and water governance in the territory remains highly contested. Water co-governance could be improved through expanded acknowledgement of First Nation jurisdiction, addressing First Nation procedural rights within water governance arrangements to reflect Indigenous forms of governance; and working to overcome barriers to implementing existing agreements. A reconsideration of the language and meaning of consent is also discussed as a means for improving co-governance.

Chapter 4 and 5 investigate novel strategies in Indigenous water governance to learn more about the innovative ways that Indigenous governments and peoples are working to protect the waters within their territories. Chapter 4 *“Seeing water like a state”?: A critical analysis of the opportunities enabled through Yukon First Nation Self-government agreements to protect water quality, quantity and rate of flow* examines the implications of “state-like” forms of governance, and in particular, legislative strategies, for achieving the goal of protecting the waters within their traditional territories. Within this context, I ask what opportunities exist, for Yukon First Nations, through the powers of self-government to protect the waters within their territories? What are the potential consequences of engaging forms of governance that bear little resemblance to traditional governance systems for how First Nations “see” water? Research findings suggest that while the forms of governance associated with Modern land claims and self-government may promote particular colonial “water governmentalities,” self-governing Yukon First Nations’ continued engagement with relational forms of governance is demonstrated through existing legislation. At the same time, the potential for Indigenous water legislation to effectively facilitate the protection of water is also heavily influenced by the broader political and economic context and a strong prospect that such legislation will open Indigenous governments to litigation by settler governments or proponents of extractive resource development.

Chapter 5, *Community-Based Monitoring as the practice of Indigenous governance: A case study of Indigenous-led water quality monitoring in the Yukon River Basin* explores CBM through a governance lens by understanding CBM as a strategy for the assertion of Indigenous sovereignty and jurisdiction. Within this context, I ask how Indigenous engagement in CBM might be better

conceptualized through a governance lens that understands Indigenous peoples as nations with decision-authority rather than knowledge holders alone? What specific challenges do Indigenous peoples face in linking CBM data to decision-making processes? Research findings reveal that CBM is understood as both a method for generating data useful for decision-making and an expression of governance itself rooted in understandings of stewardship, kinship, and responsibility. These research findings also suggest that data quality and credibility, trust and legitimacy, and relevance to decision contexts are key to mobilizing CBM data in relevant decision-making processes.

1.6 Dissertation Summary

This dissertation engages theory and empirics relevant to Indigenous water governance to understand how Indigenous peoples can better protect the waters within their traditional territories despite socio-political and environmental stressors created from the interlinked processes and impacts of settler colonialism, global environmental change and resource extraction. The water governance context, shaped by Modern land claim and Self-government agreements in Yukon creates a unique context for studying these themes as these agreements are among very few in Canada to acknowledge the existence of Indigenous water rights. The conclusion highlights the main findings of my research and recommendations for future studies. It aims to clarify the barriers to Indigenous water governance, even in contexts where Indigenous water rights are acknowledged and explore the ways that Indigenous peoples are navigating this system to overcome these challenges. Together, these insights articulate novel and proactive

approaches to shifting water governance processes and institutions to better reflect Indigenous peoples' relationships to water and forms of governance.

Chapter 2: Respecting Water: Indigenous Water Governance, Ontologies and the Politics of Kinship on the Ground

Summary

Indigenous peoples often view water as a living entity or a relative, to which they have a sacred responsibility. Such a perspective frequently conflicts with settler societies' view of water as a 'resource' that can be owned, managed and exploited. Though rarely articulated explicitly, water conflicts are rooted in ontological differences between Indigenous and settler views of water. Furthermore, the unequal water governance landscape created by settler colonialism has perpetuated the suppression of Indigenous ways of conceptualizing and relating to water. This paper thus examines the 'political ontology' of water by drawing on insights from the fields of critical Indigenous studies, post-humanism, and water governance. Additionally, we engage a case study of four Yukon First Nations (Carcross/Tagish, Kluane, Tr'ondëk Hwëch'in and White River First Nations), in the Canadian North to examine their water ontologies through the lens of a politics of kinship including ideas about "respecting water." We also examine the assumptions of settler colonial water governance in the territory, shaped by Modern land claims and Self-government agreements. We close by discussing the implications of Indigenous water ontologies for alternate modes of governing water.

2.1 Introduction

We respect not only the water we utilize, we respect the land around it because it feeds into the water. Traditionally our belief is that water is sacred to us and that we should treat it as such. We should always work hard at keeping it clean. And pray to our Creator to give us strength all the time to keep it clean. And over the years, we see industry move into our traditional territory. And everything that the industry does, which is to manage water and different things. We've seen them take over. And sometimes we step aside too much with industry, so we see changing water forces. (ELDER 2 (2015) C/TFN)

Rarely have we witnessed a conversation about water or water governance in Yukon, Canada where First Nations there have not emphasized the importance of respect for water. It is clear from the opening passage that respecting water is very important to the Tlingit Elder from Carcross/Tagish First Nation. Many Elders across all Yukon First Nation research partners (Carcross/Tagish, Kluane, Selkirk, Tr'ondëk Hwëch'in and White River First Nations) engaged in this study made similar comments about respecting water. It is tempting to interpret these statements in relation to settler/English language notions of respect, or a “deferential regard or esteem felt or shown towards a person, thing, or quality” (“respect, n.,” 2015). Yet, these terms are far from interchangeable, and inaccurate assumptions about Indigenous concepts of respect often obscure fundamental ontological differences between settlers and Indigenous peoples (Nadasdy, 2003b; Natcher et al., 2005). Based on our discussions with Elders, “Respect” instead reflects Indigenous ontologies of water characterized by reciprocal relations of responsibility between people and water as a “more-than-human person.” It conveys the profound differences

between Yukon First Nations and settler views of water as expressed through all aspects of Canadian law and policy, and the implications this has for water conflict and governance.

Indigenous peoples are increasingly at the forefront of water conflicts as the waters within their territories are under pressure from stressors including the intensification of resource extraction and the effects of global environmental change (Babidge, 2015; Boelens, 2015; Harris et al., 2017; Perreault, 2013; Wilson et al., 2015). While these stressors have undeniable biophysical effects (Bates et al., 2008; Salvarredy-Aranguren et al., 2008), we suggest here that water conflicts are rooted in ontological differences (Blaser, 2013; Nadasdy, 2007; Yates et al., 2017). While Indigenous nations in the area see water as a living being, ideas about water as a “resource” that can be owned and exploited prevail in dominant forms of water governance frameworks. This is because Indigenous ontologies and epistemologies⁵ were violently suppressed and marginalized through settler colonialism (Wolfe, 2006),⁶ and within contemporary practices of water governance (Anderson et al., 2013; McGregor, 2014; Sam and

⁵ Ontologies are ways of being and defining what something *is* and epistemologies are ways of knowing. As fundamental ways of understanding the world, ontologies are systems of identification and classification that define the boundaries between self and otherness and “serve as a point of reference for contrasting forms of cosmologies, models of social links, and theories of identity and alterity” (Descola, 2013). Simply put, ontologies might be thought of as the basic conceptual underpinnings of the meaning, purpose and identity of a thing and where it belongs in the larger social order of relations, obligations, and origin (Descola, 2013).

⁶ Although both colonialism and settler colonialism are based on domination by an external power, only settler colonialism seeks to replace Indigenous peoples with a settler society. Settler colonialism, is fundamentally about access to ‘territory,’ or land and in this case water, which is gained through various means including treaties or simply taking possession. Patrick Wolfe (2006) insists that “invasion,” in the context of settler colonialism, “is a structure not an event,” therefore it never ends.

Armstrong, 2013).⁷ In large part, this occurs because Indigenous ontologies are frequently cast as cultural constructions and relegated to the realm of “myth” or “belief,” Nadasdy (2007, p. 26) calls for the need to take Indigenous peoples’ ontological assumptions as literal rather than symbolic. Cruikshank (2012, pp. 244–245) similarly notes that a radical shift is required to engage Indigenous perspectives where “the world is inhabited by a range of beings—human and non-human—who all apprehend that world from distinct vantage points [...] from this framework, animals, humans and even features of landscape have points of view, exhibit agency, and engage in reciprocal responses.” Acknowledging this pattern and the challenges it raises, Yates, Harris and Wilson (2017) ask what it would mean to “take seriously the possibility and politics of a multiplicity of water-related worlds, highlighting multiple water realities and ways of being-with-water, not just different perceptions of or knowledge systems tied to water’s (singular) material existence” (p. 2). We articulate this possibility here as a need to study the ‘political ontology’ of water governance and “the conflicts that ensue as different worlds or ontologies strive to sustain their own existence as they interact and mingle with each other” (Blaser, 2009a, p. 877).

This study, conducted in collaboration with four Yukon First Nations, engages with the ontological politics of water and water governance in Yukon, Canada, as conveyed through First

⁷ Water governance refers to the set of regulatory processes, mechanisms and institutions through which political actors, including communities, influence environmental decisions, actions and outcomes (Bakker, 2003a). Indigenous water governance relates to Indigenous peoples inherent right to self-determination, which includes the power to make decisions, based on Indigenous law, epistemologies and ontologies to protect water for all forms of life as well as present and future generations (Phare, 2009).

Nation assertions of the need to “respect water” as a “more-than-human person” – as a being and relation in its own right. First, we review empirical data on how Elders from Yukon First Nations define what it means to respect water, in relation to Indigenous water ontologies and modes of governance or what we call a politics of kinship. Second, we analyze water governance arrangements in Yukon to understand how settler views of water are expressed, and ultimately constrain, First Nations’ ability to protect the waters within their territories in ways that accord with their ontology and associated epistemologies of water as a living entity, with agency or spirit. Finally, we examine the strategies employed by First Nations to overcome these limitations and discuss strategies for approaches to water governance that are more in line with Indigenous notions of respect and that achieve the goal of ontological pluralism required to decolonize water.

2.2 Theoretical Considerations: What *is* Water?

“Respecting water” raises important ontological challenges. To engage with this, we take as our point of departure the broader question – what *is* water? – a question that has been raised by scholars in a variety of fields (Boelens, 2014; Chen et al., 2013; Linton, 2010; Strang, 2004; Wagner, 2013). As Linton (2010) notes, the answer to this seemingly simple question is taken for granted, due to the pervasiveness of the concept of Modern Water. Water or H₂O in this modern interpretation is abstracted from social context or “rendered technical” (Li, 2007), making it possible to understand water as a resource available for human consumption and use that can be known and managed or manipulated by humans (Groenfeldt, 2013; Linton, 2010; Strang, 2004). Modern Water, it is argued, dominates current approaches to water governance, whereas the

separation of water from its social context is thus considered at the root of contemporary water crises (Schmidt and Shrubsole, 2013). Thus, critics argue that challenging this requires “attention to water’s social context and dynamics, and to reposition water as inherently political” (Linton and Budds, 2013, p. 175). Yet to date, few academics have explicitly addressed the ontological politics of water (Cf. Boelens, 2014; Linton, 2010; Norman, 2012; Wilson, 2014; Yates et al., 2017). This paper thus examines water as a “more-than-human” entity through the lens of post-humanism and critical Indigenous studies. It explores conflicts in water governance, how dominant ontologies of water inform present approaches to water governance, and how a project of decolonizing might serve to unsettle conventional water governance. In concert with recent literature (Berry et al., 2018; 2014; von der Porten et al., 2016; N. J. Wilson, 2014; Yates et al., 2017), we argue that working towards meaningful water governance alternatives will necessarily involve prioritizing Indigenous ontologies, epistemologies, and forms of governance.

The ‘ontological turn’ or the study of post-humanism and the more-than-human, has begun to challenge the assumption of a singular world, and proposed instead that we take seriously the existence of diverse ways of being and knowing within and with multiple worlds (Haraway, 2003; Kohn, 2007; Nadasdy, 2007; Sundberg, 2011, 2014; Whatmore, 2002). Indigenous scholars have long acknowledged water’s meaning and constitution as more-than-human (Anderson et al., 2013; Craft, 2014; LaBoucane-Benson et al., 2012; McGregor, 2012, 2014; Zoanni, 2017). Indigenous ontologies have also been explored from the perspective of human relationships to animals (Blaser, 2009b; Nadasdy, 2007); fish (Hoogeveen, 2016; Todd, 2014); and entities considered ‘inanimate’ from a modern perspective including trees, mountains, rocks and glaciers (Bird Rose, 2008; Cruikshank, 2005, 2012, De la Cadena, 2010, 2015). For instance,

Métis scholar Zoe Todd (2014) engages with the meaning and complexity of reciprocal relationships between people and fish in Paulatuuq, Northwest Territories, Canada. In this context, taking *literally* the Paulatuuqmiut's understanding of "fish-as-non-human persons" literally enables an understanding that both humans and animals are active agents in political and colonial processes in Northern Canada. Recent literature has also explored the limitations of viewing ontological dimensions as cultural constructions that confound environmental governance including wildlife (co-)management (Blaser, 2009a, 2009b, 2013, 2014; Nadasdy, 2007) and environmental assessment (Forsyth and Levidow, 2015; Hoogeveen, 2016; McCreary and Milligan, 2014).

More profoundly, the ontological turn has been useful in destabilizing modernism itself thereby opening spaces for ontologies that fail to fit neatly into conventional approaches to water governance. At the same time, the field has been critiqued for its universalizing tendency to use aspects of Indigenous ontologies without acknowledging the associated Indigenous thought, practice and legal/governance approaches (Collard et al., 2015; Hunt, 2014; Sundberg, 2014; Todd, 2016; Watts, 2013). Kwakwaka'wakw scholar Sarah Hunt (2014) cautions against such references to Indigenous ontologies as ultimately shallow to the extent that they act as a form of "epistemic violence" (29). Both Hunt (2014) and Watts (2013) (a Mohawk and Anishnaabe scholar) argue that Indigenous thought should not just be seen as a source of ideas that can be drawn on, but as a complex body of knowledge that is living and practiced by Indigenous peoples with whom settler society shares reciprocal responsibilities. Consequently, calls to decolonize water are fundamentally about "exposing the ontological violence authorized by Eurocentric epistemologies both in scholarship and everyday life" (Sundberg, 2014, p. 34). Our

point, following Zoe Todd (2016), is that the potential of the ontological turn will only be realized once we begin to work more fully in the vein of Indigenous scholars who “have already shown that Indigenous epistemologies and ontologies represent legal orders through which Indigenous peoples throughout the world are fighting for self-determination” (Todd, 2016, pp. 17–18; See also Daigle, 2016). We respond to calls to heed the teachings of critical Indigenous studies – a field committed to the politically engaged study of Indigenous peoples being, knowing and governing as well as the legacies of colonialism – by engaging Indigenous scholars to ask: What *is* water?

We contribute to a growing body of literature that is reshaping understanding of human–water relations through an exploration of the ontological politics of water governance in the context of settler colonialism. In particular, we question how an understanding of the politics of kinship, as engaged by four Yukon First Nations, challenges governance structures and governing agents to “respect water” in the context of water governance in Yukon Territory, shaped as it is by Modern land claims. And finally, we engage with the ways these insights might unsettle dominant ideas of water as a resource and contribute to rethinking “ontological pluralism” in water governance.

2.3 Situating Research: Setting, Methods and Positionality

Water governance in Yukon Territory is shaped by settler water laws and tripartite land claim and Self-government agreements, between territorial, federal and First Nation governments. In contrast to Indigenous peoples elsewhere in Canada (Phare, 2009; Simms et al., 2016), Yukon First Nations’ rights and responsibilities within water governance are defined explicitly in land claims and self-governance agreements. Responsibility for water governance was devolved to

Yukon Territory from the Canadian federal government in 2003. Land claims agreements acknowledge Yukon First Nations' rights to participate in decision-making about the waters and lands within their territories. Specifically, Chapter 14 of the Yukon Umbrella Final Agreement (UFA) (1993) – the framework for Modern land claims agreement in Yukon – specifically addresses 'water management.' The UFA includes provisions on specific matters including the applicability of "laws of general application" (e.g., the Yukon Waters Act) to both Settlement and non-Settlement Land; the powers of the Yukon Water Board; the extent of Yukon First Nation water rights; the management powers of Government; a process for dispute resolution; and it stipulates when compensation for the loss or damage is warranted. In relation to Indigenous water rights, Chapter 14 states, a Yukon First Nation "has the right to have water which is on or flowing through or adjacent to its Settlement Land remain substantially unaltered as to quantity, quality and rate of flow, including seasonal rate of flow" and "...to use water for a traditional use in the Yukon." Chapter 14 of the UFA is the only chapter specific to water. However, water governance is understood to include not only the decision-making processes of the Yukon Water Board, which is responsible for water licensing decisions in the territory, but other co-management boards including Yukon Environmental and Socio-Economic Impact Board (YESAB) or the land use planning process. The Yukon Water Board existed prior to land claims but became a co-management board through land claims with one third First Nations representation. According to the Yukon First Nations Self-Government Act (1994a), signatory self-governing Yukon First Nations can create their own laws and regulations of a local nature. First Nation laws and decisions can supersede territorial legislation on Settlement Lands. While First Nations' roles in water governance are more clearly defined than elsewhere in Canada, water conflicts in Yukon abound as resource extraction, dominated by the mining industry and

other changes in land and water are seen to encroach on First Nations' relationships to water and their ability to assert their sovereignty according to these relationships.

Figure 2.1 Map of Yukon First Nation overlapping Traditional Territories, Settlement Lands and Administrative headquarters for four Yukon First Nation research partners

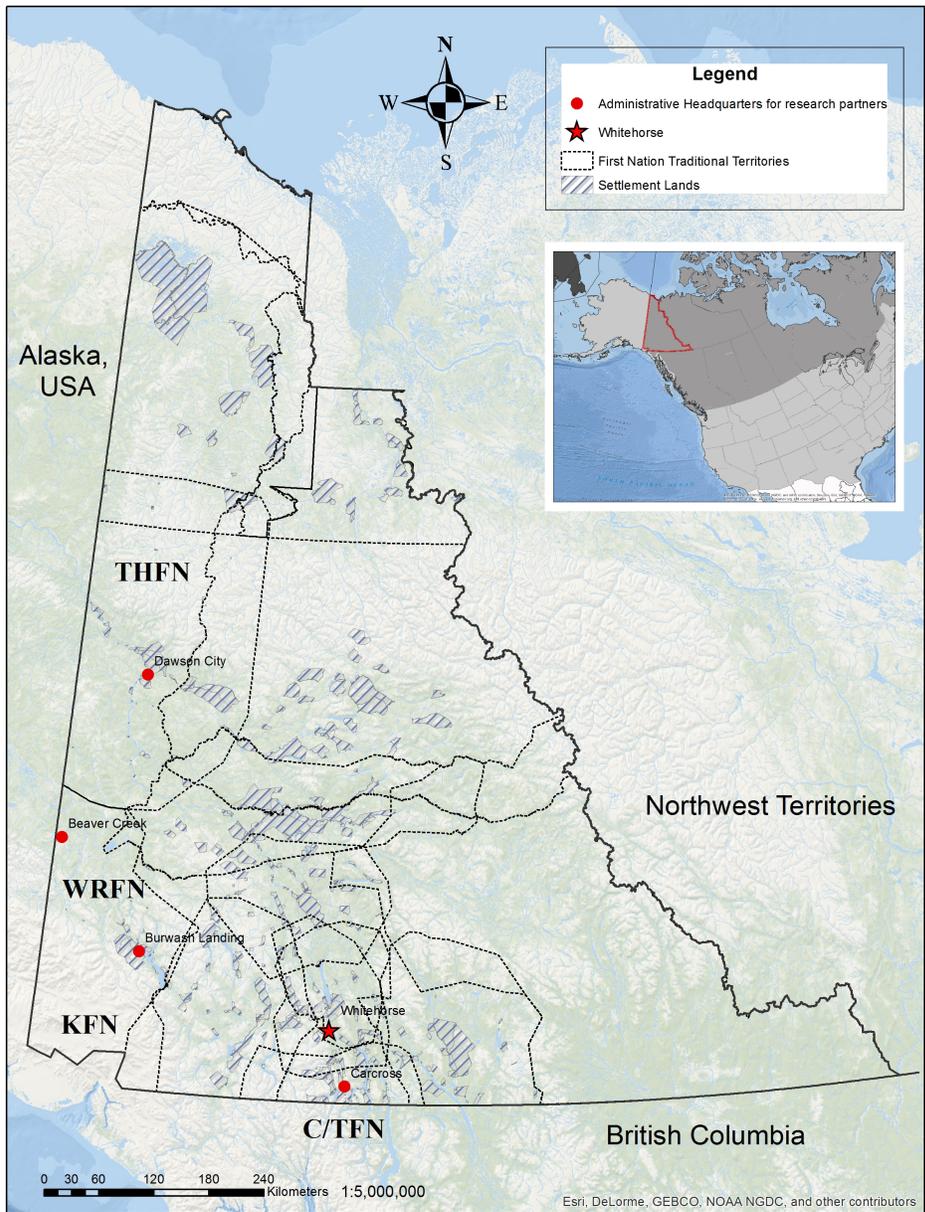


Table 2.1 Interviews conducted with Elders and First Nation government staff from Carcross/Tagish, Kluane, Tr'ondëk Hwëch'in, and White River First Nations between 2012 and 2017

First Nation	C/TFN	KFN	THFN	WRFN
Languages Spoken	Tlingit and Tagish	Southern Tutchone	Hän Hwëch'in "People of the River"	Northern Tutchone and Upper Tanana
Water	<i>Héen</i> (Tlingit) <i>Tuu</i> (Tagish)	<i>Chu</i>	<i>Chuu</i>	<i>Tu</i> (Northern Tutchone), <i>Tuu</i> (Upper Tanana)
Respect	<i>yáa át wooné</i> (Tlingit) None (Tagish)	None	None	None
Agreements	Final (2005a) & Self-government (2005b) agreements	Final (2003a) & Self-government (2003b) agreements	Final (1998a) & Self-government (1998b) agreements	No treaty. Reconciliation agreement in progress
Citizens	633	154	770	247
Elders	7	6	9	5
Total Elders	27			
First Nation Government	2	3	5	4
Total First Nations	14			
TOTAL	41			

* All partner Yukon First Nations, except C/TFN, belong to the Athabaskan-language group. Tagish Athabaskan peoples were the original inhabitants of the area. This region later became home to Inland Tlingit peoples who traveled to the area from Southeast Alaska for reasons of trade about 200 to 300 years before contact.

** Statistics compiled by Council of Yukon First Nations Self-Government Secretariat based on 2011 National Health Service data. WRFN recognizes 247 members, while only 149 of these are registered under the Indian Act. <http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/aprof/index.cfm?Lang=E>
<https://sgsyukon.ca/infographics/demographics/>

We draw here on interviews conducted between 2012 and 2017 with Elders and government employees from four Yukon First Nations (i.e., Carcross/Tagish, Kluane, Selkirk, Tr'ondëk Hwëch'in and White River) (Figure 2.1/Table 2.1). The first set of interviews was conducted in 2012 as part of a Community-Based Water Quality monitoring study with the Yukon River Inter-Tribal Watershed Council. Building on existing relationships with Yukon First Nations, the second set of interviews were conducted in 2015 as part of the lead author's dissertation research on the role of Yukon First Nations in water governance. Water governance was not the explicit focus of the first set of interviews, which focused on the meaning of water to Yukon First Nations, traditional knowledge of water and concerns about environmental change.

Working closely with Yukon First Nation governments and their staff, twenty-seven Elders were recruited to participate in interviews. Several Elders were interviewed in both 2012 and 2017 (Table 2.1). Fourteen First Nation government employees were also interviewed in 2015 and 2017. Elders were given honoraria of \$200 (2012) and \$100 (2015) to acknowledge their expertise and to thank them for sharing their time and knowledge with us. All interviews were conducted in English. Although using the names of Elders and other knowledge holders can be understood as a form of citation, we do not do so here in order to conform with Yukon First Nation's Traditional Knowledge Policies and their requirement for confidentiality (Carcross/Tagish First Nation, 2009; Kluane First Nation, 2012a; Tr'ondëk Hwëch'in First Nation, 2012). Interviews were thematically coded using NVivo and the results were and will be shared with our partner Yukon First Nations, including the return of raw data to First Nation Archives (where traditional knowledge policies are in place). We do not include here the many interviews conducted with non-First Nations water experts, as they are not the focus of this

paper; results from these interviews will appear in a later paper. Instead, we primarily reference the legal languages and logics of governance enshrined in relevant acts, policies and management plans. Research results were shared and validated by partner First Nations between August and October 2017 in the form of a community presentation and report. Research archives, with interview audio, and transcripts were also shared with each First Nation in compliance with traditional knowledge policies.

As scholars of both settler and Indigenous origin – for example, the first author is of settler origin and was born in Calgary, Alberta (Treaty 7 – Blackfoot Territory) and the second author is Kaska Dena (Wolf Clan) from Ross River, Yukon, reflexivity regarding our identities has been fundamental to our engagement with Indigenous research partners and the ontological logics they have and continue to communicate, practice and illuminate. Additionally, the first author has been working in the Yukon River Basin in collaboration with the Yukon River Inter-Tribal Watershed Council (YRITWC) – a grassroots treaty-based organization with 73 signatory Alaska Native Tribes and Canadian First Nations (Yukon and British Columbia) – since 2009. This research grew out of a three-year (2012 – 2015) project aimed at the development of a community-based climate change and contaminant monitoring network with four Yukon First Nations (i.e., Carcross/Tagish, Kluane, Tr’ondëk Hwëch’in and White River), all of whom are also research partners on this project. The second author, who was also a YRITWC employee at that time, played a fundamental role in the project. The many years of engagement with colleagues, collaborators and community members from Alaska and Yukon have helped enrich our understanding of First Nation water ontologies by engaging a more informed, critical and nuanced lens.

2.4 Respecting Water and the Politics of Kinship

It is difficult to overstate the scale and speed of changes to water within Yukon First Nations' territories, and most are seen as negative and as associated with resource development and climate change. Mining is the leading industry in the territory, but First Nations also noted concern related to hydroelectricity development, land use planning, legacy contamination (e.g., historic mine sites or dumpsites from the building of the Alaska Highway), sewage management and in some cases oil and gas development and agriculture. Consistently, Yukon First Nations associated the negative effects of resource development with respect – with “forgetting” or “losing” respect. For example, one Elder (Elder 2, C/TFN, 2015) discussed the consequences of losing respect for water:

It's when we lose that respect and that's when all our guards are down, and things happen to water. Even now, today, politically, we're on a forefront all the time to make sure that the water is kept clean and that if there's any contaminants, you know, we work hard at it to try to get it, get them to clean it up, you know, and those things.

In other words, the negative impacts to the water and land within Indigenous territories are associated with the absence or loss of respect. The First Nations certainly expressed the material importance of water to their communities, including concerns about the effects of resource development on drinking water and habitat for fish and animals. However, concerns about respect for water raise ontological questions that are not easily understood through a dualistic lens. Rather, in what follows, we engage with conceptualizations of respect for water, and its

linkages to Indigenous concepts of *relationality*, *responsibility*, and *reciprocity* to convey Yukon First Nation water ontologies.⁸

While Indigenous concepts of respect differ from settler definitions, it is difficult to convey exactly what is meant by “respect.” To begin with, not all Yukon First Nations have a word in their language for “respect.” For the Inland Tlingit (C/TFN), the term *yáa at wooné* (*Respect*) (Edwards, 2009) is frequently used to refer to proper or decorous interactions between humans as well as between humans and more-than-humans (See also Hayman et al., 2015). In consultation with Elders and archival material, we found no single word or phrase for respect in the Athabaskan languages including the Northern Tutchone (WRFN),⁹ Upper Tanana (WRFN) (John, 1997), Hän (THFN) (Ritter, 1978), Tagish (C/TFN), or Southern Tutchone languages (Nadasdy, 2003b; Tlen, 1993). Yet, the Elders from each of these Yukon First Nations frequently cite the need to “respect water.” In the context of human-animal relationships for the Southern Tutchone, Paul Nadasdy (2003b) notes it seems that First Nations peoples and the people who write about them use the word “respect” to refer to a range of beliefs, values, and practices. Consequently, “we cannot simply assume that the English word ‘respect’ stands for a distinct or coherent set of First Nations’ beliefs and practices; rather, we can only hope to understand what

⁸ Powell and Curley (Navajo political scholar) (2008) note the ontological turn has generally ignored intra-community, and in particular intergenerational differences. We acknowledge that in focusing primarily on Elders’ views of water, we are limited in our ability to identify intergenerational differences among Yukon First Nations, including those differences that might have been, in part, shaped by the massive cultural changes brought about by land claims.

⁹ A Northern Tutchone dictionary developed with the First Nation of Na-cho Nyak Dun shows that the term *njitrq* means respect (Ritter, n.d.), but Elder speakers from White River First Nation did not recognize this term, instead saying that there are many phrases that would describe respect.

First Nations peoples mean by the term if we examine it ‘in action.’ In other words, we must observe it within specific social contexts” (p. 79). Through the exploration of the teachings shared by Elders from four Yukon First Nations, we aim to better understand the concept of respect and its implications for water governance in Yukon.

The theme of “respect for water” first emerged during interviews conducted with Elders in 2012 as part of a project aimed at documenting Indigenous knowledge of water and concerns about environmental change. To deepen our understanding of the meaning of respect for our Yukon First Nation partners, in 2015, the lead author directly asked the Elders “what is respect?” and “what does it mean to respect water?” When asked about the meaning of respect, Elder 7 (C/TFN 2015), leaned back at the table and said,

That’s a pretty big word, respect. Like I said we’ve forgot a lot of things. And we’ve forgot when long time ago the old people said when you get fish you put the bones back in the water. We forgot that. You go and ask over here. They don’t know. Once you put the bones back in the water it feeds those little things and then those little things become bigger things, bigger and then pretty soon you have a whole pile of stuff these bones feed. I guess all these things that we were taught long time ago nobody seem to be thinking about it now.

We believe that in saying that respect is a “big word” the Elder was stating that respect is at once a powerful and complex concept. Similarly, the Elders emphasized that there is no single way to define respect and the meaning can vary between and among First Nations. Or, as Harold Gatensby (C/TFN 2015) stated, “like, the snowflakes, I believe. You know, every person holds

their own definition of what [respect] is.” When asked, “what does it mean to respect water?”, Elder 8 from Kluane First Nation (2015) stated,

By respect, I think they meant don't play around with it. Don't make fun of it. Don't say anything like that against the water. Because to me, water is sacred. That's how I was brought up [...] because everything that lives on the land, they have spirit and if you don't respect that spirit, then you don't respect yourself.

The words this Elder, and others use to describe respect for water makes clear that water is not just seen as a material element that makes life possible, rather for Yukon First Nations, water is a living entity, with the ‘person-like’ quality of agency referred to as “spirit.” From this perspective water not only enables human life by meeting physical needs, but water *is* life or alive. To treat water with the deference it deserves, and to tend to the needs of water systems (the return of bones) is to conceive of water as a living entity with metaphysical and physical properties whose well-being must be managed as with any being or subject of great importance. Conversely, interpreting respect for water through the English definition of the term obscures the protocols for engaging with water and the many consequences of resource development for the waters within Indigenous territories.

The meaning of respect for water can also be explored through Indigenous principles of relationality, responsibility and beneficial reciprocity (Atleo, 2004; Manson, 2015; Wilson, 2009). Together with respect for water, we characterize these principles as a politics of kinship, critical to understanding Indigenous governance. Relationality or the idea that Indigenous peoples are fundamentally rooted in their relationships (Atleo, 2004; Manson, 2015; Wilson, 2009) is central to Elders’ descriptions of respect. Water as a living entity can actively participate

in relationships across the human and non-human world. While post-humanist authors have long been interested in Indigenous peoples' ideas of the more-than-human (Sundberg, 2014), relationality emphasizes a "kincentric ecology" (Salmón, 2000) or set of relations with persons or beings, water in this case, as a part of extended networks of kinship or kin relationships. The principle of relationality is critical to understanding Yukon First Nation concepts of respect because Indigenous ontologies and epistemologies are fundamentally about the relationality of beings (Atleo, 2004; Wilson, 2009). "Identity for Indigenous peoples," as Opaskwayak Cree scholar Shawn Wilson (2009) notes, "is grounded in their relationships with the land, with their ancestors who have returned to the land and with future generations who will come into being on the land. Rather than viewing ourselves as being *in* relationship with other people or things, we *are* the relationships that we hold and are part of" (p. 80). While relationality does not negate individual agency, all people or beings are thus better understood as the embodiment of all the beings in their relational orbit that exist now and have previously come before them. Further, as Todd (2017) discusses, relationality is not always positive, because relationships are complex. Just as with our human relatives, the acknowledgement of kin relationships with water does not imply that kin always gets along. For example, water is considered the giver of life, but it can also take life away.

Responsibility and *Reciprocity* are also fundamental to understanding Indigenous concepts of respect. Humans have a responsibility to follow specific protocols or rules for behaviour in relation to water (Atleo, 2012; Coulthard, 2014). Participating Elders described some of the protocols surrounding relationships to water, paying close attention to the failure to follow these protocols – both physically and conceptually. To be "disrespectful," as noted in the quote above,

is to make fun of water or say/think bad things about it (Elder 8, 2015), to waste water or to generally take it for granted (Elder 2, Elder 3, Elder 6 and Angie Joseph-Rear, 2015). Other examples of disrespect for water provided by Elders include polluting it or contaminating it in any way by throwing garbage or inappropriate objects in the water, apart from fish bones or other animal remains (Elders 7, 10 and 15, 2015); driving through water unnecessarily or for sport (Elder 10, 2015); and using water for mining without returning the land and water to the same condition it was found in (Elder 6, Elder 10 and Angie Joseph-Rear, 2015).

Engaging in ceremony is also a meaningful way to show respect for water. Harold Gatensby (C/TFN, 2015), referred to the water ceremony held at each of the Yukon River Inter-Tribal Watershed Council's biennial summits:

The Yukon River gatherings have brought us to appreciate water in a big ceremony, in a big way every four years. And, so there's this appreciation of water and it's bringing the songs out. I've heard a couple of songs during the water ceremony that I've picked up in Teslin, so there's this cross-cultural thing going on, also. Sharing of language and perceptions and ways of being and doing things, you know? We kill a moose; we do this. They kill a moose; they do that. Same idea. It's to value the one that gave itself to us that we might live on. And to acknowledge its spirit and make sure it's got the doors open for whatever it wants to be and do, you know? (Harold Gatensby, C/TFN, 2015)

This water ceremony is not specific to any First Nation, but rather an expression of inter-tribal understandings of how to respect water. C/TFN Elders (Elder 2, Elder 7 and Harold Gatensby, Colleen James, 2015), who are of both Tlingit and Tagish origin, also referred to the Tlingit salmon ceremony. By returning the fish bones to the water, a salmon ceremony is an act of

respect for fish and water (Elder 7, C/TFN 2012, 2015) (See also Fox et al., 2017). Other First Nations also mentioned returning fish bones and guts (e.g., trout, whitefish, and salmon) to the water in a show of respect (Colleen James, Elder 7, and Elder 11, 2015).

Dene political theorist Glen Coulthard (2014) (Weledeh Yellowknives Dene First Nation), discusses the responsibilities humans have towards water and other elements of the environment: “Ethically, humans held certain obligations to the land, animals, plants, and lakes in much the same way that we hold obligations to each other. And if these obligations were met, then the land, animals, plants, and lakes would reciprocate and meet their obligations to humans, thus ensuring the survival and well-being of all over time” (2014, p. 61). While specific responsibilities differ between Indigenous peoples, reciprocity is, generally speaking, about engaging with water according to protocols to ensure mutual survival. In other words, if you take care of the water, it will take care of you. While the meaning of respect may differ across diverse Indigenous peoples, this case study of four Yukon First Nations reveals that to “respect” water is to engage in a manner consistent with the protocols or conventions required to maintain appropriate social relations, whether in relation to the spirit of a certain body of water or in reference to more general protocols for respecting water.¹⁰ These protocols and the oral traditions that inform them are the basis for Indigenous water laws that have existed for millennia (Borrows, 2002; Craft, 2017; Napoleon, 2013; Napoleon and Friedland, 2016).

¹⁰ Ethnographic documentation also indicates that for the Tagish and Inland Tlingit (C/TFN) “each major river has a personality and power of its own. Thus, those who do not belong to the sib claiming a particular river, must be very circumspect in their behavior while travelling on it. If they make loud noises or disrespectful remarks about the water, they will undoubtedly drown” (McClellan, 1975, p. 88).

Indigenous peoples have been governing the lands and waters within their territories since time immemorial, and Indigenous governance systems can be understood as dynamic legal orders, rooted in those traditions, while adapting to contemporary circumstances (Borrows, 2002; Napoleon, 2013). While Indigenous governance systems have been disrupted or constrained by settler colonial forms of governance, Indigenous peoples have enduring knowledge of such systems in practice and oral history (Borrows, 2002; Napoleon, 2013). Respect remains central to these. For example, during an interview conducted in 2012, one Elder from Carcross/Tagish First Nation discussed the importance of traditional governance structures, such as the clan system, for guiding respectful relations with water. This Elder noted, “The laws that we have for water are in the clan houses. Those kinds of things are important because we need to respect water” (Elder 7, C/TFN, 2012). Further, Victoria Watts notes (2013, p. 23), “non-human beings are active members of society. Not only are they active, they also directly influence how humans organize themselves into that society. The very existence of clan systems evidences these many historical agreements between humans and non-humans.” While Indigenous cultures are often seen as holding a value system that ought to be considered in settler governance processes (Nadasdy, 1999), ontologies are not external to governance. Critical Indigenous scholars show us how Indigenous ontologies, sovereignty and governance are linked through Indigenous thought and practice, which is guided by the principles of respect, relationality, responsibility and reciprocity (Coulthard, 2014; Coulthard and Simpson, 2016; Manson, 2015; Wilson, 2009). Denying the agency or subjectivity of more-than-human relations erases the role these entities play in practicing and knowing responsibility and in Indigenous sovereignty itself. Such practices are the engagement of a politics of kinship on the ground (Manson, 2015; Rifkin, 2010). Coulthard (2014) refers to these Indigenous decolonial principles and practice as *grounded normativity*, or

“the modalities of Indigenous land-connected practices and longstanding experiential knowledge that inform and structure our ethical engagements with the world and our relationships with human and nonhuman others over time” (Coulthard, 2014, p. 13). In other words, for Indigenous peoples’ water (and land) are understood not simply as a physical asset, but as a way of knowing (epistemology) and being (ontology) embedded in a universe of relations between human and non-human beings that can guide forms of governance and resistance. Through this lens, respect for water can be understood as a politics of kinship that is inextricably linked to Indigenous understandings of water and water governance. The following section explores the ontological politics of water governance in Yukon Territory, with a particular focus on how these are shaped by Modern land claims and Self-government agreements as well as the politics of kinship First Nations engage through respect for water.

2.5 The ‘Political Ontology’ of Water Governance in Yukon

Yukon First Nations play a substantive role in water governance in Yukon as the result of Modern land claims agreements. However, even a cursory analysis of water governance in Yukon Territory shows an approach to governance that reflects a fundamentally different view of water than that carried through the Elders’ articulation of “respecting water.” Water is widely referred to as a “resource” (e.g., Yukon Water Strategy and Action plan, 2014). Also, according to the Yukon Waters Act (2003a) “Water belongs to Government” (p. 3). While the idea that the Yukon Government “owns” the water is problematic from the perspective of Indigenous rights and jurisdiction, it also reveals the pervasiveness of settler colonialism and its buttressing ontologies – as “land [synonymous with water] is remade into property and human relationships

to [water],” restricting all views “to the relationship of the owner to his property.

Epistemological, ontological, and cosmological relationships to land are [thus] interred, indeed made pre-modern and backward. Made savage” (Tuck and Yang, 2012, p. 5). In the same vein, the “water rights of Yukon First Nations,” referred to in the UFA frames the relationship to water in relation to property rights, absencing all reference to water as an ethic of respect. It thus also undermines any charge to First Nations to recognize and enact their ethic of responsibility, to take care of water – a living entity to which they have kinship ties (Anderson et al., 2013; McGregor, 2014). Water is thus rendered a resource. Or, as Anishinaabe scholar Deborah McGregor states: “Water, in the dominant Western Euro-Canadian context, is conceptualized as a resource, a commodity to be bought and sold. Federal and provincial governments, therefore, make decisions about water based on a worldview, philosophy and set of values which stands in direct contrast to the views of First Nations people” (McGregor, 2014, p. 496). Following recent contributions by Indigenous scholars (e.g., Hunt, 2014; Tallbear 2011) who understand the suppression of Indigenous ontologies as a form of colonial violence, we argue, settler understandings of water as a resource in water governance engender significant violence through the constant impulse to separate humans from non-human relations.

Others have questioned the ontological politics of Indigenous-state relations in the Canadian North, including the ways settler ontologies and forms of governance permeate every element of co-management boards, shaped by land claims (e.g., Nadasdy 2003a; Natcher, Davis, and Hickey 2005; Stevenson 2006). Marc Stevenson contends that the relationships Indigenous peoples have with their lands, and in this case water, are rendered “virtually invisible” in co-management processes that are dominated by state management interests and processes (Stevenson, 2006).

Nadasdy (2012, 2017) also critiques the governance structures created by land claims in the Yukon, in his case for forcing Yukon First Nations to engage governance approaches that mimic state-led bureaucratic management. This is not only evident in the organization of co-management boards, but also in the way that First Nations are themselves organized in a post-land claims era. Indeed, to take on more responsibilities under their self-governance agreements, Yukon First Nations develop governing structures and legislation very different from traditional governance structures or logics, especially rooted in a politics of kinship. Natcher, Davis, and Hickey (2005) similarly discuss how Little Salmon/Carmacks First Nation's (Northern Tutchone) system of traditional laws known as *Doo'Li*, and which differently conceptualize human-fish relationships, contribute to 'hidden' conflicts in 'resource management' between settler and Indigenous populations. Co-management processes, write Natcher and colleagues, involve ontological differences, and colonial histories, related to what fish *are*. These differences are a "formidable obstacle to reaching consensus on management issues" (p. 245). The YWB and other co-management boards such as YESAB are mandated to assign traditional knowledge and science equal consideration in decision-making. However, such 'integration' is invariably reductionist, and rests on or reduces that knowledge to 'data' (e.g., fish counts conducted by Indigenous employees) useable in state management processes or in a court of law should it come to litigation (Nadasdy, 1999). This of course fails, deeply, to reflect First Nations' relationships to water because "government scientists and administrators expect expertise that conforms to their training (Natcher and Davis 2007; Nadasdy 2003), which in effect pushes Indigenous ways of knowing and Aboriginal and treaty rights to the side" (Bowie, 2013, p. 96). While there are ongoing calls to include traditional knowledge in "collaborative" water governance and decision-making processes rarely acknowledged is the importance of the

ontological framework within which such epistemologies are situated or the understandings of governance and laws that flow from them (Cf. McGregor 2012, 2014; N. J. Wilson 2014). Critiques of Indigenous-state relations in Yukon raise important questions about how First Nations' ability to influence decision-making processes is limited by the extent to which governance processes, institutions, and laws reflect their ontological perspectives and approaches to governance (Nadasdy, 2003a, 2017; Natcher et al., 2005; White, 2009b).

The limitations of such a system have resulted in three Yukon First Nations opting out of the land claim negotiations (i.e., White River, Ross River Dena Council and Liard First Nations). Elder 14 (2015) from White River First Nation, noted the shortcomings of this land claims in acknowledging Indigenous legal systems and authorities:

It's really important up here in our country, you know, to preserve that water and that's why one of the reasons [we didn't sign that land thing. We said,] nothing here gives us the power to say enough, huh? You know, because we're here to protect our land. We're stewards of the land. You know, we take care of our land, we take care of our animals we had. You know, the system that is in place on us today government-wise we had that system before you people, you know, Europeans came over here. We had it. We had our governance. We had our policies. We had everything down already. We're living by that.

In other words, White River First Nation and the Northern Tutchone and Upper Tanana Indigenous peoples that make-up the nation had a pre-existing Indigenous legal order through which they stewarded the land and water and that legal order is, in their view, neither acknowledged nor reflected by the governance arrangements resulting from Modern land claim agreements.

Several Elders from Yukon First Nations with land claims also expressed concerns that their relationships to water were not represented or protected through the governance approaches taken on their ‘behalf’ (including by their own First Nation government). They disagreed with the style of governance developed through land claims and with some of the decisions regarding resource development made by their governments (Elder 7, Elder 8, Harold Gatensby, and Colleen James, 2015). One Elder stated that “respect for water” cannot be achieved through government, but rather through stewardship or land/water-based practices that remind people of their responsibilities to water (e.g., ceremony) (Harold Gatensby). At the same time, many people from signatory First Nation governments (11 Yukon First Nations including C/TFN, KFN and THFN) see substantial power in the rights and authorities outlined in their agreements and express hope in the potential for implementing these agreements to protect water in a manner consistent with their relationships and the imperative to respect water. Our intention is neither to disparage the hard work that was put into land claim negotiations and the ongoing implementation of these agreements nor to understate the dramatic, and in many cases, beneficial changes that land claims and self-government brought about. Instead, we raise these critiques because they reflect debates occurring among and between Yukon First Nations and to highlight the importance of debates about the appropriateness of governance institutions and processes for improving water governance in Yukon.

While settler views of water structure the broader water governance landscape in Yukon, there remain opportunities through land claims and Self-government agreements for First Nations to improve and even change water governance regimes such that they become consistent with their relationships to water. Signatory self-governing Yukon First Nations (according to the Yukon

First Nations Self-Government Act (1994a)) can create or define their own laws and regulations on Settlement Land. Yukon First Nations are engaged in ongoing internal dialogue about developing or documenting their own water laws or policies. As of May 2013, Champagne and Aishihik First Nations (CAFN) have been developing a Water Strategy. Their strategy's draft vision statement reads, "CAFN Government and its citizens have a great and deep respect for water. It is a gift that sustains all life throughout the land. As long as the rivers flow, CAFN government and its citizens will promote the protection and conservation of water throughout the traditional territory" (2013, p. 1). Both THFN and C/TFN noted they are considering developing such a policy but are still early in the process. While CAFN's water policy remains in a draft format, it provides an example of how other First Nations are working to protect their relationships to water through their settler-state recognized powers as self-governing First Nations.

Although not specific to water, other examples from across Yukon demonstrate how First Nations are using these capacities to insert a politics of kinship. C/TFN Family Act (2006) reflects the clan-based origin of knowledge, the stories that encompass these, and the invocation of, literally, a kin or family based notion of relationality and respect. The Act also points to principles of traditional law that enshrine responsibilities within and between the human and nonhuman worlds, replacing the heretofore dominance of 'nature' or 'resources' and people with an ecology of relatives or kin. Specifically, the C/TFN Family Act states that the laws developed by C/TFN "give practical expression to our values and beliefs. Our laws are based on the values taken from our traditions and our stories" (Carcross/Tagish First Nation, 2006, p. 14). Just as respect guides relationships with water as well as other elements of the environment, it also

guides understandings of relations between human kin. The Tr'ondëk Hwëch'in Heritage Act (2016) also specifically refers to respect as a *Da'ole* or traditional law for the Hän Hwëch'in ("People of the River"). In articulating what their Elders' knowledge of culture and heritage, the Act notes,

'in a good way' means respect. That is our biggest law. Respect is the one that encompasses everything. When you go against doing things "in a good way," that is with respect, that's when *Da'ole* [traditional law] comes in. When we do things in a bad way, it is disrespect – meaning that you have gone against all the natural laws. You bring all the negative to yourself. It is the same concept as – the idea that what you put out there comes back to you. (Tr'ondëk Hwëch'in First Nation, 2016, p. 2).

The C/TFN Family Act and the Tr'ondëk Hwëch'in Heritage Act represent Yukon First Nations' efforts to re-engage traditional laws and values within the governance. These examples, as well as other land-based practices and ceremonies First Nations engage in, demonstrate the ways that Indigenous peoples are actively expressing a politics of kinship, grounded in understandings of proper relationships between humans as well as between humans and non-humans.

2.6 Ontological Pluralism and 'Refusing' Settler Views of Water

Decolonizing water governance such that water is indeed respected in the Yukon First Nations multifaceted sense of that work will also be necessarily rooted in views of water as a present agentive being within a network of relational or kincentric ties, responsibilities, and obligations. The many steps that might lead to that decolonization involve what Mohawk scholar Audra Simpson (2014) refers to as multiple nested forms of sovereignty. By this, she means that

Indigenous sovereignty is a constantly unfolding set of practices, rooted in relational politics, and existing within a settler state. Indigenous nations thus strategically engage with state conceptions of sovereignty, while seeking to assert forms of governance that people also consider consistent with their ontologies and epistemologies. For Simpson, Indigenous peoples are also necessarily engaged in a politics of refusal; they reject (in that refusing) the fiction of the settler state by avowing the viability of Indigenous forms of governance and insist that their governance not be subsumed within settler colonialism (e.g., swallowed up as “data points” to be integrated into a co-management plan). In this sense, we understand Yukon First Nations ongoing assertion of the need to “respect water” as a refusal of the concept of Modern Water itself, including the many associated ideas about water such as water as property and the governance arrangements that enact such assumptions.

It is not enough to simply discuss the limitations of the current system or show the many ways that Yukon First Nations continue to resist imposed ontologies, epistemologies and modes of governance. Rather, water governance arrangements in Yukon and Indigenous-state relations more broadly require a fundamental shift towards a nested sovereignty. Political ecologists have called for the development of water governance systems characterized by legal pluralism to address how colonial laws and institutions destabilize and distort the functioning of Indigenous management institutions (See Bassi, 2010; Boelens et al., 2007; Boelens and Vos, 2014; D’Andrea, 2012; Gupta et al., 2014; Zwarteveen et al., 2005). Our analysis builds on this literature to highlight the need for a commitment to ontological pluralism that actively acknowledges and supports governance practices that differ from those engaged by settler colonialism (Collard et al., 2015, p. 328). Elsewhere, Wilson (2014) calls this hydrosocial

multiplicity, to acknowledge the need to re-affirm Indigenous laws, customs, epistemologies, and ontologies about water. Building on Indigenous ontologies, epistemologies and legal orders, this requires decentering human agency and recentering the agency of more-than-human persons (Todd, 2014) to develop alternate modes of governance that might overcome current imbalances in the ontological politics of water. This will necessarily involve not just invocations of respect or deference on the part of settler bureaucrats. It means rethinking the very agency of all beings and thinking of water as a living entity deserving of many things. Furthermore, it means thinking of water as kin with its histories enlivened in the landscapes it carves and the people it holds, past and future.

Any such ontological pluralism also necessarily requires a fundamental rethinking of governance including the values, decision-making processes and institutions that are involved in such a system. Modern Water is rooted in scientific rationalism, which is an ontologically monistic perspective or one where there is a singular knowable material world or truth out there. And if a metaphysical dimension exists, that existence is framed as an inert material space onto which people project their values and beliefs. Thus, a further aspect of decolonizing water is the devolution of control over water governance to Yukon First Nations themselves (Nadasdy, 1999, 2003b). However much “government managers are reluctant to devolve true authority to local levels” (Natcher and Davis, 2007, pp. 273–274), this must remain a serious mandate. Current managers may doubt that First Nations have a sufficient understanding of the environments within their territories to develop functioning governance processes, but why not follow Natcher et al. (2005) and conclude that the ultimate success of co-management schemes will depend on members’ ability to engage rather than subvert their differences? The success of contemporary

regimes is dubious at best from a Yukon First Nations point of view, whereas the possibilities are many if the very essence of what water is and means is engaged.

Another option would be to shift from the co-management of water, dominated by settler views of water and modes of governance, to Indigenous-led modes of governance and co-governance rooted in a politics of kinship and respect for water. Indigenous scholar and lawyer (Anishinaabe-Métis) Aimée Craft (2017) asks what Indigenous water law or the *Anishinaabe nibi inaakonigewin* (“our water law”) might contribute to improving decision-making about water? While noting that all legal traditions emphasize rights, obligations, and responsibilities and most often include reciprocal and bilateral rights and obligations (between the individual and the state), she theorizes that Anishinaabe water law differs from other legal traditions in that it is “focused primarily on responsibility, rather than rights, and that it is multi-layered, multi-dimensional and sources from relationships among beings (human and non-human)” (Craft, 2017, p. 107). Through this lens, we understand Indigenous water law as an ontologically pluralistic approach to governance that acknowledges the status, rights, and privileges of more-than-humans that are equal to humans and ensure those benefits are recognized and protected. Calls for legally pluralistic water governance systems often assume that Indigenous ontologies, epistemologies and legal traditions are only relevant at the local scale and questions about whether and how these principles and institutions can be scaled-up to regional or national levels, are rarely posed (Merrey, 2009). If it is the case that Indigenous water law tends to centre on the inclusion of all relations and perspectives, governance arrangements built on Indigenous law and institutions might not only better reflect Indigenous epistemologies and ontologies, but perhaps

also better serve the collective good through engaging pluralist perspectives rather than those rooted in scientific rationalism, private property and individualism.

This logic might also extend to the concept of water rights and the governance of such rights, which transform water into a property that is owned by a human. Instead, decentring the role of humans in water governance involves acknowledging the rights of water itself. The *Te Awa Tupua* (Whanganui River Claims Settlement) represents a promising legal precedent of this kind. In that landmark case, Whanganui Maori iwi (kin group) won a 140-year legal battle to recognize their ancestral [Whanganui] river as having *personhood* and thus legal rights equal to that of humans (Salmond, 2014). Acknowledging the rights of rivers takes the legal and governance idea of water as a more-than-human person seriously. At the same time, this approach also raises essential questions about who can speak on behalf of nature or a body of water and what it would mean to practice respect in this context. At the very least, it complicates concepts of governance as it calls into question the ability of humans to govern or act on behalf of water. It may even call into question the extent to which water as a more-than-human is even “governable” (Todd, 2017).

2.7 Conclusion

In this paper, we explore the ‘political ontology’ of water and water governance in the context of the settler colonial context of the Canadian Yukon. Our findings suggest that taking Indigenous ontologies seriously involves more than a simple exploration of what settler colonial society can learn from Indigenous peoples’ views of their relationships to water. Instead, to avoid

reproducing colonial ontological and epistemic violence, rethinking the ontological politics of water necessarily involves meaningful consideration of Indigenous thought and practice, including legal and governance elements, in light of settler colonialism. Therefore, following Hunt (2014) and Watts (2013) we engage with Yukon First Nations calls to “respect water” as more than a source of ideas that can be drawn on, but as a complex body of knowledge that is living and practiced by Indigenous peoples with whom we share reciprocal responsibilities. We engage with First Nation calls to “respect water” as an Indigenous ontology that informs Indigenous approaches to governance, acknowledging Yukon First Nation relationships to water as more-than-human as a “concrete site of political and legal exchange that can inform a narrative that de-anthropocentrizes current Indigenous-State discourses” (Todd, 2014, p. 222). We understand “respect” for water as a politics that insists on the viability of Indigenous forms of governance and refuses to have their forms of governance subsumed by that of settler colonial society. Finally, in the quest to decolonize water and water governance, we ask how “respect for water” might contribute to rethinking current water governance arrangements in Yukon through devolving water governance to Indigenous control or shifting towards an Indigenous-led model of governance based on Indigenous laws and governance.

Chapter 3: Querying Water Co-Governance: Yukon First Nations and Water Governance in the Context of Modern Land Claim Agreements

Summary

Colonial governments around the world have been slow to share substantive decision-making power with Indigenous governments. Consequently, few examples of functioning water co-governance systems – where Indigenous and settler governments work together to share authority for water on a nation-to-nation basis – exist. Many questions remain about how to realize co-governance in practice within multi-level water governance systems where different levels of government have overlapping responsibilities and jurisdiction; and where Indigenous and settler legal systems and values often conflict. Through research conducted in partnership with four Yukon First Nations (Carcross/Tagish, Kluane, Tr’ondëk Hwëch’in and White River First Nations), this paper explores the co-governance of water in Yukon Territory, Canada. While debates around shared decision-making in Yukon have frequently been framed in terms of “co-management,” this work contributes to the co-governance literature through a broader assessment of the governance system created by Modern land claim and Self-government agreements, which outlines specific legal authorities and the creation of co-management institutions to implement these authorities. Analysis reveals that while Yukon First Nations have experienced significant gains in capacity as the result of these agreements, water governance in the territory remains highly contested. Water co-governance could be improved through expanded acknowledgement of First Nation jurisdiction; procedural rights for water governance

arrangements to reflect their ontologies, epistemologies, and forms of governance; and the barriers to implementing existing agreements. A reconsideration of the language and meaning of consent is also discussed as a means for improving co-governance.

3.1 Introduction

Indigenous peoples have been governing the waters and lands within their territories since time immemorial and these systems of governance have shifted over time, including important disruptions by colonial processes and dispossession.¹¹ Nonetheless, knowledge of such systems endures in practice and oral history (Borrows, 2002; Napoleon, 2013). These communities have historically and continue to be excluded from colonial government frameworks for water governance (Bakker et al., 2018; Phare, 2009; Sam and Armstrong, 2013; Simms et al., 2016; Walkem, 2005). The degradation of water quality, quantity and rates of flow in Indigenous territories due to resource development (mining, oil and gas, hydro-electric development), urbanization and agriculture (Babidge, 2015; Boelens et al., 2010; Martin and Hoffman, 2008) have had significant material and socio-cultural consequences for Indigenous peoples and their sacred relationships to water (Hidalgo et al., 2017; LaBoucane-Benson et al., 2012). In response, Indigenous peoples are increasingly articulating principles and relationships for Indigenous water governance (e.g., Babidge, 2015; Barbera-Hernandez, 2005; Boelens et al., 2012; Boelens and de

¹¹ The term Indigenous refers to those communities that claim a historical continuity with their traditional territories (Corntassel, 2003). It is used as an inclusive term to refer to Canada's First People including First Nations, Inuit and Métis peoples.

Vos, 2006; Cremers et al., 2005; Getches, 2005; Morgan et al., 2004; Perreault, 2008; Sam, 2013; Thorson et al., 2006; Toussaint et al., 2005; Walkem, 2007).¹²

Indigenous peoples are frequently engaged in collaborative water governance processes. Collaborative processes, developed to replace top-down and adversarial modes of policy making and governance, are implemented by bringing public and private stakeholders together in shared decision-making processes (Ansell and Gash, 2008). However, collaborative governance frequently fails to acknowledge Indigenous peoples substantive water rights and authorities by engaging them as “stakeholders” rather than governments (von der Porten and de Loë, 2013a). These governance arrangements tend to reinforce existing colonial relationships as one jurisdiction, generally, a colonial government, holds all decision-making power and delegates prescribed administrative activities to the others (Simms et al., 2016).

The co-governance of water, an alternative to collaborative governance processes that explicitly acknowledges Indigenous rights and authorities, is increasingly called for (Bowie, 2013; Feit, 2005; Simms et al., 2016). Co-governance between Indigenous and colonial governments proposes that both parties share authority on a nation-to-nation basis and where Indigenous peoples have explicitly agreed to share authority with non-Indigenous people (Kotaska, 2013a; Simms, 2014; P. Wilson, 2014). There are many questions about how to realize co-governance in

¹² Water governance refers to the set of regulatory processes, mechanisms and institutions through which political actors, including communities, influence environmental decisions, actions and outcomes (Bakker, 2003a). Indigenous water governance relates to Indigenous peoples inherent right to self-determination, which includes the power to make decisions, based on Indigenous law, epistemologies and ontologies to protect water for all forms of life as well as present and future generations (Phare, 2009).

practice within multi-level water governance systems. Varying levels of government have overlapping responsibilities, fragmented jurisdiction and contested control, conflicting values and differing legal systems and sources of authority (Phare et al., 2017).

In the Canadian context, settler governments have been slow to acknowledge Indigenous water rights and to share substantive decision-making power and jurisdiction, thereby perpetuating colonial power imbalances (Phare, 2009; Simms et al., 2016).¹³ Indeed, colonial water governance is predicated on the assumption of “Crown” ownership or jurisdiction over all ground and surface water and, in all cases, provincial and territorial governments maintain control over decisions related to water use and access (Boyd, 2003). While evolving legal frameworks around Indigenous rights and title have the potential to advance Indigenous water governance and co-governance (Borrows, 2002; Hlevca et al., 2014; Phare, 2009, 2011; Simms et al., 2016), Modern land claims in the Canadian North represent the only examples where Indigenous water rights have been explicitly acknowledged in Canada.

Co-management boards, created through land claims form part of the water governance system, have been the subject of an extensive body of research (e.g., Nadasdy, 2003a; Natcher et al., 2005; Stevenson, 2006). This paper instead seeks to advance the theory and practice of Indigenous-state co-governance of water, by examining a case study of the multi-level water governance system of Yukon Territory. It explores not discrete co-management arrangements

¹³ The question of whether water rights are part of Aboriginal title to land has not yet been settled in Canadian courts. Aboriginal rights to water have never been explicitly recognized or disproven through the courts in Canada (Laidlaw and Passelac-Ross, 2010; Phare, 2009).

(e.g., Yukon Water Board), but instead the nested form of governance, jurisdiction, and authority that exists in the North from the perspective of four Yukon First Nations (Carcross/Tagish, Kluane, Tr'ondëk Hwëch'in and White River First Nations). My aim is to emphasize co-governance such that it includes the broad array of the actors and institutions involved in decision-making about water, in Yukon. I critically analyze whether this system, with the many substantive and positive changes it has introduced, has gone far enough to advance the decolonization of water governance through the acknowledgement of Yukon First Nation water rights and authorities in water governance. I discuss the gains in capacity and authority experienced by Yukon First Nations in water governance as a result of land claim and Self-government agreements. I then explore Yukon First Nations' critiques of the system including distrust rooted in colonial histories, concerns about limitations in authority and jurisdiction, challenges around the implementation of agreements, and failing to meet procedural rights as current governance arrangements and institutions fail to reflect Indigenous systems of governance and law. Finally, I consider the potential for a collaborative consent model to improve water-related co-governance in Yukon.

3.2 Research Setting

In 1993, following a twenty-year process of treaty negotiation, First Nations agreed to retain Aboriginal rights and title to Settlement lands, which represent less than 10 percent (41,595km²) of the lands within their traditional territory in exchange for partnership in the governance of all

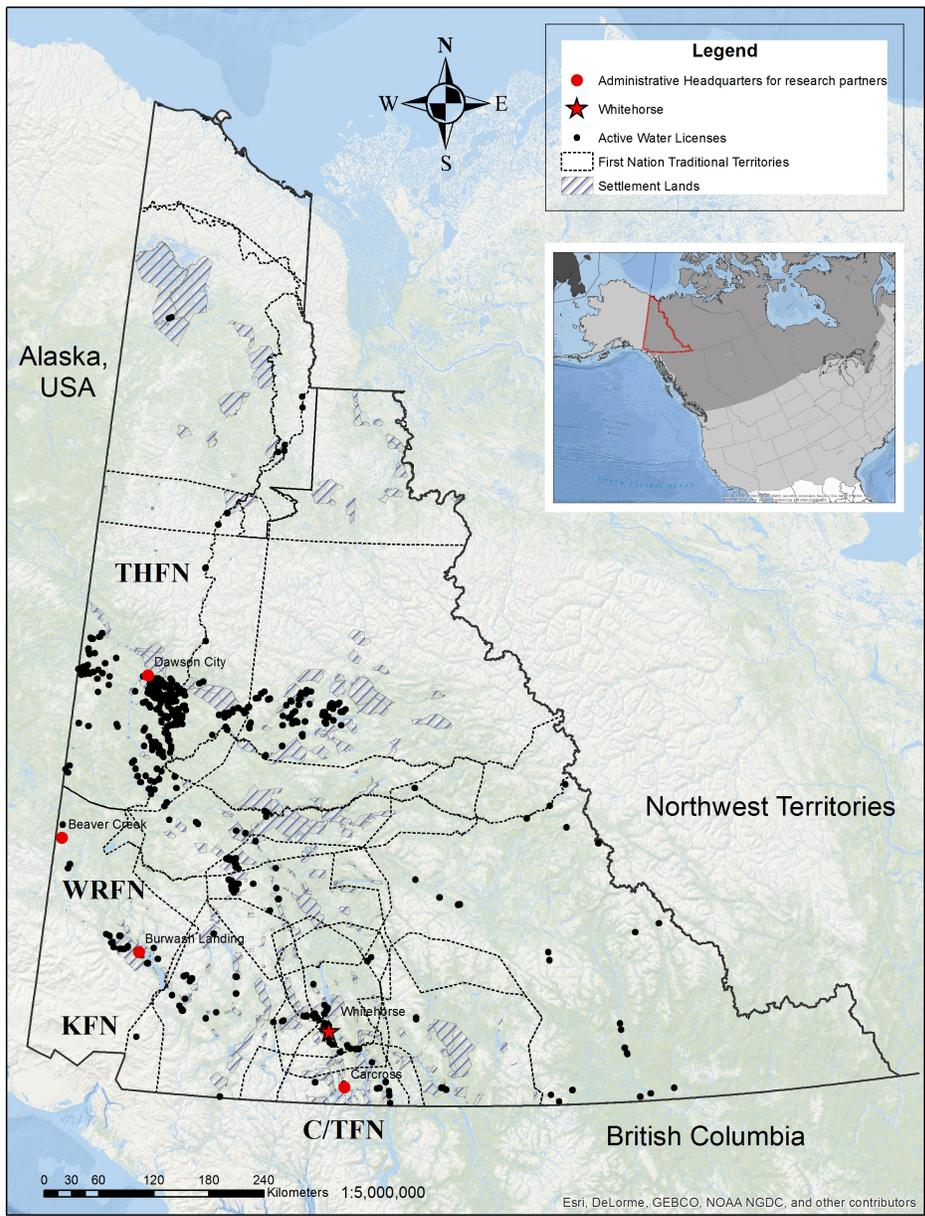
Yukon lands and resources including water (Figure 3.1). The Umbrella Final Agreement (UFA) (1993) created a framework to negotiate Modern land claims in Yukon.¹⁴

Modern land claim and Self-government agreements are tripartite agreements between a First Nation, the Government of Canada and Yukon Government. The purpose of these agreements is fivefold: to encourage reconciliations between Yukon First Nations and settler governments, and provide a basis for lasting relationships between these governments; to promote community-level decision-making and First Nation self-determination; to protect First Nations ways of life, based on spiritual and economic relationships with the land; to achieve certainty with respect to ownership and use of land and resources to create a stable environment for investment; and to provide First Nation governments and local communities with financial benefits and economic opportunities (Mapping the Way, 2016). Three Yukon First Nations, including White River First Nation, Liard First Nation and Ross River Dena Council ratified the UFA, but ultimately opted out of land claims.¹⁵

¹⁴ Modern Land claims in Yukon are classified as Comprehensive land claims because they are based on the assertion of Aboriginal rights and title that have not to date been the subject of treaty or other legal means (Hurley, 2009). In 1982, “existing and aboriginal treaty rights” gained protection under Section 35 of the Constitution Act (1982). The Constitution Act was amended in 1983 to explicitly extend protection to the rights acknowledged within Modern land claim agreements (subsection 35(3)) (Hurley, 2009).

¹⁵ These First Nations retain Aboriginal title to their traditional territories and remain Indian Bands under the federal *Indian Act* (1985) (Yukon Government, 2016). Since 2014, White River First Nation, Kaska Dena Council and Liard First Nation, have been negotiating reconciliation agreements with Yukon Government aimed at taking a proactive approach to relationships between these governments in the absence of comprehensive land claims agreements. These agreements will address shared priorities including consultation and resource management processes; economic and capacity development; and revenue sharing. Negotiation is ongoing. These agreements have the potential to clarify unsigned First Nations’ roles in decision-making about water and to increase their capacity to participate in decision-making by creating access to some of the opportunities that signatory First Nations have had, without the high cost of surrendering Aboriginal title to their territories (Alcantara, 2008).

Figure 3.1 Map of Yukon depicts the nested governance system, where First Nations maintain title and greater water rights on Settlement Lands but continue to have a say in water governance within their broader and overlapping traditional territories. This map also illustrates the distribution of active water licenses across Yukon First Nation Traditional Territories and Settlement Lands. The vast majority of these water licenses granted to mining operations (placer mining operations ~68 percent and hard rock mining ~2 percent).



Land claim and Self-government agreements acknowledge Yukon First Nations as an order of government in Canada with jurisdiction over clearly defined territories.¹⁶ They describe the nature of government-to-government relations among signatory governments, and grant Yukon First Nations the powers of self-government including: a role in the management of lands and resources upon which their people have long depended (e.g., through co-management boards). As a result, First Nation governments in Yukon and across the Canadian North have emerged as significant players in regional politics including water governance processes. Present governance arrangements represent a significant and positive change from previous arrangements, that failed to acknowledge First Nation water rights as well as life under the colonial federal Indian Act which provides for almost no say either in their own governance or in the management of their lands and resources (Nadasdy, 2017). Indeed, the conclusion of land claim and Self-government agreements in Yukon has been called a “monumental achievement” (*Beckman v. Little Salmon/Carmacks First Nation*, 2010 SCC 53, [2010] 3 S.C.R. 103, 2010) and these agreements have without a doubt facilitated a significant shift in Indigenous–state-relations in this context.

Land claim agreements (“final agreements”) uniquely shaped the multi-level water governance system of Yukon Territory, where Yukon First Nations have nested degrees of rights and

¹⁶ Self-governing Yukon First Nations are responsible for resource management and land use planning on Settlement lands throughout Yukon. Through these responsibilities, Yukon First Nations have a range of authorities including legislative authority to enact laws pertaining to their Settlement Lands. These First Nation laws and decisions can supersede Federal or territorial legislation. In Yukon, this is enabled through the Yukon First Nations Self-Government Act (1994a). Self-government agreements acknowledge that First Nations are governments rather than bands under the Indian Act (*Indian Act, RSC 1985*). For a more detailed account of First Nation self-government arrangements in Canada see Coates and Morrison (2008) and Morse (2008). These agreements do not contain a comprehensive account of jurisdictional arrangements. Instead, they tend to list those areas of governance over which First Nations can assume control and the process for doing so if they choose to do so.

authorities to influence decision-making. Chapter 14 of the UFA and individual land claim agreements specifically address ‘water management’ and acknowledges signatory First Nations’ water rights. Chapter 14 also made the Yukon Water Board into a co-management board with one third First Nations representatives appointed by Council of Yukon First Nations. Water also plays a substantial role in decision-making processes of other co-management boards, such as the Yukon Environmental and Socio-Economic Impact Assessment Board (YESAB). Furthermore, through the powers of self-government, Yukon First Nations can create laws to better assert their Chapter 14 rights to protect water quality, quantity and rate of flow for waters on or adjacent to Settlement Lands. By explicitly acknowledging First Nation water rights, these agreements represent a clear shift in water governance, and more broadly Indigenous-state relations in the territory. They create opportunities for First Nations to better protect the waters within their territories through both the creation of co-management processes for shared decision-making about water and the authority to govern waters on Settlement Lands.

Even with this shift, colonial water laws nonetheless remain central to water governance in Yukon. Chapter 14 of the UFA outlines the management powers of the Yukon and Federal governments. Although it may seem contradictory, it acknowledges settler water laws as “laws of general application” that apply equally to all lands in Yukon including Settlement Lands.¹⁷ A review of the history of water law in the Yukon shows no substantial changes to water laws have been made since land claim and Self-government agreements were enacted (Table 3.1). Even

¹⁷ Chapter 4 of this dissertation discusses the potential for self-governing Yukon First Nations to create Indigenous water laws that would supersede territorial water legislation. Indigenous water laws would therefore replace the Yukon Water Act as a “law of general application.”

through the process of Devolution (2003) – where the Federal government transferred authority for lands and resources to Yukon Government – the new territorial Yukon Waters Act and Regulations (2003a) only “mirrored” previous legislative language meaning there were no substantial changes made to the Act. “Crown” jurisdiction over water was simply downloaded from the Canadian federal government to the Yukon territorial government.

Table 3.1 Timeline outlines evolving legal and policy framework affecting Yukon First Nation roles in water governance. While Yukon First Nations were historically excluded from water governance processes as the result of colonization, land claim and Self-government agreements as well as evolving legal frameworks around First Nation consultation have made it such that First Nations play substantive roles in water governance in the territory.

Date	Description of Event
Time Immemorial	Precolonial Yukon First Nation water laws and use were in place for millennia.
1876	The Indian Act comes into effect in Canada.
1896	Industrial water use begins when the Klondike Gold Rush brings thousands of gold-seekers to the Yukon.
1902	Chief Jim Boss (Kashxóot), hereditary chief of the Ta’an Kwäch’än petitioned the Government of Canada to recognize and protect his people and their lands.
1972	Northern Inland Waters Act (federal) established a legal regime for water licensing and created The Yukon Water Board to achieve the objectives of the Act.
1973	A delegation of Yukon First Nation Chiefs presented prime minister Pierre Trudeau with “Together today for our children tomorrow”, which initiated the formal land claims process.

1985	Navigable Waters Protection Act (federal) created.
1992	Yukon Waters Act and Regulations (federal) created to streamline the water licensing process.
1993	Umbrella Final Agreement signed, creating a framework for negotiating individual Yukon First Nation Final and Self-Government Agreements.
1995	Final and Self-Government Agreements signed between the Yukon government, federal government and the “first four” Yukon First Nations (Na-Cho Nyak Dun, Champagne Aishihik, Teslin Tlingit Council and Vuntut Gwitchin First Nations).
1997	Little Salmon/Carmacks and Selkirk First Nations complete final and Self-government agreements.
1998	Tr’ondëk Hwëch’in First Nation final and Self-government agreements
2002	Ta’an Kwäch’an Council final and Self-government agreements.
2003	Kluane First Nation completes final and Self-government agreements
2003	Devolution takes effect. The federal government delegates Crown jurisdiction or authority for land and waters to Yukon government.
2003	Yukon Waters Act and Regulations (2003) (Yukon) created through “mirror legislation” (no substantial changes).
2005	Kwanlin Dün First Nation final and Self-government agreements.
2006	Carcross/Tagish First Nation final and Self-government agreements.

2012	Navigation Protection Act – Formerly Navigable Waters Protection Act (federal).
2014	Yukon Government releases water strategy, “Water for Nature, Water for People.”
2014	The Supreme Court of Canada affirms Aboriginal land title for Tsilhqot’in First Nation in <i>Tsilhqot’in Nation v. British Columbia</i> . Many anticipate that this decision will have critical implications for Aboriginal title to water.

Thus, however much First Nations’ roles in water governance are defined more explicitly in Yukon than elsewhere in Canada, water conflicts abound as the impacts of resource extraction and other environmental changes encroach on First Nations relationships to water and their ability to assert their sovereignty according to these relationships and responsibilities. In 2012, Community-Based Research conducted with my Yukon First Nation research partners (Carcross/Tagish First Nation, Kluane First Nation, Tr’ondëk Hwëch’in First Nation and White River First Nation) identified many concerns about water quality, quantity and flows within their traditional territories. These include the combined impacts of climate change, mining exploration and development, infrastructure (e.g., sewage lagoons and landfills), hydro-electric development including potential new hydro projects and upgrades to existing facilities (e.g., Yukon Energy’s proposed project to raise the winter water levels on the Southern Lakes), and legacy sites (e.g., contaminated sites such as those associated with past military activity such the construction of the Alaska Highway and legacy mines such as Faro mine) (Wilson et al., 2013a, 2013b, 2013c, 2013d). Indeed, the cumulative impacts of climate change and other anthropogenic stressors have resulted in biophysical changes including quantifiable levels of contaminants in surface waters and fish tissues, disease in human and fish populations, changes in surface water hydrology and

shifts in biogeochemical loads in the Yukon River Basin (Dubé et al., 2013b, 2013c, 2013a; Toohey et al., 2016).

Yukon First Nations identified mining impacts as a top priority (Wilson et al., 2013a, 2013b, 2013c, 2013d). Mining is the predominant industry in Yukon. As identified in Figure 3.1 (above), the vast majority of the water licenses in Yukon are granted to mining operations (placer mining operations ~68 percent and hard rock mining ~2 percent). Specific impacts to water quality include the impacts of chemicals used in hard rock mining processes, acid rock drainage, and increased sediments released by placer mining operations (Nahir et al., 2006; Richards, 2009). While low population density and the limited presence of industries such as agriculture curb the demand for water in Yukon, there are specific contexts where water quantity and flows are of concern. For example, THFN recently conducted a study of the cumulative impacts of mining operations on water quantity in some heavily impacted watersheds within their traditional territories. Their analysis shows that the total amount of water allocated to placer mining operations is greater than the total flows in the watershed. In other words, if all of the placer operations in these watersheds were to withdraw the total volume of water they are allocated through their water licenses it would completely dewater the stream (Summit Environmental Consultants Inc., 2014).

The goal of this research is to better understand the nature of water conflict in Yukon and the ability of Yukon First Nations to assert their Chapter 14 water rights to bring about real change in decision-making about water in Yukon today. It is not the purpose of this paper to provide a comprehensive overview of the biophysical impacts of mining on water in Yukon. However,

Yukon First Nation concerns about mining are central to water conflict in Yukon and, therefore, fundamentally motivate this research. In response, I ground this analysis of Yukon First Nation roles in decision-making processes specific to water and mining including mine approval, operation and closure.

3.3 Research Methods and Approach

This study draws on Community-Based Research conducted between 2012 and 2017 with four Yukon First Nations (Carcross/Tagish, Kluane, Tr'ondëk Hwëch'in and White River).

Between 2012 and 2017, interviews were conducted with thirty-three Yukon First Nation government employees and nine other waters experts from Yukon Government, YWB and YESAB (Table 3.2). Working closely with First Nation governments and their staff, thirty-three Elders were recruited to participate in interviews. Elders were given honoraria of (\$100 to \$200) to acknowledge their expertise and to thank them for sharing their time and knowledge.

Although using the names of Elders and other experts can be understood as a form of citation, the names of Elders are not used in this work following Yukon First Nation's Traditional Knowledge Policy requirements for confidentiality (Carcross/Tagish First Nation, 2009; Kluane First Nation, 2012a; Tr'ondëk Hwëch'in First Nation, 2012).

Table 3.2 Overview of interviews conducted with Elders, representatives from four Yukon First Nation Governments (Carcross/Tagish First Nation, Kluane First Nation, Tr’ondëk Hwëch’in First Nation and White River First Nation), and other water experts.

First Nation	C/TFN	KFN	THFN	WRFN
Agreements	Final (2005a) & Self-government (2005b) agreements	Final (2003a) & Self-government (2003b) agreements	Final (1998a) & Self-government (1998b) agreements	No treaty. Reconciliation agreement in progress
Languages Spoken*	Tlingit and Tagish	Southern Tutchone	Hän Hwëch’in “People of the River”	Northern Tutchone and Upper Tanana
Citizens**	633	154	770	247
Elders	7	6	9	5
Total Elders	27			
First Nation Government	5	13	8	7
Total First Nations	33			
Other Expert	9			
TOTAL	69			

* All partner Yukon First Nations, except C/TFN, belong to the Athabaskan-language group. Tagish Athabaskan peoples were the original inhabitants of the area. This region later became home to Inland Tlingit peoples who traveled to the area from Southeast Alaska for reasons of trade about 200 to 300 years before contact.

** Statistics compiled by Council of Yukon First Nations Self-Government Secretariat based on 2011 National Health Service data. WRFN recognizes 247 members, while only 149 of these are registered under the Indian Act. <http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/aprof/index.cfm?Lang=E>
<https://sgsyukon.ca/infographics/demographics/>

Several interview participants were interviewed more than once to gain insight on how things had changed over time. Interviews were transcribed and thematically coded using Nvivo.

Interviews with multiple actors (Elders, First Nation governments, Yukon Government and Co-Management Boards) and analysis of policy documents is used to triangulate research findings

including looking for points of convergence, complementarity and divergence or dissonance (Nightingale, 2009). In 2017, research results were shared with and validated by participating First Nations through discussion at community presentations and discussion of plain language reports. Finally, all interview audio and transcriptions were returned to First Nation archives.

3.4 Results & Discussion

This case study examines the ways that Modern land claim agreements have shaped water governance arrangements in Yukon Territory. While Yukon First Nations have experienced significant gains in capacity as the result of Modern land claim agreements, which outline specific legal authorities and the creation of co-management institutions to implement these authorities, these agreements do not go far enough to acknowledge First Nation authority and water governance in the territory remains highly contested. Research findings suggest that water governance could be improved through expanded acknowledgement of First Nation jurisdiction, addressing First Nation procedural rights within water governance arrangements to reflect their ontologies, epistemologies and forms of governance; and addressing barriers to implementing existing agreements.

3.4.1 Multi-level Water Rights and Authorities

A close examination of how water licenses (e.g., for mining) are granted or rejected illuminates the potential for First Nations in water governance, and the capacities for governing realized through these arrangements. Yet, it also demonstrates the limitations of the Indigenous water

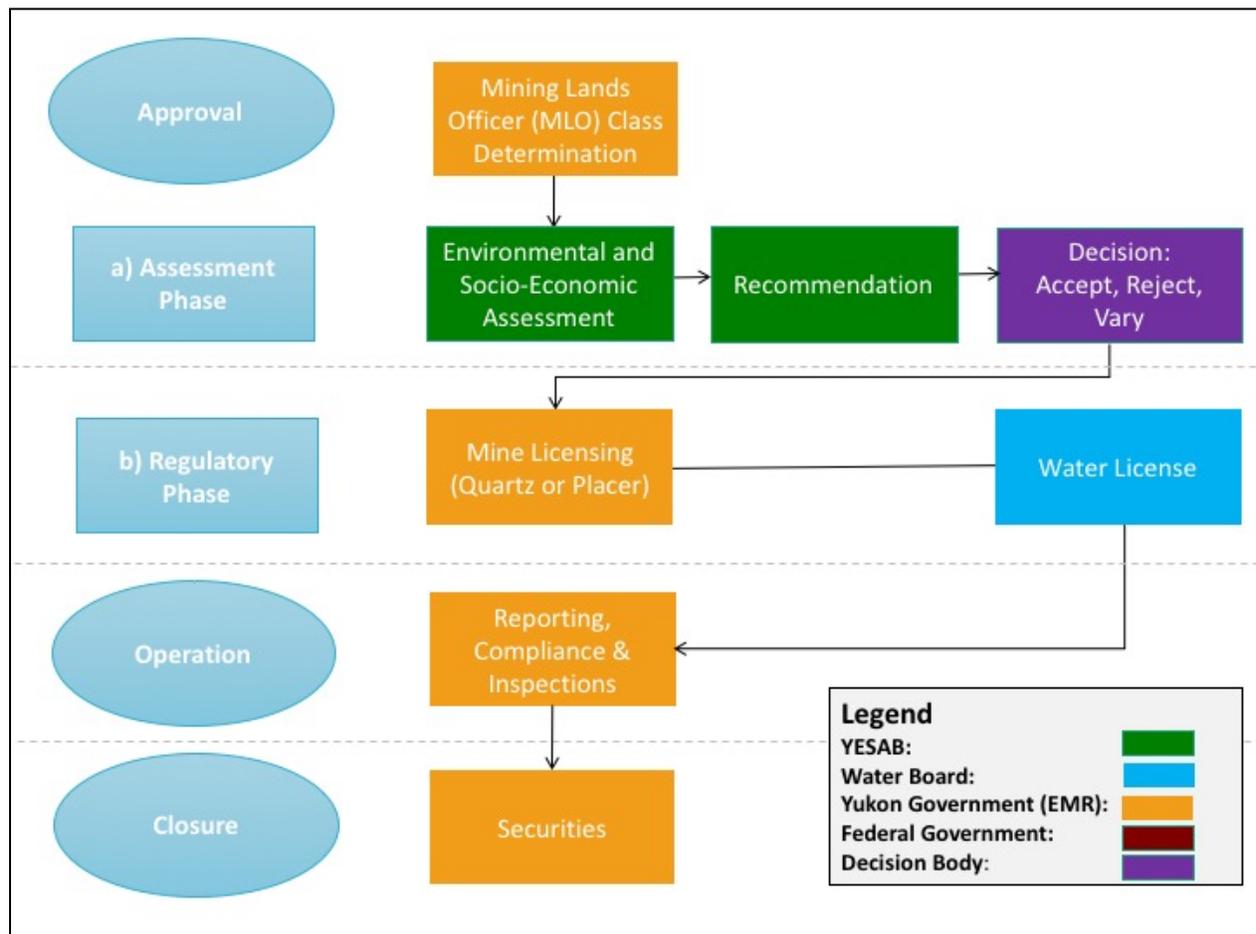
rights acknowledged in these agreements in terms of decision-authority and jurisdiction over the waters within their territories. Chapter 14 explicitly structures shared decision-making for water in the Yukon and includes designation of legally-binding authorities over water rights that must be acknowledged in all decision-making processes. Specifically, it states that a signatory Yukon First Nation “has the right to have water, which is on or flowing through or adjacent to its Settlement Land, remain substantially unaltered as to quantity, quality and rate of flow, including seasonal rate of flow.”¹⁸ Furthermore, First Nations also have the right to “Traditional Use” of water both on and off Settlement Lands, defined as “the Use of Water, without substantially altering the quality, quantity or rate of flow, including seasonal rate of flow, by a Yukon Indian Person for trapping and non-commercial Harvesting, including transportation relating to such trapping and Harvesting or for traditional heritage, cultural and spiritual purposes” (Government of Canada et al., 1993). The distinction between categories of land has meant, however, that First Nations have much more authority in relation to water on Settlement Lands than they do in their broader Traditional Territories. Finally, Chapter 14 does not include the creation of a quantified water reservation for Yukon First Nations.¹⁹

¹⁸ Other comprehensive Modern land claims in the Canadian North contain similar language. For example, NWT First Nations including the Gwich'in (1992), Sahtu Dene & Métis (1993), Tlicho agreements (2003).

¹⁹ Yukon First Nation final agreements do not include a water reservation or a right to a specified quantity of water. Comprehensive land claim agreements including the Nisga'a (2008), Tla'amin (2016) and Yale First Nation (2012) Final Agreements all contain specified water reservations (e.g., the Nisga'a Final Agreement created a 300,000 cubic decameter water reservation). These water reservations are similar to Tribal Reserved Waters rights through the *Winters Doctrine* in the United States, which recognized that surface and groundwater rights were implied by the establishment of American Indian reservations (Shurts, 2000).

Chapter 14 is the basis for decision-making about water in the territory across multiple stages of assessment (conducted by YESAB) through regulatory approval (YWB). Together these outline the terms for water use, which are subject to monitoring and inspection during operation (Figure 3.2). Notably, Chapter 14 rights can be exercised in distinct ways in each phase of the process. Descriptions of these stages and First Nations’ potential influence follow below.

Figure 3.2 Water governance system can be depicted through the multi-stage process of decision-making about water and mining in Yukon, which includes mine approval, operation and closure. Yukon First Nations can assert their Chapter 14 rights throughout each phase of this process.



3.4.1.1 Assessment Phase: YESAB

Consideration of impacts to water forms a significant part of both the Yukon Environmental and Socio-Economic Assessment Act (YESAA) and water licensing processes in Yukon, but First Nation participation and authority in each of these processes is distinct. YESAA (2003c) (mandated through Chapter 12 of the UFA) outlines the process for assessing potential environmental and socio-economic effects of development projects: a process conducted by the co-management board (one third First Nation representation): Yukon Environmental and Socio-Economic Assessment Board (YESAB). YESAB reviews the submission for completeness, advertises the project and solicits comments from the public, relevant government departments, regulators, First Nations and other affected parties. YESAB requires that applications include a minimum of one-year of baseline data and proponents are required to outline mitigation measure for potential impacts to water. Consultation occurs entirely through a “paper exercise” and comments are collected in a publicly available online forum. After review, YESAB releases an assessment for the project that includes its opinion on probable impacts, suggestions for mitigation measures, and a recommendation to the relevant government decision body as to whether the project should be allowed to proceed, and under what conditions. YESAB is not a decision-body, but rather plays an advisory role as it assesses projects and makes recommendations. Decision authority or the ability to “accept,” “reject” or “vary” YESAB recommendations rests with the relevant government(s) or the “decision body” who may set conditions for the project. Decision bodies include First Nations (when an assessable project occurs on or adjacent to Settlement Lands), the federal government and/or the Yukon Government.

First Nations exercise their Chapter 14 rights in the YESAA process by citing impacts to water quality, quantity or rate of flow on or adjacent to Settlement Lands or to Traditional Use. There are many examples, however, where development applications for mines were approved through YESAA despite First Nation opposition, even where Chapter 14 rights are asserted. There are also cases where a First Nation has influenced the YESAA process through asserting their Chapter 14 rights. For example, the YESAA assessment of Haggart Creek (Class 4 Placer Mine) (License number 2015-0150) provides one example: The Na-Cho Nyak Dun First Nation (NNDFN) commented on the application and acted as a decision-body. In their decision document, NNDFN stated that they were rejecting the placer mining operation as it would have significant adverse effects to the First Nation's Arctic Grayling fishery, riparian vegetation, as well as the effects of rerouting the stream on Category B Settlement Land access and boundaries (Na-cho Nyak Dun First Nation, 2014). The application for development was thus denied at all levels.

3.4.1.2 Regulatory Phase: Yukon Water Board

The YWB is responsible for issuing water licenses for water use and the deposit of waste in Yukon. YESAA approval is required to apply for a water license. Even if a project is approved through the YESAA process, the YWB can then still deny a license if it is determined that granting the licenses will have significant adverse effects to water (as clarified through *Western Copper Corporation v. Yukon Water Board*. YKSC 16. (2011)). Applications include a minimum of two-years of baseline data, including the year of baseline data from the YESAA application. A more detailed assessment of impacts to water is conducted at this phase, in part because project

design will be further along than at the assessment phase. There are two types of water use licenses in Yukon: Type A and Type B, depending on a variety of criteria outlined in the Waters Regulation (Yukon Legislative Counsel, 2003b). Type A applications require a public hearing except when no intervener wants to participate. A public hearing is only held for Type B applications when, based on the interventions received, the YWB considers there to be a public interest. As a quasi-judicial body with decision authority, the YWB has more than an advisory role in water licensing decisions. The YWB's water licensing decisions are legally binding and only reversible in a court of law.

Individual First Nations can also influence the YWB decision-making process through the same interventions available to others, but they do not have the authority to make water licensing within their territories or even on their Settlement Lands. Chapter 14 of the final agreements does however outline several additional roles and authorities specific to Yukon First Nations water licensing. These occur in the initial decision-making process and in the compliance monitoring and inspection conducted following approval (Table 3.3). First Nations have the right to be (a) consulted in water licensing processes and are notified of applications within their traditional territories and (b) to intervene by submitting written comment or participating in public hearings. While other interested parties also have the right to intervene in water license decisions (e.g., Yukon Government, Federal Government, ENGOs etc.), First Nations are notified of all water licenses occurring in their traditional territories. One First Nation Water Expert KFN, (Expert 4, 2015), discussed their experience intervening in the YWB licensing processes: “We were responding to an application for a mine and we quoted that Chapter 14, the quantity, quality and rate of flow section and they wrote to us right away and wanted to know all of this stuff. So

that’s kind of our clout, is the quality, quantity, rate of flow.” In other words, some First Nations felt their concerns were taken seriously by the YWB as the result of their Chapter 14 rights. For example, Little Salmon Carmacks First Nation’s intervention in the Carmacks Copper’s water licensing processes was key to the rejection of the water license. The YWB denied a water license for a Quartz mining operation because it was not satisfied that the waste produced by this undertaking would be treated and disposed of in an appropriate manner (QZ08-084) (Yukon Water Board, 2010).

Table 3.3 Yukon First Nation Chapter 14 roles with respect to water licensing territory.

Water Right	Description	Chapter 14	Examples
Intervener Status (resulting in a license being denied)	Affected Yukon First Nations have intervener status in water board public hearings	Chapter 14	Little Salmon Carmacks vs. Carmacks Copper
Inspection of Licenses	To determine if water use complies with the terms and conditions of the license	14.11.1.3	Little Salmon Carmack at Tashun Creek
Revision of Terms	To establish whether the conditions of a license need to be reviewed due to unforeseen impacts on the First Nation	14.11.1.4	Little Salmon Carmack at Tatchun Creek Bridge
Compensation	The Yukon First Nation is entitled to compensation for provable loss or damages.	14.12.0	No payout made to date

However, water licenses are rarely denied and thus remain one indicator of a lack of influence in the licensing process. For example, an Elder from C/TFN stated,

And it seems like we’re always on the losing end of it. That’s where the Water Board is just, it doesn’t really make any decisions. It’s just because I know two of our members sat

on there, and they said it's not really a decision-making body. And I agree that maybe there's a place for it, but it seemed like the government, both Yukon and Canada, is more interested in the mining industry. Mining spends millions of dollars and the Water Board clears their application. And I haven't yet heard them turn down a water license because of that (Elder 3, C/TFN, 2015).

According to the documentation available on "Waterline," 14 of 2772 licenses (0.5% of all licenses) have been denied by the YWB (four for municipal undertakings, 8 for placer mining and two for quartz mining). Of these, 786 are now active and 1986 are closed licenses (based on reviews that were completed as of June 27th, 2017 (Waterline, 2017)). Such a perspective does not account for the ways that First Nation interventions influence the terms and conditions attached to water licenses, but it is significant that so few water licenses are denied.

3.4.1.3 Operation: Water License Compliance and Inspection

Following the approval of a water license, Yukon Government becomes responsible for monitoring and compliance of license terms and conditions. First Nation concern about the inadequacy of the monitoring and enforcement of water licenses is particularly salient. A staff member at THFN noted insufficient monitoring for the extensive number of placer mines in their traditional territory:

My concern is there's not enough monitoring of it. Like EMR downstairs, they go out and investigate. But there is only five of them. And they can't do all the mines. And sometimes when we're flying over and we see something discharging into the streams, killing, you know, fish bearing streams, or putting their chemical in there that's not

settled, it's kind of disheartening, because there's no one there to stop it, and we have no real control over telling them, because it's not on someone's [Settlement] land (Expert 11, THFN, 2015).

Several factors contribute to concerns about enforcement and compliance. First Nations noted Yukon government's approach to enforcement is too soft and violators are rarely held accountable. EMR's three E enforcement policy begins with educating and encouraging violators to correct behavior before moving onto enforcement methods that include levying fines and laying charges. While charges are laid, these are rare (for example Tamarack Inc. was recently charged in Yukon Territorial court and ordered to pay a total of \$31,000 in fines for violations) (Croft, 2017). Adding to this sense of inadequacy, First Nations shared the sentiment that there are too few inspectors and existing inspectors don't always understand the terms and conditions of water licenses (e.g., large-scale quartz mines can have very extensive and complex terms and conditions).

Yukon First Nations are the only party that has the additional right to ask the YWB to review or inspect active licenses (14.11.1.3) to determine whether they have complied with the conditions of their license. Similarly, Yukon First Nations have the right to recall a license to establish whether the conditions of a license ("revision of terms") need to be reviewed due to unforeseen impacts on the First Nation (14.11.1.4). The right to inspect and revise water license terms and conditions is important because it provides First Nations the opportunity to have input after the licenses have been approved. Little Salmon Carmacks First Nation (LSCFN) exercised the right to both inspect and revise a water license held by Yukon Government, Department of Highways and Public Works (DHPW) at the Tatchun Creek Bridge (MS14-003) (Yukon Water Board,

2014). LSCFN raised concerns about DHPW's use of mine-derived waste rock to reinforce the creek bank around the bridge (taken from Minto Mine, a copper mine). Yet, Tatchun Creek is an important spawning stream for Chinook salmon (Chuck, 2014). Recent studies have found that even trace (sub-lethal) amounts of copper in salmonid habitat can reduce the fish's ability to navigate and detect predators (e.g., McIntyre et al., 2012). The use of waste rock was examined by experts obtained by DHPW as part of the application for a water license submitted in October 2012 and they disputed that they were in violation of their license by using "zero grade" waste rock, which is non-toxic and does not leach metal. In this case, LSCFN successfully used their powers to inspect and revise the water license resulting in requirement for additional water quality monitoring conducted at the site to ensure no negative effects on salmon habitat.

A Yukon First Nation has the right to apply for compensation for losses caused by a water license (14.8.6) including impacts of unlawful use to "Traditional Use" throughout their traditional territory as well as on or adjacent to Settlement Land (14.12.6.1, 14.12.6.2). For example, a Yukon First Nation can apply for compensation if a water license could be shown to damage fish habitat critical to food security or to have inundated Settlement Lands. Any affected party, including First Nations, can also apply for compensation under Section 5 of the Yukon Waters Act (2003a). No cases of compensation, under Chapter 14 or the Waters Act have taken place to date in the territory. This is likely due in part to the fact that many First Nations develop Impact Benefit Agreements (IBAs) with the proponents that include provisions for compensation.

3.4.2 Yukon First Nation Critiques of the Water Co-Governance System

Despite the explicit acknowledgement of water rights and authorities in land claim agreements, the four Yukon First Nations expressed concerns about limitations in their influence upon and trust in the water governance system itself. First, these encompass the limitations of the current system in the acknowledgement of Yukon First Nation jurisdiction over water, as well as co-management as a limited form of shared decision-making. Second, there are concerns regarding procedural rights present in the system, which limit acknowledgement of Yukon First Nation epistemologies, ontologies and forms of governance. Third, there exist several barriers to implementing land claim. Fourth, I draw attention to the need to consider the role of Yukon First Nations without land claims in the co-governance of water. In raising these critiques, I do not seek to deny the agency of Indigenous peoples or disparage the hard work of the Indigenous and non-Indigenous peoples who negotiated and are working to implement land claim and Self-government agreements. Moreover, it is important not to understate the dramatic and, in many cases, beneficial changes these agreements have introduced. Instead, I raise these critiques because they reflect debates occurring within and between Yukon First Nations and they highlight questions about jurisdiction as well as the appropriateness of the governance process and institutions meant to oversee the co-governance of water. Furthermore, these debates and critiques are crucial to tracing the actual power Indigenous peoples have been able to exercise as the result of the water rights described in Chapter 14 on Water Management.

3.4.2.1 From Co-management to Co-jurisdiction

When asked what powers Yukon First Nations have to protect waters in the territory, one Elder responded: “Very little, actually. Because the water, it’s not something that... I know we tried to negotiate because the government wouldn’t talk about water. All they talked about is quantity and quality of the water flow. So we can’t restrict any of that. Because that’s a federal [Sic] jurisdiction, water” (Elder 3, C/TFN, 2015).

The governance arrangements outlined in land claims agreements deny First Nation jurisdiction through the continued assertion of Crown jurisdiction over water in Yukon. Chapter 14 rights are subject to “the Laws of General Application.” This includes the Yukon Waters Act (2003), which asserts, “Water belongs to Government” (Section 3). This assertion of Yukon Government “ownership” of water is further supported by Chapter 14 stating “[t]he property in Water in the Yukon shall be determined by Laws of General Application” (Chapter 14 section 14.3.1). In other words, water governance in Yukon is predicated on the same colonial assumption of “Crown” jurisdiction as elsewhere in Canada – or the idea that provinces, and in some cases territories or the federal government, “own” the waters within their borders and have the right to make decisions about water licensing for nearly all water access and use.²⁰ While water licensing

²⁰ The Canadian Constitution divides responsibility for water between the federal government and provincial/territorial governments. Provincial governments, and territorial governments, like Yukon, that have undergone devolution, have responsibility for most aspects of fresh water management. Provincial and in the case of Yukon territorial, legislative powers include, but are not restricted to: water supply, pollution control, hydroelectric development, flow regulation, and authorization of water use. The federal government has jurisdiction over fisheries, navigation, federal lands and Indian reserves (including drinking water supply on reserves), and international relations, for the most part related to management of boundary waters shared with the U.S (Bakker, 2007; Boyd, 2003).

decisions are made by the YWB, rather than Yukon government, these limits in jurisdiction were among the reasons that First Nations like WRFN chose not to complete this process. Elder 14 (2015) stated, “It’s really important up here in our country to preserve that water and that’s why, you know, one of the reasons [we didn’t sign that land claim thing. We said,] nothing here gives us the power to say enough, huh? You know, because we’re here to protect our land.”

While Yukon First Nations are guaranteed the right to have a say about all lands and resources in Yukon, co-management engages limited understanding of shared decision-making. In this vein Goetze (2005) notes, power-sharing arrangements in co-management differ dramatically with regard to the authority of Indigenous nations in decision-making processes. At its worst, Indigenous peoples play an “advisory” role that lacks any substantive authority in decision-making processes (e.g., YESAB) and settler governments retain the final authority. As an alternative, co-jurisdiction or joint decision-making is a more equitable form of shared decision-making. The term co-governance is also suitable because it requires the negotiated agreement of both parties.

The YWB itself falls somewhere in between typical advisory co-management roles and joint decision-making. While the YWB, as a quasi-judicial body, is unique in its ability to make binding decisions, individual First Nations are not party to these decisions. The CYFN appoints one third of the board members to the YWB and other co-management boards in Yukon, but these individuals do not directly represent their First Nation or First Nation interests in general. While no water use can infringe on First Nation water rights (Chapter 14), the primary means by

which First Nations can influence decision-making is through consultation²¹ in YESAB and YWB processes. First Nation critiques reflect concerns about this rather limited form of shared decision-making.

To decolonize water governance, the creation of a co-governance system should be based on the acknowledgement of co-jurisdiction (rather than Crown jurisdiction) and must counter power imbalances in the process of creating and operationalizing these decision-making processes.²² The question of who has the final authority is fundamental to co-governance: the Indigenous nation, settler government, or both, through a consensus-based decision making (Kotaska, 2013a, p. 102). Examples of co-jurisdiction illustrate how this process could be improved. For example, the *Kunst'aa guu – Kust'aayah* or Haida protocol is a comprehensive reconciliation agreement. In addition to shared decision-making, the Haida protocol includes joint decision-making for specific decisions. For example, The Haida Gwaii Management Council – body delegated Indigenous and crown authority to make joint decisions – engages consensus decision-making to make strategic resource management decisions, including those for land use, forestry, and conservation. Importantly, it has delegated Indigenous and Crown authority to make joint decisions. There are several reasons why the Haida were able to negotiate joint decision-making:

²¹ In *Delgamuukw v. British Columbia* (1997), Lamer held that consultation with the affected Indigenous peoples must take place before infringing on Aboriginal rights. The degree of consultation required depends on the extent of the infringement and lies on a spectrum from 'mere consultation' to consent.

²² I discuss co-governance and co-jurisdiction as ways to improve on current co-management processes that fail to acknowledge Indigenous jurisdiction or authority to make decisions about water. Co-governance and shared jurisdiction with settler governments may not be the goal of Yukon First Nations without land claim agreements (e.g., White River First Nation). However, more detailed analysis of the perspectives of unsigned Yukon First Nations is beyond the scope of this paper.

they possess a uniquely strong Aboriginal title claim, with no issues of territorial overlap with other First Nations (Findlay, 2010). That is, territorial overlap among Yukon First Nations presents significant challenges to implementing joint decision-making for water licensing in Yukon as not all First Nations have the same perspective on what activities should occur in their shared territories. In some areas, three or more Yukon First Nations have overlapping territory, making the achievement of consensus much more difficult although not impossible.

Self-government agreements give signatory Yukon First Nations the authority to enact laws and make decisions that can supersede Federal or territorial legislation (Section 24.1.2). While I examine the opportunities created by Self-government agreements in more depth in Chapter 4 of this dissertation, it is important to note here that self-governing First Nations could create legislation asserting their Chapter 14 rights to protect water quality, quantity and rate of flow for waters on or adjacent to Settlement Lands. That said, it is not yet legally clear whether First Nation laws can supersede Crown jurisdiction over water because, as above, the agreements also affirm powers to the Yukon government to assert laws of general application in relation to water. While no Yukon First Nation has done this to date, there are several examples where Yukon First Nations are working towards implementing their Chapter 14 rights through self-government. For example, Champagne Aishihik First Nation developed a draft water strategy in (2013) and continues to work towards this today. THFN is also in the process of updating the THFN Land and Resources Act (2004) to include water (First Nation Water Expert 7) and C/TFN is exploring the potential for creating their own Waters Act.

3.4.2.2 Procedural Rights

Procedural justice goes beyond distributive justice or questions about the equitable or just distribution of entitlements within a governance system to argue that it also matters who is involved in decision-making or has a seat at the table and what process is used to make decisions (Schlosberg, 2007; Walker, 2012). This legal principle can be expanded to account for First Nations critiques of current governance arrangements for failing to adequately reflect First Nation water ontologies and epistemologies and governance systems (See Wilson Chapter 2 for an expanded discussion of the ontological politics of water governance). For example, one Elder from C/TFN noted,

Spiritually we are connected to everything. We are part of the land. We're part of the water. It's part of our lifestyle. We live it. We live it every day. And we thank the Creator for all those things that is natural for us to utilize. And we thank them all time and that's the thing. We don't look at just one little area and think it's not going to hurt anything. We look at the big picture, you know. For us, traditional lifestyle, it's looking at the big picture all the time. And you can't do something over here and think it's not going to affect our lifestyle because traditionally it does. [...] Everything relies on everything. We just can't look at things sectorally. (Elder 2, C/TFN, 2012)

Another Elder describes this breakdown in governance as a failure to “respect water.” For example, “The spirit of water needs to be respected. And, I don't see that happening so much. I mean water should be celebrated daily. It's very, very important. More important than all the gold in the world, water is” (Harold Gatensby, C/TFN, 2012). Disrespect for water is often noted in relation to specific decision outcomes (e.g., water licensing decisions), which prioritize

industrial water use over First Nation relationships to water and their current or projected impacts to water. But these critiques also call into question the potential for present governance institutions and processes to make decisions that are respectful of water.²³

Indeed, to benefit from the powers of land claim agreements northern Indigenous peoples have had to radically alter their way of life (Nadasdy, 2003b), including approaches to governance as First Nations need to take on “state-like” forms of governance (Nadasdy, 2017). As noted by Natcher and Davis (2007), while the language of devolution and local control permeates Indigenous-state relations, “the new institutions that have been created via the land claims process have little resemblance to indigenous forms of governance and management” (p. 272). Critics also argue that the new governance arrangements developed through land claims not only obscure and reinforce existing power relations, but can also serve to extend state power and access to water, land and other resources while thwarting meaningful change by tying First Nation communities up in bureaucratic processes (Nadasdy, 2003b, 2017).

While these critiques fail to account for the ways that First Nations exercise agency as they engage with the water governance system created through land claims as well as the opportunities presented through self-government, they draw attention to the limitations of present governance systems that might be interpreted to interfere with the First Nations meaningful involvement in fair and equitable process. Definitions of procedural rights can be expanded to

²³ This perspective was widespread, but not shared by all First Nation interview participants. Generational differences between Elders and younger generations who currently work for First Nation governments were also noted, where the above perspective was expressed more strongly by the former than the latter.

acknowledge the need to honor Indigenous epistemologies, ontologies and forms of governance, because of their prior existence and to counteract current power imbalances that privilege and normalize settler worldviews and forms of governance (Goetze, 2005; Kotaska, 2013a; Simms et al., 2016; Tipa and Welch, 2006). Much of the scholarship that examines Indigenous peoples ‘customary’ approaches to water governance assumes that Indigenous ontologies, epistemologies and legal traditions are only relevant at the local scale and questions about whether and how these principles and institutions can be scaled-up to regional or national levels, are rarely posed (Merrey, 2009). However, I find that procedural justice in water co-governance would be better achieved by adapting governance processes to privilege or better reflect Indigenous legal orders in the development of co-governance institutions, laws and policy. For instance, given critiques of the water governance system in Yukon, we might ask how Yukon First Nations’ calls to “respect” water (See Chapter 2 and 4) might inform both the process and substance of potential modernization of the Yukon Waters Act and Regulations (2003a)?

3.4.2.3 Implementation of Agreements

First Nations have experienced significant gains in capacity as the result of their agreements and, in some cases, they provide people with the language and legal authority to change things. However, these authorities are meaningless in practice if they are not implemented. Barriers to implementation are two-fold: First, First Nations face challenges in capacity and funding limiting their ability to implement agreements. Roburn and THFN (2012) critique self-government arrangements for extending First Nation powers without a concomitant increase in funding for governance. Core funding for Self-governing First Nations is scarce and a large percentage of

government revenues are obtained through project specific projects or programs making First Nations substantially less financially stable than other governments (See also Nadasdy, 2017, pp. 31–37). Financial stability has implications for First Nation capacity to engage in planning and governance processes making the decolonization of financial relationships a priority. These limitations in capacity can undermine the First Nations’ ability to intervene fully in decision-making processes about water, where substantial resources are required (e.g., staff hours and financial requirements to hire experts). This forces First Nations to make choices about where to best invest their limited time and resources, and to anticipate when it is ideal to fully engage in all stages of decision-making about water. First Nations are still very early in the implementation of these agreements and a lot more will be possible down the road. However, there is no doubt that limited capacity and resources slow implementation.

Second, Yukon First Nations have criticized settler governments for failing to respect land claim agreements more broadly. The Peel Watershed dispute raises important questions for the co-governance of water in Yukon as it relates to the duty of settler governments to respect land claims and to work towards implementing these agreements in the spirit and intent with which they were negotiated. The Peel Watershed Planning Commission developed a plan in 2011 (through a 7-year co-management process outlined in Chapter 11 of final agreements). The recommended plan did not meet Yukon government’s expectation due to the extant degree of protection within the watershed (80% protected vs. 20% remained open to oil, gas and mineral development). Yukon’s response was to unilaterally develop their own plan, which included new land use designations and a significant shift in the balance of protected areas (71% open for mineral exploration and 29% protected). This decision thus dramatically failed to “effectively

engage and reconcile different perspectives and values through the Yukon government-led decision-making process for the Peel Watershed land use plan” (Staples et al., 2013, p. 4). Yukon Government’s actions then became the subject of legal action by First Nations (First Nation of Nacho Nyak Dun, Tr’ondëk Hwëch’in and Gwich’in Tribal Council) and environmental organizations (Yukon Chapter-Canadian Parks and Wilderness Society and Yukon Conservation Society) and resulted in a series of court cases between 2014 and 2017.²⁴

The objective of these court cases was to establish the interpretation of the process for regional land use planning outlined in Chapter 11 of the UFA, which has specific implications for water governance, especially in terms of the importance of land use planning for managing cumulative effects. But perhaps more significant are the broad implications related to the interpretation of Modern land claim agreements. The Peel case makes clear that Modern land claims, which create a framework for co-governance between First Nations and settler governments, should not be interpreted in a technical or legalistic manner. Instead, the decision affirms that reconciliation is fundamental to the implementation of Modern land claims including provisions for co-management within these agreements. These processes are legally binding and the “Crown” must act honorably in their implementation (Langlois and Truesdale, 2015a, 2015b). In other words,

²⁴ In 2014, the Yukon Supreme Court ruled in their favor stating that Yukon Government’s actions did not reflect reconciliation as fundamental to the “spirit and intent” of Modern land claim agreements (*The First Nation of Nacho Nyak Dun v. Yukon*, 2014). Yukon Government appealed this decision and in 2015 the Yukon Court of Appeal partially reversed the Yukon Supreme Court’s decision (*The First Nation of Nacho Nyak Dun v. Yukon*, 2015). First Nations appealed this second decision and the Supreme Court ruled in favor of the First Nations sending the parties back to the point in the process where “Yukon can approve, reject, or modify the Final Recommended Plan” (*First Nation of Nacho Nyak Dun v. Yukon*, 2017 SCC 58).

settler governments have a responsibility to interpret the terms of land claims agreements generously and with the intent to achieve reconciliation.

3.4.2.4 Authorities of Yukon First Nations with Unceded Territories

There remain important questions about how unsigned Yukon First Nations fit into water governance in Yukon. Yukon First Nations without final agreements (Ross River Dena Council, Liard First Nation and White River First Nation) can and do intervene in YESAB processes and water licensing decisions. Transboundary First Nations (NWT or British Columbia) are also eligible to intervene in YWB processes. However, without land claims these First Nations sit in a regulatory gray area. Chapter 14 rights pertain primarily to Settlement Lands and these First Nations do not have Settlement Lands. The Type B water license to Selwyn Chihong Mining Ltd. (QZ10-042) provides some insight about how the YWB views these First Nations. The Selwyn (QZ10-042) project is a proposed zinc-lead mine located within the unceded traditional territories of Ross River Dena Council (RRDC) and Liard First Nation. There were also interim protected lands located immediately south of the mining claim. However, in their “Reasons for Decision,” the YWB concluded that Chapter 14 applies to Settlement Lands and not interim protected lands. On this basis, the YWB concluded that the undertaking would not substantially alter the quantity, quality or rate of flow of water flowing on, through or adjacent to Settlement Land, including seasonal rate of flow (Yukon Water Board, 2011).

Present approaches to considering unsigned Yukon First Nations’ water rights are contested and will potentially be the subject of future litigation in light of recent Supreme Court of Canada

decision *Tsilhqot'in Nation v. British Columbia 2014 (SCC 44)* (*Tsilhqot'in Nation v. British Columbia 2014 (SCC 44)*, 2014), which reaffirmed Aboriginal land title for the Tsilhqot'in First Nation. While not discussed explicitly by the Court, the decision is likely to have implications for Aboriginal title to water in terms of making claims to watercourses and sources and to submerged lands (Hlevca et al., 2014). While, for example, the YWB argues that Interim protected lands are not Settlement Lands, this perspective ignores the fact that First Nations without land claim agreements have not ceded their inherent water rights or Aboriginal title to water within their traditional territories.

3.4.3 Opportunities for Improving Co-governance

Despite the above critiques of co-governance arrangements, there remain opportunities to improve conditions to address Yukon First Nation substantive and procedural rights as well as build trust. Yukon Government, including both the Water Resources Branch and EMR, has engaged THFN and KFN in water quality monitoring programs. With EMR, First Nations have opportunities to observe inspections and any actions taken in response to violations. THFN is also working with EMR to have their staff members trained as compliance inspectors so they can conduct inspections on Settlement Lands. Yukon Government's water strategy and action plan also committed to enhancing cooperation, coordination and collaboration with other water managers (Environment Yukon, Water Resources Branch, 2014). Specific commitments relevant to Yukon First Nations included plans to host annual or biennial Water Forums, enhanced communication with First Nation governments, the development of a policy for managing wetlands, formalizing an approach to Community-Based Monitoring and the incorporation of

traditional knowledge into government water policies and plans. Work has advanced on these action items. Perhaps the most progress has occurred in relation to CBM as four agreements have been developed for Community Water Research and Monitoring. However, echoing findings in the collaborative governance literature that such efforts act as a trust building exercise, in this case between Indigenous and Settler governments (Ansell and Gash, 2008). Efforts to build relationships with First Nations have primarily focused on the technical aspects of improving water management (e.g., addressing the current lack of water data by increasing monitoring programs); these efforts also serve to build trust. Nonetheless more is needed on a political level to improve co-governance in a way that addresses First Nation substantive and procedural rights.

The development of the water strategy represents one foregone opportunity for engaging new models for shared decision making. Yukon First Nations were consulted through a series of public meetings (Environment Yukon, Water Resources Branch, 2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h). But First Nations critiqued Yukon Government's approach for failing to engage them as parties to the creation of the strategy itself (Water Action Plan Meeting, November 2014). Examples from other jurisdictions are useful in guiding alternative approaches. For example, in the creation of the "Northern Waters, Northern Voices: NWT Water Stewardship Strategy" the Government of Northwest Territories recognized that an effective water strategy must reflect Aboriginal perspectives. To ensure that all water partners were at the decision-making table in the development of their strategy, all Aboriginal governments were invited to participate in an Aboriginal Steering Committee (ASC) and members of the ASC played key roles in the development of the final strategy.

As the NWT demonstrates, engaging First Nations as governments in co-governance processes, in a manner that goes beyond the minimum consultation requirements, is needed to build trust. Federal, provincial and territorial governments have a legal duty to consult and accommodate Indigenous peoples on any decisions that may affect Aboriginal or Treaty rights (Morellato, 2008; Newman, 2009). However, Indigenous governments are not only seeking meaningful consultation, but a substantive or significant role in decision-making about the lands and water within their traditional territories, as part of their inherent right to self-determination (Phare, 2009; Simms et al., 2016). In Yukon, signed First Nations with land claims gave up title to ~90% of their traditional territories in exchange for a say in decision-making about all water and land in Yukon. Nothing in land claim agreements limits settler governments and First Nations to the types of engagements they currently have. Phare and others (2017) have proposed a collaborative consent model to improve shared decision-making between Indigenous and settler governments.²⁵ They define collaborative consent as:

an ongoing process of committed engagement between Indigenous and non-Indigenous governments— acting as equal partners, each with their asserted authority—to secure mutual consent on proposed paths forward related to matters of common concern and all aspects of governance. Collaborative consent is about changing how decisions at all

²⁵ There is significant legal basis for a collaborative consent model in Canada. The Canadian federal government has committed to implementing the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (2008), which requires free, prior and informed consent (see Articles 10, 19, 28, and 29 of UNDRIP). Furthermore, Section 35 of the Constitution Act, 1982, recognizes and affirms existing Aboriginal and treaty rights. The Courts have held that Section 35 is grounded in the Honor of the Crown – or the requirement for the Crown to act honorably in dealings with Indigenous peoples - and creates the duty of the Crown to consult and accommodate potential or established Aboriginal or treaty rights where a proposed activity could adversely impact those rights (*Delgamuukw v. British Columbia*. 3 S.C.R. 1010, 1997, *Haida Nation v. British Columbia (Minister of Forests)* 3 S.C.R. 511, 2004 SCC 73, 2004, *Tsilhqot'in Nation v. British Columbia* 2014 (SCC 44), 2014).

levels are made: from individual projects up to law and policy. These are long-term processes requiring both Indigenous and non-Indigenous governments to build their own structures to engage and ultimately to build new institutions and shared processes for decision-making. (p. 1)

Such an approach may not have been tenable in Yukon at the time of the creation of the Water Strategy and Action plan. This is in part because Yukon Government faced many organizational challenges after the federal government devolved authority for water governance to Yukon Government' and the organization of Yukon Government's approach was a major driver behind the creation of the strategy (Expert 14).

Yukon government's approach came closer to a collaborative consent model in recent (2014-2016) negotiations of the transboundary British Columbia-Yukon Mackenzie River Basin Bilateral Water Management Agreement (2016) (BWMA), where First Nation governments (Teslin Tlingit Council and Daylu Dena Council) were engaged on a government-to-government basis as this agreement was negotiated. While the format for the agreement did not allow these First Nations to be parties to the official agreement, Yukon government had early discussion with some First Nations about developing parallel agreements that would address their role in the implementation of the BWMA. To reduce capacity challenges during consultation and technical review of the BWMA, where requested, First Nations were provided funding to participate in this process, including covering the costs of engaging their own technical experts (Expert 14). Future decision-making processes would also benefit from creating a First Nation advisory committee on water (not all Yukon First Nations are represented by existing institutions like Yukon Council of First Nation or the Yukon River Inter-Tribal Watershed Council).

Representatives from all First Nations in Yukon would also be fundamental to understanding how water governance processes and institutions might be changed to better reflect First Nation understandings of water and forms of governance.

A collaborative consent approach might be applied to modernizing the Yukon Waters Act and Regulations (2003a) (created through “mirror legislation”) as well as the processes and procedures of the YWB and the Water Board Secretariat, which have not been reviewed in light of many major changes in environmental management and governance in Yukon. For example, there are currently no regulations for environmental flows or groundwater. Modernizing the Act and Regulations would also represent an opportunity to review the format of the YWB. Yukon Government’s water strategy and action plan titled, “Water for Nature, Water for People” (2014) objectives specify the need to examine the effectiveness of the Waters Act and Waters Regulation and licenses issued under this legislation (Environment Yukon, Water Resources Branch, 2014). The Mines Licensing Improvement Initiative (MLII), whose objective is to reduce regulatory overlap and improve coordination and effectiveness of authorizations for major mines in Yukon in relation to the regulated use of water or deposit of waste to water (Government of Yukon, 2018), is currently undertaking a review process to bring legislation in line with First Nation final agreements given that no law enacted by the Government of Yukon is enforceable if it is inconsistent with a Final Agreement (Section 13(2) Yukon First Nations Land Claims Settlement Act, 1994). At this point, it is not clear whether the MLII process will initiate the process of modernizing the Waters Act and Regulations, but regardless this represents an opportunity for First Nations to advocate for changes in the legislation and to the YWB. Such an approach would go beyond typical approaches to consultation, to engage First Nations as parties

to the process of revising the legislation. The collaborative consent model was applied in the three-year process of developing the Species at Risk Act (2009) in Northwest Territories, Canada where the territorial and Indigenous governments co-drafted legislation. In this example, legislation was drafted by a working group made-up of high-ranking officials from the Government of Northwest Territories, all Indigenous governments along with the legal counsels of all involved parties. This legislation was subject to the regular committee and public review process; however, very few changes were made to the final draft. The GNWT intends to apply this process to co-develop several more laws with Indigenous peoples (Ishkonigan Inc. et al., 2015; Phare et al., 2017). Engaging a collaborative consent type process in the modernization of the Yukon Waters Act could circumvent the conflict between Indigenous and settler governments seen in other contexts. For example, recent research documents the conflict resulting from inadequate First Nation consultation in the modernization of the water law in British Columbia (Joe et al., 2017; Jollymore et al., 2017b; Simms et al., 2016).

3.5 Conclusion

Yukon First Nations have experienced significant gains in governance capacity as the result of land claims and self-government, which outline specific language and legal authorities. However, water governance in the territory remains highly contested and there are many ways to improve co-governance. As I have shown in this paper, current co-governance arrangements fall short of Yukon First Nation expectations in many ways. There are continued asymmetries of power and jurisdiction and a failure of procedural justice as governance arrangements fail to

reflect Indigenous understandings of water and governance: all informed by enduring legacies of colonialism.

Neither settler governments nor Yukon First Nations need to accept the deficiencies of the current governance arrangements. There are many opportunities for improvement. Some of the needed changes can be brought about through implementation of agreements to improve overall decision-making about water and better assert First Nation water rights within those processes. Although unsigned First Nations are cast as sitting in a regulatory grey area in Yukon, these First Nations have perhaps the most leverage to make change within this system through current negotiation of Reconciliation Agreements and other processes. While in many ways they are treated as though they have fewer rights than signed First Nations, through the implied water rights in the Tsilhqot'in Nation decision WRFN, RRD and LFN arguably have much more expansive water rights since they have not ceded Aboriginal title nor water rights throughout their vast territories. Echoing Low and Shaw's (2011) findings from their research with First Nations in environmental governance in the Great Bear Rainforest in British Columbia, Yukon First Nations without land claims may have the greatest ability to shape things for the better because they have not ceded title to land or their inherent rights to water. In Yukon, this could mean negotiating changes to water governance arrangements in a way that improve the co-governance of water.

Taken together, this study advances the literature on co-governance and Indigenous water governance in several key ways. First, I expand definitions of co-governance systems beyond the decision-making processes of one institution, as many studies of co-governance and co-

management have done (e.g., Goetze, 2005; Nadasdy, 2003a). By this I mean I look at co-governance as a complex multi-level system involving many actors, institutions issues and claims. A collaborative consent model adds to this by appreciating co-governance as a cumulative and interactive engagement in multiple decision-making processes, and the building of trust through the constant renewal of consent between Indigenous peoples and settler states. Second, while the acknowledgement of Indigenous peoples substantive water rights and authorities is a major barrier to implementing co-governance, the empirics of this case study also substantiate the argument that Settler governments must acknowledge and support the continuation of Indigenous epistemologies, ontologies, laws and governance systems and give them equal weight to non-Indigenous ones (Goetze, 2005; Kotaska, 2013a; Simms et al., 2016; Tupa and Welch, 2006). I make two key points about the implications of the failure to do so: a) I argue that requiring First Nations to take on “state-like” forms of governance can result in the extension of state power through “water governmentalities” that impinge on Indigenous sovereignty and (re)pattern governance arrangements in ways that conflict, compete and align to reinforce dominant claims to water (Boelens et al., 2016; Zwarteveen and Boelens, 2014); b) I examine how these arrangements can be seen as a violation of Indigenous peoples’ procedural rights. Said another way, by requiring Indigenous peoples to constantly engage in a governance system shaped by settler understanding of water, opportunities for the assertion of Indigenous sovereignty and anything we might call “meaningful engagement” is significantly compromised. Co-governance in Yukon is challenged by limits to Indigenous and settler government capacities and resources to implement the aforementioned arrangements and agreements. While too often the literature points to the capacity limitations of First Nations, who are indeed underfunded and under-resourced and so cannot respond to the many governance challenges they face, both

Indigenous and settler governments need to engage in capacity building for co-governance arrangements to function (Kotaska, 2013a; Simms et al., 2016; Tipa and Welch, 2006). While First Nations would benefit from additional funding and resources dedicated to engagement in water governance processes, Simms et al (2016) suggest that the emphasis should be placed on reversing the colonial gaze. That is, capacity building is equally a mandate for colonial governments who require substantial growth and development to build understanding of Indigenous forms of water governance as well. These governments, to date, have by and large demonstrated only a nascent understanding of the processes and strategies that diverse Indigenous governments are developing. Finally, this case study provides an empirical basis for a discussion about how to operationalize co-governance in complex, multi-scalar systems with overlapping and often conflicting jurisdictions, values of water, legal systems and sources of authority. To this end, I discuss how variable the present system is for enabling higher quality consultation, better capacity to restrict or negotiate within territory development and better interpretation of already strong language regarding water rights.

Chapter 4: “Seeing Water Like a State?” A Critical Analysis of the Legal Opportunities Enabled through Yukon First Nation Self-government

Agreements

Summary

Yukon First Nations and the waters within their traditional territories face a variety of socio-political and environmental pressures including the effects of historical and ongoing settler colonialism, global environmental change and mining activity. These communities are in the process of implementing Self-government and Modern land claim agreements, which contain powerful acknowledgements of Indigenous rights and authorities, including the right to unaltered “water quality, quantity and rate of flow” on Settlement lands (~10 percent of their traditional territories). Self-governing Yukon First Nations have real, although limited, legal authorities on Settlement Lands including the ability to enact laws that supersede territorial legislation.

Through research conducted in partnership with four Yukon First Nations (Carcross/Tagish, Kluane, Tr’ondëk Hwëch’in and White River First Nations), I examine how these Indigenous governments are engaging the authorities acknowledged in Modern land claim and Self-government agreements to assert their rights and responsibilities to water as a more-than-human relation. In particular, I analyze the potential for the creation of legislation pertaining to water on Settlement Land. I engage with critical Indigenous scholarship to examine the challenges facing these communities and to reveal emerging approaches to Indigenous water governance. More specifically, I analyze the “state-like” bureaucracies that First Nations must develop to assert

their sovereignty in this context. While these forms of governance are critiqued for bearing little resemblance to traditional forms of governance, I demonstrate how First Nations exercise agency as they strategically navigate these opportunities in order to protect water in a manner they deem consistent with the values, principles and relationships of Indigenous water governance.

4.1 Introduction

Yukon First Nation land claim agreements contain powerful acknowledgements of Indigenous water rights and authorities, including the right to unaltered “water quality, quantity and rate of flow” on Settlement lands (~10 percent of their traditional territories). These rights are relevant to various decision-making processes about water in Yukon including co-management of socio-economic impact assessment and water licensing (See Chapter 3 on co-governance). However, self-governing Yukon First Nations (SGYFNs) can also assert their water rights through legal authorities on Settlement Lands including the ability to enact laws that supersede territorial legislation. The powers enabled through self-government represent some key opportunities to create legislation that asserts their sovereignty and responsibility to water, which as discussed in Chapter 2 of this dissertation is itself understood as a living entity that must be respected (See also Anderson et al., 2013; LaBoucane-Benson et al., 2012; McGregor, 2012, 2014; Wilson, 2014).

While no Yukon First Nation has developed water legislation to date, the research presented here provides a critical analysis of how three self-governing Yukon First Nations (SGYFN) (Carcross/Tagish, Kluane, and Tr’ondëk Hwëch’in) are strategically navigating the opportunities

created by land claim and Self-government agreements to protect the waters within their territories.²⁶ First, I engage with First Nations expressed relationships to and values of water and their desire to develop legislation to protect these relationships. Second, I examine existing legislation developed by these SGYFNs to find that there are different approaches that First Nations might take to developing water legislation including reflecting Indigenous legal traditions to various extents. Third, I discuss some of the challenges to developing water legislation related to building technical and administrative capacity for enforcement and to respond to potential litigation. I expand on this discussion by drawing on lessons learned by Tribes in the United States who have engaged “state-like” forms of governance to develop enforceable water quality standards under the Clean Water Act. Finally, I discuss the implications of this case for broader debates about the challenges involved in taking on “state-like” forms of governance and the ways First Nations are actively exercising their agency to navigate these opportunities.

4.2 Theoretical Considerations: “Seeing Water Like a State”?

Indigenous peoples around the world have been governing the waters and lands within their territories since time immemorial and continue to do so despite historical and ongoing disenfranchisement and dispossession through settler colonialism (Borrows, 2002; Napoleon,

²⁶ The ability of unsigned Yukon First Nations, who have not ceded their inherent water rights or aboriginal title to water, to develop water legislation is not specifically considered in this paper. It is possible for these First Nations to develop and assert water legislation. While the specificities of these circumstances are beyond the scope of this paper, many insights from this analysis are also relevant to unsigned First Nations.

2013). Indigenous peoples have complex socio-cultural relationships to water and, in a North American context it has been shown that Indigenous forms of water governance are closely linked to understanding water as a living entity whose “spirit” must be respected (Anderson et al., 2013; Craft, 2014; LaBoucane-Benson et al., 2012; McGregor, 2012, 2014; N. J. Wilson, 2014; Yates et al., 2017). This view of water extends far beyond mainstream views of water as part of the “natural world” or “environment.” Instead, water is best understood as a relative to whom humans are linked through a web of extended kin relationships (Anderson et al., 2013; LaBoucane-Benson et al., 2012; McGregor, 2012, 2014; N. J. Wilson, 2014). As Anishinabe legal scholar John Borrows (2002) states, Indigenous law “originates in the political, economic, spiritual, and social values expressed through the teachings and behavior of knowledgeable and respected individuals and elders. These principles are enunciated in the rich stories, ceremonies, and traditions within First Nations” (p.13) In other words, understandings of water as a living entity, as is articulated through oral traditions, are expressions of Indigenous water law and provide a set of values and principles that can serve as the basis for contemporary decision-making about water. Reinvigorating Indigenous legal traditions can play a powerful role in illuminating future directions for Indigenous nations and also serve to revitalize the connections between Indigenous communities and their cultures (Christie, 2007). To that end, the legislative authorities enabled by Self-government agreements are seen as an opportunity to decolonize Indigenous-state relationships through the creation of Indigenous water laws that better reflect Indigenous relationships to water and legal traditions that have been suppressed or marginalized through historical and ongoing colonialism (Anderson, Clow, and Haworth-Brockman 2013; Sam and Armstrong 2013; McGregor 2014). At the same time, these opportunities have not been without critique.

It has been noted that to benefit from the powers of land claim and Self-government agreements northern Indigenous peoples have had to radically alter their way of life and engage forms of governance that bear little resemblance to traditional forms of governance (Nadasdy, 2003b, 2017; Natcher and Davis, 2007).²⁷ Nadasdy (2017) has critiqued these arrangements for requiring Yukon First Nations to fundamentally transform their approaches to governance:

Canada's modern treaty-making process necessarily projects onto northern indigenous societies some very particular assumptions about the kinds of political entities they must be in order to participate in such a process at all. To the extent they have participated, northern indigenous peoples have had to accept – in practice if not in theory – a host of Euro-Canadian assumptions about the nature of power and governance that are implicit in the notion of a treaty between sovereign (or semi-sovereign) entities. (p. 6)

²⁷ Social relations among pre-contact and early contact Indigenous peoples in Yukon were “ordered by principles of kinship and reciprocity rather than territoriality. Although indigenous kinship networks certainly existed in space, they were not defined by – nor did they define – specific territory” (Nadasdy, 2017, p. 99). Nadasdy builds on McClellan's (1975) extensive ethnographic documentation of Southern Tutchone, Tagish, and Inland Tlingit peoples, which shows “a very sparse population was spread over a vast area, making a loosely linked social network with very few sharply defined linguistic and cultural boundaries [...]. Cohesive political units did not exist – just widely scattered clusters of living groups whose composition and size changed throughout the year as people moved about in quest of food. Large social gatherings were sporadic and brief. They were either for trading or potlatch purposes, and they were structured along either sib or moiety lines” (p. 14). A moiety is a form of social organization where society is divided into one of two unilineal decent groups. Athabaskan peoples of the southern and central Yukon have the Crow and Wolf moieties, which are determined along matrilineal and exogamous lines. In other words, one must marry a member of the opposite moiety, which is inherited from ones' mother. For “Tlingitized” First Nations in Yukon, these moieties are further divided into clans (or sibs), which are unilineal groups descended from a common (often mythic) ancestor (e.g., the *Daklaweidi* (Killerwhale) clan is one of six C/TFN clans).

In other words, to function in a state-centric settler colonial political system, engaging with other “state-like” political entities (e.g., Canadian federal, territorial and provincial governments), First Nations have had to “assume the trappings of the state” (p. 7).²⁸ In this view, the First Nations governments that resulted from Modern land claim agreements are “state-like” in that they have citizens and their governments exercise real, though limited, jurisdiction over distinct territories and peoples.²⁹ From such a perspective, engaging the powers of self-government might be understood as promoting new governance arrangements that continue to constrain Indigenous forms of governance in indirect and less forceful, but equally violent ways – as distinct from anything we might call decolonizing Indigenous-state relationships (Smith, 2013; Walia, 2013). Engaging state-like forms of governance may have several specific consequences for Indigenous water governance. James C. Scott (1998) addressed the intersections of state power and expertise, territory, and control and management of ‘natures.’ Among other concerns, Scott stressed that states regularly pursue programs that advance the goal of ecological and cultural

²⁸ Rather than a thing, “state” can be understood as an ideological project that legitimizes a complex arrangement of government institutions and processes, which often have differing and contradictory agendas and interests (Nadasdy, 2003b, 2017). States are defined by the exertion of a monopoly over the legitimate use of force over a clearly defined territory and population. Where the legitimacy of these claims is contested, they are able to at least maintain the fiction that this is the case (Nadasdy, 2017). State governance is associated with Weberian bureaucracies, which the governance arrangements resulting from land claim agreements in the Canadian North have been shown to closely resemble (Nadasdy, 2003b, 2017; Stevenson, 2006; White, 2009b). Max Weber (1864 – 1920) – a German sociologist whose work established models through which theorists today still understand bureaucracies – among other features, these bureaucracies are considered to be politically hierarchical; operate following to complex, written, formal, impersonal rules and procedures; sharply divide public from private spheres; have an extensive compartmentalization of functions and division of labour where decision-making is done through “rational” evaluation of “factual” empirical evidence (Weber, 1946, 1946).

²⁹ Following Nadasdy (2017), I use the term “state-like” to refer to First Nation governments. These governments remain entrenched in the Canadian state and do not have unfettered powers associated with states (for example, with reference to international relations) so the First Nations cannot be considered independent sovereign states.

simplification and legibility. This simplification is achieved through the creation of ‘management units’ that considers “resources” outside of the broader ecological, socio-cultural and political realities they are a part of (Stevenson, 2006). State programs extend state power over Indigenous peoples and often entails considerable physical, epistemic and ontological violence as they seek to dispossess Indigenous peoples of their lands, political structures and cultures.

In the book *What is water?: the history of a modern abstraction*, Linton (2010) describes the history of Modern Water (understandings of water as a resource that can be known, owned and exploited (Groenfeldt, 2013; Linton, 2010; Strang, 2004)) as a history of abstraction, meaning that water has become increasingly separated from its social and political contexts (Linton and Budds, 2013). The development of the hydrologic sciences played an important role in the production of Modern Water. Overall, the conceptualization of water as a material substance, H₂O, which circulates through the physical processes of the hydrologic cycle (e.g., precipitation, evapotranspiration etc.) ignores socio-cultural relations to water and the ways that these are shaped through interactions among water users, including relations infused with power differences and the cultural politics that follow (Boelens, 2013).

The abstraction of water is closely connected to state-formation as hydrologic science made water increasingly “legible” and amenable to control by state agencies (Linton, 2010). In the United States, for example, Robert E. Horton’s (1931) visualization of the “hydrologic cycle” was easily adapted to the needs of the state by rendering the nation’s water visible to central governing agencies and “by institutionalizing the quantification of stocks and flows of water on a national scale, the state took a major step in making water available for, and amenable to, management by state agencies” (Linton, 2010, p. 149). In the 20th century, in colonial states such

as the United States, Canada and Australia, the “legibility” of water and the hydraulic construction this enabled (e.g., the development of hydro-power) has been closely related to the development of national identity and state expansion (Dunlap, 1999; Harris and Alatout, 2010; Swyngedouw, 2015; Worster, 1986). At the same time, these processes frequently contributed to the colonial dispossession of Indigenous peoples (e.g., Feit, 1979; Lawson, 1994; Martin and Hoffman, 2008).

Political ecologists have engaged the concept of “hydrosocial territories” – understood as hybrid socio-political and natural spaces that are created and recreated through interactions between diverse actors with divergent interests, material flows, hydrologic technologies within socio-economic and political practices, structures and institutions – to conceptualize the hydrologic dimensions of territorial politics and governance for Indigenous peoples (Boelens et al., 2016; Duarte-Abadía et al., 2015; Hommes et al., 2016; Perramond, 2016; Seemann, 2016). Boelens et al. (2016) argue that these processes “are intrinsically linked to different and often divergent water governance systems and their contestation” (1). Scholars have shown that dominant conceptualizations of hydrosocial territory envision relations between society and nature that correspond to particular truths and knowledge claims about water (Boelens, 2014; Boelens et al., 2016; Duarte-Abadía et al., 2015; Perramond, 2016; Romano, 2016; Zwartveen and Boelens, 2014). These “powerful hydrosocial territories envision to position and align humans, nature and thought within a network that aims to transform the diverse socionatural water worlds into a dominant governance system” (Boelens et al., 2016, p. 6). As defined by Foucault (1991), such territory-building projects aim to “conduct the conduct” of specific populations thereby producing new “water governmentalities” that (re)pattern hydrosocial territories in ways that

align to reinforce dominant claims to water (“Modern Water”) (Boelens et al., 2016; Zwartveen and Boelens, 2014). From this perspective, these governmentalities are considered to impinge on the sovereignty of Indigenous peoples and create political arrangements that make these spaces “legible” and therefore exploitable and controllable (Bebbington and Bury, 2013; Francisco and Boelens, 2015). This paper addresses and adds to this literature by asking what it means for decolonization for Indigenous peoples to engage “state-like” forms of governance from the point of view of Modern land claims and self-government in Yukon Territory? Specifically, what are the consequences of taking on more bureaucratic forms of governance for how Yukon First Nations “see water”? Is it possible for First Nations to develop legislation informed by their understandings of water as a living entity?

4.3 Research Setting: Yukon First Nation Self-Government

Eleven of 14 Yukon First Nations have land claim and Self-government agreements. This means that Yukon First Nations have concluded a large proportion of the total of 22 Self-government agreements across Canada. In the case of Yukon First Nations, Aboriginal Self-government agreements were negotiated alongside land claim agreements (Government of Canada; Indigenous and Northern Affairs Canada, 2008).³⁰ Through a twenty-year process of treaty negotiation, First Nations agreed to retain Aboriginal rights and title to Settlement lands, which

³⁰ These figures include the Yale Final Agreement, the Tla’amin Final Agreement (2016) and the Déline Final Self-Government Agreement (2015), which have been signed, but are not yet in effect.

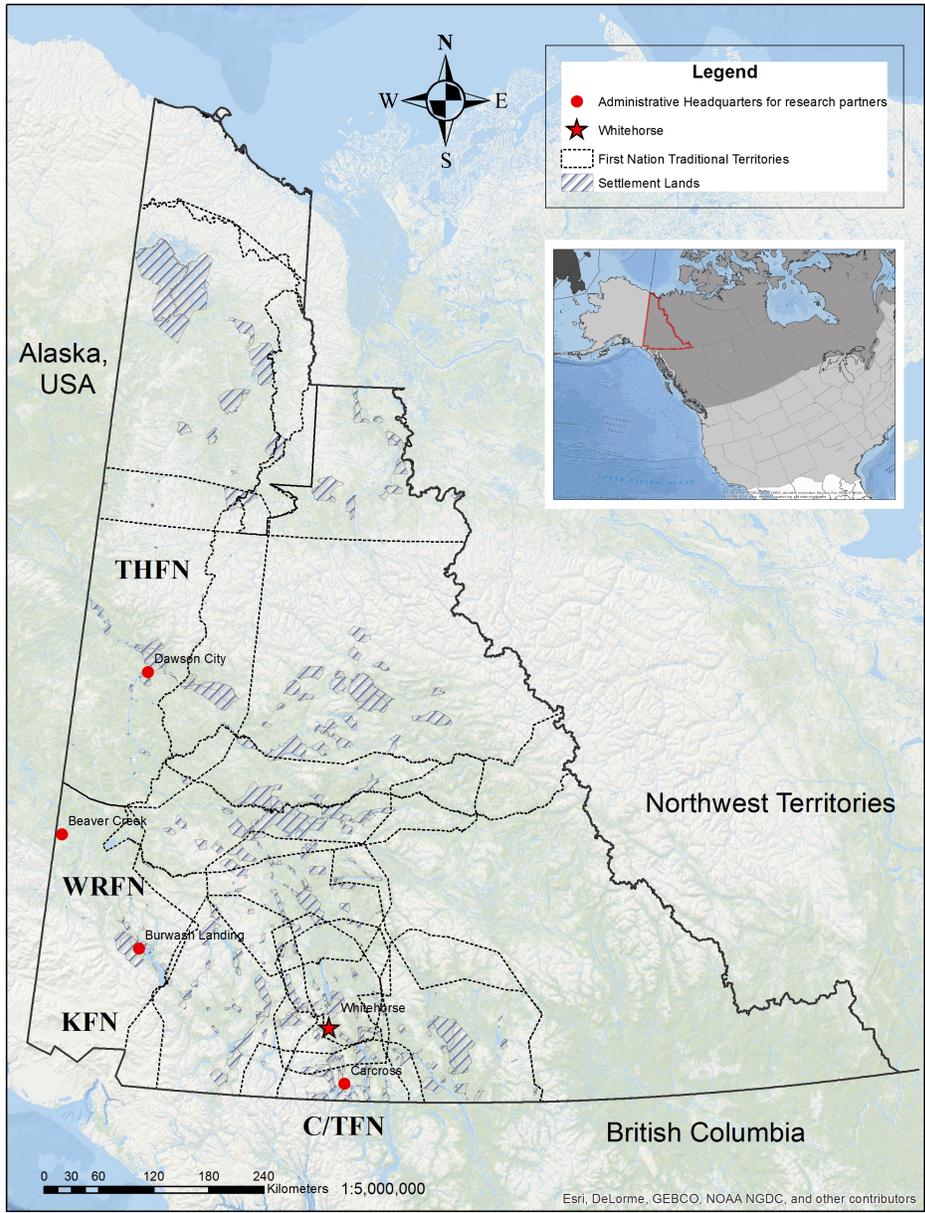
represent less than 10 per cent (41,595km²)³¹ of the lands within their traditional territory in exchange for partnership in the governance of all Yukon lands and resources including water (Figure 4.1). The Umbrella Final Agreement (1993) – a framework agreement used to negotiate 11 Final land claim and Self-government agreements) include far more than the scant provisions of the 19th century treaties for reserve lands, annual annuities, and farm implements. These Modern, late 20th century treaties address subjects ranging from water, lands, forests, access, fisheries, wildlife, taxation, dispute resolution, eligibility and enrollment to their Implementation.

Three Yukon First Nations, including White River First Nation, Liard First Nation, and Ross River Dena Council ratified the UFA but ultimately opted out of land claim and Self-government agreements. These First Nations retain Aboriginal title to their traditional territories and remain Indian Bands under the federal *Indian Act* (1985) (Yukon Government, 2016). Since 2014, Kaska Dena Council) have been negotiating reconciliation agreements with Yukon Government aimed at taking a proactive approach to relationships between these governments in the absence of comprehensive land claims agreements. These agreements will address shared priorities including consultation and resource management processes; economic and capacity development; and revenue sharing. Negotiation is ongoing. These agreements have the potential to clarify unsigned First Nations' roles in decision-making about water and to increase their capacity to participate in decision-making by creating access to some of the opportunities that

³¹ There are three types of Settlement Lands: Category A, B and Fee simple. Category A Settlement Land is Settlement Land where a Yukon First Nation has ownership of the surface and subsurface, including minerals (Government of Canada et al., 1993).

signatory First Nations have had, without the high cost of surrendering Aboriginal title to their territories (Alcantara, 2008).

Figure 4.1 Map of Yukon First Nation overlapping Traditional Territories, Settlement Lands and administrative headquarters for four Yukon First Nation research partners.



Yukon First Nation Self-government agreements were the first of their kind in Canada. Land claim and Self-government agreements are tripartite agreements between a First Nation, the Government of Canada and Yukon Government, and are unique for their time because the Yukon Government was a full partner in their negotiation. The willingness of the territorial government to negotiate jurisdictional matters is considered to have significantly shaped these Self-government agreements (Penikett, 2012). All self-governing First Nations operate within the framework of the Canadian Constitution, but unlike land claims agreements, which are constitutionally protected under Section 35, Yukon First Nation Self-government agreements are only protected under a federal statute or the Yukon First Nations Self-Government Act (1994a). The Yukon land claims treaty had entrenched a constitutional commitment to negotiate self-government, which gave First Nations considerable leverage (Penikett, 2012).³² Self-government agreements acknowledge that First Nations are governments rather than bands under the Indian Act (1985). They recognize extensive “province-like” powers of Indigenous governments and give Yukon First Nation governments greater control and law-making authority over a range of jurisdictions including governance, social and economic development, education, health, lands, water and more (Government of Canada; Indigenous and Northern Affairs Canada, 2008). The agreements devolve a range of responsibilities for environmental management on Settlement Lands, previously held by federal agencies. Yukon First Nations thus have the authority to establish laws for use and occupation, develop and administer land management programs, and to levy fees for the use of land on Settlement Lands. Yukon First Nations have established

³² For a more detailed account of First Nation self-government in Canada, see Coates and Morrison (2008) and Morse (2008).

“Natural Resources” or “Lands and Resources” departments to administer these responsibilities, including but not limited to responsibility for administering land management programs, advising First Nation leadership and overseeing activity occurring on Settlement Lands (e.g., hunting, fishing, resource development or research).

The lawmaking authority among self-governing First Nations extends to four general areas including internal management and the administration of certain rights and benefits acknowledged in land claim agreements (e.g., Chapter 14 water rights); the provision of programs and services to its citizens; laws of a “local or private nature” on Settlement Land and in relation to taxation of interests on Settlement Land or of its citizens (INAC, 2008, p. 11). Yukon First Nations can replace Yukon territorial laws (“laws of general application”) by enacting laws that apply to Settlement Land or its citizens. Federal laws continue to apply on Settlement Land. In the event of a conflict between a territorial and self-governing Yukon First Nation laws, First Nation law prevails. However, First Nation laws do not supersede federal legislation and if there is a conflict federal law prevails (INAC, 2008). To avoid conflict, Self-government agreements require First Nations and Yukon Government to consult each other before enacting a law that might impact either a Yukon or First Nation law (INAC, 2008).

Even with the expanded roles for Yukon First Nations acknowledged by Modern land claims (see Chapter 3 on water co-governance for a detailed analysis), colonial water laws nonetheless remain central to water governance in Yukon. My analysis of water law in Yukon shows no substantial changes to water laws have been made since land claim and Self-government agreements were enacted. Even through the process of Devolution (2003) – where the Federal

government transferred authority for lands and resources to Yukon Government – the new territorial Yukon Waters Act and Regulations (2003a) only “mirrored” previous legislative language meaning there were no substantial changes made to the Act. “Crown” jurisdiction over water was simply downloaded from the Canadian Federal Government to the territorial government. This continued assumption of “Crown” ownership or jurisdiction over all ground and surface water is typical of colonial water governance in Canada, where provincial governments and Yukon post-devolution maintain control over decisions related to water use and access (Boyd, 2003).³³ Self-governing Yukon First Nations, however, have the unique opportunity to create Indigenous water legislation that supersedes colonial water legislation and the assumption of “Crown” jurisdiction.

4.4 Research Methods and Approach

This study of emerging forms of Indigenous water authority draws on community-based research conducted between 2012 and 2017 with four Yukon First Nations (Carcross/Tagish, Kluane, Tr’ondëk Hwëch’in and White River). Three key methods were engaged including interviews, participant observation and document analysis. Interviews were conducted with thirty-three Yukon First Nation government employees and nine other waters experts from Yukon

³³ The Canadian Constitution divides responsibility for water between the federal government and provincial/territorial governments. Provincial governments, and territorial governments, like Yukon, that have undergone devolution, have responsibility for most aspects of fresh water management. Provincial and in the case of Yukon territorial, legislative powers include, but are not restricted to: water supply, pollution control, hydroelectric development, flow regulation, and authorization of water use. The federal government has jurisdiction over fisheries, navigation, federal lands and Indian reserves (including drinking water supply on reserves), and international relations, for the most part related to management of boundary waters shared with the U.S (Bakker, 2007; Boyd, 2003).

Government, YWB, and YESAB (Table 4.1). Working closely with First Nation governments and their staff, thirty-three Elders were recruited to participate in interviews. Elders were given honoraria of (\$100 to \$200) to acknowledge their expertise and to thank them for their time and knowledge. Although using the names of Elders and other experts can be understood as a form of citation, the names of Elders are not used in this work following Yukon First Nation's Traditional Knowledge Policy confidentiality requirements (Carcross/Tagish First Nation, 2009; Kluane First Nation, 2012a; Tr'ondëk Hwëch'in First Nation, 2012). Several interview participants, across these expert types, were interviewed more than once to gain insight into how governing water had changed over time. Interviews were transcribed and thematically coded using Nvivo.

An enduring interest in creating Indigenous water legislation exists among Yukon First Nations. I have observed expressions of that interest among First Nation and Alaska Native Tribal governments since 2011, primarily at the Yukon River Inter-Tribal Watershed Council (YRITWC) Summit in Ruby, Alaska. The YRITWC has, in particular, engaged legal expertise over several years to examine the potential for Indigenous governments to create a legally enforceable approach to protecting the waters within their traditional territories and the broader YRB. This interest has also been a dominant theme at YRITWC Summits that I have attended (Ruby, Alaska 2011, Mayo, Yukon 2013, Minto, Alaska 2015, Carcross, Yukon 2017). My Yukon First Nation partners have also been engaged in ongoing internal dialogues about developing water legislation to assert the powers of self-government. The creation of water legislation has thus persisted as a primary focus among Yukon First Nations throughout my

doctoral fieldwork (2012 to 2017). Thus, this research seeks to advance understandings of the approaches Yukon First Nations might take to achieve this goal.

Table 4.1 Overview of interviews conducted with Elders, representatives from four Yukon First Nation Governments (Carcross/Tagish First Nation, Kluane First Nation, Tr’ondëk Hwëch’in First Nation and White River First Nation) and other water experts.

First Nation	C/TFN	KFN	THFN	WRFN
Agreements	Final (2005a) & Self-government (2005b) agreements	Final (2003a) & Self-government (2003b) agreements	Final (1998a) & Self-government (1998b) agreements	No treaty. Reconciliation agreement in progress
Languages Spoken*	Tlingit and Tagish	Southern Tutchone	Hän Hwëch’in “People of the River”	Northern Tutchone and Upper Tanana
Citizens**	633	154	770	247
Elders	7	6	9	5
Total Elders	27			
First Nation Government	5	13	8	7
Total First Nations	33			
Other Expert	9			
TOTAL	69			

* All partner Yukon First Nations, except C/TFN, belong to the Athabaskan-language group. Tagish Athabaskan peoples were the original inhabitants of the area. This region later became home to Inland Tlingit peoples who traveled to the area from Southeast Alaska for reasons of trade about 200 to 300 years before contact.

** Statistics compiled by Council of Yukon First Nations Self-Government Secretariat based on 2011 National Health Service data. WRFN recognizes 247 members, while only 149 of these are registered under the Indian Act. <http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/aprof/index.cfm?Lang=E>
<https://sgsyukon.ca/infographics/demographics/>

Interviews with multiple actors, participant observation and analysis of policy and legal documents have been used to elaborate and corroborate research findings including looking for points of convergence, complementarity, and divergence (Nightingale, 2009). In 2017, research results were also shared with and validated by participating First Nations during community presentations and via discussion of plain language reports. Finally, all interview audio and transcriptions have been returned to First Nation archives.

4.5 Legislating Indigenous Water Governance

Self-government agreements create opportunities to implement new approaches to water governance. Although no Yukon First Nation has done this to date, the potential to create legislation asserting their Chapter 14 rights is of utmost interest, particularly in reference to protecting water quality, quantity and rate of flow for waters on or adjacent to Settlement Lands. These laws could supersede the Yukon Waters Act and Regulations (2003a) as a law of general application, however much federal laws relating to water would still apply. Several Yukon First Nations are thus working towards implementing these Chapter 14 rights as a function of Self-government agreements and in reference to potential water laws and regulations on Settlement Land. Both THFN and C/TFN noted that they are working towards this goal but are still early in the process. Although not a law, Champagne and Aishihik First Nations' (CAFN) Water Strategy provides perhaps the most advanced example. As of May 2013, that strategy's draft vision statement read, "CAFN Government and its citizens have a great and deep respect for water. It is a gift that sustains all life throughout the land. As long as the rivers flow, CAFN government and its citizens will promote the protection and conservation of water throughout the traditional

territory” (2013, p. 1). While CAFN’s water strategy is still in draft format, it provides an example of how other First Nations are working to protect their relationships to water through settler-state recognized powers as self-governing First Nations.

Interviews, conducted as part of this project, showed that water is a priority for Yukon First Nations given concerns about resource development in Yukon and the significance of Yukon First Nation socio-cultural and material relationships to water. While linguistic and cultural diversity exists across the three Yukon First Nations engaged in this research, a sense of complex connectivity to water was expressed by these communities. Many Elders and First Nation government employees articulated these relationships by stating that they themselves are “part of the water, part of the land.” Furthermore, Yukon First Nations view water as a living entity that has spirit and must be respected (See Chapter 2 of this dissertation for detailed analysis). These relationships with water are characterized by respect, responsibility and reciprocity and through which water is seen as part of an extended network of kinship. As C/TFN Elder Colleen James notes,

Water is important to me because it’s the stuff of life. Without it, life can’t go on. And I think it’s important to all of life on the planet. And I try to share that with the family, and they know that it’s the stuff of life, very important, and to treat it like a relative, and to treat it good, and to appreciate it (Colleen James, C/TFN, 2012).

The idea that we should treat water as a relative encapsulates many aspects of Yukon First Nation understandings and relationships to water. This understanding of water differs fundamentally from the Modern Water or water as a resource engaged through the hydrologic sciences or contemporary resource management (Cf. Wilson, 2014; Yates et al., 2017).

All three Yukon First Nations discussed the development of water legislation to protect First Nation relationships to water. However, Elders and First Nations government officials from C/TFN, in particular, expressed the desire to develop legislation consistent with their relationships to water and their ontologies, epistemologies and the First Nation's legal traditions. Such an approach would directly contrast with present settler water laws. For example, a key critique of the Yukon Waters Act (2003a) has been its assertion of Crown jurisdiction or "ownership" of water. While this raises clear issues of power and jurisdiction typical of colonial water governance, it also highlights the pervasiveness of settler water ontologies of water as a resource that can be owned and managed (Explored in more detail in Chapter 2). Therefore, the development of Indigenous water legislation, and the assumption of jurisdiction over water through that legislation represents an opportunity to better reflect First Nation relationships to water and forms of governance.

Several Elders expressed some critiques of the goal of developing water legislation. One Elder (Colleen James C/TFN, 2015, 2017) questioned whether the creation of legislation would be consistent with a First Nation ethic of non-interference, which is itself based on the principle of respect for individual autonomy. This principle captures the idea that it is not typical to tell someone what to do or what not to do, but rather to educate or provide information to people so that they can make their own decisions. Developing legislation would, by definition, direct people as to what they can or cannot do in relation to water. Colleen James instead proposed that a water declaration could be developed (*Heen* (water in Tlingit) Declaration) that announces or educates people about Tagish and Tlingit relationships to water, without specifically telling

people what to do. Furthermore, another Elder from C/TFN noted that while it might be important to develop legislation consistent with these relationships to water, the idea of “law” as it originates within a western legal framework was never used by their Elders to describe their relationships to water. They stated, “myself, I don’t know. I know my dad never talked about any water laws or water rights, you know. [...] Basically, I hear a lot about water rights and water laws, but I know my dad never talked anything about water laws. Just that we all are part of the water system we share” (Elder 3 (C/TFN), 2015).

4.5.1 Existing Self-Governing Yukon First Nation Legislation

As already noted, no Yukon First Nation has established water legislation to date, yet existing legislation enabled by self-governing agreements illustrates some of the possible approaches that might be taken. Table 4.2 provides an overview of these and was developed by those who participated in this research. The table includes the dates this legislation was enacted, the subject of the legislation, the scale of application, the extent to which existing legislation draws on traditional values and law, and incidentally whether and how water is mentioned. These pieces of legislation cover a variety of areas including family law and child welfare, culture and heritage and land management.

The point here is to demonstrate both the extent to which existing Acts draw on traditional values and laws given the expressed interest in developing legislation that explicitly engages the First

Nations' relationships to water. The C/TFN Family Act (2006)³⁴ and the THFN Heritage Act (2016), by way of corollary, explicitly references traditional values and laws. For the former, traditional stories are interpreted to define virtues and values (legal principles) to develop a child welfare system consistent with Tlingit/Tagish traditional laws. Although the THFN Heritage Act (2016) does not contain traditional stories, the legislation develops an approach to Heritage and Culture rooted in the First Nations' way of life, traditional Laws and core values. In their own way, traditional laws, virtues, and values are used to understand the intent and foundation of these pieces of contemporary legislation and processes, which then enshrine responsibilities within and between the human and nonhuman worlds. Interestingly, the three pieces of Yukon First Nation legislation developed to ensure the sustainable management of Settlement Lands and resources contain the fewest references to traditional law. The C/TFN Land Interests Act (2016) contain no traditional stories or laws as does the aforementioned Family Act (2006), but states "the oral history and traditional practices of C/TFN provide the source of the virtues and values that are the foundation for all C/TFN law, and provide guidance for interpreting and grounding C/TFN law in C/TFN virtues and values" (p. 5). The KFN Lands and Resources Act (2012b) and the THFN Land and Resources Act (2004) most closely resemble colonial pieces of legislation. While developed with the purpose of asserting First Nation approaches to management and governance of Settlement Lands, they do not explicitly mention traditional law; they do however protect 'traditional activities' or activities undertaken by a citizen on a non-commercial basis to

³⁴ Carcross/Tagish First Nation has put considerable effort into articulating the beliefs, values, and laws based on their Tlingit/Tagish tradition. The "Book of Statutes" document developed by C/TFN presents traditional stories and discusses the beliefs and practices that underlie these stories; the responsibilities that follow from these beliefs and practices are also considered. The Family Act (2006) comprises "book two" of C/TFN "Book of Statutes."

obtain food or providing for subsistence, or for ceremonial, spiritual or cultural purposes.

Furthermore, both the KFN and THFN Acts also consistently use terms like “resources” to refer to land, water, and plants. For example, the THFN Land and Resources Act (2004) refers to water as a “renewable natural resource.” The term “resource” (also used consistently throughout land claim agreements) is reminiscent of settler water laws.

Table 4.2 Comparison of existing legislation created by three SGYFNs

First Nation	C/TFN	C/TFN	KFN	THFN	THFN
Law	Family Act (2006)	Land Interests Act (2016)	Lands and Resources Act (2012b)	Land and Resources Act (2004)	Heritage Act (2016)
Description	Reclaims responsibility for its families by establishing its own child welfare legislation.	Creates the rules and administrative structure for land disposition on Settlement Lands including citizens access leases.	Articulates an approach to managing Settlement lands and resources including the land use planning.	Establishes an approach to managing Settlement lands and resources including for leases, dispositions, and land use planning.	Provides direction for the management of heritage and culture.
Scale of Application	C/TFN Citizens	Settlement Lands	Settlement Lands	Settlement Lands	Traditional Territory
Indigenous values, practices and law	Traditional laws, values and stories form the basis of this law and are woven throughout the Act.	“The oral history and traditional practices of C/TFN provide the source of the virtues and values that are the foundation for all C/TFN law, and provide guidance for interpreting and grounding C/TFN law...”	Promotion of traditional activities is specified as a priority, but no references to the law being also rooted in traditional knowledge or practices.	Prioritizes and protects “traditional activities” or activities undertaken by a citizen on a non-commercial basis to obtain food or providing for subsistence, or for a ceremonial, spiritual or cultural purpose.	Summarizes the meaning of the First Nations’ way of life, traditional laws and core values pertaining to Heritage.
Water	Stories woven throughout the legislation reference practices, relationships with and responsibilities to water.	States that no disposition, unless explicitly stated, conveys any exclusive right, privilege, property or interest in water.	Notes that an authorization under this Act may include additional terms and conditions to conduct monitoring and reporting to protect the quality, quantity and rate of flow of waters.	Water is defined as one of these “renewable natural resources” along with land, flora, fungi etc.	Water references throughout the act as an entity to which THFN has a relationship and responsibility. It also states that THFN citizens “are part of the land, part of the water.”

While these pieces of legislation refer to traditional laws and values to varying extents, analysis of the First Nations' Constitutions, which outline the First Nations process and authority for developing legislation, all explicitly note that self-government and the legislation developed by the First Nation are motivated by the desire to protect First Nation relationships to their traditional territories including cultural, spiritual and material connections (Carcross/Tagish First Nation, 1997; Kluane First Nation, 1995; Tr'ondëk Hw'ëch'in First Nation, 1998). Section 3.2.1 of the THFN Constitution (1998) states that the objective of the THFN government is to, among others, "govern Tr'ondëk Hwëch'in citizens, lands, and resources in accordance with Tr'ondëk Hwëch'in culture and traditions." Similarly, the C/TFN Constitution (1997) is an expression of their traditional system of government, enshrines principles of fair treatment of our citizens and gives the Executive Council the power and responsibility to "develop laws based on the custom and traditions of the Carcross/Tagish First Nation and in accordance with the Constitution and the Carcross/Tagish First Nation Self-Government Agreement and the inherent rights of its members." However, while some of the legislation developed employs language that seems inconsistent with First Nations relationships to water (e.g., "resources"), further examination of First Nation constitutions clarifies the motivation of these laws; that is, the protection of First Nations culture and traditions including relationships to water as a living entity.

Direct linkages between Indigenous legal traditions and contemporary forms of governance are perhaps the most obvious for C/TFN. In addition to drawing extensively on oral tradition to develop their Family Act (2006), C/TFN engages traditional governance structures by organizing their First Nation government using Tagish and Tlingit clan-based traditions including their organization and designation of authority. Their Executive Council consists of a *Khà Shâde Hëni*

(Chief) and appointed council members representing the six clans including *Daklaweidi* (Killerwhale) and *Yen Yedi* (Wolf) (both of Wolf Moieties) and *Deisheetaan* (Beaver), *Ganaxtedi* (Raven), *Kookhittaaan* (Crow), *Ishkahittan* (Frog) (all of the Crow Moiety). Furthermore, the council includes two Elder Advisors from the *Gooch* (Wolf) and *Yeitl* (Crow) moieties.³⁵ The importance of this clan-based government for C/TFN's water governance was highlighted during an interview conducted in 2012 with a C/TFN Elder who discussed the importance of traditional governance structures, such as the clan system, for guiding respectful relations with water. He noted: "The laws that we have for water are in the clan houses. Those kinds of things are important because we need to respect water" (Elder 7 (C/TFN), 2012). Furthermore, different clan houses hold different stories and/or interpretations of the same story that are important for legal principles that might inform the development of a Water Act.

Water is different than land and presents its own challenges. If these self-governing First Nations decide to create water legislation, it is essential that these laws are effective and enforceable without creating too great of a burden for First Nations who already face capacity constraints. This research revealed several such challenges SGYFNs might face. First, while Yukon First Nations have made substantial progress asserting the powers of Self-government, implementation has been slowed by the systemic underfunding of First Nation self-government efforts. The shortcoming of the financial arrangements associated with Self-government agreements has been widely debated. Financial Transfer Agreements (FTAs) were negotiated

³⁵ Originally Chief was appointed, by clan leaders who were appointed by their Clans. After concerns raised by C/TFN citizens, this system was changed to democratic vote for the chief.

along with Self-government agreements for First Nations to provide public services to their citizens. FTAs were intended to create new financial relationships between these First Nations and the federal government (INAC, 2008, p. 7). However, Roburn and THFN (2012) critique Self-government agreements for extending First Nation powers without a concomitant increase in funding for governance (See also Nadasdy, 2017, pp. 31–37). Core funding for Self-governing First Nations is scarce and a large percentage of government revenues are obtained through project-specific revenues. This shortcoming of the financial arrangements associated with Yukon Self-government agreements was acknowledged from the beginning: Barry Stuart, the chief negotiator for Yukon between 1985 and 1990, once compared the Yukon Self-government agreements to getting a new Cadillac with no gas in the tank (Penikett, 2004, 2012). Self-governing Yukon First Nations are in the process of renegotiating financial transfer agreements to address this issue. While it is not the purpose of this paper to review the financial arrangements of Yukon Self-government agreements in-depth, this systemic underfunding imposes limitations on First Nation financial capacity to engage in planning and governance processes including the development, implementation, and enforcement of water legislation.

First Nations noted the need to build capacity to develop, implement and enforce water legislation as a key challenge. This will involve the need to develop new expertise related to water quality, quantity and rate of flow. In general, land claims have resulted in the devolution of a significant amount of administrative responsibilities to Yukon First Nations. Assuming these responsibilities has proven challenging for First Nations who have needed to develop new organizational skills and knowledge of government relations including knowledge of settler government legislation, regulations, policies and the technical expertise to understand and

engage in the contemporary governance landscape (Natcher and Davis, 2007). At the same time, First Nations, who have small populations, often find it difficult to recruit staff with the appropriate technical capacity from within their own communities (Tanner, 2001). In many cases, non-First Nations individuals, who have relevant expertise including familiarity with the bureaucratic and technical aspects of contemporary resource governance, are hired to fill these positions. Despite their best intentions, non-First Nations employees end-up applying their own ideologies, ontologies and epistemologies, grounded in a Western resource management tradition, to these governance processes. This can involve engaging decision-making processes that mirror state administrative bureaucracies and tools (e.g., water quality monitoring, water classification systems as well as governance structures that mirror state bureaucracies). David Natcher and Susan Davis (2007) argue, this most often results in a

centralized system of management that, like the territorial and federal departments, flows from the top down, with land managers remaining largely isolated from First Nation members. With non-First Nation managers being ideologically inaccessible to most First Nation members, the management of settlement lands is seen by many First Nation members as a mere extension of [state] government administration (Nadasdy 2003). (p. 273)

Indeed, water requires a very different set of expertise than land management, covered by existing First Nation legislation. It flows and crosses political boundaries. Understanding water chemistry and hydrology requires skill sets and capacities that even the territorial government has had to make an effort to build (Environment Yukon, Water Resources Branch, 2014). For example, there is a surprising lack of baseline data on water quality, quantity and rate of flow for surface water and even less for groundwater.

Community-based water monitoring is one important way that Yukon First Nations have been building their capacity for enforcement such as the Indigenous Observation Network and monitoring programs with Yukon Government (Water Resources Branch and Energy Mines and Resources). THFN is in the process of having some of their Lands and Resources Staff trained as EMR Inspectors to ensure better compliance with water licenses and environmental assessment approvals on Settlement Lands. In a study of the Indigenous Observation Network (A version of which comprises Chapter 5 of this dissertation), Wilson and others (2018) show that the CBM program engages scientific knowledge of water quality monitoring, while the Tribes and First Nations who participate in the program see it as a form of Indigenous water governance (as an act of stewardship requiring respect and responsibility to water as a living entity, but also as a way to gain data that might be used in decision-making processes). Regardless, First Nations will likely need to engage consultants or other outside technical assistance to demonstrate that any water regulations are based on rigorous data and methodologically sound.

First Nations already face significant challenges to capacity, and the development of enforceable water laws only amplifies this fact, as significant additional time and resources are required to succeed. One First Nation employee (Expert 2, C/TFN, 2015) went so far as to question whether Yukon First Nations should take on jurisdiction for water because of the challenges they will likely face in enforcing these laws, should their implementation be successful. There also exists the potential that any such new laws might open them to litigation by settler governments and resource development proponents. For example, a mining proponent might assert that water quality objectives outlined by a First Nation are too strict or based on faulty methods. The same water expert cited above (Expert 2) also suggested that a better way to ensure the protection of

water in Yukon would be for Yukon First Nations to assert their Chapter 14 rights to engage in other planning and management process.

4.5.2 “Treatment as State”

While Yukon First Nations are still early in the process of developing their water legislation, much can be learned from the examples of Indigenous peoples who have developed legal approaches to water. For instance, a parallel can be drawn between the opportunities available to SGYFNs related to water and the “Treatment as State” (TAS) of Tribes under the U.S. Clean Water Act (CWA) (1972). TAS acknowledges Indigenous peoples’ legal authorities to develop water codes or legislation. Thus, the experience of Tribes who have attained TAS status is instructive for Yukon First Nations looking to develop water legislation.

The U.S. Federal Pollution Control Act, more commonly known as the Clean Water Act (CWA) was created to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” (*Clean Water Act (Federal Pollution Control Act)*, 1972). The CWA was to be implemented through relationships between the U.S. Federal government and states but remained silent on the role of Tribes. The involvement of Tribes was not clarified until 1987 when Congress passed the “Treatment as States” (TAS) provision of the CWA. In general, the Code of Federal Regulations governing the Protection of the Environment now stipulates that tribal WQS would have the same treatment under section 510 of the CWA as states WQS. Tribes, like states can develop WQS more conservative than the CWA requires (40 CFR 131.3(j) (2002) and 40 CFP 131.4 (a)) (2002)).

The TAS approach explicitly acknowledges the status of Tribes as sovereign nations and implicitly recognizes the importance of the natural environment for the survival of tribal cultures, which are inextricably connected to the environment. It can be understood as a powerful tool for Tribes to extend authority over tribal waters (e.g., the ability to develop more stringent WQS including those based on cultural and spiritual designated uses). This was demonstrated in the legal case *City of Albuquerque v. Browner* (1993) over the Pueblo of Isleta's tribal WQS. The Pueblo's boundaries are located only five miles downstream from the City of Albuquerque's sewage plant outlet. While the Pueblo get their drinking water from groundwater, the Rio Grande is central for religious reasons and the river water is consumed directly during ceremony. The Pueblo of Isleta quickly applied for TAS under the CWA and received this approval in October of 1992. They adopted water quality standards for the stretch of the Rio Grande which runs through their lands. The Pueblo designated the waters for "primary contact ceremonial use," "primary contact recreational use," "warm water fishery use," "secondary contact recreational use," "agricultural water supply use," and "industrial water supply use," and promulgated numeric and narrative limitations to support these uses." They submitted these WQS to the EPA and the EPA approved them despite some concerns (Fort, 1995). In this dispute, the EPA attempted to set aside as many jurisdictional questions as possible by relying on the scientific evidence put forth by the Tribe associated with the creation of the WQS as they might impact the City of Albuquerque.

In relation to the Pueblo of Isleta WQS, Dussias (1998) emphasized the importance of the EPA's approach to approval based on the tribe's Indigenous Knowledge and interests in developing the WQS represents a radical departure from previous federal efforts to eliminate or ignore tribal

relationships to the environment and spirituality. In contrast, Ranco (2009) argues that the case could also be understood as a failure of tribal self-determination because of the extent of the EPA's authority over the process. For example, the Tribe obtained permission to adopt water quality standards (WQS) under a US federal law and system that they did not devise and could not change, the Tribes' WQS were subject to review by the EPA – a U.S. agency and only the agency who reviewed them had the authority to enforce the WQS. In summary, “to gain any authority over its water quality standards, the tribe was required to go through a tedious procedure to gain the approval and recognition of the federal government” (Ranco, 2009, p. 48). In other words, however much the EPA has the power to support Tribal Sovereignty, the same powers can be used to the opposite effect.

While TAS had been said to show a strong commitment to tribal sovereignty, critiques of process and forms of governance Tribes must engage in have also been made (Saunders, 2009). To be treated like a state, with the authority to set their own WQS, Tribes must meet an onerous set of requirements. For instance, Tribes must prove that they have a functioning tribal government with the authority and capacity to regulate. The U.S. EPA evaluates the Tribes readiness for TAS against a set of “requirements for Indian Tribes to Administer a Water Quality Standard Program” (Section 40 Code of Federal Regulations 131.8), which stipulate that Tribes must be federally recognized and exercise authority over a Federal Indian Reservation, have a “governing body carrying out substantial governmental duties and powers,” and, among other requirements, be “reasonably” capable on the “Administrator’s judgement, of carrying out the functions” (Section 40 Code of Federal Regulations 131.8). Among other requirements, Tribes must also provide a map of the geographic area over which they assert authority and a narrative statement

describing their current approach to environmental governance including previous management experience, existing tribal laws and policies, and a description of the technical ability of tribal staff.

Only 54 of 562 federal recognized Tribes have been approved for TAS to administer water quality standards; 44 of these have approved WQS (US EPA, 2014). Many Tribes are automatically excluded by the requirements from taking on TAS (e.g., the failure to demonstrate adequate governance capacity or the inability to exercise authority over waters). Two hundred, twenty-nine (229) Alaska Native Tribes also do not exercise authority over lands or the waters within them; this stems from the unique land ownership arrangements developed through the Alaska Native Land Claims Settlement Act. At the same time, Tribes may also be deterred because there can be more risks than rewards related to the assertion of tribal sovereignty. As noted by Saunders (2009, p. 452) “as often happens when Tribes dare to regulate, disputes over jurisdiction with non-Indians, particularly with state governments, inevitably occur.” According to Fort (1995), TAS provision increases the number of “states” up to ten-fold and therefore dramatically expands the potential for jurisdictional conflict. Tribes may be deterred by this ‘risks outweigh the benefits’ view of TAS. For example, Tribes may be deterred by the potential for enacting their own WQS because of the potential they might face expensive and time-consuming litigation (Porter, 2006; Saunders, 2009). In addition to threats from litigation, Porter (2006) suggests that Tribes may be reluctant to participate in TAS due to the perception that TAS threatens their sovereignty; lack of funding and infrastructure to develop and implement water-quality programs, and differences in cultural concepts about water. It has also been shown that the tribal WQ programs that most closely resemble state or federal programs are more likely to

survive litigation than tribal programs that reflect their cultural values and governance systems (Ranco, 2009, p. 46). This is likely because water legislation resembling settler water laws is more likely to be understood, considered transparent and defensible in a court of law.

While SGYFNs have more latitude than Tribes under TAS to determine the form and focus of potential water legislation, the critiques of TAS affirm some of the concerns shared by Yukon First Nations about this potential and affiliated legal challenges. Furthermore, while TAS has been forward-looking in terms of allowing Tribes to develop water codes that reflect their relationships to water and traditions, there is pressure from the broader political and legal context for legislation to reflect settler legislation. Yukon First Nations are likely to face similar political-economic pressures. Settler governments do not have the authority to approve or reject SGYFN laws, but Self-government agreements require that settler governments are consulted about the development of new legislation. In so doing, the pressure to produce something they would recognize as “legislation” is reasonable to anticipate.

4.6 Discussion and Conclusion

In the discussion that follows I highlight three primary arguments: First, I contend that while there are downsides to taking on “state-like” forms of governance, SGYFNs are actively working to engage opportunities enabled through Self-government and land claims to protect the waters within their territories in a manner consistent with their legal orders and ontologies. Second, building on recent examples of state water legislation that acknowledge water as a more-than-human person, I argue that the view of water as a resource, often called Modern Water (Linton,

2010), is not inherent to states. Third, I argue the experiences of U.S. Tribes with TAS status under the Clean Water Act is instructive regarding the limitations SGYFN may face in their efforts to engage revitalized Indigenous legal traditions within Indigenous water legislation because they are working within a broader context structured by the dominant legal system and its ontological underpinnings.

SGYFNs have gained substantial authority through land claims and Self-government agreements, as compared to their previous status as bands under the Indian Act (1985).³⁶ Yet there is no doubt that to benefit from the powers of land claim and Self-government agreements, northern Indigenous peoples have had to radically alter their way of life and engage forms of governance that bear little resemblance to traditional forms of governance (Nadasdy, 2003b, 2017; Natcher and Davis, 2007). Such critiques remind us to heed the potential consequences of engaging these forms of governance. In the context of water governance, they are useful in prompting us to consider the ways ‘state-like’ forms of governance might, consciously or unconsciously, shape how Indigenous peoples “see” water. It is widely noted that Modern Water has been hegemonic. “Seeing” water in this way permeates all colonial water legislation and has been essential to both state formation and the extension of state power through the control of water. These critiques raise critical questions about how the development of Indigenous water legislation and the specific types of technical and administrative expertise needed to accomplish

³⁶ While land claim (Chapter 14) and Self-government agreements acknowledge Yukon First Nation authority to develop contemporary legislation, their rights and authorities stem from the inherent right to self-government and self-determination based on their ancestral spiritual, cultural and material connections to their traditional territories and the waters within them, as opposed to established rights, which have been negotiated or defined in and through courts or treaties (Borrows, 2002, 2010).

this might contribute to subtle changes in how First Nations “see” water. Indeed, legislation seeking to codify Indigenous legal traditions would necessarily involve some simplification of the complex traditions, practices, and relationships in relation to water. Boelens (2009) argues that the codification of customary or local water rights in Latin America is used to facilitate state control and to further the neoliberal goal of incorporating local water users rights and organizations into the market system. In Yukon, it has been argued that the changes brought about by Modern land claims and Self-government agreements not only obscure and reinforce existing power relationships, but by tying First Nation communities up in bureaucratic processes they can thwart meaningful change and extend the power of settler states through naturalizing settler governance concepts and structures (Nadasdy, 2017). In this sense, settler colonialism might be seen as a form of governmentality or a “relatively diffuse set of governing relations that operate through circumscribed modes of recognition that structurally ensures continued access to Indigenous peoples’ lands and resources by producing neoliberal subjectivities that coopt Indigenous peoples into becoming instruments of their own dispossession” (Coulthard, 2014, p. 156 cites Alfred (2009) and L. Simpson (2011)). From this perspective, there is a potential that the water governmentalities produced through Modern land claim agreements might impinge on the sovereignty of Indigenous peoples and create political arrangements that make these spaces “legible” and therefore exploitable and controllable (Bebbington and Bury, 2013; Francisco and Boelens, 2015).

While the above critiques are useful for characterizing the problematic power inequalities associated with settler colonial water governmentalities, they fail to acknowledge Indigenous peoples’ agency and hard work as they engage with the governance processes and opportunities

created through land claim and self-government. For instance, Yukon First Nations are asserting their agency by strategically developing legislation and infusing it with Indigenous values, principles, and laws. Several pieces of legislation are explicitly based on Indigenous legal traditions and principles (e.g., C/TFN Family Act and THFN Heritage Act). Others made no mention of traditional law, but in all cases, the First Nation constitutions express the desire to govern their territories in a manner consistent with the First Nations culture and traditions. While none of these pieces of legislation is specific to water, examples from elsewhere also show that First Nations are taking various approaches to Indigenous water governance and protecting water quality, quantity and rate of flow within their territories. Indeed, there are several examples where contemporary policies and legislation are infused with traditional law and relationship to water. Similarly, critical Indigenous scholars have shown that, even while settler colonial forms of governance and concepts are problematic and seemingly at odds with Indigenous ontologies, epistemologies, and laws, Indigenous peoples continue to enact relational politics within and through these systems in order to maintain their culture and distinct polities (Manson, 2015; Simpson, 2014). For example, C/TFN developed their First Nation bureaucracy based on the Tagish and Tlingit clan-system and actively worked to engage oral tradition and Indigenous legal principles in the development of legislation. At the same time, further analysis of the development and enforcement of emerging Indigenous water legislation will be critical to move beyond merely acknowledging First Nation agency, to trace the actual ability of these governments to wield real power in relation to water governance in Yukon.

While Modern Water was essential for colonial expansion and state formation, this does not mean that state governments must continue to “see” water in this way. Recent moves towards

acknowledging the rights and personhood of nature provide evidence that such a shift is possible (Boyd, 2017). In a landmark case in New Zealand courts the Whanganui Maori iwi (kin group) won a 140-year legal battle to recognize their ancestral Whanganui river as having personhood and thus legal rights equal to that of humans. The *Te Awa Tupua* (Whanganui River Claims Settlement) Act (2017) represents a promising legal precedent that responds to the iwi's fundamental spiritual connection to the river as expressed by the phrase *ko au te awa ko au* ("I am the river, and the river is me"). The legislation states that a guardian or *Te Pou Tupua*, will be appointed to act on behalf of the river. Two peoples will be appointed to act in this role; one from the Crown and one from the *Whanganui iwi*. To implement these new rights, the legislation also creates an institutional framework consisting of several new actors and rules. *Te Pou Tupua* will be supported by an advisory group (*Te Karewao*) and a new strategy group (*Te Kopuka na Te Awa Tupua*), which will develop, approve, and monitor the implementation of a catchment watershed strategy for the river, *Te Heke Ngahuru*. The legislation also included financial support for implementing a new framework and introducing the legislation at the national level (O'Donnell et al., 2017). The acknowledgement of the personhood of the *Whanganui* river not only represents a shift away from Modern Water but a shift toward acknowledging Indigenous peoples' relationships to water. The institutional framework developed to implement the legislation seeks to nest governance principles consistent with Maori ontologies into the new property rights arrangements. The institutional framework created through the legislation ensures that the personhood of the river is given legitimacy and strengthens the potential that the rights will be brought into force (O'Donnell et al., 2017). While this approach has not been widely adopted by settler states, it provides an example for how Indigenous peoples might develop legislation in a manner consistent with their relationships to water.

Finally, the experiences of Tribes with TAS are instructive in terms of some of the challenges SGYFNs might face in developing and enforcing their legislation. As the TAS example shows, Tribes who develop legislation are very likely to face litigation by proponents and/or settler governments. The extent to which their legislation stands-up in court will, therefore, in part depend on the legislation's resemblance to settler legislation, regulations or policy. As Inupiat/Inuvialuit legal scholar Gordon Christie (2007) notes, Indigenous peoples should be wary of the limitations imposed on the reinvigoration of Indigenous legal traditions through framings structured by the dominant legal system and its ontological underpinnings. Yukon First Nations are strategically engaging legislative options for the purpose of protecting their relationships to water. Critiques of these forms of governance can assist with the development of SGYFN water legislation by highlighting how to avoid reproducing the same problems found in colonial legislation. While there are clear benefits to developing this legislation, some Yukon First Nations will likely determine that the risks are not worth the rewards.

Chapter 5: Community-Based Monitoring as the Practice of Indigenous Governance: A Case Study of Indigenous-led Water Quality Monitoring in the Yukon River Basin

Summary

Indigenous peoples are increasingly developing Community-Based Monitoring programs to protect the waters and lands within their territories in response to multiple ecological and political stressors. CBM tends to focus on Indigenous peoples' role as 'knowledge holders.' This paper explores CBM through a governance lens by understanding CBM as a strategy for the assertion of Indigenous sovereignty and jurisdiction. We examine how Indigenous peoples conceptualize the relationship between CBM and water governance processes to improve the linkages between monitoring and Indigenous governance. Our findings suggest that data quality and credibility, trust and legitimacy and relevance to decision contexts are key to mobilizing CBM data in relevant decision-making processes. We provide three recommendations to improve linkages between CBM programs and Indigenous governance: Indigenous governments must take a leading role in CBM programs, networked capacity between Indigenous governments can be built using a bridging organization, and CBM programs should be closely coupled with Indigenous water governance strategies. All research herein is collaborative and is based on our engagement with the Indigenous Observation Network – an Indigenous-led community-based water quality monitoring network involving Yukon and BC First Nations as well as Alaska Native Tribes. It is considered the largest Indigenous water quality network in the

world and is coordinated by the Yukon River Inter-Tribal Watershed Council and the United States Geological Survey. Results are derived from interviews with twenty samplers and ten other stakeholders with attention to ways to better inform internal and external decision-making processes.

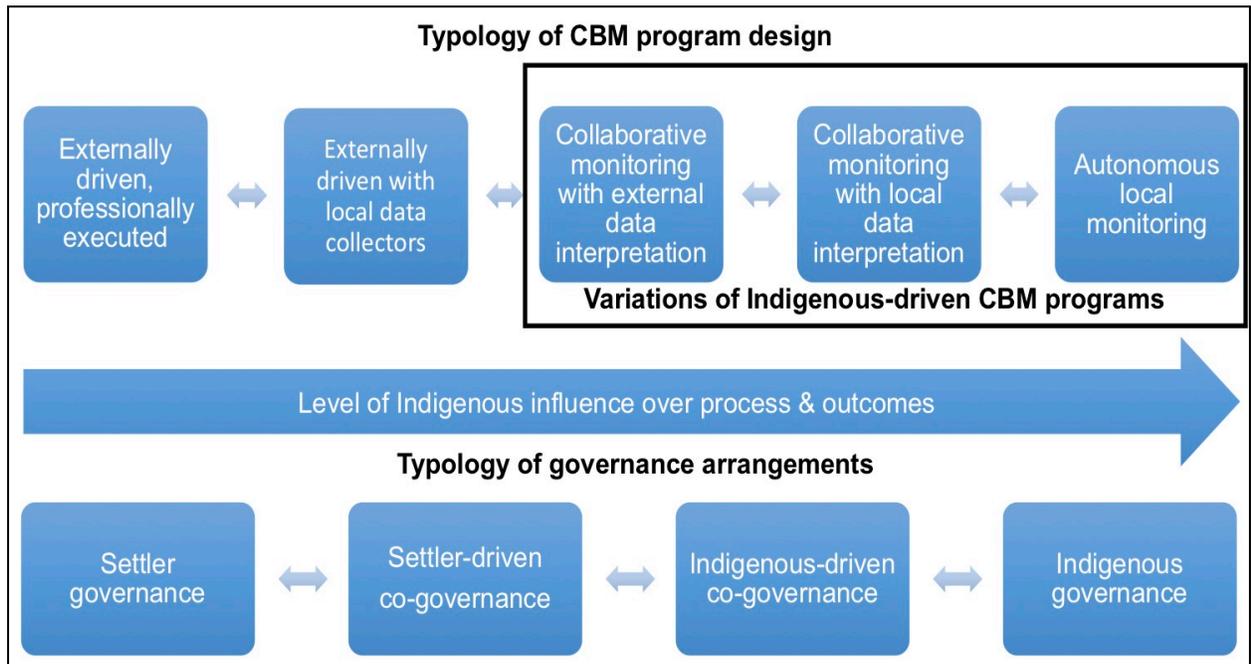
5.1 Introduction

Indigenous peoples, or those communities that claim a historical continuity with their traditional territories (Corntassel, 2003), have been governing the waters and lands within their territories since time immemorial. Indigenous governance systems have, however, been disrupted or constrained by colonial forms of governance despite enduring knowledge of such systems in practice and oral history (Borrows, 2002; Napoleon, 2013). Governance is understood, for many Indigenous people, as involving a sacred responsibility for water stewardship that stems from their reciprocal relationships to water as a living entity (Anderson et al., 2013; McGregor, 2014; Sam and Armstrong, 2013; N. J. Wilson, 2014). However, governance constraints, including water rights and access, deeply affect Indigenous peoples' ability to protect the waters that are important to their ways of life, health, and culture. An emerging solution to these pressures and those introduced by resource development and global environmental change are Community-Based Monitoring (CBM) programs, which seek to document the changes occurring within their territories (Kotaska, 2013b; Lowe, 2016; Parlee et al., 2012). CBM is a process where parties “collaborate to monitor, track and respond to issues of common community concern” (Whitelaw et al., 2003, p. 410). Although a large majority of CBM programs involve “citizen volunteers” of settler origin, there are a growing number of CBM programs involving Indigenous peoples

globally. Such programs can be found in Canada (Berkes et al., 2007; Gearheard et al., 2011; Kotaska, 2013b; Parlee et al., 2012); the USA (Johnson et al., 2015); Australia (Wiseman and Bardsley, 2016); New Zealand (Harmsworth et al., 2011) and across the polar regions due to the disproportionate effects of climate change at high latitudes (Alessa et al., 2015).

Despite a growing number of programs involving Indigenous peoples, the CBM literature rarely refers to Indigenous peoples as governing their traditional territories. Berkes and others (2007) suggest that involving Indigenous ‘stakeholders’ in CBM can “bring a wider range of knowledge to understand ecosystem change” (p. 145). From this perspective, Indigenous peoples are considered ‘knowledge holders’ whose engagement in CBM can improve understanding of environmental change (Johnson et al., 2015; Wiseman and Bardsley, 2016). At the same time, the underuse of CBM data in decision-making is identified as one of the greatest challenges facing these programs (Buckland-Nicks et al., 2016; Buytaert et al., 2016; Conrad and Hilchey, 2011; Hunsberger, 2004). Previous research on the connection between CBM and decision-making has usefully specified factors contributing to this problem including concerns about data quality and credibility (Legg and Nagy, 2006), the frequent mismatch between the data collected and the decision-context (Conrad, 2006), and data fragmentation due to inconsistent funding and data collection protocols (Bliss et al., 2001). However, these studies do not identify Indigenous peoples as either CBM participants or decision-makers. Overall, the common assumption that Indigenous peoples are ‘stakeholders’ who contribute their knowledge, rather than governments who make decisions, has meant the potential for CBM as a tool for asserting sovereignty and jurisdiction has rarely been explored (c.f. Parlee et al. 2012, Kotaska 2013).

Figure 5.1 Typology of CBM program design compared to a typology of governance arrangements involving Indigenous peoples. Each depicts increasing levels of Indigenous leadership or control. Program designs on the far right (black box) can be considered Indigenous-led CBM and with varying levels of involvement from external parties (Adapted from Danielsen et al., 2009; Hill et al., 2012).



To achieve a better understanding, we develop a framework to compare Indigenous peoples’ roles in governance and CBM programs. Danielsen and colleagues (2009) established a typology of community participation in monitoring programs, where program design ranges from externally driven, professionally executed monitoring to autonomous local monitoring programs (Figure 5.1). While not specific to Indigenous CBM, these categorizations are useful when considering the degrees of engagement and control Indigenous peoples have within a spectrum of monitoring programs. This approach identifies the range of possibility for CBM but is not specific to the ways Indigenous peoples are engaging CBM as a tool to assert their sovereignty

and jurisdiction. Toward that end, we juxtapose the typology of program design with a rough typology of governance arrangements where the latter ranges from settler governance to co-governance arrangements (i.e., settler and Indigenous driven co-governance) through to Indigenous governance arrangements (Figure 5.1 bottom) (Adapted from Hill et al., 2012).

Indigenous-led CBM programs take the form of both collaborative and autonomous monitoring, with varying levels of involvement for external parties, and tends to correspond with Indigenous-led co-governance or Indigenous governance (Figure 5.1, top – black box).

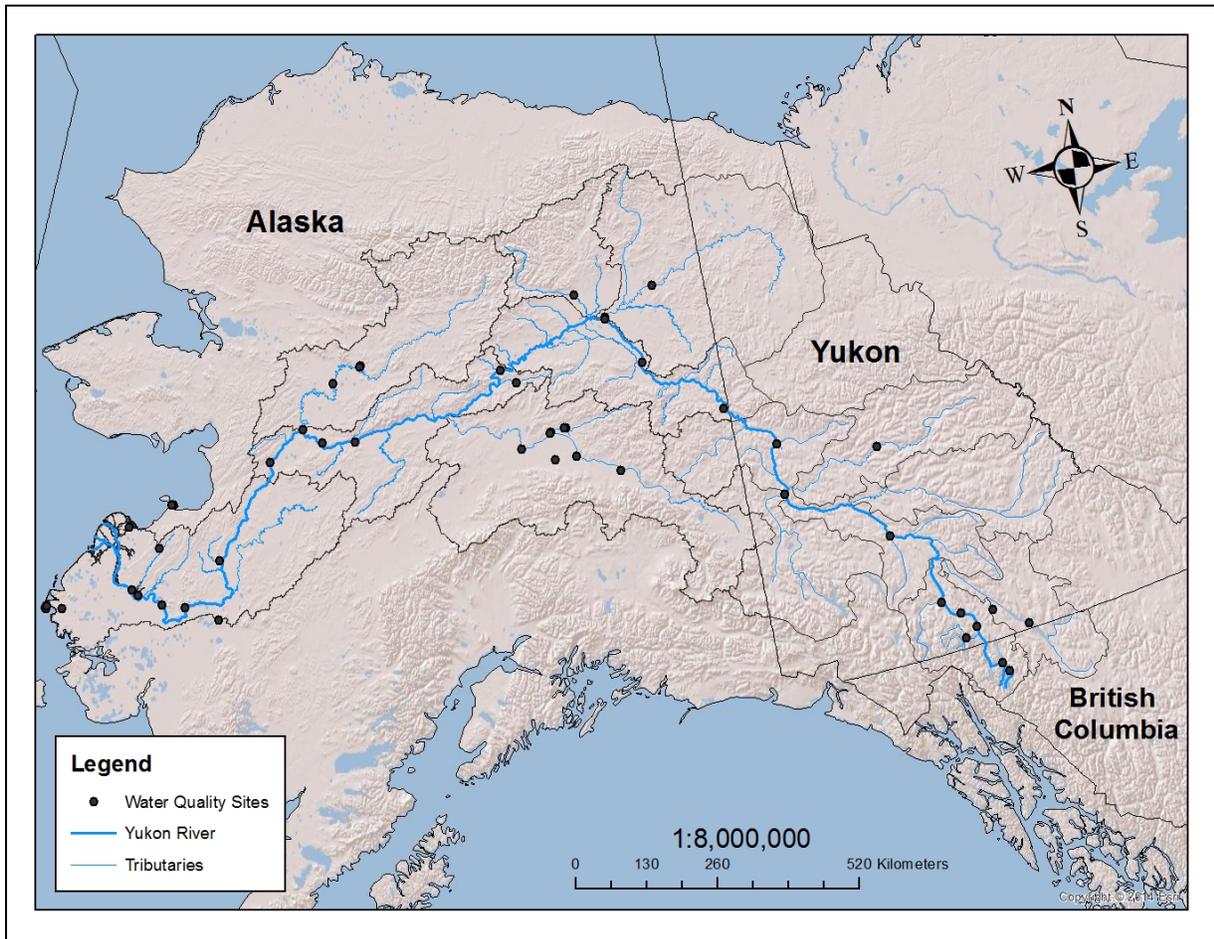
In this paper, we seek to challenge the very notion of CBM as knowledge input alone and instead consider it an important emerging expression of Indigenous governance itself. We examine a case study of the Indigenous Observation Network (ION) – an Indigenous-led community-based water quality monitoring network involving First Nations in Canada and Alaska Native Tribes (Indigenous governments), coordinated by the Yukon River Inter-Tribal Watershed Council (YRITWC) – in the Yukon River Basin (YRB). A case study approach is used to analyze Indigenous peoples' conceptualizations of CBM in relation to water governance including responsibilities for water stewardship, Indigenous governance perspectives and the broader governance landscape, shaped by settler approaches to governance. Next, we examine the opportunities and challenges faced in engaging CBM data within decision-making processes relevant to Indigenous peoples. This includes the importance of data quality, trust, and legitimacy of the organizations and people involved in CBM programs as well as the accessibility and relevance of the data to the Indigenous communities for specific decision contexts. Lastly, we discuss the elements of CBM program design that can improve linkages to

Indigenous governance processes including, the role of leadership, networked governance, and capacity, as well as tighter integration of governance strategies with CBM.

5.2 Research Setting

The ION is a transboundary Indigenous initiative that aims to combine Western Science and IK to research, sustain and protect the YRB and the Indigenous people who reside in the watershed. ION is facilitated by the YRITWC – an Indigenous grassroots organization, consisting of 73 First Nations and Alaska Native Tribes signatories dedicated to the protection and preservation of the YRB. Thirty-four Indigenous governments in Yukon and British Columbia are actively participating in ION to conduct water quality monitoring at 54 sites from the headwaters to the mouth across the entire YRB (Schuster and Herman-Mercer, 2015). ION is supported by a Memorandum of Understanding (MoU) between the United States Geological Survey (USGS) and the YRITWC. The MoU represents a formal agreement to cooperate and engage in research to develop and continue a baseline water quality monitoring program based on protocols and methods derived from the USGS and that acknowledges Indigenous culture, knowledge, and perspectives (USGS, 2009). At present, ION is considered the largest Indigenous water quality network in the world (Figure 5.2) and it incorporates IK in conjunction with high-quality field, laboratory, and data analysis methods.

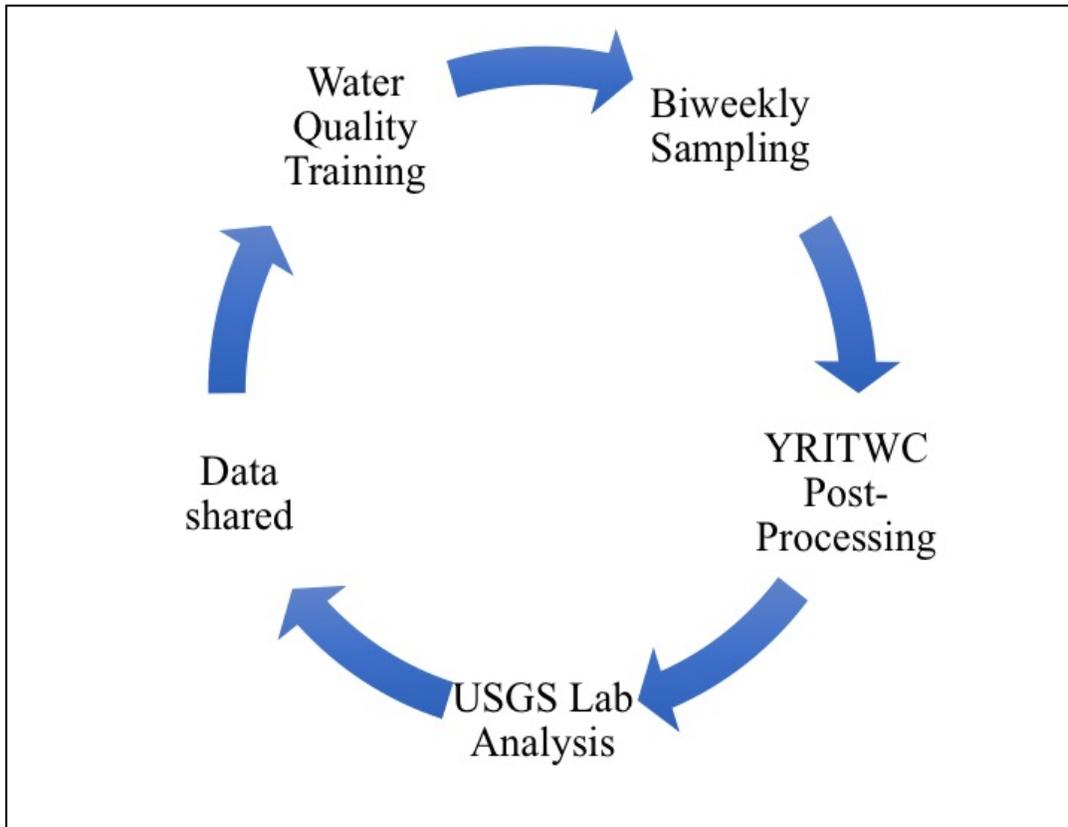
Figure 5.2 Map of ION water quality sites within the YRB



As of 2015, thirty-six samplers from thirty Indigenous governments dedicated their time to the collection, processing, and shipping of water quality samples for ION. Samplers include the U.S. Environmental Protection Agency funded Indian General Assistance Program (EPA IGAP) Coordinators from Alaska Native Tribes as well as First Nations youth and environmental staff, whom together conduct bi-weekly surface water sampling during the open water season (June to October) and in some cases during the winter months (Figure 5.3). USGS and YRITWC research scientists train samplers following USGS protocols and field methodologies. Water quality monitoring includes *in situ* measurements of pH, dissolved oxygen, conductivity, and

temperature in addition to the collection of surface water samples for chemical analysis (YRITWC, 2014). A variety of biogeochemical parameters are collected to investigate the effects of climate change on river water quality including dissolved organic carbon, dissolved greenhouse gases, major ions (anions and cations), nutrients, trace metals and stable water isotopes (YRITWC, 2014). YRITWC staff process water samples and ship them to the USGS National Research Program (NRP) laboratory in Boulder, Colorado for analysis.

Figure 5.3 Water Quality Sampling for the ION takes place in several states including sampling, training, laboratory analysis, and returning the data to communities



The raw data (QA/QC) procedure is performed by USGS NRP, the Alaska Climate Science Center (ACSC), and YRITWC before data interpretation is completed and made available to participating Indigenous governments for their use. The water quality data are shared with participating communities in the form of plain language reports (2013 and 2015) summarizing the spatial and temporal trends seen at each water monitoring site and an assessment of the results relative to federal or state water quality guidelines or standards. Data from 2006 to 2014 are also publicly available for all water quality sites on the USGS ScienceBase website.

5.3 Methods

This research was designed using an approach known as Community-Based Participatory Research (CBPR), which focuses on issues of real importance to communities, involves community members in all phases of the research process and centers on the goal of social change (Minkler and Wallerstein, 2008). CBPR is not a research method in itself, but an ethical philosophy that promotes shared decision-making power and ownership over the research process, co-learning, the co-creation of knowledge and its dissemination in a mutually beneficial manner (Castleden et al., 2012). CBPR has been used to decolonize conventional relationships between university researchers and Indigenous communities (Castleden et al., 2008) and to avoid reproducing the negative histories of research between Indigenous peoples and external researchers (Denzin et al., 2008; Smith, 1999; Wilson, 2009). The use of CBPR was facilitated by the long-term relationship between the lead author and the YRITWC (since 2009), and the research design is informed by this ongoing collaboration.

Semi-structured interviews were conducted with First Nation and Alaska Native Tribal samplers. Interviews were organized around the themes of Indigenous peoples' relationships to water, concerns about environmental change and evaluation of their experience sampling for ION (e.g., capacity, training sessions, sampling challenges, the relevance and accessibility of sampling protocols and results as well as data use). Samplers were provided a small gift card (valued at \$30 CAD) to thank them for their participation and acknowledge their contribution. Semi-structured interviews were also conducted with other stakeholders, which included YRITWC staff, Executive Council members, and USGS staff. Interviews were conducted between August and December of 2015. Interview participants were recruited in a targeted manner by using the list of current samplers. The lead author interviewed samplers who were present at two events including YRITWC's Summit in Minto, Alaska in August 2015, the Alaska Tribal Conference on Environmental Management Water Quality Training (ATCEM) in October 2015 in Anchorage, Alaska. To increase the number of samplers from Yukon and British Columbia, interviews were conducted in their communities or by telephone between August and September 2015. Samplers from the same community were often interviewed together. A total of 20 samplers and ten stakeholders were interviewed (Table 5.1). Interviews were audio-recorded, transcribed and coded using NVivo, utilizing thematic qualitative coding techniques (Saldaña, 2013). The results of this research were shared with the YRITWC and signatory governments through a presentation at their Biennial Summit in Carcross, Yukon in August 2017 and a plain language community report (Wilson, 2017).

Table 5.1 Summary of interviews conducted with Water Quality Samplers and Other Stakeholders in Canada and Alaska, USA.

Region	Canada (YT and BC)	USA (Alaska)
Samplers	7 (57%)	13 (43%)
Other Stakeholders	6	4
Sub-Total	13	17
Total	30	

*Interviews were conducted with a subset of the thirty Tribal and First Nation samplers who were active in 2015 (4 of 7 Yukon and British Columbian First Nations and 10 of 23 Alaska Native Tribes). Percentages were calculated after adjusting for cases with more than one interview per community.

5.4 Results

A better understanding of CBM and its connection to governance is essential to Indigenous sovereignty and to the success of the ION as the network is itself nested within the complex water governance landscape of the YRB. This includes multiple, overlapping jurisdictions (British Columbia, Yukon, Alaska as well as the Canadian and US Federal governments) and the role of two general types of land claims as central to water policy. These are the Alaska Native Claims Settlement Act (1971) and the Yukon Umbrella Final Agreement (1993) (eleven modern, comprehensive land claims and Self-government agreements). Furthermore, there are several First Nations with unceded territories in Yukon and British Columbia.

Indigenous jurisdiction over water is acknowledged to varying extents in these contexts, which have different mechanisms for decision-making about water. It is not the purpose of this paper to provide a systematic analysis of the governance context of the YRB or the opportunities to use

CBM data. Instead, our analysis of the governance dimensions of CBM for Indigenous peoples draws on contextual examples to illustrate the linkages between CBM and Indigenous peoples' engagement in water governance. Water governance, for our purposes, is understood as the set of regulatory processes, mechanisms and institutions through which political actors, including communities, influence water-related decisions, actions and outcomes (Bridge and Perreault, 2009).

Two distinct but related themes linking CBM to Indigenous governance emerged through our analysis. First, the ways in which CBM can be understood as a practice of governance itself as Indigenous understandings of stewardship, kinship, and responsibility to water that inform CBM are fundamental to Indigenous governance. Second, the opportunities and challenges for using CBM data to influence governance outcomes within both internal and external decision-making processes.

5.4.1 Responsibility and Kinship Motivates CBM

Indigenous peoples in the YRB have a sacred responsibility for water stewardship, and this responsibility to protect water has been a key motivation behind the ION. As one Yukon First Nation sampler noted,

I'm an environmental monitor for my First Nation. And I think water is very important to First Nations people because our elders always tell us that water provides life and it's very important for us to make sure that the water is always clean, always running clean,

free of contaminants and whatnot. And that is what the First Nations does to monitor the water quite steadily, on a routine basis.

In the same vein, samplers discussed the importance of ION at the watershed-scale, including downstream communities. An Alaska Native sampler raised a concern about the effects of upstream communities on water quality near their community: “Being a community at the mouth of the Yukon, we’re downstream from all the rest of the Yukon River villages. It’s kind of a concern about the water quality because what happens up there comes down to us.” Similarly, samplers from upstream First Nations also considered protecting water quality for downstream communities an important motivator for their participation in the ION.

Indigenous stewardship is fundamentally about a responsibility to care for water as a living entity. These powerful statements of responsibility contribute to the enactment and coupling of Indigenous governance and stewardship through a politics of kinship (See Manson 2015). Applied to CBM, stewardship is not separate from governance, but rather CBM is itself the practice of Indigenous governance. Indigenous samplers engage in sampling to fulfill their responsibility to care for the waters within their territories, and these acts of care for more-than-human relations engage the politics of kinship on the ground. Moreover, one sampler noted their government conducts monitoring that includes but is not limited to ION to keep other governments and industry “honest” as they operate within their traditional territory. For example, to ensure that legacy contaminated sites are properly monitored and remediated by the Canadian Federal government. CBM has similarly been called a form of “direct action” (Lowe, 2016) where Indigenous peoples need “moccasins on the ground” to know what is going on in their territories (Thomas, 2016). CBM is used to assert Indigenous jurisdiction over land and water

and to fulfill the responsibility for water stewardship, regardless of the extent it is acknowledged by settler governments. In this sense, CBM is viewed as a means to counter unequal power relationships by using independent, Indigenous-led CBM to collect environmental data (Kotaska, 2013b).

5.4.2 Improving Linkages Between Indigenous CBM and Water Governance

The majority of samplers said their community had already used or intended to use the ION data. However, most of these individuals reported that the data had been used for educational purposes with only two Yukon First Nation samplers noting they directly used ION water quality results in decision-making (e.g., in their submissions to the Yukon Environmental and Socio-Economic Impact Assessment Board). This finding parallels those of other studies noting that CBM data has had limited uptake in decision-making processes (Buckland-Nicks et al., 2016; Buytaert et al., 2016; Conrad and Hilchey, 2011; Hunsberger, 2004). Samplers and other stakeholders identified three key challenges to data use by Indigenous governments in this context.

5.4.2.1 Data Quality and Credibility

Where CBM data might be used for legal or decision-making purposes, data quality assurance and control (QA/QC) protocols, as well as standardized operation procedures (SOPs) must be a priority for CBM programs as the rigor of the dataset will likely be challenged. The ION water quality program's SOPs and QA/QC protocols across the YRB has been a priority for the YRITWC. During interviews, YRITWC and USGS staff members discussed how ION's

program design actively seeks to resolve concerns about data quality through the use of the sampling methodologies SOPs and QA/QC procedures based on the USGS protocols and an EPA approved quality assurance project plan (QAPP) (Wilde, 2015). Both the USGS protocols and EPA QAPP provide guidelines for sampling methodologies, handling, and sample processing from the field to the laboratory. While data quality can be a challenge in CBM programs, the close collaboration between the USGS, EPA, YRITWC and participating Tribes and First Nations to implement field and laboratory QA/QC creates higher confidence in the ION water quality data.

Decision-makers often disregard the credibility of CBM data (Bradshaw, 2003; Conrad, 2006; Conrad and Hilchey, 2011; Gouveia et al., 2004). Given widespread skepticism about the ability of non-professionals to produce high-quality environmental data (Cohn, 2008; Legg and Nagy, 2006), the quality of CBM data is significant to its use in decision-making. CBM studies are often lacking in program design, SOPs or QA/QC protocols and training, which limit data accuracy, comparability, and completeness (Conrad and Hilchey, 2011). Yet, recent studies suggest ‘volunteers’ can and do collect high-quality data that are comparable to professional datasets given adequate program design (Danielsen et al., 2014; Jollymore et al., 2017a; Shelton, 2013; Storey et al., 2016). Bonney and others note (2014, p. 1436), “with appropriate protocols, training, and oversight, volunteers [non-professionals] can collect data of quality equal to those collected by experts.” Statistical analysis reveals that ION’s program design has the appropriate level of support to achieve high data quality (Herman-Mercer et al., Under Review).

The level of rigor required in CBM programs depends on the intended decision context (Hunsberger, 2004). Official monitoring determines whether regulations are being broken, and therefore needs to rely on high-quality data obtained through accurate measurements following “court-acceptable procedures.” Similarly, the objective of CBM programs is often to establish a baseline to determine whether a site is impacted by natural and/or anthropogenic sources. In the latter context, establishing a baseline of pollution can be done using a variety of methods as long as they are considered scientifically reliable (reproducible, sufficiently accurate, with adequate controls) and sufficiently reliable for the intended application (Au et al., 2000). In other words, if the methods match the program objectives, it is not necessary to have the same level of rigor as professional environmental monitoring (Bliss et al., 2001). When CBM seeks to establish a baseline to identify the mere presence of pollution, programs can employ a lesser level of rigor than monitoring that might be used as legal evidence. Nevertheless, it is not sufficient to demonstrate that your program can produce high-quality data. It is important to consider aligning sampling methodologies and procedures with the QA standards employed by settler governments. Non-compatible QA procedures are a major barrier to statistically comparing different datasets; a necessary step to provide evidence that CBM data should be integrated into government agencies database, hence used in decision-making broader processes.

5.4.2.2 Trust and Legitimacy

Trust and legitimacy were identified as critical factors for linking CBM to decision-making concerning Indigenous territory and jurisdiction due to the legacy of colonialism. ION quality samplers indicated they value the program due to their ability to trust the resulting data. They

also noted higher confidence in data collected by members of their community or within the ION network than other sources of data including settler government or industry data. When asked how they thought ION data compared to other sources of water quality data, one sampler stated,

Because I did it, I guess! You know it's a good question, because if you're told how to do it and you do it in the same fashion every time, you know that those kind of results are going to stay pretty consistent. You have to put on gloves, you got to wash the bottles and all that; you've got to calibrate before you get out there. And if people don't do that, and they just walk out, then everything might be way off. And if you find out that oh, it wasn't calibrated, the equipment, then how can you trust the equipment, I mean the results that you get back.

When asked, in follow-up, how their view of ION data compares to industry collected data, such as that collected by a mining company, they replied emphatically, "I wouldn't trust them! You got my answer, I wouldn't trust them!" Additionally, the legitimacy of the organization coordinating the CBM program has a significant effect on the extent to which communities trust the data (Hunsberger, 2004). For the Indigenous governments involved with ION, there were two factors affecting the perceived legitimacy of the YRITWC. First, as a treaty-based organization, which takes its direction from its Indigenous signatory governments and two executive boards in Alaska and Yukon, that are made up of representatives from these communities, Indigenous leadership of the YRITWC, and ION by association, meant that the program's mandate was consistent with community goals and was perceived as independent from the influence of settler governments or industries. Second, according to USGS and YRITWC Science staff, the strength of relationships between samplers and staff was fundamental to inspiring trust. In other words, social capital – or the relationships along with shared norms and values that contribute to social

trust and facilitate cooperation among or between groups for mutual benefit (Putnam, 2000) – is critical to the success of CBM programs (Conrad and Hilchey, 2011).

CBM groups often emerge out of public distrust of governments and industry (Au et al., 2000; Bliss et al., 2001; Irwin, 2002; Savan et al., 2003), where government enforcement and compliance measures are considered inadequate or industry cooptation of scientists is a concern (Savan et al., 2003). Against this backdrop, CBM is often motivated by an interest in holding governments and industry accountable (Bliss et al., 2001). Indigenous peoples' distrust of external data sources has been demonstrated. In a study of colonial and Indigenous water governance, conducted in partnership with the Lower Similkameen Indian Band in British Columbia (LSIB), Canada, Simms (2014) discusses the First Nation's distrust of data originating from governments and industry. With both the LSIB and ION, the source of the water quality data was a significant factor affecting trust. Relationships between Indigenous peoples and settler governments suffer from a "crisis of confidence" (Goetze, 2005, p. 23) and are characterized by unequal power relationships and a profound sense of distrust as the result of historical and ongoing colonialism. It is not surprising that samplers expressed both distrust in external sources of data and a greater trust in CBM data collected by their community or government. Just as trust and legitimacy positively influence the extent to which Indigenous governments might rely on CBM data in governance processes, these factors will also be likely to increase the extent to which these data influence decision-making processes involving both Indigenous and settler governments, especially around contentious issues. While representatives from settler governments were not interviewed as part of this study, previous studies suggest settler governments tend to distrust the data generated by CBM programs (Buckland-Nicks et al., 2016;

Hunsberger, 2004). Distrust of CBM data is linked not only to concerns about data quality but also influenced by their trust in the data and the perceived legitimacy of the organization coordinating the CBM program (See Hunsberger 2004).

5.4.2.3 Relevance to Decision Context

The use of data in decision-making processes requires relevance to those contexts to address community concerns and questions. Identifying the information needs of communities and decision-makers is a key challenge faced by CBM programs seeking to influence decision-making processes (Buckland-Nicks et al., 2016; Hunsberger, 2004). Yet, the ‘wrong data’ might be collected; many CBM groups focus on monitoring tasks as opposed to considering potential applications (Conrad, 2006). In this section, we discuss the relevance of ION to decision-making in the Yukon River Basin, including the relevance of the sampling protocols and sample sites. Many of the samplers interviewed indicated their Tribe or First Nation had other site-specific concerns that are not addressed by the ION water quality parameters (e.g., concerns about heavy metals and sediment loads from mining runoff or leachate from local sewage lagoons or landfills (Mutter, 2014)). While several samplers critiqued ION for failing to address site-specific contaminant concerns within their traditional territory, another sampler noted that the baseline information collected by ION is still valuable for their First Nation:

[My First Nation government] has always been clear that we think it’s important to have baseline information, and I think the water quality sampling program does provide that baseline information. And it doesn’t always have the specific needs that we have, but it’s still a good way to compare. I think it’s important to feed into the bigger regional aspect

of things. Looking at the Yukon River watershed as a whole is really important.

Especially because we are in the headwaters, it's important to see how the [water] quality is changing from the headwaters down lower in the river.

While ION monitors water quality at the basin-wide scale of the YRB, it would be challenging and perhaps unnecessary to monitor all the parameters of local concern on a watershed basis.

Baseline monitoring through ION is important and can be used to 'signal' any variation in water quality to identify site-specific monitoring needs. For Alaska Native Tribes wishing to do more monitoring, the EPA IGAP requires several years to create a baseline of water quality data before funding can be requested for advanced site-specific monitoring (US EPA, 2007). In this sense, ION assists Alaska Native Tribes with obtaining the baseline data required to proceed with site-specific monitoring. Furthermore, participation in ION contributes to the capacity building needed to conduct site-specific monitoring. In the Canadian portion of the YRB, the YRITWC has worked with Indigenous governments to conduct some site-specific monitoring. Five Yukon First Nations (Carcross/Tagish, Kluane, Selkirk, Tr'ondëk Hwëch'in and White River) participated in site-specific contaminants monitoring between 2012 and 2015 (heavy metals, hydrocarbons, nutrients, and bacteria). In British Columbia, Taku River Tlingit First Nation worked with the YRITWC to conduct site-specific monitoring related to concerns about placer mining impacts within their traditional territory water resources in 2016.

For the ION water quality monitoring program, each Alaska Native Tribe or First Nation monitors a site upstream from their community (Tribal or First Nation administrative headquarters). If a second sample site exists, it is located downstream from the community. For Tribes and First Nations, who have geographically expansive traditional territories, throughout

which their communities continue to rely on water, there are many other sample sites where it would be pertinent to establish a water quality baseline. For example, the Yukon First Nations with Modern land claim and self-governance agreements, retain rights and title to Settlement Lands (roughly 10 percent of their traditional territory) face increasing environmental pressure from resource development and climate change. Chapter 14 of their land claim agreements, acknowledges First Nation authority to protect water quality, quantity and flows of water adjacent to or flowing through Settlement Lands (Government of Canada et al., 1993).

Furthermore, Yukon First Nation governments have the ability to create laws in contexts where there are jurisdictional gaps (e.g., on Settlement Lands) (Natcher and Davis, 2007), which could include water quality standards. Baseline water quality data for each of the parcels of Settlement Land would likely be needed to enforce water quality standards.

Currently, there exists a ten-year baseline database to study the effects of climate change on the water quality on the Yukon River and its tributaries. In the absence of other data sources, this study provides a picture of environmental change at a basin-wide scale. Yet, the ION samplers see this record as failing to meet local level community concerns as it serves broader research objectives about the effects of global environmental change at a watershed scale. Specifically, current parameters (e.g., water temperature, dissolved organic carbon, etc.) and sample site locations (e.g., upstream and downstream from communities) are not alone ideal for decision-making. Furthermore, while IK informs the development and management of ION, there are no IK indicators included in the program. These challenges in program design are due in part to a lack of input by Indigenous governments into determining the monitored parameters, which are currently based on USGS sampling protocols. However, the diversity of site-specific concerns

across the watershed, and even within the traditional territories of specific nations, means that it is not likely strategic or financially viable to monitor and address all concerns at the watershed scale. However, First Nations and Tribes should be consulted as to how to adapt the current program design or develop new supplementary programs to better meet their information needs. The use of existing ION data in decision-making processes is limited due to sample site location and monitored parameters and the program should adapt to meet community data needs. The program continues to have great value for Indigenous governments as it provides high-quality baseline data that addresses some of their broader concerns and needs.

5.5 Discussion

Monitoring is much more than data collection and dissemination; Indigenous peoples' roles in monitoring go well beyond their cited role as 'knowledge holders.' Rather it is an everyday act that has been reconceptualized as an important practice for the assertion of Indigenous sovereignty and jurisdiction. Indigenous peoples also aim to use CBM data in decision-making processes. CBM program design influences community ability to meet their monitoring goals including the ability to influence decision-making processes (Buckland-Nicks et al., 2016; Conrad and Hilchey, 2011; Danielsen et al., 2005, 2010). Given the challenges discussed above, the following discussion considers how CBM programs could be designed to increase influence on governance processes.

5.5.1 Indigenous-led CBM

Indigenous leadership is fundamental to ION's success. While ION strategically engages external parties, for Indigenous peoples, who are working to protect the waters within their territories, taking a leadership role in CBM programs is essential to ensuring that the data are relevant to the decision-making processes and that, from their perspective, the data are rigorous, trustworthy, relevant and accessible. While much of the CBM literature focuses on the need for rigor, this study suggests that for Indigenous peoples in the YRB the ability to trust water quality data is also directly linked to the sense of ownership over ION. An assessment of the strengths and weaknesses of CBM suggests that community participation in monitoring enhances community capacity and the scale and speed of implementation of decision-making directly linked to environmental trends at a local scale (Danielsen et al., 2009, 2010). Building on these findings, and the typology presented in the introduction of this paper (Figure 5.1), we suggest that Indigenous leadership in CBM programs is a vital element of program design required to achieve desired governance outcomes. In addition to engaging Indigenous peoples as knowledge holders, Indigenous peoples and governments should be taking a lead role in all aspects of monitoring including program design, analysis, and interpretation.

5.5.2 Networked Governance and Capacity

The capacity of diverse Indigenous nations to conduct water quality monitoring in their traditional territories has been greatly increased by the ION's program design. While the YRITWC and the USGS coordinate monitoring efforts, individual Indigenous governments

conduct field measurements, and water sampling. This network was developed and maintained through continuous relationship building. Face-to-face meetings at water quality training sessions and the YRITWC's biennial summits have been key to building an understanding of the unique water challenges experienced by Indigenous nations. These engagements also build linkages at the watershed scale. In the transboundary context of the YRB, which spans Alaska, Yukon and British Columbia, ION has also increased connections among Tribes and First Nations who may not otherwise have had the opportunity to work collaboratively on water issues.

Capacity building is critical to linking CBM to governance processes including the ability to conduct, analyze and use CBM data in a way that is considered reliable and legitimate. Partnerships have been noted to play an important role in capacity building, particularly where partners, like the USGS and YRITWC, provide technical support which can increase the legitimacy of CBM (Hunsberger, 2004). IONs networked program design contributes to capacity building, by distributing technical and financial capacities through strong collaborative relationships with Indigenous governments. Without these relationships, the ION would not exist because of the complex logistics of this large-scale, transboundary network, where sample sites are in relatively remote locations. For example, many of the participating Alaska Native Tribes are in villages, which are not connected to the road system. During an interview with one ION stakeholder, it was noted, that while the samplers were the main strength of the program, the YRITWC's role as a facilitator along with the technical support provided by the USGS were key to the ION's success:

I think the samplers have been the main strength. I think the fact that they've been committed to going out on a bi-weekly basis for the better part of this program is the biggest strength. I also think that the cost sharing of us running the samples at the USGS, and then the Watershed Council managing the logistics and sample shipment is another big strength. I think it would be really hard for either organization to do it on their own, but the communities are the biggest strength.

While the samplers are critical to the ION's success, the role played by the YRITWC also draws our attention to the role of bridging organizations in capacity building. Bridging organizations, or organizations whose work serves to mediate connections between previously unconnected actors or actor groups, including different levels of governance and resource and knowledge systems (Berkes, 2009). By occupying a mediating position, bridging organizations can play an important role in capacity building by facilitating coordinated actions between actors and groups who lack the trust, capacity, resources, mandates or interest in connecting directly (Armitage and Plummer, 2010; Rathwell and Peterson, 2012). Linkages both across landscapes and between actors, from the local to watershed scale, is particularly important for shared resources, such as water, whose users operate at multiple spatial scales (Rathwell and Peterson, 2012). Indigenous peoples often develop bridging organizations. Specific to CBM, the Coastal Stewardship Network (CSN) – a regional monitoring program, is housed by the First Nations alliance of Coastal First Nations. The CSN is a network of Coastal First Nation stewards (also called “guardian watchmen”) who collect their data for their own resource planning, management, and decision-making purposes (Kotaska, 2013). The CSN coordinates local First Nation stewardship offices that collect information based on some common protocols, along with other context-specific indicators of concern, to facilitate regional governance initiatives. While the case study

of ION suggests that bridging organizations such as the YRITWC improve the potential for CBM programs to increase Indigenous peoples influence over water governance processes, further research is needed to examine this topic.

5.5.3 Integration of Governance Strategies with CBM

A tighter integration of Indigenous water governance strategies and CBM will also improve the influence these programs have on decision-making involving Indigenous peoples. The YRITWC aims, for example, to link ION to Indigenous water rights and governance through the Yukon River Watershed Plan (YRWP), which describes the Tribes' and First Nations' long-term vision and objectives for the YRB. The plan's objective is to maintain "water quality, water quantity and river flows [...] substantially unaltered from natural conditions" (YRITWC, 2013). The centerpiece of the plan is a set of measurable and specific water quality standards required to achieve the plan's vision and objectives for the watershed. The water quality standards aim to improve and protect existing water quality to sustain the health of the people, animals, and plants in the watershed. While the plan has yet to be implemented, the water quality standards could be applied in various locations across the watershed, regardless of the differences in standards or guidelines across borders and are intended to be consistent with the legal and regulatory regimes of settler governments throughout the YRB including the United States, Canada, Alaska, Yukon and British Columbia.

The YRWP aims to link directly to the water quality data collected through ION to establish baseline conditions, against which to monitor for potential future degradation of water quality.

However, some of the water quality standards recommended for the YRWP are based on parameters that are not currently monitored in the ION and have never been monitored in the YRB. To better link ION and other site-specific monitoring to the YRWP, water quality sampling protocols would need to address these additional water quality/contaminant standards. Regardless of the stage of implementation, the intentional linkages between ION and YRWP represent an attempt to directly link CBM with decision-making relevant to Indigenous peoples.

The ION water quality reports apply relevant water quality standards (Alaska) and guidelines (Canada) from settler governments. Guidelines or standards are applied to determine whether water is suitable for a specific water use (e.g., for aquatic life habitat, recreation, and drinking water). Currently, water quality in Alaska is evaluated using the Alaska Department of Environmental Conservation's Water Quality Standards (ADEC, 2016) and Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC, 2008). Drinking water is evaluated using the EPA's Drinking water standards (US EPA, 2015). Whereas, water quality in Yukon and British Columbia are evaluated using the Canadian Guidelines for the Protection of Aquatic Life (CCREM, 1987). Applying standards/guidelines to the ION data supports Tribal and First Nation decision-makers by putting the data in a format that makes any water quality exceedances known in order that these governments might take action.

5.6 Conclusion

This case study of ION highlights the importance of a governance lens for understanding Indigenous peoples' participation in CBM programs. While the inclusion of IK in monitoring is a priority for Indigenous peoples, it is important not to limit their role in CBM to that of 'knowledge holders' who contribute to improved understanding of global environmental change; this obscures Indigenous people's motivations for engaging in CBM. Other scholars have similarly acknowledged that CBM is highly political and can work counter to the goals of local and Indigenous peoples (Noble and Birk, 2011; Staddon et al., 2014), and that weakness of linkages between CBM and decision-making are common (Buckland-Nicks et al., 2016; Buytaert et al., 2016; Conrad and Hilchey, 2011; Hunsberger, 2004).

Instead, this paper argues that a governance lens illuminates the potential for CBM as a tool for asserting Indigenous sovereignty and jurisdiction and as a way of understanding CBM as more than data gathering—as a form of Indigenous water governance. The ION samplers and program partners certainly view water quality sampling as a governance tool wherein CBM is a means to assert sovereignty, through the practice of stewardship, and by gathering data that inform internal and external planning and decision-making. Furthermore, research findings suggest data quality and credibility, trust and legitimacy, relevance to decision contexts are key to linking CBM data to decision-making. Finally, three recommendations to better link CBM programs and Indigenous governance emerged: Indigenous governments must take a leading role in CBM programs; Networked capacity between Indigenous governments can be built using a bridging

organization, and CBM programs should be closely coupled with Indigenous water governance strategies.

Chapter 6: Conclusion

The purpose of this dissertation was to contribute to scholarship on Indigenous water governance by identifying, characterizing and anticipating the benefits and challenges of approaches to protecting Indigenous peoples' relationships to water. The literature on Indigenous water governance has frequently pointed to the problematic reluctance of settler governments and legal systems to acknowledge Indigenous peoples' substantive water rights and authorities (Babidge, 2015; Barbera-Hernandez, 2005; Boelens et al., 2012; Boelens and de Vos, 2006; Cremers et al., 2005; Morgan et al., 2004). Indeed, this reality is mirrored in the persistent failure of provincial and federal governments across Canada to acknowledge Indigenous water rights (Laidlaw and Passelac-Ross, 2010; Phare, 2009). As highlighted by Von der Porten (2013b), this has meant that water governance processes rarely engage Indigenous peoples as self-determining or sovereign nations or the holders of *sui generis* rights. With few exceptions Indigenous peoples are treated as 'stakeholders': a misrepresentation which fails to acknowledge their status as nations with rights and decision-authority over the waters within their territories. The regulatory injustices created by colonial water governance frameworks in Canada have serious implications for Indigenous peoples' health, culture and well-being (Harris et al., 2017; Hoover et al., 2012; McLean, 2007; Walkem, 2007).

There are two general approaches to addressing injustice in water governance for Indigenous peoples: 1) reform to current water governance systems to involve Indigenous peoples as nations within colonial state-led governance processes (e.g., recognition of Indigenous water rights); 2) systemic transformation that addresses broader challenges through decolonizing Indigenous

state-relationships (von der Porten and de Loë, 2014). These approaches are not mutually exclusive and are both important to protecting the waters within Indigenous territories. However, the latter, decolonizing water governance is the ultimate goal of initiatives in Indigenous water governance.

Decolonizing water governance requires Indigenous-led processes that promote redress and reconciliation between Indigenous peoples and settler states and populations and that necessarily imagine and generate alternative institutions and relations (Arsenault et al., 2018; McGregor, 2014; Simms et al., 2016; N. J. Wilson, 2014). Indeed, “reconciliation of the relationship between the colonial governments and Indigenous peoples may not only be a pre-condition, but the basis for creating enduring and effective water governance” (Bakker et al., 2018, p. 11).

Against this backdrop, Arsenault and others (2018) consider what it would mean to operationalize the values and principles articulated through Indigenous research methodologies, based on Indigenous epistemologies and water relations (ontologies) including those which are commonly called the “four Rs” (respect, responsibility, reciprocity, and relevance) (Kirkness and Barnhardt, 1991), to reframe Canadian water governance. Colonial legal systems constantly require Indigenous peoples to define their relationships to water through rights-based discourses, which view water as a “resource” (McGregor, 2014; N. J. Wilson, 2014; Yates et al., 2017). In contrast, the 4Rs come much closer to the values and principles that infuse Indigenous relationships to water as a living entity that has “spirit” and must be respected (Craft, 2017; McGregor, 2014; N. J. Wilson, 2014; Yates et al., 2017), which are embedded in Indigenous legal systems and forms of governance (Craft, 2017). Thus, I echo their argument that a more effective water governance framework can be developed by applying “Indigenous concepts of

reciprocal relations to critical water policy issues” (Arsenault et al., 2018, p. 13). In this sense, decolonizing water governance requires going beyond the mere acknowledgement of Indigenous peoples’ water rights through colonial legal and governance frameworks, but to also question how governance systems, institutions, and processes can be transformed to acknowledge and respect multiple legal and normative orders that exist within the same political space and the interactions between these orders (Boelens et al., 2005; Hidalgo et al., 2017).

There are several other preconditions for decolonizing water governance. Tupa and Welsh (2006), Goetz (2005), Kotaska (2013a), and Simms (2014) all describe additional elements of effective decolonial governance: settler governments acknowledge First Nations as governments (nation-to-nation relationship) and observe their Indigenous rights and title (defined by Indigenous nations); an emphasis on power sharing and counteracting current power imbalances including those created by colonial policies and relations; the co-creation of new systems of (co-) governance where First Nations have substantive or legally binding authority according to the level of authority they desire; Settler governments acknowledge and support the continuation of Indigenous ontologies, epistemologies, laws and governance systems through giving them equal weight to non-Indigenous ones; First Nations and settler governments engage in capacity building; Indigenous governments can collect resource revenues throughout their territories and share resource revenues with settler governments in areas they have agreed to share; and settler governments compensate Indigenous peoples for losses associated with water. Against this backdrop, the following section describes the findings and implications of applied research in Yukon, Canada for the field of Indigenous water governance.

6.1 Findings and Implications

In this dissertation, I engage an empirical case study of the water governance system shaped by Modern land claim and Self-government agreements in Yukon, Canada and the ways these arrangements create and constrain spaces for the expression of Indigenous forms of water governance. This case study is unique and important because Yukon First Nations with Modern land claim agreements are among the very few Indigenous peoples in Canada to have their water rights acknowledged. To learn from this example, I analyze whether the governance arrangements created through land claims and Self-government agreements go far enough to acknowledge Yukon First Nations' rights and authorities in relation to water. At the same time, I take up critiques of land claim agreements (e.g., Nadasdy, 2017, 2003; Natcher and Davis, 2007) to examine the broader political and cultural implications of taking on the new forms of governance that resulted from land claim and Self-government agreements. Through this case study and insights from the fields of critical Indigenous studies and the political ecology of water, I conclude that while Modern land claim agreements in Yukon take important steps to acknowledge Yukon First Nations' inherent water rights, further change is needed to decolonize water governance and Indigenous-state relations. Specifically, I highlight how, despite the acknowledgement of a range of Indigenous water rights including the right to unaltered water quality, quantity, and rate of flow, this system falls short. Specifically, these agreements are limited in both their acknowledgement of Yukon First Nation authority in relation to water and the ways that present governance arrangements perpetuate water injustices through continuing to engage colonial forms of governance that fail to reflect Indigenous ontologies, epistemologies and legal systems. At the same time, I find that there is a lot that can be learned from Yukon First

Nations who are engaging novel strategies to overcome the shortcomings of current water governance arrangements in Yukon. These insights are advanced by the four empirical chapters in this dissertation in the following ways:

Chapter 2 engages with the ontological politics of water governance and water conflict between settler and Indigenous peoples. Specifically, I showed that Yukon First Nation water ontologies, as described through the lens of “respecting water,” understand water as a living entity that has “spirit.” I compare Yukon First Nation views of water, with the assumptions of settler colonial water governance and law in the territory, which understands water as a material resource that can be ‘owned’ and exploited. I discuss the implications of Indigenous water ontologies for alternate modes of governing water including the ways that revitalization of Indigenous legal systems could contribute to reshaping current governance systems. This analysis also suggests that a transformation in water governance will not only require invocations of respect or deference on the part of settler bureaucrats, but a deep rethinking of the very agency of all beings and thinking of water as a living entity deserving of many things; it means thinking of water as kin with its own histories enlivened in the landscapes it carves and the people it holds, past and future.

Chapter 3 contributes to the study of water co-governance through a detailed empirical study of the shifts in water governance resulting from Modern land claim agreements in Yukon. This analysis reveals that while Yukon First Nations have experienced significant gains in capacity as the result of these agreements, which outline specific legal authorities and the creation of co-management institutions to implement these authorities, water governance in the territory

remains highly contested. These findings suggest that water co-governance could be improved through expanded acknowledgement of First Nation jurisdiction, addressing First Nation procedural rights within water governance arrangements to reflect their ontologies, epistemologies, and forms of governance; and addressing barriers to implementing existing agreements. Overall, this work suggests that acknowledgement of Indigenous water rights alone, without jurisdiction or the creation of governance systems that reflect Indigenous understandings of water, is not enough to transform a colonial water governance system.

Chapter 4 advances the conversations on the novel approaches to water governance enabled through Yukon First Nation Self-government agreements. In particular, I focus on the opportunity for Self-Governing Yukon First Nations to create water legislation that supersedes the Yukon government's water legislation and jurisdiction over water. This represents a powerful opportunity to assert Indigenous forms of governance and authority in relation to water. However, there are potential challenges including those associated with the codification of Indigenous legal systems and the constraints imposed by the broader political and economic context that may expose Yukon First Nations to unwanted litigation. I engage with examples from other jurisdictions to explore the factors that contribute to these challenges. While this paper focuses on water governance for Self-Governing Yukon First Nations, many of these insights are also relevant to Indigenous peoples in other legal contexts, including for non-self-governing Yukon First Nations, who are seeking to assert Indigenous water laws based on their inherent and unceded water rights and title.

Chapter 5 contributes to study of CBM through conceptualizing Indigenous participation in these programs as an emerging governance strategy. In particular, these findings indicate that CBM is understood as both a method for generating data useful for decision-making and an expression of governance itself rooted in understandings of stewardship, kinship, and responsibility.

Furthermore, these findings also suggest that data quality and credibility, trust and legitimacy and relevance to decision contexts are key to mobilizing CBM data in relevant decision-making processes. While the topic requires more empirics, this study provides evidence for three recommendations to improve linkages between CBM programs and Indigenous governance: Indigenous governments must take a leading role in CBM programs; networked capacity between Indigenous governments can be built using a bridging organization, and CBM programs should be closely coupled with Indigenous environmental governance strategies.

6.2 Limitations

This research engages with Indigenous water governance in relation to four specific Yukon First Nations. However, Indigenous peoples are highly diverse, both culturally and in terms of the historical and governance contexts they are situated within. The common experience of colonialism makes my research findings applicable to other Yukon First Nations and to Indigenous peoples around the globe. However, many of the findings are specific to the water governance system in Yukon and to the four Yukon First Nations (Tr'ondëk Hwëch'in, Kluane, White River and Carcross/Tagish First Nations) who participated in this study. That said, the high level findings of this research are still relevant to Indigenous peoples elsewhere in Canada

and internationally due to the common challenges they face as the result of colonial Indigenous-state relationships and impacts to water as the result of resource development.

6.1 Reflections on Community-Engaged Scholarship

This research has challenged me to reflect on my commitment to community-engaged scholarship. Any serious engagement in CBPR necessitates a focus on issues of real importance to communities, and involves community members in all phases of the research process and centers on the goal of social change (Minkler and Wallerstein, 2008). CBPR is also central to the decolonization of conventional relationships between university researchers and Indigenous communities (Castleden et al., 2008). This is reflected in the ways that I sought to live up to the ethical standards for research outlined in Yukon First Nation research protocols, including the need to conduct research that reflects the core principles of CBPR (the “four Rs”): respect, responsibility, reciprocity, and relevance (Diver and Higgins, 2014; Kirkness and Barnhardt, 1991; Wilson, 2009). Similar to the OCAP (Ownership, Control, Access, Possession) principles, these traditional knowledge policies represent an ethical framework “developed by First Nations to bring self-determination into the realm of research and information management” (National Aboriginal Health Organization, 2007, p. 4). This meant that my methods incorporated several elements not typically included in social science research. For instance, I conducted validation exercises where I shared my research results with my Yukon First Nation partners, in the form of community reports and presentations, to solicit their input before completing my dissertation. Through this process, I was able to improve the accuracy of my findings and incorporate additional information into this research. In accordance with traditional knowledge policies, I

also returned interview audio and transcription to respective First Nation archives. While following traditional knowledge policies has been a critical step in seeking to avoid reproducing the negative histories of research between Indigenous peoples and external researchers (Denzin et al., 2008; Smith, 1999; Wilson, 2009), these methods are somewhat limited by the colonial nature of academic research and university institutions. As Castleden and others note (2015), academic demands are often inconsistent with the goal of decolonizing the research process. For instance, institutional metrics used to assess academic merit and grant tenure privileges conventional understandings of productivity and validity in research. As a result, researchers are evaluated by metrics that conflict with the relational values and accountability necessary for decolonizing research. In my experience, rigorous community-based research involves a substantial investment of time to develop research relationships and knowledge mobilization products (e.g., reports, presentations etc.), and to ensure relational accountability in the research process. However, these “non-academic” research products are not considered equal in value to peer-reviewed publications in an academic setting. Thus, the use of CPBR alone cannot decolonize research. Successful decolonization of relationships between Indigenous peoples and academic researchers requires a broader shift in the university itself to prioritize research relationships consistent with the ethics of relational accountability.

6.2 Future Research Directions

Three key areas of future research emerge from this work: First, there is a need for further research into applied approaches to transform water governance systems to reflect Indigenous principles, ontologies and legal traditions. Indigenous legal scholars have significantly

contributed to conceptualizing the principles of Indigenous legal traditions and their value for revitalizing Indigenous forms of governance (e.g., Borrows, 2002; Christie, 2007; Craft, 2017; Napoleon, 2013). However, there have been few examples implemented to date. Scholars such as Napoleon and Friedland (2016) have developed methodological approaches for interpreting legal principles from Indigenous oral traditions. Aimée Craft (2017) has applied this method in collaboration with Anishinaabe First Nations in Northern Ontario and Manitoba in order to interpret *Anishinaabe nibi inaakonigewin* (“our water law”). Val Napoleon and others are also presently working with three B.C. First Nations to develop Indigenous water laws. Despite this handful of examples, there is a need for research examining how Indigenous views of water and legal traditions can best inform decision-making about water while strategically navigating the barriers created by colonial water governance system and the broader political and economic context. This research would have meaningful applications across a number of contexts and processes in which First Nations are engaging to protect the waters within their territories. As this dissertation has discussed, such an approach could inform the development of First Nation water legislation in Yukon.

Second, further research is needed to explore the implications of the language and meaning of consent for water governance and co-governance. Phare and others (2017) have shown that there is a significant legal basis for implementing collaborative consent models in Canada.

Specifically, Section 35 of the Constitution Act, 1982, recognizes and affirms existing Aboriginal and treaty rights. The Courts have held that Section 35 is grounded in the Honour of the Crown – or the requirement for the Crown to act honourably in dealings with Indigenous peoples - and creates the duty of the Crown to consult and accommodate potential or established

Aboriginal or treaty rights where a proposed activity could adversely impact those rights (*Delgamuukw v. British Columbia*, 3 S.C.R. 1010, 1997, *Haida Nation v. British Columbia (Minister of Forests)* 3 S.C.R. 511, 2004 SCC 73, 2004, *Tsilhqot'in Nation v. British Columbia* 2014 (SCC 44), 2014). Furthermore, In 2016, The Canadian federal government has committed to implementing the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (2008), which requires free, prior and informed consent (see Articles 10, 19, 28, and 29 of UNDRIP). This research notes that a collaborative consent approach could be applied to the much-needed modernization of the Yukon Waters Act (2003), going beyond typical approaches that meet the minimum requirements for consultation, to engage First Nations as parties to the process of revising the legislation. Such a process could circumvent the conflicts resulting from inadequate consultation of Indigenous peoples such as those encountered in the modernization of the water act in British Columbia (Joe et al., 2017; Jollymore et al., 2017b; Simms et al., 2016). In assessing the implications of UNDRIP for water governance in Canada, Askew and others (2017) identified concerns about the extent to which “consent” or FPIC may be interpreted as an acknowledgement of First Nation “veto” in relation to resource development within their territories as a significant barrier to the implementation of such approaches. Further research is required to determine how to implement this approach.

Third, my doctoral research was fundamentally motivated by my Yukon First Nation research partners’ concerns about the need to understand and respond to the accelerating effects of global environmental change and resources development on the waters within their territories.

However, the governance of cumulative impacts to water was not explicitly addressed in this dissertation. Cumulative effects are defined as “a change in the environment caused by multiple

interactions among human activities and natural processes that accumulate across space and time” (Noble, 2014, p. 243). There is a growing research body of literature seeking to understand and address cumulative effects to water and watersheds (Dubé et al., 2013a; Noble et al., 2011, 2014; Sheelanere et al., 2013; Squires et al., 2010) including analyses specific to the Yukon River (Dubé et al., 2013b, 2013c). However, more research is needed to engage with the governance of cumulative impacts to water and Indigenous peoples. Contributions are needed on two fronts: first, better specification and acknowledgement of the specific impacts experienced by Indigenous peoples is needed including the intangible and tangible cultural impacts rarely considered within decision-making processes (Gregory and Trousdale, 2009; Turner et al., 2008); and second, analysis of the ways that legal frameworks acknowledging Indigenous rights and title in Canada can be leveraged to better protect the waters within Indigenous territories is needed. In Yukon, this requires an analysis of how cumulative effects are considered in the YESAA process, water licensing decisions and potentially managed through the land use planning process outlined in Yukon First Nation final agreements.

References

- ADEC, 2016. Alaska Department of Environmental Conservation's Water Quality Standards.
- ADEC, 2008. Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances.
- Ahlers, R., Zwartveen, M., 2009. The water question in feminism: water control and gender inequities in a neo-liberal era. *Gend. Place Cult.* 16, 409–426.
<https://doi.org/10.1080/09663690903003926>
- Alcantara, C., 2008. To Treaty or Not to Treaty? Aboriginal Peoples and Comprehensive Land Claims Negotiations in Canada. *Publius J. Fed.* 38, 343–369.
- Alessa, L., Kliskey, A., Gamble, J., Fidel, M., Beaujean, G., Gosz, J., 2015. The role of Indigenous science and local knowledge in integrated observing systems: moving toward adaptive capacity indices and early warning systems. *Sustain. Sci.* 11, 91–102.
<https://doi.org/10.1007/s11625-015-0295-7>
- Alfred, T., 2009. *Peace, power, righteousness*. Oxford University Press.
- Alfred, T., 2006. Sovereignty: An inappropriate concept. *Indig. Exp. Glob. Perspect.* 322–336.
- Alfred, T., 2005. *Indigenous pathways of action and freedom*. Peterb. Broadview.
- Alfred, T., 2001. From Sovereignty to Freedom: Towards an Indigenous Political Discourse. *Indig. Aff.* 3, 22–34.
- Alfred, T., Corntassel, J., 2005. Being Indigenous: Resurgences against Contemporary Colonialism. *Gov. Oppos.* 40, 597–614. <https://doi.org/10.1111/j.1477-7053.2005.00166.x>
- Anderson, K., Clow, B., Haworth-Brockman, M., 2013. Carriers of water: aboriginal women's experiences, relationships, and reflections. *J. Clean. Prod., Special Volume: Water, Women, Waste, Wisdom and Wealth* 60, 11–17.
<https://doi.org/10.1016/j.jclepro.2011.10.023>
- Ansell, C., Gash, A., 2008. Collaborative Governance in Theory and Practice. *J. Public Adm. Res. Theory* 18, 543–571. <https://doi.org/10.1093/jopart/mum032>
- Armitage, D., Berkes, F., Doubleday, N., others, 2007. *Adaptive co-management: collaboration, learning and multi-level governance*. UBC Press.
- Armitage, D., Plummer, R., 2010. *Adapting and Transforming: Governance for Navigating Change*, in: Armitage, D., Plummer, R. (Eds.), *Adaptive Capacity and Environmental Governance*, Springer Series on Environmental Management. Springer Berlin Heidelberg, pp. 287–302.
- Arsenault, R., Diver, S., McGregor, D., Witham, A., Bourassa, C., 2018. Shifting the Framework of Canadian Water Governance through Indigenous Research Methods: Acknowledging the Past with an Eye on the Future. *Water* 10, 49. <https://doi.org/10.3390/w10010049>
- Askew, H., Snelgrove, C., Wrightson, K.R., Couturier, D., Koebel, A., Nowlan, L., Bakker, K., 2017. *Between Law and Action: Assessing the State of Knowledge on Indigenous Law, UNDRIP and Free, Prior and Informed Consent with Reference to Fresh Water Resources*. West Coast Environmental Law, University of British Columbia.
- Atleo, E.R., 2012. *Principles of Tsawalk: An Indigenous approach to global crisis*.
- Atleo, E.R., 2004. *Tsawalk: A Nuuchah-nulth Worldview*. UBC Press.
- Au, J., Bagchi, P., Chen, B., Martinez, R., Dudley, S.A., Sorger, G.J., 2000. Methodology for public monitoring of total coliforms, *Escherichia coli* and toxicity in waterways by

- Canadian high school students. *J. Environ. Manage.* 58, 213–230.
<https://doi.org/10.1006/jema.2000.0323>
- Babidge, S., 2015. Contested value and an ethics of resources: Water, mining and indigenous people in the Atacama Desert, Chile. *Aust. J. Anthropol.* 1–20.
<https://doi.org/10.1111/taja.12139>
- Bakker, K., 2012. Water: Political, biopolitical, material. *Soc. Stud. Sci.* 42, 616–623.
<https://doi.org/10.1177/0306312712441396>
- Bakker, K., 2007. *Eau Canada: the future of Canada's water*. UBC Press, Vancouver, BC.
- Bakker, K., 2003a. Good governance in restructuring water supply: A handbook. Federation of Canadian Municipalities.
- Bakker, K., 2003b. A Political Ecology of Water Privatization. *Stud. Polit. Econ.* 70, 35–58.
- Bakker, K., 2002. From state to market?: water mercantilización in Spain. *Environ. Plan. A* 34, 767–790.
- Bakker, K., Simms, R., Joe, N., Harris, L., 2018. Indigenous Peoples and Water Governance in Canada: Regulatory Injustice and Prospects for Reform, in: Boelens, R., Perreault, T., Vos, J., Zwarteveen, M. (Eds.), *Water Justice*. Cambridge University Press, Cambridge.
- Barbera-Hernandez, L., 2005. Indigenous Peoples, Human Rights and Natural Resource Development: Chile's Mapuche Peoples and the Right to Water. *Annu. Surv. Int. Comp. Law* 11, 1–28.
- Barker, J., 2005. Sovereignty matters: Locations of contestation and possibility in indigenous struggles for self-determination. University of Nebraska Press, U.S.A.
- Bassi, M.P., 2010. Ethical Issues of Water Resource Management in a Changing Climate: Equity and Legal Pluralism in Chile [WWW Document]. URL
<http://scholarsbank.uoregon.edu/jspui/handle/1794/10620> (accessed 1.14.12).
- Bates, B., Kundzewicz, Z.W., Wu, S., Palutikof, J.P., 2008. Climate change and water. IPCC Secretariat.
- Bebbington, A., Bury, J., 2013. *Subterranean Struggles: New Dynamics of Mining, Oil, and Gas in Latin America*. University of Texas Press.
- Beckman v. Little Salmon/Carmacks First Nation, 2010 SCC 53, [2010] 3 S.C.R. 103, 2010.
- Benda-Beckman, F. von, 1997. Citizens, strangers and indigenous peoples: Conceptual politics and legal pluralism. *Law Anthropol.* 9, 1–42.
- Berkes, F., 2010. Devolution of environment and resources governance: trends and future. *Environ. Conserv.* 37, 489–500. <https://doi.org/10.1017/S037689291000072X>
- Berkes, F., 2009. Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. *J. Environ. Manage.* 90, 1692–1702.
<https://doi.org/10.1016/j.jenvman.2008.12.001>
- Berkes, F., 1994. Co-management: bridging the two solitudes. *North. Perspect.* 22, 18–20.
- Berkes, F., Berkes, M.K., Fast, H., 2007. Collaborative Integrated Management in Canada's North: The Role of Local and Traditional Knowledge and Community-Based Monitoring. *Coast. Manag.* 35, 143–162. <https://doi.org/10.1080/08920750600970487>
- Berkes, F., George, P.J., Preston, R.J., 1991. Co-management: the evolution of the theory and practice of joint administration of living resources. Program for Technology Assessment in Subarctic Ontario, McMaster University.

- Berry, K.A., Jackson, S., Saito, L., Forline, L., 2018. Reconceptualising Water Quality Governance to Incorporate Knowledge and Values: Case studies from Australian and Brazilian Indigenous Communities. *Water Altern.* 11, 40–60.
- Bird Rose, D., 2008. On history, trees, and ethical proximity. *Postcolonial Stud.* 11, 157–167.
- Birkenholtz, T., 2008. Contesting expertise: The politics of environmental knowledge in northern Indian groundwater practices. *Geoforum* 39, 466–482.
- Blaser, M., 2014. Ontology and indigeneity: on the political ontology of heterogeneous assemblages. *Cult. Geogr.* 21, 49–58. <https://doi.org/10.1177/1474474012462534>
- Blaser, M., 2013. Ontological Conflicts and the Stories of Peoples in Spite of Europe: Toward a Conversation on Political Ontology. *Curr. Anthropol.* 54, 547–568. <https://doi.org/10.1086/672270>
- Blaser, M., 2009a. Political Ontology. *Cult. Stud.* 23, 873–896. <https://doi.org/10.1080/09502380903208023>
- Blaser, M., 2009b. The Threat of the Yrmo: The Political Ontology of a Sustainable Hunting Program. *Am. Anthropol.* 111, 10–20. <https://doi.org/10.1111/j.1548-1433.2009.01073.x>
- Bliss, J., Aplet, G., Hartzell, C., Harwood, P., Jahnige, P., Kittredge, D., Lewandowski, S., Soscia, M.L., 2001. Community-based ecosystem monitoring. *J. Sustain. For.* 12, 143–167. https://doi.org/10.1300/J091v12n03_07
- Boelens, R., 2015. *Water, Power and Identity: The Cultural Politics of Water in the Andes.* Routledge.
- Boelens, R., 2014. Cultural politics and the hydrosocial cycle: Water, power and identity in the Andean highlands. *Geoforum, American Fact Finder* 57, 234–247. <https://doi.org/10.1016/j.geoforum.2013.02.008>
- Boelens, R., 2013. The Shotgun Marriage: Water Security, Cultural Politics, and Forced Engagements between Official and Local Rights Frameworks, in: Lankford, B.A., Bakker, K., Zeitoun, M., Conway, D. (Eds.), *Water Security: Principles, Perspectives and Practices.* Routledge, New York, pp. 239–255.
- Boelens, R., 2009. The Politics of Disciplining Water Rights. *Dev. Change* 40, 307–331. <https://doi.org/10.1111/j.1467-7660.2009.01516.x>
- Boelens, R., Bustamante, R., De Vos, H., 2007. Legal pluralism and the politics of inclusion, recognition and contestation of local water rights in the Andes. *Community-Based Water Law Water Resour. Manag. Reform Dev. Ctries.* 96–113.
- Boelens, R., de Vos, G., 2006. Water law and indigenous rights in the Andes. *Cult. Surviv. Q.* 29, 18–21.
- Boelens, R., Duarte, B., Manosalvas, R., Mena, P., Avendaño, T.R., Vera, J., 2012. Contested Territories: Water Rights and the Struggles over Indigenous Livelihoods. *Int. Indig. Policy J.* 3.
- Boelens, R., Getches, D.H., Gil, J.A.G., 2010. Out of the mainstream: water rights, politics and identity. *Earthscan.*
- Boelens, R., Hoogesteger, J., Swyngedouw, E., Vos, J., Wester, P., 2016. Hydrosocial territories: A political ecology perspective. *Water Int.* 41, 1–14.
- Boelens, R., Vos, J., 2014. Legal pluralism, hydraulic property creation and sustainability: the materialized nature of water rights in user-managed systems. *Curr. Opin. Environ. Sustain.* 11, 55–62.

- Boelens, R., Zwarteveen, M., Roth, D., 2005. Legal complexity in the analysis of water rights and water resources management, in: Roth, D., Boelens, R., Zwarteveen, M. (Eds.), *Liquid Relations: Contested Water Rights and Legal Complexity*. Rutgers University Press, New Brunswick, pp. 1–20.
- Bonney, R., Shirk, J.L., Phillips, T.B., Wiggins, A., Ballard, H.L., Miller-Rushing, A.J., Parrish, J.K., 2014. Next Steps for Citizen Science. *Science* 343, 1436–1437. <https://doi.org/10.1126/science.1251554>
- Borrows, J., 2010. *Canada's Indigenous constitution*. University of Toronto Press, Toronto, Ontario.
- Borrows, J., 2002. *Recovering Canada: The Resurgence of Indigenous Law*, First Thus edition. ed. University of Toronto Press, Scholarly Publishing Division, Toronto.
- Borrows, J., 1997. Living between Water and Rocks: First Nations, Environmental Planning and Democracy. *Univ. Tor. Law J.* 47, 417–468. <https://doi.org/10.2307/825948>
- Bowie, R., 2013. Indigenous Self-Governance and the Deployment of Knowledge in Collaborative Environmental Management in Canada. *J. Can. Stud. D'études Can.* 47, 91–121.
- Boyd, D.R., 2017. *The Rights of Nature: A Legal Revolution That Could Save the World*. ECW Press.
- Boyd, D.R., 2003. *Unnatural law: Rethinking Canadian environmental law and policy*. UBC press.
- Bradshaw, B., 2003. Questioning the credibility and capacity of community-based resource management. *Can. Geogr. Géographe Can.* 47, 137–150. <https://doi.org/10.1111/1541-0064.t01-1-00001>
- Bridge, G., Perreault, T., 2009. Environmental Governance, in: *A Companion to Environmental Geography*, Blackwell Companions to Geography. Wiley-Blackwell, Chichester, West Sussex, U.K., pp. 475–497.
- Bruyneel, K., 2007. *The third space of sovereignty the postcolonial politics of U.S.-indigenous relations*. University of Minnesota Press, Minneapolis.
- Buckland-Nicks, A., Castleden, H., Conrad, C., 2016. Aligning Community-Based Water Monitoring Program Designs with Goals for Enhanced Environmental Management'. *JCOM* 15, 23.
- Budds, J., 2004. Power, Nature and Neoliberalism: The Political Ecology of Water in Chile. *Singap. J. Trop. Geogr.* 25, 322–342. <https://doi.org/10.1111/j.0129-7619.2004.00189.x>
- Buytaert, W., Dewulf, A., Bièvre, B.D., Clark, J., Hannah, D.M., 2016. Citizen Science for Water Resources Management: Toward Polycentric Monitoring and Governance? *J. Water Resour. Plan. Manag.* 142, 01816002. [https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0000641](https://doi.org/10.1061/(ASCE)WR.1943-5452.0000641)
- Carcross/Tagish First Nation, 2016. *Land Interests Act*.
- Carcross/Tagish First Nation, 2009. *Carcross/Tagish First Nation Traditional Knowledge Policy*.
- Carcross/Tagish First Nation, 2006. *Book Two: Government of Carcross/Tagish Traditional Family Beliefs and Practices*.
- Carcross/Tagish First Nation, 1997. *Constitution of the Carcross/Tagish First Nation*.
- Caruso, E., 2011. Co-management redux: anti-politics and transformation in the Ashaninka Communal Reserve, Peru. *Int. J. Herit. Stud.* 17, 608–628. <https://doi.org/10.1080/13527258.2011.618254>

- Castleden, H., Garvin, T., First Nation, H., 2008. Modifying Photovoice for community-based participatory Indigenous research. *Soc. Sci. Med.* 66, 1393–1405.
<https://doi.org/10.1016/j.socscimed.2007.11.030>
- Castleden, H., Morgan, V.S., Lamb, C., 2012. “I spent the first year drinking tea”: Exploring Canadian university researchers’ perspectives on community-based participatory research involving Indigenous peoples. *Can. Geogr. Géographe Can.* 56, 160–179.
<https://doi.org/10.1111/j.1541-0064.2012.00432.x>
- Castleden, H., Sylvestre, P., Martin, D., McNally, M., 2015. “I Don’t Think that Any Peer Review Committee . . . Would Ever ‘Get’ What I Currently Do”: How Institutional Metrics for Success and Merit Risk Perpetuating the (Re)production of Colonial Relationships in Community-Based Participatory Research Involving Indigenous Peoples in Canada. *Int. Indig. Policy J. Lond.* 6.
- CCREM (Canadian Council of Resources and Environment Ministers), 1987. Canadian water quality guidelines.
- Champagne Aishihik First Nation, 2013. CAFN Draft Water Strategy.
- Chen, C., MacLeod, J., Neimanis, A., 2013. Thinking with water. McGill-Queen’s Press-MQUP.
- Christie, G., 2007. Culture, Self-Determination and Colonialism: Issues Around the Revitalization of Indigenous Legal Traditions. *Indig. Law Rev. J.* 6, 13–29.
- Chuck, T., 2014. Board will monitor Tatchun Creek water quality. *Whitehorse Dly. Star.*
- City of Albuquerque v. Browner, 865 F. Supp. 733, 1993.
- Clark, D., Joe-Strack, J., 2017. Keeping the “co” in the co-management of Northern resources. *North. Public Aff.* 5, 71–74.
- Clean Water Act (Federal Pollution Control Act), 1972.
- Coates, K., Morrison, W.R., 2008. From Panacea to Reality. The Practicalities of Canadian Aboriginal Self-Government Agreements. *Aborig. Self Gov. Can.* Yale Belanger Ed Pp105-122 Saskat. SA Purich Publ.
- Cohn, J.P., 2008. Citizen science: Can volunteers do real research? *BioScience* 58, 192–197.
- Collard, R.-C., Dempsey, J., Sundberg, J., 2015. A manifesto for abundant futures. *Ann. Assoc. Am. Geogr.* 105, 322–330.
- Conrad, C., 2006. Towards Meaningful Community-Based Ecological Monitoring in Nova Scotia: Where are we versus where we would like to be. *Environments* 34, 25–36.
- Conrad, C.C., Hilchey, K.G., 2011. A review of citizen science and community-based environmental monitoring: issues and opportunities. *Environ. Monit. Assess.* 176, 273–91. <http://dx.doi.org.ezproxy.library.ubc.ca/10.1007/s10661-010-1582-5>
- Corntassel, J., 2003. Who is indigenous? ‘Peoplehood’ and ethnonationalist approaches to rearticulating indigenous identity. *Natl. Ethn. Polit.* 9, 75–100.
<https://doi.org/10.1080/13537110412331301365>
- Corntassel, J., Witmer, R.C., 2008. Forced federalism: Contemporary challenges to indigenous nationhood. University of Oklahoma Press, Norman, Oklahoma.
- Coulthard, G.S., 2014. Red Skin, White Masks: Rejecting the Colonial Politics of Recognition. Univ Of Minnesota Press, Minneapolis.
- Coulthard, G.S., 2008. Beyond recognition: Indigenous self-determination as prefigurative practice, in: Leanne, S. (Ed.), *Lighting the Eighth Fire: The Liberation, Resurgence, and Protection of Indigenous Nations*. Arbeiter Ring Publishing, Winnipeg, Manitoba, pp. 187–204.

- Coulthard, G.S., Simpson, L.B., 2016. Grounded Normativity / Place-Based Solidarity. *Am. Q.* 68, 249–255. <https://doi.org/10.1353/aq.2016.0038>
- Craft, A., 2017. Giving and receiving life from Anishinaabe nibi inakonigewin (our water law) research, in: Thorpe, J., Rutherford, S., Sandberg, L.A. (Eds.), *Methodological Challenges in Nature-Culture and Environmental History Research*. Routledge, pp. 105–119.
- Craft, A., 2014. Anishinaabe Nibi Inakonigewin Report: Reflecting the Water Laws Research Gathering conducted with Anishinaabe Elders, June 20-23, 2013 at Roseau River, Manitoba. University of Manitoba, Centre for Human Rights Research (CHRR) and Public Interest Law Centre (PILC).
- Cremers, L., Ooijevaar, M., Boelens, R., 2005. Institutional reform in the Andean irrigation sector: Enabling policies for strengthening local rights and water management. *Nat. Resour. Forum* 29, 37–50. <https://doi.org/10.1111/j.1477-8947.2005.00111.x>
- Croft, D., 2017. Reality TV star fined \$31K for filmed stunt in Yukon [WWW Document]. CBC News. URL <http://www.cbc.ca/news/canada/north/yukon-beets-fine-sentenced-1.4263463> (accessed 10.6.17).
- Cruikshank, J., 2012. Are Glaciers ‘Good to Think With’? Recognising Indigenous Environmental Knowledge 1. *Anthropol. Forum* 22, 239–250. <https://doi.org/10.1080/00664677.2012.707972>
- Cruikshank, J., 2005. Do glaciers listen?: local knowledge, colonial encounters, and social imagination. Univ of British Columbia Pr.
- Daigle, M., 2016. Awawenitakik: The spatial politics of recognition and relational geographies of Indigenous self-determination. *The Canadian Geographer/Le Géographe canadien* 60, 259–269.
- D’Andrea, A., 2012. Legal pluralism and customary water resources management in Guatemala. *Water Int.* 37, 683–699.
- Danielsen, F., Burgess, N.D., Balmford, A., Donald, P.F., Funder, M., Jones, J.P.G., Alviola, P., Balete, D.S., Blomley, T., Brashares, J., Child, B., Enghoff, M., Fjeldså, J., Holt, S., Hübertz, H., Jensen, A.E., Jensen, P.M., Massao, J., Mendoza, M.M., Ngaga, Y., Poulsen, M.K., Rueda, R., Sam, M., Skielboe, T., Stuart-Hill, G., Topp-Jørgensen, E., Yonten, D., 2009. Local Participation in Natural Resource Monitoring: a Characterization of Approaches. *Conserv. Biol.* 23, 31–42. <https://doi.org/10.1111/j.1523-1739.2008.01063.x>
- Danielsen, F., Burgess, N.D., Jensen, P.M., Pirhofer-Walzl, K., 2010. Environmental monitoring: the scale and speed of implementation varies according to the degree of people’s involvement. *J. Appl. Ecol.* 47, 1166–1168. <https://doi.org/10.1111/j.1365-2664.2010.01874.x>
- Danielsen, F., Jensen, A.E., Alviola, P.A., Balete, D.S., Mendoza, M., Tagtag, A., Custodio, C., Enghoff, M., 2005. Does monitoring matter? A quantitative assessment of management decisions from locally-based monitoring of protected areas. *Biodivers. Conserv.* 14, 2633–2652. <https://doi.org/DOI 10.1007/s10531-005-8392-z>
- Danielsen, F., Jensen, P.M., Burgess, N.D., Altamirano, R., Alviola, P.A., Andrianandrasana, H., Brashares, J.S., Burton, A.C., Coronado, I., Corpuz, N., Enghoff, M., Fjeldså, J., Funder, M., Holt, S., Hübertz, H., Jensen, A.E., Lewis, R., Massao, J., Mendoza, M.M., Ngaga, Y., Phipper, C.B., Poulsen, M.K., Rueda, R.M., Sam, M.K., Skielboe, T., Sørensen, M.,

- Young, R., 2014. A Multicountry Assessment of Tropical Resource Monitoring by Local Communities. *BioScience* 64, 236–251. <https://doi.org/10.1093/biosci/biu001>
- De la Cadena, M., 2015. *Earth beings: Ecologies of practice across Andean worlds*. Duke University Press.
- De la Cadena, M., 2010. Indigenous Cosmopolitics in the Andes: Conceptual Reflections beyond “Politics.” *Cult. Anthropol.* 25, 334–370. <https://doi.org/10.1111/j.1548-1360.2010.01061.x>
- Delgamuukw v. British Columbia. 3 S.C.R. 1010, 1997.
- Denzin, N.K., Lincoln, Y.S., Smith, L.T., 2008. *Handbook of critical and indigenous methodologies*. Sage, Los Angeles.
- Descola, P., 2013. *Beyond nature and culture*. University of Chicago Press, Chicago, Illinois, USA.
- Diver, S.W., Higgins, M.N., 2014. Giving Back Through Collaborative Research: Towards a Practice of Dynamic Reciprocity. *J. Res. Pract.* 10, 9.
- Duarte-Abadía, B., Boelens, R., Roa-Avedaño, T., 2015. Hydropower, Encroachment and the Re-patterning of Hydrosocial Territory: The Case of Hidrosogamoso in Colombia. *Hum. Organ.* 74, 243–254.
- Dubé, M.G., Duinker, P., Greig, L., Carver, M., Servos, M., McMaster, M., Noble, B., Schreier, H., Jackson, L., Munkittrick, K.R., 2013a. A framework for assessing cumulative effects in watersheds: An introduction to Canadian case studies. *Integr. Environ. Assess. Manag.* 9, 363–369. <https://doi.org/10.1002/ieam.1418>
- Dubé, M.G., Muldoon, B., Wilson, J., Maracle, K.B., 2013b. Accumulated state of the Yukon River watershed: Part I critical review of literature. *Integr. Environ. Assess. Manag.* 9, 426–438. <https://doi.org/10.1002/ieam.1360>
- Dubé, M.G., Wilson, J.E., Waterhouse, J., 2013c. Accumulated state assessment of the Yukon River watershed: Part II quantitative effects-based analysis integrating western science and traditional ecological knowledge. *Integr. Environ. Assess. Manag.* 9, 439–455. <https://doi.org/10.1002/ieam.1363>
- Dunlap, T.R., 1999. *Nature and the English diaspora: environment and history in the United States, Canada, Australia, and New Zealand*. Cambridge University Press.
- Dussias, A.M., 1998. Asserting a Traditional Environmental Ethic: Recent Developments in Environmental Regulation Involving Native American Tribes Symposium: Legal Advice to Nature: Counseling the Environment on What to Expect from the New Environmental Initiatives: Articles. *N. Engl. Law Rev.* 33, 653–666.
- Edwards, K., 2009. *Dictionary of Tlingit*. Sealaska Heritage Institute.
- Environment Yukon, Water Resources Branch, 2014. *Water for Nature, Water for People: Yukon Water Strategy and Action Plan*. Environment Yukon, Whitehorse, YT.
- Environment Yukon, Water Resources Branch, 2013a. *Summary of Comments: Dawson City Open House (Draft Yukon Water Strategy for Public Review)*.
- Environment Yukon, Water Resources Branch, 2013b. *Summary of Comments: Whitehorse Open House*.
- Environment Yukon, Water Resources Branch, 2013c. *Summary of Comments: Haines Junction Open House*.
- Environment Yukon, Water Resources Branch, 2013d. *Summary of Comments: Mayo Open House*.

- Environment Yukon, Water Resources Branch, 2013e. Summary of Comments: Tagish Public Meeting.
- Environment Yukon, Water Resources Branch, 2013f. Summary of Comments: Pelly Crossing Meeting.
- Environment Yukon, Water Resources Branch, 2013g. Summary of Comments: Ross River Public Meeting.
- Environment Yukon, Water Resources Branch, 2013h. Summary of Comments: Fort McPherson Public Meeting.
- Feit, H.A., 2005. Re-cognizing co-management as co-governance: Visions and histories of conservation at James Bay. *Anthropologica* 267–288.
- Feit, H.A., 1979. Political Articulations of Hunters to the State. Means of Resisting Threats to Subsistence Production in the James Bay and Northern Quebec Agreement.
- Findlay, C., 2010. Reconciliation Protocols – British Columbia’s New Way of Doing Business with First Nations.
- First Nation of Nacho Nyak Dun v. Yukon, 2017 SCC 58, 2017.
- Forsyth, T., 2003. *Critical political ecology*. Routledge.
- Forsyth, T., Levidow, L., 2015. An Ontological Politics of Comparative Environmental Analysis: The Green Economy and Local Diversity. *Glob. Environ. Polit.* 15, 140–151. https://doi.org/10.1162/GLEP_a_00315
- Fort, D.D., 1995. State and Tribal Water Quality Standards under the Clean Water Act: A Case Study. *Nat. Resour. J.* 35, 771.
- Foucault, M., 1991. Governmentality, in: Burchell, G., Gordon, C., Miller, P. (Eds.), *The Foucault Effect: Studies in Governmentality*. University of Chicago Press, Chicago, Illinois, USA.
- Fox, C.A., Reo, N.J., Turner, D.A., Cook, J., Dituri, F., Fessell, B., Jenkins, J., Johnson, A., Rakena, T.M., Riley, C., Turner, A., Williams, J., Wilson, M., 2017. “The river is us; the river is in our veins”: re-de ning river restoration in three Indigenous communities. *Sustain. Sci.* 12, 521–533. <https://doi.org/10.1007/s11625-016-0421-1>
- Francisco, J.C.R. de, Boelens, R., 2015. Payment for Environmental Services: mobilising an epistemic community to construct dominant policy. *Environ. Polit.* 24, 481–500. <https://doi.org/10.1080/09644016.2015.1014658>
- Gearheard, S., Aporta, C., Aipellee, G., O’Keefe, K., 2011. The Igliniit project: Inuit hunters document life on the trail to map and monitor arctic change. *Can. Geogr.-Geogr. Can.* 55, 42–55. <https://doi.org/10.1111/j.1541-0064.2010.00344.x>
- Getches, D.H., 2005. Defending Indigenous Water Rights with the Laws of Dominant Culture: The Case of the United States, in: Roth, D., Boelens, R., Zwartveen, M. (Eds.), *Liquid Relations: Contested Water Rights and Legal Complexity*. Rutgers University Press, New Brunswick, pp. 44–65.
- Goetze, T.C., 2005. Empowered Co-Management: Towards Power-Sharing and Indigenous Rights in Clayoquot Sound, BC. *Anthropologica* 47, 247–265.
- Gouveia, C., Fonseca, A., Câmara, A., Ferreira, F., 2004. Promoting the use of environmental data collected by concerned citizens through information and communication technologies. *J. Environ. Manage.* 71, 135–154. <https://doi.org/doi:10.1016/j.jenvman.2004.01.009>

- Government of British Columbia, Government of Yukon, 2016. Mackenzie River Basin Bilateral Water Management Agreement.
- Government of Canada, 2016. Tla'amin Final Agreement.
- Government of Canada, 2015. Déline Final Self-Government Agreement.
- Government of Canada, 2012. Yale First Nation Final Agreement.
- Government of Canada, 2008. Nisga'a Final Agreement and Background Information.
- Government of Canada, 2005a. The Carcross/Tagish First Nation Final Agreement.
- Government of Canada, 2005b. The Carcross/Tagish First Nation Self-Government Agreement.
- Government of Canada, 2003a. Kluane First Nation Final Agreement.
- Government of Canada, 2003b. Kluane First Nation Self-Government Agreement.
- Government of Canada, 2003c. Yukon Environmental and Socio-economic Assessment Act (S.C. 2003, c. 7).
- Government of Canada, 1998a. The Tr'ondëk Hwëch'in Final Agreement.
- Government of Canada, 1998b. The Tr'ondëk Hwëch'in Self-Government Agreement.
- Government of Canada, 1994a. Yukon First Nations Self-Government Act, S.C. 1994, c. 35.
- Government of Canada, 1994b. Yukon First Nations Land Claims Settlement Act.
- Government of Canada, Council for Yukon Indians, Government of the Yukon, 1993. Yukon Umbrella Final Agreement.
- Government of Canada; Indigenous and Northern Affairs Canada, 2008. Fact Sheet: Aboriginal Self-Government [WWW Document]. URL <http://www.aadnc-aandc.gc.ca/eng/1100100016293/1100100016294> (accessed 10.27.17).
- Government of Northwest Territories, 2009. Species at Risk (NWT) Act.
- Government of Yukon, 2018. Mine Licensing Improvement Initiative [WWW Document]. Energy Mines Resour. URL <http://www.emr.gov.yk.ca/mining/mine-licensing-improvement-initiative.html> (accessed 2.3.18).
- Gregory, R., Trousdale, W., 2009. Compensating aboriginal cultural losses: An alternative approach to assessing environmental damages. *J. Environ. Manage.* 90, 2469–2479.
- Groenfeldt, D., 2013. *Water Ethics: A Values Approach to Solving the Water Crisis*. Routledge.
- Gupta, J., Hilderling, A., Misiedjan, D., 2014. Indigenous people's right to water under international law: a legal pluralism perspective. *Curr. Opin. Environ. Sustain.* 11, 26–33.
- Haida Nation v. British Columbia (Minister of Forests) 3 S.C.R. 511, 2004 SCC 73, 2004.
- Haraway, D.J., 2003. *The companion species manifesto: Dogs, people, and significant otherness*. Prickly Paradigm Press Chicago.
- Harmsworth, G.R., Young, R.G., Walker, D., Clapcott, J.E., James, T., 2011. Linkages between cultural and scientific indicators of river and stream health. *N. Z. J. Mar. Freshw. Res.* 45, 423–436. <https://doi.org/10.1080/00288330.2011.570767>
- Harris, C., 2004. How Did Colonialism Dispossess? Comments from an Edge of Empire. *Ann. Assoc. Am. Geogr.* 94, 165–182. <https://doi.org/10.1111/j.1467-8306.2004.09401009.x>
- Harris, L.M., Alatout, S., 2010. Negotiating hydro-scales, forging states: Comparison of the upper Tigris/Euphrates and Jordan River basins. *Polit. Geogr.* 29, 148–156. <https://doi.org/10.1016/j.polgeo.2010.02.012>
- Harris, M., McKenzie, S., Rodina, L., Shah, S.H., Wilson, N.J., 2017. Water Justice: Key concepts, debates and research agendas, in: Holifield, R., Chakraborty, J., Walker, G. (Eds.), *The Routledge Handbook of Environmental Justice*. Routledge, New York, NY, pp. 338–349.

- Hayman, E., Wedge, M., James, C., 2015. “Storytelling Water North of the Future Héen Kas’él’ti Oo (Among the Ragged Lakes): Collaborative Water Research with Carcross/Tagish First Nation, Yukon Territory, Canada, in: Buechler, S., Hanson, A.-M.S. (Eds.), *A Political Ecology of Women, Water and Global Environmental Change*. Routledge, London, pp. 185–205.
- Herman-Mercer, N., Schuster, P.F., Maracle, K.B., 2011. Indigenous Observations of Climate Change in the Lower Yukon River Basin, Alaska. *Hum. Organ.* 70, 244–252.
- Herman-Mercer, N.M., Antweiler, R.C., Wilson, N.J., Mutter, E.A., Toohey, R.C., Schuster, P.F., Under Review. *Achieving Data Credibility in Community-Based Monitoring: A Case Study of Water Quality Monitoring in the Yukon River Basin*.
- Hidalgo, J.P., Boelens, R., Vos, J., 2017. De-colonizing water. Dispossession, water insecurity, and Indigenous claims for resources, authority, and territory. *Water Hist.* 9, 67–85. <https://doi.org/10.1007/s12685-016-0186-6>
- Hill, R., Grant, C., George, M., Robinson, C.J., Jackson, S., Abel, N., 2012. A Typology of Indigenous Engagement in Australian Environmental Management: Implications for Knowledge Integration and Social-ecological System Sustainability. *Ecol. Soc.* 17, 23. <http://dx.doi.org/10.5751/ES-04587-170123>
- Hlevca, R., Spencer, M., Carr-Wilson, S., 2014. *Tsilhqot’in Nation v B.C.* Summary of Panel Discussions on the Supreme Court of Canada Decision. Polis Project on Ecological Governance, University of Victoria.
- Hommes, L., Boelens, R., Maat, H., 2016. Contested hydrosocial territories and disputed water governance: Struggles and competing claims over the Ilisu Dam development in southeastern Turkey. *Geoforum* 71, 9–20. <https://doi.org/10.1016/j.geoforum.2016.02.015>
- Hoogeveen, D., 2016. Fish-hood: Environmental assessment, critical Indigenous studies, and posthumanism at Fish Lake (Teztan Biny), Tsilhqot’in territory. *Environ. Plan. Soc. Space* 34, 355–370. <https://doi.org/10.1177/0263775815615123>
- Hoover, E., Cook, K., Plain, R., Sanchez, K., Waghiyi, V., Miller, P., Dufault, R., Sislin, C., Carpenter, D.O., 2012. Indigenous peoples of North America: environmental exposures and reproductive justice. *Environ. Health Perspect.* 120, 1645–1649.
- Horton, R.E., 1931. The field, scope, and status of the science of hydrology. *Eos Trans. Am. Geophys. Union* 12, 189–202.
- Hunsberger, C., 2004. *Exploring links between citizen environmental monitoring and decision making: three Canadian case examples (Thesis)*. University of Waterloo, Waterloo, Ontario.
- Hunt, S., 2014. Ontologies of Indigeneity: the politics of embodying a concept. *Cult. Geogr.* 21, 27–32. <https://doi.org/10.1177/1474474013500226>
- Hurley, M.C., 2009. *Settling Comprehensive Land Claims*. Parliamentary Information and Research Service, Library of Parliament.
- INAC, 2008. *Building the Future: Yukon First Nation Self-Government*. Indian Act, RSC 1985, c I-5, 1985.
- Indian and Northern Affairs Canada, 2003. *Tlicho Agreement*.
- Indian and Northern Affairs Canada, 1993. *Sahtu Dene & Métis Comprehensive Land Claim*.
- Indian and Northern Affairs Canada, 1992. *Gwich’in Comprehensive Land Claim Agreement*.

- Irwin, A., 2002. *Citizen science: A study of people, expertise, and sustainable development*. Routledge, London; New York.
- Ishkonigan Inc., The Phare Law Corporation, North Raven, 2015. *Collaborative Consent: A Nation-To-Nation Path to Partnership with Indigenous Governments*.
- Joe, N., Bakker, K., Harris, L.M., 2017. *Perspectives on the BC Water Sustainability Act : First Nations Respond to Water Governance Reform in British Columbia*. University of British Columbia.
- John, B., 1997. Nee'aaneek (Upper Tanana Glossary [dictionary] - Scottie Creek Dialect).
- Johnson, N., Alessa, L., Behe, C., Danielsen, F., Gearheard, S., Gofman-Wallingford, V., Kliskey, A., Krümmel, E.-M., Lynch, A., Mustonen, T., others, 2015. The contributions of community-based monitoring and traditional knowledge to Arctic observing networks: Reflections on the state of the field. *Arctic* 68, 1. <http://dx.doi.org/10.14430/arctic4447>
- Jollymore, A., Haines, M.J., Satterfield, T., Johnson, M.S., 2017a. Citizen science for water quality monitoring: Data implications of citizen perspectives. *J. Environ. Manage.* 200, 456–467. <https://doi.org/10.1016/j.jenvman.2017.05.083>
- Jollymore, A., McFarlane, K., Harris, L.M., 2017b. Whose input counts? Evaluating the process and outcomes of public consultation through the BC Water Act Modernization. *Crit. Policy Stud.* 1–25.
- Kirkness, V.J., Barnhardt, R., 1991. First Nations and higher education: The four R's—Respect, relevance, reciprocity, responsibility. *J. Am. Indian Educ.* 1–15.
- Kluane First Nation, 2012a. *Kluane First Nation Traditional Knowledge Policy (Draft)*.
- Kluane First Nation, 2012b. *Lands and Natural Resources Act*.
- Kluane First Nation, 1995. *Constitution*.
- Kohn, E., 2007. How dogs dream: Amazonian natures and the politics of transspecies engagement. *Am. Ethnol.* 34, 3–24.
- Kotaska, J.G., 2013a. Reconciliation “at the end of the day”: decolonizing territorial governance in British Columbia after Delgamuukw. University of British Columbia, Vancouver, B.C.
- Kotaska, J.G., 2013b. Chapter 6: Eyes and Ears on the Coast, in: *Reconciliation “at the End of the Day”: Decolonizing Territorial Governance in British Columbia after Delgamuukw*. Dissertation, pp. 236–281.
- LaBoucane-Benson, P., Gibson, G., Benson, A., Miller, G., 2012. Are We Seeking Pimatisiwin or Creating Pomewin? Implications for Water Policy. *Int. Indig. Policy J.* 3, n/a.
- Laidlaw, D., Passelac-Ross, M., 2010. *Water Rights and Water Stewardship: What About Aboriginal Peoples?*
- Langlois, J., Truesdale, C., 2015a. Yukon court overturns government land use plan for the Peel Watershed. *JFK Law*.
- Langlois, J., Truesdale, C., 2015b. Yukon Court of Appeal kills Yukon’s Peel Watershed plan, but parties sent back to the drawing board. *JFK Law*.
- Lawson, M.L., 1994. *Dammed Indians: The Pick-Sloan Plan and the Missouri River Sioux, 1944-1980*. Univ of Oklahoma Pr.
- Legg, C.J., Nagy, L., 2006. Why most conservation monitoring is, but need not be, a waste of time. *J. Environ. Manage.* 78, 194–199. <https://doi.org/10.1016/j.jenvman.2005.04.016>
- Li, T., 2007. *The will to improve: governmentality, development, and the practice of politics*. Duke University Press, Durham.

- Linton, J., 2010. What is water?: the history of a modern abstraction, *Nature/history/society* series. UBC Press, Vancouver.
- Linton, J., Budds, J., 2013. The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water. *Geoforum*. <https://doi.org/10.1016/j.geoforum.2013.10.008>
- Loftus, A., 2009. Rethinking Political Ecologies of Water. *Third World Q.* 30, 953–968. <https://doi.org/10.1080/01436590902959198>
- Low, M., Shaw, K., 2011. FIRST NATIONS RIGHTS AND ENVIRONMENTAL GOVERNANCE: Lessons from the Great Bear Rainforest. *BC Stud.* 9–33.
- Lowe, L., 2016. Fort Nelson First Nation: Towards Water Governance and Planning.
- Manson, J., 2015. Relational Nations: trading and sharing ethos for Indigenous food sovereignty on Vancouver Island. University of British Columbia.
- Mapping the Way, 2016. Our Agreements [WWW Document]. [Mappingtheway.ca](http://mappingtheway.ca). URL <http://mappingtheway.ca/our-agreements> (accessed 1.31.18).
- Martin, T., Hoffman, S.M. (Eds.), 2008. *Power Struggles: Hydro Development and First Nations in Manitoba and Quebec*. Univ. of Manitoba Press.
- McClellan, C., 1975. My old people say: an ethnographic survey of Southern Yukon Territory. National Museum of Man; available from National Museums of Canada, Ottawa.
- McCreary, T.A., Milligan, R.A., 2014. Pipelines, permits, and protests: Carrier Sekani encounters with the Enbridge Northern Gateway Project. *Cult. Geogr.* 21, 115–129. <https://doi.org/10.1177/1474474013482807>
- McGregor, D., 2014. Traditional Knowledge and Water Governance: The ethic of responsibility. *Altern. Int. J. Indig. Peoples* 10, 493–507. <https://doi.org/10.1177/117718011401000505>
- McGregor, D., 2012. Traditional Knowledge: Considerations for Protecting Water in Ontario. *Int. Indig. Policy J.* 3, 1–21.
- McIntyre, J.K., Baldwin, D.H., Beauchamp, D.A., Scholz, N.L., 2012. Low-level copper exposures increase visibility and vulnerability of juvenile coho salmon to cutthroat trout predators. *Ecol. Appl.* 22, 1460–1471. <https://doi.org/10.1890/11-2001.1>
- McLean, J., 2007. Water injustices and potential remedies in indigenous rural contexts: A water justice analysis. *The Environmentalist* 27, 25–38.
- Merrey, D.J., 2009. African models for transnational river basin organisations in Africa: An unexplored dimension. *Water Altern.* 2, 183.
- Minkler, M., Wallerstein, N. (Eds.), 2008. *Community-Based Participatory Research for Health: From Process to Outcomes*, 2nd ed. Jossey-Bass, San Francisco, CA.
- Morellato, M., 2008. The Crown's Constitutional Duty to Consult and Accommodate Aboriginal and Treaty Rights. National Centre for First Nations Governance.
- Morgan, M., Strelein, L., Weir, J., 2004. Indigenous rights to water in the Murray Darling Basin. Support Indig. Final Rep. Living Murray Initiat.
- Morse, B., 2008. Regaining recognition of the inherent right of Aboriginal governance. *Aborig. Self-Gov. Can. Curr. Trends Issues* 3rd Ed Ed Yale Belanger 55–84.
- Mutter, E., 2014. Assessment of Contaminant Concentrations and Transport Pathways in Rural Alaska Communities' Solid Waste and Wastewater Sites. University of Alaska Fairbanks, Fairbanks, Alaska.
- Na-cho Nyak Dun First Nation, 2014. Decision Document: Class 4 Placer Mine - Haggart Creek (YOR Project Number: 2014-003).

- Nadasdy, P., 2017. *Sovereignty's Entailments: First Nation State Formation in the Yukon*. University of Toronto Press, Scholarly Publishing Division.
- Nadasdy, P., 2012. Boundaries among Kin: Sovereignty, the Modern Treaty Process, and the Rise of Ethno-Territorial Nationalism among Yukon First Nations. *Comp. Stud. Soc. Hist.* 54, 499–532.
- Nadasdy, P., 2007. The Gift in the Animal: The Ontology of Hunting and Human-Animal Sociality. *Am. Ethnol.* 34, 25–43.
- Nadasdy, P., 2005. The anti-politics of TEK: The institutionalization of co-management discourse and practice. *Anthropologica* 47, 215–232.
- Nadasdy, P., 2003a. Reevaluating the co-management success story. *Arctic* 56, 367–380.
- Nadasdy, P., 2003b. Hunters and bureaucrats: power, knowledge, and aboriginal-state relations in the southwest Yukon. UBC Press, Vancouver.
- Nadasdy, P., 1999. The politics of TEK: Power and the “integration” of knowledge. *Arct. Anthropol.* 36, 1–18.
- Nahir, M., van Aanhout, M., Reinecke, S., 2006. Application of Risk Management to Abandoned Mine Sites in the Canadian North, in: Published by the American Society of Mining and Reclamation (ASMR). Presented at the 7th International Conference on Acid Rock Drainage (ICARD), St. Louis MO.
- Napoleon, V., 2013. Thinking About Indigenous Legal Orders, in: Provost, R., Sheppard, C. (Eds.), *Dialogues on Human Rights and Legal Pluralism, Ius Gentium: Comparative Perspectives on Law and Justice*. SpringerLink, pp. 229–245.
- Napoleon, V., Friedland, H., 2016. An Inside Job: Engaging with Indigenous Legal Traditions through Stories. *McGill Law J. Rev. Droit McGill* 61, 725–754.
<https://doi.org/10.7202/1038487ar>
- Natcher, D.C., 2013. Gender and Resource Co-Management in Northern Canada. *Arctic* 66, 218–221.
- Natcher, D.C., Davis, S., 2007. Rethinking Devolution: Challenges for Aboriginal Resource Management in the Yukon Territory. *Soc. Nat. Resour.* 20, 271–279.
<https://doi.org/10.1080/08941920601117405>
- Natcher, D.C., Davis, S., Hickey, C.G., 2005. Co-Management: Managing Relationships, Not Resources. *Hum. Organ.* 64, 240–250.
- National Aboriginal Health Organization, 2007. *OCAP: Ownership, Control, Access and Possession*. National Aboriginal Health Organization, Ottawa, Canada.
- New Zealand, 2017. *Te Awa Tupua (Whanganui River Claims Settlement) Act*.
- Newman, D.G., 2009. *The duty to consult: New relationships with Aboriginal peoples*. UBC Press.
- Nichols, T.N., Berkes, F., Jolly, D., Snow, N.B., Sachs Harbour, N.W.T., 2004. Climate change and sea ice: Local observations from the Canadian Western Arctic. *Arctic* 57, 68–79.
- Nightingale, A., 2009. Triangulation, in: Kitchin, R., Thrift, N. (Eds.), *International Encyclopedia of Human Geography*. Elsevier, Oxford, pp. 489–492.
- Noble, B., Birk, J., 2011. Comfort monitoring? Environmental assessment follow-up under community–industry negotiated environmental agreements. *Environ. Impact Assess. Rev.* 31, 17–24. <https://doi.org/10.1016/j.ear.2010.05.002>
- Noble, B.F., 2014. *Introduction to Environmental Impact Assessment: A Guide to Principles and Practice, Third Edition* edition. ed. Oxford University Press.

- Noble, B.F., Sheelanere, P., Patrick, R., 2011. Advancing Watershed Cumulative Effects Assessment and Management: Lessons from the South Saskatchewan River Watershed, Canada. *J. Environ. Assess. Policy Manag.* 13, 567–590.
- Noble, B.F., Skwaruk, J.S., Patrick, R.J., 2014. Toward cumulative effects assessment and management in the Athabasca watershed, Alberta, Canada. *Can. Geogr. Géographe Can.* 58, 315–328. <https://doi.org/10.1111/cag.12063>
- Norman, E.S., 2017. Standing Up for Inherent Rights: The Role of Indigenous-Led Activism in Protecting Sacred Waters and Ways of Life. *Soc. Nat. Resour.* 1–17.
- Norman, E.S., 2014. Governing Transboundary Waters: Canada, the United States, and Indigenous communities. Routledge.
- Norman, E.S., 2012. Cultural politics and transboundary resource governance in the Salish sea. *Water Altern.* 5, 138–160.
- Norman, E.S., Bakker, K., 2017. Transcending Borders Through Postcolonial Water Governance? Indigenous Water Governance Across the Canada-US Border, in: *Water Policy and Governance in Canada*. Springer, pp. 139–157.
- O'Donnell, E., Maloney, M., Parker, C., 2017. New developments in the legal status of rivers. University of Melbourne, Melbourne, Australia.
- Parlee, B.L., Geertsema, K., Willier, A., 2012. Social-ecological thresholds in a changing boreal landscape: insights from Cree knowledge of the Lesser Slave Lake region of Alberta, Canada. *Ecol. Soc.* 17, 20. <http://dx.doi.org/10.5751/ES-04410-170220>
- Penikett, T., 2012. Six definitions of aboriginal self-government and the unique Haida model. Conference Paper, Ottawa: Action Canada Northern Conference.
- Penikett, T., 2004. *Breaking Trail*. Trafford Publishing.
- Perramond, E.P., 2016. Adjudicating hydrosocial territory in New Mexico. *Water Int.* 41, 173–188. <https://doi.org/10.1080/02508060.2016.1108442>
- Perreault, T., 2013. Dispossession by Accumulation? Mining, Water and the Nature of Enclosure on the Bolivian Altiplano. *Antipode* 45, 1050–1069. <https://doi.org/10.1111/anti.12005>
- Perreault, T. [1], 2008. Custom and Contradiction: Rural Water Governance and the Politics of Usos y Costumbres in Bolivia's Irrigators' Movement. *Ann. Assoc. Am. Geogr.* 98, 834–854. <https://doi.org/10.1080/00045600802013502>
- Pearce, T.D., Ford, J.D., Prno, J., Duerden, F., Pittman, J., Beaumier, M., Berrang-ford, L., Smit, B., 2011. Climate change and mining in Canada. *Mitig. Adapt. Strateg. Glob. Change* 16, 347–368. <http://dx.doi.org/10.1007/s11027-010-9269-3>
- Phare, 2013. Indigenous peoples and water: Governing across borders, in: Norman, E.S., Cohen, A., Bakker, K. (Eds.), *Water without Borders?: Canada, the United States, and Shared Waters*. University of Toronto Press, pp. 27–46.
- Phare, M.-A., Simms, R., Brandes, O.M., Miltenberger, M., 2017. Collaborative Consent and British Columbia's Water: Towards Watershed Co-governance. POLIS Project on Ecological Governance & Environmental Law Centre, Victoria, BC.
- Phare, M.-A.S., 2011. *Restoring the lifeblood: Water, First Nations opportunities for change*. Walter Duncan and Gordon Foundation, Toronto, Ontario.
- Phare, M.-A.S., 2009. *Denying the Source: The Crisis of First Nations Water Rights*. Rocky Mountain Books.
- Pinkerton, E., 1992. Translating legal rights into management practice: overcoming barriers to the exercise of co-management. *Hum. Organ.* 51, 330–341.

- Porter, K.S., 2006. Good Alliances Make Good Neighbors: The Case for Tribal-State-Federal Watershed Partnerships Symposium: Native Water Law and Public Policy: Critical Issues in the Great Lakes and St. Lawrence Watersheds. *Cornell J. Law Public Policy* 16, 495–538.
- Powell, D.E., Curley, A., 2008. K'è, Hozhó, and non-governmental politics on the Navajo Nation: Ontologies of difference manifest in Environmental Activism. *Anthropol. Q.* 81, 17–58.
- Putnam, R.D., 2000. *Bowling alone: the collapse and revival of American community*. Simon & Schuster, New York.
- Ranco, D.J., 2009. Models of Tribal Environmental Regulation - In Pursuit of a Culturally Relevant Form of Tribal Sovereignty. *Fed. Lawyer* 56, 46–51.
- Rathwell, K.J., Peterson, G.D., 2012. Connecting Social Networks with Ecosystem Services for Watershed Governance: a Social-Ecological Network Perspective Highlights the Critical Role of Bridging Organizations. *Ecol. Soc.* 17, 24. <https://doi.org/10.5751/ES-04810-170224>
- Richards, J.P., 2009. *Mining, society, and a sustainable world*. Springer.
- Reidlinger, D., Berkes, F., 2001. Contributions of traditional knowledge to understanding climate change in the Canadian Arctic. *Polar Rec.* 315–328.
- respect, n., 2015. . OED Online.
- Rifkin, M., 2010. *When did Indians become straight?: Kinship, the history of sexuality, and native sovereignty*. Oxford University Press.
- Ritter, J., 1978. Han Gwich'in Athapaskan Noun Dictionary.
- Ritter, J., n.d. Northern Tutchone Dictionary.
- Robbins, P., 2011. *Political Ecology: A Critical Introduction*, 2nd ed. Wiley, Hoboken.
- Robbins, P., 2003. Political ecology in political geography. *Polit. Geogr., Forum: Political Geography in Question* 22, 641–645. [https://doi.org/10.1016/S0962-6298\(03\)00071-4](https://doi.org/10.1016/S0962-6298(03)00071-4)
- Roburn, S., Tr'ondëk Hwëch'in Heritage Department, 2012. *Weathering Changes: Cultivating Local and Traditional Knowledge of Environmental Change in Tr'ondëk Hwëch'in Traditional Territory*. *Arctic* 65, 439–455.
- Romano, S.T., 2016. Democratizing discourses: conceptions of ownership, autonomy and 'the state' in Nicaragua's rural water governance. *Water Int.* 41, 74–90. <https://doi.org/10.1080/02508060.2016.1107706>
- Roth, D., Boelens, R., Zwarteveen, M. (Eds.), 2005. *Liquid Relations: Contested Water Rights and Legal Complexity*. Rutgers University Press, New Brunswick.
- Saldaña, J., 2013. *The coding manual for qualitative researchers*, 2nd ed. ed. SAGE, Thousand Oaks, CA.
- Salmón, E., 2000. Kincentric Ecology: Indigenous Perceptions of the Human–Nature Relationship. *Ecol. Appl.* 10, 1327–1332. [https://doi.org/10.1890/1051-0761\(2000\)010\[1327:KEIPOT\]2.0.CO;2](https://doi.org/10.1890/1051-0761(2000)010[1327:KEIPOT]2.0.CO;2)
- Salmond, A., 2014. Tears of Rangi: Water, power, and people in New Zealand. *HAU J. Ethnogr. Theory* 4, 285–309. <https://doi.org/10.14318/hau4.3.017>
- Salvarredy-Aranguren, M.M., Probst, A., Roulet, M., Isaure, M.-P., 2008. Contamination of surface waters by mining wastes in the Milluni Valley (Cordillera Real, Bolivia): Mineralogical and hydrological influences. *Appl. Geochem.* 23, 1299–1324. <https://doi.org/10.1016/j.apgeochem.2007.11.019>

- Sam, M.G., 2013. Oral narratives, customary laws and indigenous water rights in Canada.
- Sam, M.G., Armstrong, J., 2013. Indigenous water governance and resistance: a Syilx perspective, in: Wagner, J.R. (Ed.), *The Social Life of Water*. Berghahn Books, Oxford, UK, pp. 239–254.
- Saunders, M., 2009. Clean Water in Indian Country: The Risks (and Rewards) of Being Treated in the Same Manner as a State Indian Law. *William Mitchell Law Rev.* 36, 533–564.
- Savan, B., Morgan, A.J., Gore, C., 2003. Volunteer environmental monitoring and the role of the universities: the case of Citizens' Environment Watch. *Environ. Manage.* 31, 0561–0568. <https://doi.org/doi:10.1007/s00267-002-2897-y>
- Schlosberg, D., 2007. *Defining Environmental Justice: Theories, Movements, and Nature*. OUP Oxford.
- Schmidt, J.J., Shrubsole, D., 2013. Modern Water Ethics: Implications for Shared Governance. *Environ. Values* 22, 359–379. <https://doi.org/10.3197/096327113X13648087563746>
- Schuster, P.F., Herman-Mercer, N.M., 2015. *Water Quality in the Yukon River Basin, Alaska and Canada, Water Years 2009-2013*. U.S. Geological Survey, Boulder, CO.
- Scott, J.C., 1998. *Seeing like a state: how certain schemes to improve the human condition have failed*. Yale University Press.
- Seemann, M., 2016. Inclusive recognition politics and the struggle over hydrosocial territories in two Bolivian highland communities. *Water Int.* 41, 157–172. <https://doi.org/10.1080/02508060.2016.1108384>
- Shaw, K., 2008. *Indigeneity and political theory: sovereignty and the limits of the political*. Taylor & Francis.
- Sheelanere, P., Noble, B.F., Patrick, R.J., 2013. Institutional requirements for watershed cumulative effects assessment and management: Lessons from a Canadian trans-boundary watershed. *Land Use Policy* 30, 67–75.
- Shelton, A.M., 2013. *The accuracy of water quality monitoring data: a comparison between citizen scientists and professionals (Thesis)*. Dalhousie University, Halifax, Nova Scotia.
- Shurts, J., 2000. *Indian reserved water rights the Winters doctrine in its social and legal context, 1880s-1930s*. University of Oklahoma Press, Norman, Oklahoma.
- Simms, B.R., 2014. "All of the water that is in our reserves and that is in our territory is ours": colonial and Indigenous water governance in unceded Indigenous territories in British Columbia. University of British Columbia, Vancouver, B.C.
- Simms, R., Harris, L., Joe, N., Bakker, K., 2016. Navigating the tensions in collaborative watershed governance: Water governance and Indigenous communities in British Columbia, Canada. *Geoforum* 73, 6–16. <https://doi.org/10.1016/j.geoforum.2016.04.005>
- Simpson, A., 2014. *Mohawk Interruptus: Political Life Across the Borders of Settler States*. Duke University Press.
- Simpson, A., 2011. Settlement's Secret. *Cult. Anthropol.* 26, 205–217. <https://doi.org/10.1111/j.1548-1360.2011.01095.x>
- Simpson, L., 2008. Looking after Gdoo-naaganinaa: Precolonial Nishnaabeg diplomatic and treaty relationships. *Wicazo Sa Rev.* 23, 29–42.
- Smith, A., 2013. Unsettling the Privilege of Self-Reflexivity, in: Winddance Twine, F., Gardener, B. (Eds.), *Geographies of Privilege*. Taylor and Francis, Florence, pp. 263–279.

- Smith, L.T., 1999. *Decolonizing methodologies: Research and Indigenous peoples*. Zed Books, New York.
- Squires, A.J., Westbrook, C.J., Dubé, M.G., 2010. An approach for assessing cumulative effects in a model river, the Athabasca River basin. *Integr. Environ. Assess. Manag.* 6, 119–134. https://doi.org/10.1897/IEAM_2008-081.1
- Staddon, S.C., Nightingale, A., Shrestha, S.K., 2014. The social nature of participatory ecological monitoring. *Soc. Nat. Resour.* 27, 899–914. <https://doi.org/10.1080/08941920.2014.905897>
- Staples, K., Chávez-Ortiz, M., Barrett, M.J., Clark, D., 2013. *Fixing Land Use Planning in the Yukon Before It Really Breaks: A Case Study of the Peel Watershed*. North. Rev.
- Stevenson, M., 2004. Decolonizing Co-Management in Northern Canada. *Cult. Surviv. Q.* 28, 68–72.
- Stevenson, M.G., 2006. The Possibility of Difference: Rethinking Co-management. *Hum. Organ.* 65, 167–180. <https://doi.org/10.17730/humo.65.2.b2dm8thgb7wa4m53>
- Storey, R., Wright-Stow, A., Kin, E., Davies-Colley, R., Stott, R., 2016. Volunteer stream monitoring: Do the data quality and monitoring experience support increased community involvement in freshwater decision making? *Ecol. Soc.* 21, 32. <https://doi.org/10.5751/ES-08934-210432>
- Strang, V., 2004. *The meaning of water*. Berg, Oxford; New York.
- Sundberg, J., 2014. Decolonizing posthumanist geographies. *Cult. Geogr.* 21, 33–47. <https://doi.org/10.1177/1474474013486067>
- Sundberg, J., 2011. Diabolic Caminos in the Desert and Cat Fights on the Río: A Posthumanist Political Ecology of Boundary Enforcement in the United States–Mexico Borderlands. *Ann. Assoc. Am. Geogr.* 101, 318–336. <https://doi.org/10.1080/00045608.2010.538323>
- Summit Environmental Consultants Inc., 2014. *Placer Mining: Evaluation of Water Licensing and Cumulative Water Withdrawal Assessments*.
- Swyngedouw, E., 2015. *Liquid Power: Contested Hydro-Modernities in Twentieth-Century Spain*. MIT Press.
- Swyngedouw, E., 2009. The Political Economy and Political Ecology of the Hydro-Social Cycle. *J. Contemp. Water Res. Educ.* 142, 56–60. <https://doi.org/10.1111/j.1936-704X.2009.00054.x>
- Swyngedouw, E., 2005. Dispossessing H₂O: The Contested Terrain of Water Privatization. *Capital. Nat. Social.* 16.
- Swyngedouw, E., 2004. *Social power and the urbanization of water: Flows of power*. Oxford University Press, Oxford; New York.
- Takeda, L., Røpke, I., 2010. Power and contestation in collaborative ecosystem-based management: The case of Haida Gwaii. *Ecol. Econ., Special Section: Ecological Distribution Conflicts* 70, 178–188. <https://doi.org/10.1016/j.ecolecon.2010.02.007>
- Tallbear, K., 2011. Why Interspecies Thinking Needs Indigenous Standpoints [WWW Document]. *Cult. Anthropol.* URL <http://www.culanth.org/fieldsights/260-why-interspecies-thinking-needs-indigenous-standpoints> (accessed 4.2.16).
- Tanner, A., 2001. The double bind of aboriginal self-government, in: Scott, C.H. (Ed.), *Aboriginal Autonomy and Development in Northern Quebec and Labrador*. UBC Press, Vancouver, B.C., pp. 396–416.

- The Constitution Act, 1982, Schedule B to the Canada Act 1982 (UK), 1982, c 11 [WWW Document], n.d. URL <https://www.canlii.org/en/ca/laws/stat/schedule-b-to-the-canada-act-1982-uk-1982-c-11/latest/schedule-b-to-the-canada-act-1982-uk-1982-c-11.html> (accessed 1.18.16).
- The First Nation of Nacho Nyak Dun v. Yukon, 2015.
- The First Nation of Nacho Nyak Dun v. Yukon, 2014.
- Thomas, J., 2016. “Excellent results” from N.W.T. Indigenous guardians programs [WWW Document]. URL [about:reader?url=http%3A%2F%2Fwww.cbc.ca%2Fnews%2Fcanada%2Fnorth%2Findigenous-guardians-report-1.3837312](http://www.cbc.ca/news/canada/north/indigenous-guardians-report-1.3837312) (accessed 11.8.16).
- Thorson, J.E., Britton, S., Colby, B.G. (Eds.), 2006. Tribal water rights: essays in contemporary law, policy, and economics, 1st ed. University of Arizona Press, Tucson.
- Tipa, G., Welch, R., 2006. Comanagement of natural resources issues of definition from an indigenous community perspective. *J. Appl. Behav. Sci.* 42, 373–391.
- Tlen, D.L., 1993. Kluane Southern Tutchone Glossary (English to Southern Tutchone), 1st ed, Occasional Papers of the Northern Research Institute - Monography #1. Yukon College, Whitehorse, Y.T.
- Todd, Z.C., 2017. Fish against borders: imagining fish, oil, water and Métis law beyond the settler state.
- Todd, Z.C., 2016. An Indigenous Feminist’s Take On The Ontological Turn: ‘Ontology’ Is Just Another Word For Colonialism. *J. Hist. Sociol.* 29, 4–22. <https://doi.org/10.1111/johs.12124>
- Todd, Z.C., 2014. Fish pluralities: Human-animal relations and sites of engagement in Paulatuuq, Arctic Canada. *Études/Inuit/Studies* 38, 217. <https://doi.org/10.7202/1028861ar>
- Toohy, R.C., Herman-Mercer, N.M., Schuster, P.F., Mutter, E., Koch, J.C., 2016. Multi-decadal increases in the Yukon River Basin of chemical fluxes as indicators of changing flowpaths, groundwater, and permafrost. *Geophys. Res. Lett.* 2016GL070817. <https://doi.org/10.1002/2016GL070817>
- Toussaint, S., Sullivan, P., Yu, S., 2005. Water ways in aboriginal Australia: an interconnected analysis. *Anthropol. Forum J. Soc. Anthropol. Comp. Sociol.* 15, 61. <https://doi.org/10.1080/0066467042000336715>
- Tr’ondëk Hwëch’in First Nation, 2016. Tr’ondëk Hwëch’in Heritage Act.
- Tr’ondëk Hwëch’in First Nation, 2012. Tr’ondëk Hwëch’in Traditional Knowledge Policy. Tr’ondëk Hwëch’in Government.
- Tr’ondëk Hwëch’in First Nation, 2004. Land and Resources Act.
- Tr’ondëk Hw’ëch’in First Nation, 1998. Constitution of the Tr’ondëk Hwëch’in.
- Tsilhqot’in Nation v. British Columbia 2014 (SCC 44), 2014.
- Tuck, E., Yang, K.W., 2012. Decolonization is not a metaphor. *Decolonization Indig. Educ. Soc.* 1.
- Turner, N.J., Gregory, R., Brooks, C., Failing, L., Satterfield, T., 2008. From invisibility to transparency: identifying the implications. *Ecol. Soc.* 13, 7.
- United Nations, 2008. United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).
- U.S. Environmental Protection Agency, 2002. Title 40 131 Water Quality Standards, Code of Federal Regulations.

- US EPA, 2007. Final Guidance on Awards of Grants to Indian Tribes under Section 106 of the Clean Water Act.
- US EPA, O., 2015. National Primary Drinking Water Regulations.
- US EPA, O., 2014. EPA Approvals of Tribal Water Quality Standards and Contacts [WWW Document]. US EPA. URL <https://www.epa.gov/wqs-tech/epa-approvals-tribal-water-quality-standards-and-contacts> (accessed 11.10.17).
- U.S. Public Law 92-203, 1971. ANCSA (Alaska Native Claims Settlement Act).
- USGS, 2009. Memorandum of Understanding (MOU) between Yukon River Inter-Tribal Watershed Council and U.S. Geological Survey.
- von der Porten, S., de Loë, R., 2013a. Water governance and Indigenous governance: Towards a synthesis. *Indig. Policy J.* 23.
- von der Porten, S., de Loë, R.C., 2014. Water policy reform and Indigenous governance. *Water Policy* 16, 222–243. <https://doi.org/10.2166/wp.2013.046>
- von der Porten, S., de Loë, R.C., 2013b. Collaborative approaches to governance for water and Indigenous peoples: A case study from British Columbia, Canada. *Geoforum* 50, 149–160. <https://doi.org/10.1016/j.geoforum.2013.09.001>
- von der Porten, S., de Loë, R.C., McGregor, D., 2016. Incorporating Indigenous Knowledge Systems into Collaborative Governance for Water: Challenges and Opportunities. *J. Can. Stud.* 50, 214–243. <https://doi.org/10.3138/jcs.2016.50.1.214>
- Wagner, J.R., 2013. *The Social Life of Water*, 1st ed. Berghahn Books, New York, NY.
- Walia, H., 2013. *Undoing border imperialism*, Anarchist intervention series. AK Press, Edinburgh.
- Walkem, A., 2007. *The Land is Dry: Indigenous Peoples, Water and Environmental Justice*, in: *Eau Canada: The Future of Canada's Water*. UBC Press, Vancouver, BC.
- Walkem, A.A., 2005. *Bringing water to the land: re-cognize-ing indigenous oral traditions and the laws embodied within them*. University of British Columbia.
- Walker, G., 2012. *Environmental Justice: Concepts, Evidence and Politics*. Routledge.
- Waterline, 2017. *Active Water Licenses*.
- Watts, V., 2013. Indigenous place-thought and agency amongst humans and non humans (First Woman and Sky Woman go on a European world tour!). *Decolonization Indig. Educ. Soc.* 2.
- Weber, M., 1946. *From Max Weber: Essays in sociology*. Oxford university press, New York.
- Western Copper Corporation v. Yukon Water Board. *YKSC* 16, 2011.
- Whatmore, S., 2002. *Hybrid geographies: natures, cultures, spaces*. Sage, Thousand Oaks, California.
- White, G., 2009a. “Not the Almighty”: Evaluating Aboriginal Influence in Northern Land-Claim Boards. *Arctic* 61.
- White, G., 2009b. Cultures in collision: Traditional knowledge and Euro-Canadian governance processes in northern land-claim boards. *Arctic* 59.
- Whitelaw, G., Vaughan, H., Craig, B., Atkinson, D., 2003. Establishing the Canadian Community Monitoring Network. *Environ. Monit. Assess.* 88, 409–418. <http://dx.doi.org.ezproxy.library.ubc.ca/10.1023/A:1025545813057>
- Wilde, F.D., 2015. *National Field Manual for the Collection of Water-Quality Data (Techniques of Water-Resources Investigations No. Book 9)*, Handbooks for Water-Resources

- Investigations. United States Department of Interior and United States Geological Survey, Reston, VA.
- Wilson, N.J., 2017. Indigenous Observation Network: Evaluating Community-Based Water Quality Monitoring in the Yukon River Basin (Community Report). University of British Columbia, Vancouver, BC, CAN.
- Wilson, N.J., 2014. Indigenous water governance: Insights from the hydrosocial relations of the Koyukon Athabaskan village of Ruby, Alaska. *Geoforum* 57, 1–11. <https://doi.org/10.1016/j.geoforum.2014.08.005>
- Wilson, N.J., Inkster, J., Toohey, R., Donovan, S.M., 2013a. Integrating Indigenous Knowledge into a Community Contaminant and Climate Change Monitoring Program: Carcross/Tagish First Nation (Community Report). Yukon River Inter-Tribal Watershed Council, Whitehorse, Yukon.
- Wilson, N.J., Inkster, J., Toohey, R., Donovan, S.M., 2013b. Integrating Indigenous Knowledge into a Community Contaminant and Climate Change Monitoring Program: Kluane First Nation (Community Report). Yukon River Inter-Tribal Watershed Council, Whitehorse, Yukon.
- Wilson, N.J., Inkster, J., Toohey, R., Donovan, S.M., 2013c. Integrating Indigenous Knowledge into a Community Contaminant and Climate Change Monitoring Program: White River First Nation (Community Report). Yukon River Inter-Tribal Watershed Council, Whitehorse, Yukon.
- Wilson, N.J., Inkster, J., Toohey, R., Donovan, S.M., 2013d. Integrating Indigenous Knowledge into a Community Contaminant and Climate Change Monitoring Program: Trondek Hwechin First Nation (Community Report). Yukon River Inter-Tribal Watershed Council, Whitehorse, Yukon.
- Wilson, N.J., Mutter, E., Inkster, J., Satterfield, T.A., 2018. Community-Based Monitoring as the practice of Indigenous water governance: A case study of Indigenous water quality monitoring in the Yukon River Basin. *J. Environ. Manage.* 210, 290–298.
- Wilson, N.J., Walter, M.T., Waterhouse, J., 2015. Indigenous Knowledge of Hydrologic Change in the Yukon River Basin: A Case Study of Ruby, Alaska. *Arctic* 68, 93–106. <https://doi.org/10.14430/arctic4459>
- Wilson, P., 2014. The Blue Paper: Water Co-Governance in Canada. Forum on Water Leadership (FLOW).
- Wilson, S., 2009. Research Is Ceremony: Indigenous Research Methods. Fernwood Publishing Co., Ltd., Winnipeg, Manitoba.
- Wiseman, N.D., Bardsley, D.K., 2016. Monitoring to Learn, Learning to Monitor: A Critical Analysis of Opportunities for Indigenous Community-Based Monitoring of Environmental Change in Australian Rangelands. *Geogr. Res.* 54, 52–71. <https://doi.org/10.1111/1745-5871.12150>
- Wolfe, P., 2006. Settler colonialism and the elimination of the native. *J. Genocide Res.* 8, 387–409. <https://doi.org/10.1080/14623520601056240>
- Worster, D., 1986. Rivers of Empire: Water, Aridity, and the Growth of the American West. Pantheon Books, New York.
- Yates, J.S., Harris, L.M., Wilson, N.J., 2017. Multiple ontologies of water: Politics, conflict and implications for governance. *Environ. Plan. Soc. Space* 35, 797–815. <https://doi.org/10.1177/0263775817700395>

- YRITWC, 2014. Water Quality Monitoring Field Manual.
- YRITWC, 2013. Yukon River Watershed Plan.
- Yukon Government, 2016. History of Land Claims [WWW Document]. Exec. Coun. Off. - Gov. Yukon. URL <http://www.eco.gov.yk.ca/landclaims/history.html> (accessed 1.20.16).
- Yukon Legislative Counsel, 2003a. Yukon Waters Act.
- Yukon Legislative Counsel, 2003b. Waters Regulations, O.I.C. 2003/58.
- Yukon Water Board, 2014. Tatchun Creek Bridge: Water Use Application MS14-003 (CMF Construction).
- Yukon Water Board, 2011. Reason for Decision: Water Use Application QZ10-042 (Selwyn Chihong Mining Ltd.).
- Yukon Water Board, 2010. Reason for Decision: Water Use Application QZ08-084 (Carmacks Copper Ltd.).
- Zoanni, D.K., 2017. Traditional Knowledge Systems and Tribal Water Governance on Fort Peck Indian Reservation, MT. Montana State University, Bozeman, Montana.
- Zwarteveen, M., Roth, D., Boelens, R., 2005. Water Rights and Legal Pluralism: Beyond Analysis and Recognition, in: Roth, D., Boelens, R., Zwarteveen, M. (Eds.), *Liquid Relations: Contested Water Rights and Legal Complexity*. Rutgers University Press, New Brunswick, pp. 254–268.
- Zwarteveen, M.Z., Boelens, R., 2014. Defining, researching and struggling for water justice: some conceptual building blocks for research and action. *Water Int.* 39, 143–158. <https://doi.org/10.1080/02508060.2014.891168>

Appendices

Appendix A Elder Interview Consent Form



The University of British Columbia
Institute for Resources, Environment and Sustainability
4th Floor, 2202 Main Mall
Vancouver, BC Canada V6T 1Z4
Phone: 604-822-9250, Fax: 604-822-9250

Participant Consent Form

Vulnerability and change in hydrosocial systems: Insights from Indigenous peoples' relations to water in the Yukon River Basin

Principal Investigator: Professor Terre Satterfield
Institute for Resources, Environment and Sustainability

Co-Investigator(s): Nicole Wilson
Institute for Resources, Environment and Sustainability

Sponsor(s): Social Sciences and Humanities Research Council, Insight Grant and the Northern Scientific Training Program.

The research is conducted as part of a graduate degree and collected data will be part of a thesis.

Purpose: This study aims to improve understandings of Indigenous peoples' vulnerability and responses to change in water in the Yukon River Basin. To do this we are working with the Tr'ondëk Hwëch'in, Kluane, White River and Carcross/Tagish First Nations and the Yukon River Inter-Tribal Watershed Council.

Description of Participant Activities: You are being invited to participate in an interview because of your experience and knowledge related to water and water governance. Your participation in this research will consist of an interview to discuss your own (or your community's) concerns about water and engagement with water governance. You will be asked to choose 1 to 2 sites, which you consider important and/or contaminated places that we might visit. This interview will last approximately 1 - 4 hours depending on the location of the site(s) and will be audio-recorded only with your consent. Please feel free to ask questions about the project at any time during the interview. If you feel uncomfortable about any particular question(s), you may decline to answer them.

Confidentiality: Your identity will be kept confidential. Generic names and code numbers will be used to identify participants on all reports and to all external parties. All records will be kept

in a secure location at UBC. Audio recording will be uploaded to a portable laptop and will be password-protected. Original records will be destroyed following the upload. The recordings will then be stored for at least five years in a safe location that is only accessible to the our research team (see above). In the case where First Nations have a Traditional Knowledge Policy in place (i.e. Carcross Tagish First Nation and Tr'ondeck Hwech'in First Nation), with your permission, recordings and transcripts will be provided to the First Nations access restricted archive. Paper documents will be protected. All computerized files will be password-protected and encrypted.

Potential Risks: No potential risks are expected, although topics may arise in the course of the interview conversation that you may not have intended to include. Should you feel uncomfortable at any time during the interview, you do not have to answer questions, you have the right to stop the interview and/or inform the researcher about information you do not wish to have included in the final documentation.

Potential Benefits: Participants may not benefit directly from participation in the study, but may appreciate being able to share their personal experiences of these important changes. Conclusions relevant for policy are anticipated, and as such, may result in indirect benefits for you, or for the community.

Compensation: In appreciation for your participation in our study, we are offering a \$200.00 honorarium.

Results of the Study: Your interview will be added to a project database and may be included in reports and related educational materials, publications, and/or conference proceedings arising from the project. You are most welcome to request a copy of the results of the project should you wish. Please provide a mailing address we can send a report on the findings to.

Contact for information: We are available to answer any questions you may have about this study. You may contact any member of the research team at the contact details provided above.

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Services at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

Consent: Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without any disadvantage to yourself of any kind.

NAME: _____

ADDRESS: _____

SIGNATURE: _____

WITNESS: _____ DATE: _____

Consent to use your name in research outputs:

Should you prefer to have your name *included* in any outputs of this work at the time of or after the signing of this form, please waive your confidentiality below. If this decision has been made after the original signing of this form, please be sure to date the newly signed portion below. The inclusion of your name will apply only to those documents released after the date accompanying this waiver.

SIGN HERE IF WAIVING CONFIDENTIALITY:

WITNESS: _____ DATE: _____

Once signed you should receive a copy of this consent form.

Your signature above indicates that you have received a copy of this consent form for your own records, and that you consent to participate in this study.

Appendix B Elder Interview Protocol



The University of British Columbia
Institute for Resources, Environment and Sustainability
4th Floor, 2202 Main Mall
Vancouver, BC Canada V6T 1Z4
Phone: 604-822-9250, Fax: 604-822-9250

Community Interview Protocol (Site Visits)

Vulnerability and change in hydrosocial systems: Insights from Indigenous peoples' relations to water in the Yukon River Basin

The purpose of this interview is to provide participating Elders with an opportunity to share their concerns related to the impacts of contaminants and climate change on water resources and communities and to share their ideas about water management and governance in their traditional territories and beyond. Interview participants will be asked to contribute to the development of water indicators based on traditional knowledge that might be used alongside western scientific water quality monitoring techniques.

This interview will last approximately 1 - 4 hours, depending on the location of the site(s). Interview participants will receive an honorarium in recognition of the time and knowledge that they share.

Interview topics and sample questions:

Socio-cultural relations to water (Ontologies):

1. Tell me a bit about where you are from and why water is generally important to you? To your community?

2. What is most important to you about the water within your traditional territory? Within the Yukon River Basin as a whole?

3. 12. On a scale of 1 to 5, How would you rate the overall health of the water within your traditional territory generally? (Choose one)

- 1 Very healthy1
- 2 Healthy2
- 3 Neither healthy nor unhealthy.....3
- 4 Unhealthy4
- 5 Very unhealthy5

[Do not read]

Don't know

Refuse

4. Choosing interview site(s):
 - a. Can you tell me about your favourite place you use/visit often in your traditional territory that is within the Yukon River Basin?
 - b. Can you tell me about a place that you consider the water to be contaminated or polluted?

[Show interview participant participatory map of sites of concern developed during 2012 focus groups. They can choose one of these sites or identify additional sites to be visited. Additional sites identified will be added to the map for future reference]

[The following questions will be asked while at the sites selected by participants]

5. For the one or two places that you identified:
 - a. What is most important to you about this place to you?
 - b. How does being in this place make you feel?
 - c. When you are away from this place how do you feel?
 - d. What does your relationship with this place mean for you?
 - e. How do you see yourself in relation to this place?
 - f. How do you feel when you are out on [insert place]?
 - g. Do these places mean the same or different things for other members of your community?
 - h. What do you or members of your community use the water at this site for (Examples include drinking, fishing, thinking)?
 - i. How would you feel if this place changed? (How do the changes you have seen in this place make you feel?)
- 6 Where do you feel most comfortable? Most safe and secure?
 - a. Where do you feel your best? Happiest?
7. What do you like about living here?
 - j. Would you want to live anywhere else?
 - k. Do you think other places could offer you the same experience as [insert place]?

Environmental Impacts: Threats to water quality, quantity and seasonal rates of flow

8. What changes have you seen in the water in your traditional territory? (Examples including alterations in precipitation patterns, temperature, the timing of freeze-up or break-up, the thickness of lake or river ice, water levels throughout the year and/or the appearance of water)
 - a. How do you think water quality and quantity have changed? ie. What do you think has caused these changes?
 - b. What do you think are the biggest impacts on/threats to the waters within your traditional territory presently?
 - c. How have the changes in water resources you observe impacted subsistence livelihoods?
 - d. What do you think will be problems in the future?

9. How have these changes impacted you? How you use your traditional territory?
 - a. How have these changes/impacts made you feel?
 - b. Do you feel your relationship with your traditional territory has changed because of [insert impacts mentioned by participant]?
 - c. Are there places you no longer use due to changes in water quality or quantity?

10. If it gets worse, what will that mean for you? For your community?
 - a. What changes do you feel might be too much for you?
 - b. How well do you feel you can deal with these changes?

Action and Priorities

11. What do you think should be done about the changes taking place in your traditional territory?
 - a. Do you think that these changes can be fixed?
 - b. What do you think is the most important thing that needs to be addressed?
 - c. Who do you think should be involved in planning for the region? i.e. community, regional government, state/territorial government, federal government
 - d. Would you like to be involved? In what ways?
What do you think you could do to help protect the region?
 - e. What is the role of community-based water monitoring in taking action to address your concerns about water?
 - f. What would make you feel safer about your water quality, quantity and rate of flow in your traditional territory?
 - g. What do you want your traditional territory to be like for your (grand)children?

Water Quality, Quantity & Flow Indicators

READ: One of the goals of this work is to develop culturally relevant water indicators based on your traditional knowledge of water. These indicators could be used to monitor qualities of water over time alongside other scientific approaches to water monitoring.

12. What qualities do you look for when you are trying to determine what the water quality/quantity is like at a site? [Free list all qualities that come to mind] Examples include:
 - a. *Sensorial qualities:* Taste, smell, colour, sediments/clarity, sound of flowing water, water level, sandbars, rate of flow/seasonal water levels, attributes of adjacent land for example, disturbance of soil or plants?
 - b. *Extra-tangible qualities/values:* For example, respect? Health? Access? Safety? Predictability?

READ: We can develop indicators based on the qualities of water you identified above. In the following questions, we will elaborate on the qualities of water you identified above.

[Ask Questions 13 to 17 for each quality that was identified in Question 11]

13. Define what good [insert name of quality identified above, for example flow] and bad [insert name of quality identified above, for example flow] would look like on your terms?

14. Let's talk first about "bad flow" [or other qualities identified above]. If it is really bad, what does it look like? How do you know if it's really bad? e.g., Too many rocks exposed, no visible running water, bad smell, running too fast.

15. Are all of the qualities "bad flow" you identified above equally bad? Are some worse than others? For example, are exposed rocks worse than bad smell?

READ: We will develop a scale for the most important qualities of flow you identified in question 13. The following questions will help us define the end points and mid-points along a scale.

16. If flows are really bad and sandbars are exposed, what does that look like? What is the worst you have seen?

17. If the flow is right and there isn't a sandbar problem, what does it look like? For example, it's safe to travel by boat and you don't see any sandbars?

18. What is the middle point between the high and low points you identified above, where it is not very bad, but it is not very good either?

[Draw scale out as you go. Either 3-point or 5-point scale]

19. Using the scales we made, how would you rate the sites that we have chosen to visit today?

21. Having used the scales to rate the sites, is there anything you would change about them?

22. Is there anything that you would like to add to this interview that I have not already asked you about?

Thank You!

Appendix C Water Expert Consent Form



The University of British Columbia
Institute for Resources, Environment and Sustainability
4th Floor, 2202 Main Mall
Vancouver, BC Canada V6T 1Z4
Phone: 604-822-9250, Fax: 604-822-9250

Participant Consent Form

Vulnerability and change in hydrosocial systems: Insights from Indigenous peoples' relations to water in the Yukon River Basin

Principal Investigator: Professor Terre Satterfield
Institute for Resources, Environment and Sustainability

Co-Investigator(s): Nicole Wilson
Institute for Resources, Environment and Sustainability

Sponsor(s): Social Sciences and Humanities Research Council, Insight Grant and the Northern Scientific Training Program.

The research is conducted as part of a graduate degree and collected data will be part of a thesis.

Purpose: This study aims to improve understandings of Indigenous peoples' vulnerability and responses to change in water in the Yukon River Basin, which spans Alaska, Yukon and British Columbia. Water governance has been identified as one way that Tribes and First Nations are responding to environmental change. In order to improve understanding of water governance in this context of environmental change, we are specifically interested in learning about the role of Tribes and First Nations in water management and governance in this transboundary watershed. To do this we are working with the Tr'ondëk Hwëch'in, Kluane, White River and Carcross/Tagish First Nations and the Yukon River Inter-Tribal Watershed Council.

Description of Participant Activities: You are being invited to participate in an interview because you have been identified as a knowledgeable individual on the topic of water governance in the Yukon River Basin (Yukon Territory, British Columbia and/or Alaska). Your participation in this research will consist of an interview to discuss your concerns about water and engagement with water governance. The interview will last between 1 to 2 hours and will be audio-recorded only with your consent. Please feel free to ask questions about the project at any time during the interview. If you feel uncomfortable about any particular question(s), you may decline to answer them.

Confidentiality: Your identity will be kept confidential. Generic names and code numbers will be used to identify participants on all reports and to all external parties. All records will be kept in a secure location at UBC. Audio recording will be uploaded to a portable laptop and will be password-protected. Original records will be destroyed following the upload. The recordings will

then be stored for at least five years in a safe location that is only accessible to the our research team (see above). Paper documents will be protected. All computerized files will be password-protected and encrypted.

Potential Risks: No potential risks are expected.

Potential Benefits: Subjects may not benefit directly from participation in the study, but may appreciate being able to share their personal experiences of these important changes. Conclusions relevant for policy are anticipated, and as such, may result in indirect benefits for you, or for the community.

Results of the Study: Your interview will be added to a project database and may be included in reports and related educational materials, publications, and/or conference proceedings arising from the project. You are most welcome to request a copy of the results of the project should you wish. Please provide a mailing address we can send a report on the findings to.

Contact for information: We are available to answer any questions you may have about this study. You may contact any member of the research team at the contact details provided above.

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Services at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

Consent: Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without any disadvantage to yourself of any kind.

NAME: _____

ADDRESS: _____

SIGNATURE: _____

WITNESS: _____ DATE: _____

Consent to use your name in research outputs:

Should you prefer to have your name *included* in any outputs of this work at the time of or after the signing of this form, please waive your confidentiality below. If this decision has been made after the original signing of this form, please be sure to date the newly signed portion below. The inclusion of your name will apply only to those documents released after the date accompanying this waiver.

SIGN HERE IF WAIVING CONFIDENTIALITY:

WITNESS: _____ DATE: _____

Once signed you should receive a copy of this consent form.

Your signature above indicates that you have received a copy of this consent form for your own records, and that you consent to participate in this study.

Appendix D Water Expert Interview Protocol



The University of British Columbia
Institute for Resources, Environment and Sustainability
4th Floor, 2202 Main Mall
Vancouver, BC Canada V6T 1Z4
Phone: 604-822-9250, Fax: 604-822-9250

Expert Interview Protocol

Vulnerability and change in hydrosocial systems: Insights from Indigenous peoples' relations to water in the Yukon River Basin

The goal of this interview is elicit input from experts, who represent a diversity of organizations regarding water management and governance in the Yukon River Basin (Yukon Territory and Alaska). Social Network Analysis will be conducted based on the answers to some of the questions asked during this interview. This interview should last approximately 1- 2 hours.

Interview topics and sample questions:

1. Introduction:

- a. How long have you been working in your current position?
- b. Can you explain your current position to me: what do you do?
- c. In what capacity do you engage with water in your work?
- d. How long have you worked on water issues?

2. Water uses, Values and Risks:

- a. How is water used (valued) in the watershed and/or Alaska/Yukon?
- b. What are your main concerns about water quality, quantity or rate of flow in the Yukon River Basin?
- c. How would you rank these concerns?

3. Water Management and Governance:

- a. Can you tell me about the kinds of water-related research, management or planning processes that your organization/First Nation/Tribe is involved in currently, or was involved in during the past?
- b. In what capacity are you involved in these processes?
- c. What are some barriers and challenges you see to First Nation/Tribal involvement in water governance in Yukon/British Columbia/Alaska?
- d. What are some opportunities you see today for increased First Nation/Tribal involvement in water governance in Yukon/British Columbia/Alaska?
- e. Have you seen any changes in how First Nation/Tribes are being involved in water governance in Yukon/British Columbia/Alaska?
- f. How does your First Nation/Tribe interact with other levels of governments with respect to water management and planning?

- g. How does your First Nation/Tribe interact with other First Nations and/or Tribes with respect to water management and planning?
- h. What would you change about the way water is managed or governed in the Yukon/British Columbia/Alaska, if anything?
- i. Can you describe the kinds of powers that the First Nation/Tribe currently asserts with respect to water planning/use/management?
- j. *Yukon Only*: Chapter 14 of the Yukon Umbrella Final Agreement affirms Yukon First Nation water rights by stating that Yukon First Nations have the right to water that is “substantially unaltered as to quantity, quality and rate of flow.” How has this informed or affected the actions taken by your First Nation?
- k. *BC First Nations/Yukon First Nations with transboundary claims*: How does the lack of land claim agreements in British Columbia affect or inform your First Nations ability to use or make decisions about water?
- l. *Alaska Native Tribes*: What impact does ANSCA (Alaska Native Claims Settlement Act) have on the ability of Tribes to make decisions about water?
- m. There is increasing emphasis on watershed level planning/governance on North America. What do you see as the implications of watershed governance for First Nations/Tribes in Yukon/British Columbia/Alaska?
- n. How does the U.S. Canada Border impact what Tribes and First Nations are able to engage in watershed governance in the Yukon River Basin?
- o. In the long-term, how do you think that increased First Nations/Tribal involvement in water governance either through self-governance or co-governance could influence the way water is managed?

4. *Community-Based Monitoring*:

- a. How has your community used water data from community-based monitoring in decision-making?
- b. What other types of information (e.g., water quality samples, traditional knowledge) do you use to help you make decisions about water (and land) within your traditional territories?
- c. Settlement lands?

5. *Social Network Analysis*:

- a. Are there any other people who you would recommend to participate in this study?
- b. What institution do they work for?
- c. Do you have any connections to organizations involved in water or environmental work in Yukon, British Columbia or Alaska whose work is relevant to the Yukon River Basin?
- d. How does the work conducted by these organizations/individuals connect to your own work?

6. Is there anything that I haven't asked you about that you would like to add to this interview?

Thank You!

Appendix E CBM Technician Consent Form



The University of British Columbia
Institute for Resources, Environment and Sustainability
4th Floor, 2202 Main Mall
Vancouver, BC Canada V6T 1Z4
Phone: 604-822-9250, Fax: 604-822-9250

Participant Consent Form

Vulnerability and change in hydrosocial systems: Insights from Indigenous people's relations to water in the Yukon River Basin

Principal Investigator: Professor Terre Satterfield
Institute for Resources, Environment and Sustainability

Co-Investigator(s): Nicole Wilson
Institute for Resources, Environment and Sustainability

Sponsor(s): Social Sciences and Humanities Research Council, Insight Grant and the Northern Scientific Training Program.

The research is conducted as part of a graduate degree and collected data will be part of a thesis.

Purpose: This study aims to improve understandings of Indigenous peoples' vulnerability and responses to change in water in the Yukon River Basin, which spans Alaska, Yukon and British Columbia. To do this, we are working with the Yukon River Inter-Tribal Watershed Council (YRITWC). Community-based monitoring programs are considered one method Tribes and First Nations are using to document environmental change within their territories. We are specifically interested in learning about the benefits and challenges of the YRITWC's Indigenous Observation Network from your perspective.

Description of Participant Activities: You are being invited to participate in an interview because of your participation in the Indigenous Observation Network, the YRITWC's community-based monitoring program, as a water quality sampler. Your participation in this research will consist of an interview to discuss the benefits and challenges of the Indigenous Observation Network. The interview will last between 1 to 1.5 hours. The interview will be audio-recorded and in written format only with your consent. Please feel free to ask questions about the project at any time during the interview. If you feel uncomfortable about any particular question(s), you may decline to answer them.

Confidentiality: Your identity will be kept confidential. Generic names and code numbers will be used to identify participants on all reports and to all external parties. All records will be kept in a secure location at UBC. Audio recording will be uploaded to a portable laptop and will be password-protected. Original records will be destroyed following the upload. The recordings will

then be stored for at least five years in a safe location that is only accessible to the our research team (see above). Paper documents will be protected. All computerized files will be password-protected and encrypted.

Potential Risks: No potential risks are expected, although topics may arise in the course of the interview conversation that you may not have intended to include. Should you feel uncomfortable at any time during the interview, you do not have to answer questions, you have the right to stop the interview and/or inform the researcher about information you do not wish to have included in the final documentation.

Potential Benefits: Participants may not benefit directly from participation in the study, but may appreciate being able to share their personal experiences related to their involvement with the Indigenous Observation Network. The conclusions of this research will be relevant to community-based monitoring in this and other contexts, and as such, may result in indirect benefits for you, or for the community.

Compensation: In appreciation for your participation in our study, we are offering a gift valued at \$30.00 CAD.

Results of the Study: Your interview will be added to a project database and may be included in reports and related educational materials, publications, and/or conference proceedings arising from the project. You are most welcome to request a copy of the results of the project should you wish. Please provide a mailing address we can send a report on the findings to.

Contact for information: We are available to answer any questions you may have about this study. You may contact any member of the research team at the contact details provided above.

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Services at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

Consent: Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without any disadvantage to yourself of any kind.

NAME: _____

ADDRESS: _____

SIGNATURE: _____

WITNESS: _____ DATE: _____

Once signed you should receive a copy of this consent form.

Your signature above indicates that you have received a copy of this consent form for your own records, and that you consent to participate in this study.

Appendix F CBM Technician Interview Protocol



The University of British Columbia
Institute for Resources, Environment and Sustainability
4th Floor, 2202 Main Mall
Vancouver, BC Canada V6T 1Z4
Phone: 604-822-9250, Fax: 604-822-9250

Community-Based Monitoring Interview Protocol (Water Quality Technicians)

Vulnerability and change in hydrosocial systems: Insights from Indigenous peoples' relations to water in the Yukon River Basin

This interview is aimed at individuals who participate as water quality sampling technicians as part of the Yukon River Inter-Tribal Watershed Council's (YRITWC) Indigenous Observation Network (ION). The interview will last approximately 1 – 1.5 hours. Participants will be given a small gift to acknowledge the contribution of their time and knowledge.

Interview topics and sample questions:

First, I have some questions designed to gather some background information about water in your watershed or traditional territory.

Questions on Risk, Vulnerability and Culture

READ: Before discussing community-based monitoring, I have a couple of questions for you about a) how and why people use and value water in the Yukon River Basin b) the extent to which people see the ways they use and value water as threatened. Understanding these two things is critical for assessing the extent to which ION is monitoring for change in the things people value and/or able to address their specific questions about risks to water.

Socio-cultural relations to water (Identity, place attachment, meaning, uses and values)

1. Tell me a bit about where you are from and why water is generally important to you? To your community?
2. What is most important to you about the water within your traditional territory? Within the Yukon River Basin as a whole?

3. To what extent do you agree or disagree with the following statements about the traditional territory of [Insert name of tribe or First Nation]? (Check one per row)

Thoughts on your traditional Territory	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	[do not read] Do not know
It is my favourite place to be						
Everything about it is a reflection of me						
No other place can offer the same experience						
I feel most at home there						
It is the best place to do the things I enjoy						
I feel my best (happiest) when I am there						
I feel that I can really be myself there						
It is important to who I am as a person						
I feel the most safe and secure when I am there						

4. I'm going to read a list of ways of relating to or using water. To what extent do you agree or disagree that these are important to your community? (Check one per row)

Thoughts on the water in my traditional territory	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	[do not read] Do not know
Provides educational opportunities						
Is scientifically important						
Provides tourism and recreational opportunities (examples are fishing, swimming, boating)						
Is important for travel (e.g., for travelling required for hunting, fishing, trapping, berry picking)						
Provides habitat for fish and other animals (e.g., Fish, moose, beaver etc.)						
A source of food						
A source of medicine						
Contributes to aesthetic and visual enjoyment (e.g., a Tranquil, beautiful, scenic or relaxing)						
A source of drinking water						

Is used for other domestic uses from your tap						
Has industrial uses (e.g., mining, oil and gas development or agriculture)						
Is important for Indigenous culture						
Has spiritual and ceremonial uses and values						
Other: (Please specify)						

5. Please describe which subsistence activities you participate in and describe why they are important to you and/or your community? (Examples include hunting, fishing, trapping, berry picking and medicinal plant harvesting)

6. How important is it to have good water quality and water quantity (water levels and seasonal rates of flow) for the activities mentioned above? Please describe...

7. Throughout the year, how frequently do you participate in subsistence activities (examples include hunting, fishing, trapping, berry picking and medicinal plant harvesting)?

- On a weekly basis1
- Several times a year2
- Once a month.....3
- Once a year4
- Not at all5
- [Do not read]
- don't know
- did not answer

Community drinking water and wastewater profile

8. What is the source of drinking water for your community? (Estimate what percentage of your community relies on each of these sources)

- Community well (Ground water source)
 - Individual well (Ground water source)
 - Surface water source (Examples include lakes or rivers)
 - Natural source (EG. Traditional drinking water sources other than your main supply such as springs, lakes or rivers)
 - Other _____
- (do not read)
- Don't know
 - Did not answer

9. Is your community's main source of drinking water chlorinated?

- Yes
- No

10. What percentage of your community has access to running water in their homes? How is it delivered to the houses (e.g., Piped or trucked)?

11. Do you receive enough household tap water for all your domestic needs?

- Yes 1
 - No 2
- (do not read)
- Don't know
 - Did not answer

12. Is your community currently under a Drinking or Boil Water Advisory, or has your reserve been under a drinking or boil water advisory in the past 12 months, as far as you know?

- Yes 1
 - No 2
- (do not read)
- Don't know
 - Did not answer

13. What form of sewage treatment do you have in your community? (e.g., Sewage lagoon or Leach fields)

Environmental Impacts: Threats to water quality, quantity and seasonal rates of flow

14. On a scale of 1 to 5, how would you rate the overall health of the water within your traditional territory generally?

- Very bad1
- Below average.....2
- Average.....3
- Above average4
- Very good.....5
- (do not read)
- Don't know8
- Did not answer9

15. On a scale from 1, very bad to 5, very good with 3 meaning neither good nor bad, how would you rate the quality of drinking water in your community?

- Very bad1
- Below average.....2
- Average.....3
- Above average4
- Very good.....5
- (do not read)
- Don't know
- Did not answer

16. How safe or unsafe do you think your tap water supply is? Is it...

[Read list]

- Very safe1
- Somewhat safe.....2
- Somewhat unsafe.....3
- Very unsafe4
- (do not read)
- Don't know
- Did not answer

17. What changes have you seen in the water in your traditional territory?

- e. How do you think water quality and quantity have changed? ie. What do you think has caused these changes?
- f. What do you think are the biggest impacts on/threats to the waters within your traditional territory presently?
- g. What do you think will be problems in the future?

18. How have these changes impacted you? How you use your traditional territory?
- d. How have these changes/impacts made you feel?
 - e. Do you feel your relationship with your traditional territory has changed because of [insert impacts mentioned by participant]?
 - f. Are there places you no longer use due to changes in water quality or quantity?
 - g. How well do you feel you can deal with these changes?
19. If it gets worse, what will that mean for you? For your community?
- a. What changes do you feel might be too much for you?

Action and Priorities

20. What do you think should be done about the changes taking place in your traditional territory?
- h. Do you think that these changes can be fixed?
 - i. What do you think is the most important thing that needs to be addressed?
 - j. Who do you think should be involved in planning for the region?
i.e. community, regional government, state/territorial government, federal government
 - k. Would you like to be involved? In what ways?
 - l. What do you think you could do to help protect the region?
 - m. What would make you feel safer about your water quality, quantity and rate of flow in your traditional territory?

21. I am interested in learning which sources of information your community uses to learn about changes in water quality or quantity. To what extent do you agree or disagree that the following are reliable sources of information about water?

Information Source	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	[do not read] Do not know
Word of mouth						
Public meetings or presentations						
Discussions with other governments						
Water quality data from ION						
Government sources of water data (For example, Environment Canada)						
Websites						

Traditional knowledge						
News Paper Articles						
Other. Please specify:						
Receive very little reliable information						

READ: *Now I have a few questions the Yukon River Inter-Tribal Watershed Council's water quality monitoring program, the Indigenous Observation Network and your experience as a water quality sampler within this program.*

22. Tell me a bit about why you are involved with community-based monitoring?

23. How many years have you been participating in the YRITWC's water quality monitoring program as a sampler?

24. Why do you participate in the YRITWC Sampling Program? (e.g., why is this community-based monitoring program important to you? Why is it important for your community?)

25. How well does the CMB program address your community's concerns? If not, how could the program be improved?

26. What have you learned by participating in the CBM program?

27. To what extent do you think other members of your community aware of the CBM program?

- very unaware1
- unaware2
- neutral3
- aware4
- very aware5
- [do not read]
- do not know6
- did not answer7

28. In your opinion, what could be done to make people more aware of the monitoring program?

29. How much do you agree or disagree with the following statement?

The program and sampling data are worthwhile [valuable?] for my community (Choose one)

- strongly disagree1
- disagree2
- neutral3
- agree4
- strongly agree5
- [do not read]
- do not know.....6
- did not answer.....7

30. How many water quality training sessions have you attended? (These include either central training session in Fairbanks, Anchorage or Whitehorse or on site training programs in your community)

31. Did you find those training sessions helpful?

- Yes
- No

32. What are the main challenges you have encountered in your role as a water quality sampler?

33. How have you, your Tribe or First Nation or other parties benefited from participation water quality sampling as part of ION, if at all?

34. Do you conduct the water quality training as part of your job? (For example, working for a Tribe or First Nation)

35. Does your Tribe or First Nation receive specific funding for you to participate?

- Yes
- No

- i. If so [answered yes to 35], which sources of funding do you receive (please list/briefly explain)?
- ii. If your Tribe or First Nation were not funded to do the sampling, would it change your ability to participate?
- iii. If not [answered no to 35], to what extent would a funding source assist you with participating in sampling?

36. Have there ever been times when you were not able to sample?

- Yes
- No

- a. IF YES, what prevented you (please list)? What would have helped in that situation?
- b. IF NOT, what factors have enabled you to consistently conduct sampling?

37. What do you think about the current site(s) where your community samples? What would you change about this, if anything? (For example, the site location or sampling parameters related to water quality, quantity or rate of flow)

38) Has your community used or do you intend to use the water quality data?

Yes

No

39. What role, if any, does traditional knowledge play in understanding changes in water quality, quantity and rate of flow within your traditional territory?

40. How has traditional knowledge been used in conducting ION? What suggestions would you make to improve the involvement of traditional knowledge in monitoring, if any?

41. Does your community have or participate in any other monitoring program? (Examples include fish and wildlife monitoring programs)

42. Did you receive a copy of your community's water quality report in 2013?

Yes

No

43. Have you read your community's water quality report?

Yes

No

a) If yes: What did you think about the water quality report?

b) Have you heard comments from other community members about the water quality report?

c) If no, please list the reasons why. This is very useful information for us, so we can ensure more people read the monitoring results from their community.

44. What changes would you recommend for the next version of the water quality report?

45. Do you have suggestions for other ways the YRITWC could share important information about CBM program?

46. Do you have any other suggestions for improving the program?

Demographics

READ: Now I have just a few more questions about you.

47. Tribe or First Nation respondent is from (resides in or is a citizen of):

a) Resides of: _____

b) Is a member of: _____ (self-identification)

48. What is your age? (Check one)

- 18-25 1
- 26-35 2
- 36-45 3
- 46-55 4
- 56-65 5
- 66-75 6
- 76+ 7
- [do not read 8 or 9]
- don't know 8
- did not answer 9

49. Gender (self-identification):

50. What languages do you speak? (Indigenous Language, English, French etc.)

51. What is the highest level of formal education that you have completed?

- Grade School 1
- High School 2
- Some College or Technical School 3
- University Degree 4
- Graduate Degree 5
- [do not read 5 or 6]
- don't know 6
- did not answer 7

52. Are there any other comments you would like to make?

Thank you for your time!

Appendix G CBM Other Stakeholder Consent Form



The University of British Columbia
Institute for Resources, Environment and Sustainability
4th Floor, 2202 Main Mall
Vancouver, BC Canada V6T 1Z4
Phone: 604-822-9250, Fax: 604-822-9250

Participant Consent Form

Vulnerability and change in hydrosocial systems: Insights from Indigenous peoples' relations to water in the Yukon River Basin

Principal Investigator: Professor Terre Satterfield
Institute for Resources, Environment and Sustainability

Co-Investigator(s): Nicole Wilson
Institute for Resources, Environment and Sustainability

Sponsor(s): Social Sciences and Humanities Research Council, Insight Grant, and the Northern Scientific Training Program.

The research is conducted as part of a graduate degree and collected data will be part of a thesis.

Purpose: This study aims to improve understandings of Indigenous peoples' vulnerability and responses to change in water in the Yukon River Basin, which spans Alaska, Yukon and British Columbia. To do this, we are working with the Yukon River Inter-Tribal Watershed Council (YRITWC). Community-based monitoring has been identified as one way that Tribes and First Nations participate in water management and governance. The purpose of this interview will be to evaluate the benefits and challenges of the YRITWC's Indigenous Observation Network.

Description of Participant Activities: You are being invited to participate in an interview because of your participation in the Indigenous Observation Network, the YRITWC's community-based monitoring program. Your participation in this research will consist of an interview to discuss the benefits and challenges of the Indigenous Observation Network. The interview will last between 1 to 2 hours and will be audio-recorded only with your consent. Please feel free to ask questions about the project at any time during the interview. If you feel uncomfortable about any particular question(s), you may decline to answer them.

Confidentiality: Your identity will be kept confidential. Generic names and code numbers will be used to identify participants on all reports and to all external parties. All records will be kept in a secure location at UBC. Audio recording will be uploaded to a portable laptop and will be password-protected. Original records will be destroyed following the upload. The recordings will then be stored for at least five years in a safe location that is only accessible to the our research

team (see above). Paper documents will be protected. All computerized files will be password-protected and encrypted.

Potential Risks: No potential risks are expected, although topics may arise in the course of the interview conversation that you may not have intended to include. Should you feel uncomfortable at any time during the interview, you do not have to answer questions, you have the right to stop the interview and/or inform the researcher about information you do not wish to have included in the final documentation.

Potential Benefits: Participants may not benefit directly from participation in the study, but may appreciate being able to share their personal experiences related to their involvement with the Indigenous Observation Network. The conclusions of this research will be relevant to community-based monitoring in this and other contexts, and as such, may result in indirect benefits for you or the work that you do.

Results of the Study: Your interview will be added to a project database and may be included in reports and related educational materials, publications, and/or conference proceedings arising from the project. You are most welcome to request a copy of the results of the project should you wish. Please provide a mailing address we can send a report on the findings to.

Contact for information: We are available to answer any questions you may have about this study. You may contact any member of the research team at the contact details provided above.

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Services at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

Consent: Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without any disadvantage to yourself of any kind.

NAME: _____

ADDRESS: _____

SIGNATURE: _____

WITNESS: _____ DATE: _____

Once signed you should receive a copy of this consent form.

Your signature above indicates that you have received a copy of this consent form for your own records, and that you consent to participate in this study.

Appendix H CBM Other Stakeholder Interview Protocol



The University of British Columbia
Institute for Resources, Environment and Sustainability
4th Floor, 2202 Main Mall
Vancouver, BC Canada V6T 1Z4
Phone: 604-822-9250, Fax: 604-822-9250

Community-Based Monitoring Interview Protocol (Other Stakeholder)

Vulnerability and change in hydrosocial systems: Insights from Indigenous peoples' relations to water in the Yukon River Basin

The purpose of this interview will be to gain insight into the benefits and challenges associated with community-based monitoring programs like the YRITWC's Indigenous Observation Network. You are being invited to participate in an interview because of your participation in the Indigenous Observation Network, the YRITWC's community-based monitoring program. The interview will last approximately 1 – 1.5 hours.

Interview topics and sample questions:

1. *Introduction:* How long have you been working in your current position? Can you explain your current position to me: what do you do? In what capacity do you engage with water in your work?
2. What is your role in ION water quality monitoring program?
3. *History of ION:*
 - a. How many years have you been involved with the network?
 - b. Why was ION first developed?
 - c. Who was involved in developing the program?
4. Why is community-based monitoring important? Why is ION in particular important?
5. What have been the main strengths/benefits of ION? What factors have contributed to its success?
6. What are the main challenges associated with ION? How could these challenges be addressed?
7. What could be done to address these challenges and more generally to improve the program?
8. To your knowledge, how has traditional knowledge informed water quality monitoring conducted through ION?

9. To your knowledge, how is the water quality data collected through ION used?

10. Have you experienced any data quality issues? What have you done, or what could be done to overcome these?

11. What advice or suggestions would you provide to other people who are interested in developing their own CBM program?

12. Is there anything that I haven't asked you about that you would like to add to this interview?

Thank You!