

Water and Social Well-Being in the Northwest Territories

by

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Abstract

Water security recognizes human and ecological needs for sustainable access to an adequate quantity and quality of water. However, in northern Canada, many Aboriginal communities are struggling to ensure that current and future generations have access to secure water resources. While reliable drinking water is a key component of water security for humans, it is important to recognize that northern Aboriginal concerns about water security extend far beyond access to potable water. Water is an integral component of northern Aboriginal livelihoods, community, spirituality and culture. The growing impacts that human development activities and climate are having on the water resources on which northern Aboriginal communities depend have brought water security concerns to the forefront in these communities. While there are technical barriers that need to be overcome in order to address these concerns, an equally substantial challenge is that of improving water governance. A key step in improving water governance in northern Canada's Aboriginal communities is to ensure that Aboriginal water values and interests are better recognized and more clearly incorporated into decision-making processes. While there has been increased recognition of the importance of including Aboriginal values in water-related decision-making and policy processes, limited progress has been made in this regard because of a lack of well-developed methods for identifying the non-economic values of water.

This research applies a social well-being lens to investigate the ways water is valued in a northern Aboriginal context. The research emphasizes the importance of integrating the three key dimensions of social well-being – material, relational and subjective – to make more explicit the dimensions of one's life that are valued in relation to water. Three main objectives guide this research: 1) to understand the current water resource conditions and contextual circumstances impacting local water use and perceptions in the case community; 2) to use a social well-being lens to identify and examine the values that people associate with water resources in the NWT; and 3) to examine how an understanding of these water values may be relevant to policy and decision-making processes in the NWT, particularly in the context of the Northwest Territories Water Strategy and corresponding Action Plan.

Research activities occurred in the community of Trout Lake, a small Aboriginal community located in the Dehcho region of the NWT, and involved two primary data collection methods: 1) document and literature review; and 2) semi-structured interviews. In total, 22

documents (primarily from grey literature) pertaining to the water resource conditions and local water perspectives in Trout Lake were gathered. Many peer-reviewed articles were also consulted for conceptual and empirical information. 28 semi-structured interviews were conducted in Trout Lake with community members identified by the Smbaa K'e Dene Band as being knowledgeable about water use in the community. A second set of interviews was conducted in Yellowknife with nine representatives from a diversity of water policy organization and research groups in the NWT. All interviews were transcribed, coded and analyzed for common themes, trends and patterns using qualitative analysis software (NVivo).

The community interview results and analysis of water values indicate that Trout Lake community members value water for many diverse and interconnected reasons. These reasons range from the more easily apparent material values of water such as those related to livelihood activities, traditional foods, and drinking water, to less tangible values linked to social and political relationships, and personal values associated with peoples' own perceptions about the quality of life they are able to achieve. The results suggest that while the people living in Trout Lake consider water to be critically important to their material well-being, they also associate strong relational and subjective values with water that are just as, if not more, important than the material values.

The results from the water policy actor interviews provided useful insights into the relevance of the Trout Lake water value information for helping to address specific water governance challenges in the NWT. Poor communication, a lack of common language, conflicting worldviews and a lack of community capacity and organization were identified as some of the most prevalent challenges limiting the degree to which community voices are heard in NWT water-related decisions. The development of a water consultation tool to better account for and improve the articulation of community water values (material, relational and subjective) during consultation processes was identified as the most useful application of the Trout Lake water value information gathered from the community interviews.

The research also offers additional conceptual contributions related to the use of the social well-being framework in the context of water valuation and from a northern Aboriginal perspective. The social well-being framework was found to contribute to an improved understanding of non-economic water values in three ways: 1) using a social theory approach to

water valuation that is systematic and more holistic; 2) providing a deeper understanding of such values, as well as the connections and relationships among them; and 3) providing insights into how and why people use and think about water based on their values.

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List of Abbreviations

AANDC	Aboriginal Affairs and Northern Development Canada
AAROM	Aboriginal Aquatics Resources and Oceans Management
ASC	Aboriginal Steering Committee
CCME	Canadian Council of Ministers of the Environment
CIMP	Cumulative Impacts and Monitoring Program
CPAWS	Canadian Parks and Wilderness Society
DFN	Dehcho First Nation
DFO	Department of Fisheries and Oceans
EIRB	Environmental Impact Review Board
ENR	Environment and Natural Resources
GNWT	Government of the Northwest Territories
HSS	Health and Social Services
INAC	Indian and Northern Affairs Canada
MA	Millennium Ecosystem Assessment
MACA	Department of Municipal and Community Affairs
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVLWB	Mackenzie Valley Land and Water Board
NGO	Non-Government Organization

NWT	Northwest Territories
PWS	Public Works Services
SKDB	Sambaa K'e Dene Band
SKDC	Sambaa K'e Development Corporation
UN	United Nations
UN-ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UN-WWAP	United Nations World Water Assessment Programme
WLU	Wilfred Laurier University

Chapter 1: Introduction

1.1 Problem Context

Ensuring that both current and future generations have access to secure water resources is a serious concern in many of Canada's Aboriginal communities (Dearden and Mitchell 2002). According to Health Canada (2012), one in every six Aboriginal communities in Canada has confirmed or suspected microbiological or chemical contaminants in their drinking water. These communities are unable to access the quality of water required to satisfy their basic human needs. However, Aboriginal concerns about water security extend beyond just having access to potable drinking water. For Aboriginal people, water is a sacred gift from the Creator and is the lifeblood of Mother Earth (Sanderson 2008; Anderson et al. 2013). Water is used in traditional ceremonies and cultural activities, to grow medicinal plants, for psychological healing and cleansing, and is seen as a source of inspiration for both human and environmental continuity (McGregor and Whitaker 2001; Lavalley 2006; Assembly of First Nations 2014). Aboriginal people believe that all water, not just water for human use, needs to be protected. Aboriginal peoples' guardianship of water reflects the strong and intricate relationships that many Aboriginal cultures have with all land and water resources. Many of Canada's Aboriginal communities continue to exercise traditional water-related laws, rules, and traditions that reflect not only a continued desire to respect and protect their traditional water resources, but an overarching responsibility to do so (Sanderson 2008).

Increasing development activities and changing climatic conditions in Canada are making it difficult for Aboriginal people to implement the laws and traditions that represent their continued guardianship of water (Lini and Castro 2004). The growing impacts that development activities and climate change are having on Canada's land and water resources have brought

water security concerns to the forefront in many Aboriginal communities across Canada. While there are technical obstacles that must be overcome in order to address these growing concerns, an equal or perhaps more substantive challenge is that of improving water governance (de Loë and Kreutzwiser 2007; Norman et al. 2011). Water governance refers to “the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society” (Rogers and Hall 2003: 16). The diversity of competing interests and values among the many water-related actors in northern Canada tend to make water governance a complex and often difficult issue to address in the region. There is a growing interest in water governance issues in Canada’s north and recognition that human dimensions are at the core of contemporary water problems (Simms and de Loë 2010; Baltutis and Shah 2012; von der Porten and de Loë 2013).

Water security is an emerging concept of contemporary water management that is increasingly being linked to water governance. The relationship between water security and governance is often described as symbiotic, where water security sets the objectives for water governance while effective water governance provides the enabling environment for ensuring water security. Despite ongoing debates over definitions of the concept, water security generally refers to having sustainable access to an adequate quantity and quality of water necessary for both human and ecosystem health (Grey and Sadoff 2007). This definition reflects the need to establish a balance between water protection and human water use. There is a growing consensus among researchers, water managers and policy makers that solutions to such water security challenges today exist in the domain of human behaviour and governance (Kashyap 2004; Loë and Kreutzwiser 2007; Simms and de Loë 2010).

A key step in improving water governance in northern Canada's Aboriginal communities is to ensure that all Aboriginal interests and values of water are recognized and incorporated into decision-making processes. Methods to understand the economic values of water include cost-benefit analysis, contingent valuation and choice experiments (Birol et al. 2006). However, water is critical to the cultural, spiritual, intellectual and physical well-being of Aboriginal people, and thus is associated with a diversity of values, many of which are not easily measured or compared in economic terms (Blackstock 2001; Mascarenhas 2007). The methods to identify the non-monetary values of water are not well developed. Consequently, water and related land-use decisions tend to be based primarily on the economic value of water, which tend to ignore the non-market values of water that are critical to all aspects of Aboriginal well-being.

Understanding the non-economic ways that people value water and how to incorporate those values into decision-making processes is an ongoing challenge in the Northwest Territories (NWT), particularly in Aboriginal communities. Freshwater is a valuable economic resource in the NWT, primarily for industrial development activities such as oil, gas and mineral exploration. However, water is also critical to the overall well-being of Aboriginal people who make up approximately 50% of the territory's population (Statistics Canada 2008). In the NWT it is recognized that Aboriginal people hold a sacred relationship with water and value water for its intrinsic cultural, spiritual and historical worth (McGregor 2009). While many NWT water and land-use planning strategies and approaches (i.e., NWT Protected Area Strategy, NWT Biodiversity Strategy) acknowledge the importance of these values to Northerners, questions remain about how such values fit into NWT decision-making processes. These questions reflect an implementation gap for understanding: 1) how these values can be better integrated into NWT water and land-use decision-making; and 2) how to ensure that they remain part of decisions

over the long-term. The need to address this gap is discussed in the NWT Water Stewardship Strategy (GNWT 2010) (Water Strategy), which is a collaborative document developed by the Government of the Northwest Territories (GNWT), Aboriginal Affairs and Northern Development Canada (AANDC) and Aboriginal representatives from across the NWT. The Water Strategy focuses on outlining a plan to bring all levels of government, agencies and the public together to help sustain NWT waters and encourage action towards improved water stewardship decisions in the Territories. The Strategy clearly recognizes that a major challenge to better integrate Aboriginal water values into NWT decision-making processes is the lack of well-developed methods to identify the non-economic values of water. As such, the document specifically calls for improved water valuation methods that move beyond a sole focus on economic valuation.

1.2 Research Goal and Objectives

The goal of this research is to investigate the linkages between water resources and the material, relational and subjective dimensions of social well-being in an Aboriginal community in the NWT. A social well-being lens is used to identify and better understand the values that Aboriginal community members associate with water in the NWT. The intent is that the social well-being framework will provide a means to help make the intangible values that many Aboriginal people associate with water more explicit to water-related policy and decision-makers in the NWT. A better understanding of the myriad ways that people value and use water within the NWT is critical to ensure that water-related decisions are broadly supported, well informed, transparent and accountable. Such an understanding is also considered to be the first step in moving towards a less economically focused, and more NWT-relevant water valuation method, which the Water Strategy indicates is one of the fundamental action items to improve water

stewardship in the Territories. The Water Strategy (GNWT 2010:15) clearly states the need to “work with knowledgeable partners [to] assess current strategies and develop a NWT relevant approach in valuation of water and ecosystem services”. It is anticipated that the findings of this project will help to address this action item by providing the water value information needed to develop more appropriate water valuation methods for the NWT, and ultimately help improve water stewardship.

Three primary objectives guide this research: 1) to understand the current water resource conditions (e.g., quality and quantity) and contextual circumstances (e.g., community culture, history, traditions) impacting local water use and perceptions in the case community; 2) to use a social well-being lens to examine the values that people associate with water resources in the NWT; and 3) to examine how an understanding of these water values may be relevant to policy and decision-making processes in the NWT, particularly in the context of the Water Strategy and corresponding Action Plan (GNWT 2011).

1.3 Research Design

Multiple research approaches are applied to inform the overall research design used to address the three objectives outlined above. A mixed methods research approach is used to account for the diversity of the objectives, particularly the need to understand both the human and physical dimensions of water resources. Qualitative data inquiry methods (i.e., document review, semi-structured interviews) are used to gain insight into the human dimensions of water and its relevance to water policy and decision-making, while quantitative information (i.e., existing water quality and quantity measurements) is used to understand how the physical dimensions of water may impact how people use and value water. A collaborative research approach is also applied to ensure that the research design is culturally sensitive, and that it privileges culture and

context. Collaboration is especially important for this research given the well-being focused nature of the research objectives and the associated need to include cultural knowledge and experiences throughout the all stages of the research project. In terms of data collection, a single-case study approach is used to explore the relationship between water and well-being in a NWT Aboriginal community. This approach was selected primarily due to logistical challenges of conducting collaborative research in more than one Northern community, but also because the approach enables a detailed investigation into how people relate to and use water in their community (Yin 2003). The single-case study approach is also well-suited for the purpose of this study because it permits the use of multiple forms of inquiry and thus coincides with using a mixed methods approach. These research approaches and their application to this thesis are further discussed in Chapter 3.

1.4 Case Study Context

The findings of this study are aimed at better understanding the myriad ways that water is valued in the NWT and determining the relevance of these values to water policy and decision-making processes in the Territories, particularly with respect to the Water Strategy. However, the project is undertaken with the purpose of collecting detailed information at the local scale. The fieldwork for this research involved working with the residents of Trout Lake (Sambaa K'e), a small Dene community in the Dehcho region of the NWT. A more in-depth overview of the case study community is outlined in Chapter 4.

1.4.1 Regional Context

The Dehcho region is located in the southwestern part of the NWT, bordering British Columbia and Alberta to the south and the Yukon to the west (see Figure 2, Chapter 4 for map). The Dehcho region covers approximately 208,385 km² of sub-arctic taiga plains and taiga cordillera

ecozones, representing nearly 18% of the total NWT land mass. The population of the region is estimated to be approximately 3,354 people, over 85% of which are Aboriginal (SENES Consultants Limited 2011). The small population of the region is geographically dispersed across the six communities located in the Dehcho region: Fort Liard, Nahanni Butte, Trout Lake, Jean Marie River, Fort Simpson and Wrigley. These communities are heavily reliant on the water resources in the region, as all of them are located along the shores of lakes or rivers.

The Mackenzie and Liard Rivers are the two largest river systems that flow through the Dehcho territory, and thus they play an important role in the complex hydrological regime of the region (Faria 2002). The Mackenzie River is the larger of the two, flowing more than 1,738 kilometers from the western end of Great Slave Lake to the Canadian Arctic where it drains into the Beaufort Sea (Kokelj 2003). The Mackenzie River is joined by the Liard River, its largest tributary, at Fort Simpson, which is located near the centre of the Dehcho region (Faria 2002).

The Mackenzie and Liard rivers are important ecosystem features in the Dehcho region. The rivers play a major role in maintaining the biological diversity and ecological productivity of the region by providing critical habitat for a diversity of wildlife species (e.g., fish, moose, muskrats, caribou marten, birds) and a variety of riparian plant communities (Millburn et al. 1999; Faria 2002). The ecological health of the Dehcho region is of critical importance to its predominately Aboriginal population who are entirely dependent on the natural environment to support their traditional subsistence lifestyle.

As an expansive and geographically diverse region, ecosystems in the Dehcho region tend to be highly dynamic, and thus it is not unusual to observe periods of natural change (Wolfe et al. 2007). However, there are growing concerns about the impacts that climate change and

anthropogenic activities such as oil and gas development are having on the region. At the present there is one mine operating the Dehcho region (Cantung), although other mines and industrial development activities have been proposed (i.e., the Prarie Creek Mine, Mackenzie Gas Project). There are concerns that the combination of these climate driven and development based stressors may cause harm to the land, water and the well-being of people living in the Dehcho region (SENES Consultants Limited 2011).

1.4.2 Local Context

The need to better understand how people in the Dehcho region value water is especially important in the community of Trout Lake. The community has a population of approximately 95 people and is located on the southeast shore of Trout Lake. The Trout Lake community is one of the smallest, most remote and traditional communities in the NWT.

The community is highly dependent on local water resources to support their traditional land-based activities such as hunting, trapping and fishing, which continue to be major source of livelihood sustenance (SENES Consultants Limited 2011). In addition to depending on the water for basic material necessities (i.e., food, fuelwood, clothing, income), residents of Trout Lake also rely on water resources for many spiritual activities that help to maintain their culture (SENES Consultants Limited 2011). For the people in Trout Lake, water is both a material construct that connects people to the natural environment, and a symbolic one that is imbued with deep cultural and spiritual importance. The strong connection and intimate relationship that the residents of Trout Lake have with water has made water quality and quantity a particularly important concern in the community (SENES Consultants Limited 2011).

1.5 Thesis Structure

This thesis is presented in 7 Chapters. Chapter 1 has introduced the research problem and context, as well as the primary research goal, guiding objectives and case study context. The body of thesis begins in Chapter 2, which presents a literature review of relevant themes, concepts and theoretical foundations for the research study. The review focuses on the core themes of water security, water governance, water values and valuation, and well-being. These themes are drawn together in a detailed discussion of the concept of social well-being, which is used as the primary conceptual framework for this study. Chapter 3 summarizes the general methodological approach applied to the study, outlines the various data collection activities and briefly discusses data analysis procedures. Chapter 4 provides background information about the community of Trout Lake and synthesizes existing knowledge about the water resource conditions surrounding the community. The results from analysis of the interview data are presented in Chapters 5 and 6. Chapter 5 focuses on identifying and discussing the range of values that people in the community of Trout Lake associate with water, while Chapter 6 discusses the relevance of such values to water-related decision-making processes in the NWT. Drawing on the results discussed in Chapters 4, 5 and 6, Chapter 7 summarizes the key findings from the project and highlights the main conceptual and practical contributions of the study. The chapter concludes by proposing directions for future research and offering general recommendations for an NWT appropriate water consultation tool.

Chapter 2: Literature Review

This chapter provides an overview of the main concepts used to inform this research. The first half of the chapter reviews and examines the connections between the concepts of water security, water governance and water valuation, while the latter half focuses on describing the theoretical framework of social well-being which underpins this research. Key characteristics and previous applications of the social well-being framework are provided to explain its potential to improve existing water valuation methods in a northern Aboriginal context. Although the concepts discussed in this chapter are relevant to a vast body of literature on Traditional Knowledge (see Berkes 2012 for example), it is not reviewed here as it is beyond the scope of the study.

2.1 Water Security

Changing climatic conditions and human water demands are putting substantial pressure on Canada's freshwater resources and hydrological systems (Schindler and Donahue 2006). This has led to increased concern about water-related human and ecological vulnerability (Norman et al. 2011). These concerns have stimulated an increase in research and policy activity around the concept of water security over the past decade (Cook and Bakker 2012). Although a diversity of definitions and interpretations of water security have been put forward over the past fifteen years, there is no generally accepted definition (Norman and Baker 2010; Norman et al. 2011). Cook and Bakker (2012) found that most definitions vary of water security substantially in scope, are often discipline or context-specific, and in many cases, contradict each other. Table 1 provides an overview of the range of water security definitions found in the academic and policy literature. The selected definitions are sorted into 'narrow' and 'broad' framings of the concept in order to illustrate the degree that they differ in scope. For the purpose of this study, I define water security as a multi-dimensional concept that recognizes the need for sustainable access to

an adequate quantity and quality of water needed to support and enhance both human well-being and ecosystem health. This broad definition reflects the duality between water use and protection, while also acknowledging the importance of the ecosystem as an integral part of both human and water security.

Early references to the term ‘water security’ generally define the concept in a very narrow sense, focusing primarily on the select elements of the concept that are directly relevant to a particular discipline (e.g., economics, political science, national development). Examples of these ‘narrow’ framings of water security are listed in Table 1. In contrast to more conceptually-focused broad and integrative water security definitions, these discipline-focused definitions tend to be more operational and thus provide a stronger link to policy, modeling and empirical research (Cook and Bakker 2012). In particular, narrower framings of water security allow for detailed identification and assessment of specific water security concerns and issues in a given context (e.g., water contamination, water availability). This is especially important for water resource managers who often can only focus on the primary water concerns in their management area.

However, critiques of these narrow water security framings have highlighted an inability to address the complex and interconnected realities of contemporary water issues (Norman et al. 2011). For example, Bakker and Cook (2012) argue that narrow water security definitions fail to recognize and to integrate the various pressures and stressors that affect secure access to water resources (i.e., range of political and socio-economic factors).

Table 1: Scope of Definitions of Water Security, Selected Examples

Water Security Definition	Reference
<i>Narrow Framings:</i>	
“the capacity of a population to ensure that they continue to have access to potable water”	Jenicek et al. 2011:1
“a condition where there is sufficient quantity of water at a quality necessary, at an affordable price, to meet both the short-term and long-term needs to protect the health, safety, welfare, and productive capacity of population”	Witter and Whiteford 1999:2
<i>Broad Framings:</i>	
“the gossamer that links together the web of food, energy, climate, economic growth and human security challenges that the world economy faces over the next two decades”	World Economic Forum 2009:5
“the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development; for ensuring protection against water-borne pollution and water-related disasters; and for preserving ecosystems in a climate of peace and political stability”	UN Water Security and Global Water Agenda Report 2013: 1
<i>Definition Adopted for this Research:</i>	
a multi-dimensional concept that recognizes the need for sustainable access to an adequate quantity and quality of water needed to support and enhance both human well-being and ecosystem health	

Cook and Bakker (2012: 99) suggest that “narrow framings would be usefully allied with broader, integrative framings of water security – such that these over-arching issues (such as the political and socio-economic factors) are also taken into account”. In response, most water security definitions that have emerged over the decade have become more broad and holistic in that they tend to integrate the diversity of stressors and dimensions that affect water security (i.e., water quality, water quantity, water for human systems, and water for ecological systems). The Global Water Partnership (2000: 12) played a key role in promoting this shift in 2000 by describing water security as something that should “[aim] to capture the complex concept of holistic water management and the balance between resource protection and resource use”. The

World Economic Forum and United Nations Water were also influential in helping to facilitate a transition towards a more holistic framing of water security as they too released much broader definitions of water security in 2009 and 2013, respectively (see Table 1).

These broader definitions of water security are gaining increasing support from many water researchers in both natural and social sciences (Norman et al. 2011; Dunn et al. 2012). Both Norman et al. (2011) and Zubrychi et al. (2011) assert that an integrated definition of water security provides a more realistic way to frame the complex water issues we now face, and thus is a better fit to address the needs of our changing social and ecological environment. The fundamental argument here is that a comprehensive approach to water security is ultimately needed to inform better water and related land-use decisions. Cook and Bakker (2012) emphasize a similar point, arguing that integrative approaches to water security are more effective at capturing the complex dimensions that impact the water available to sustain both human and ecosystem health. Dunn et al. (2012) lend support to these arguments and contend that by including the multiple stressors that affect secure access to water, holistic definitions of water security enable decision-makers to identify and address the trade-offs between conflicting water uses.

Finally, it is important to be cautious of potential operational challenges that may be associated with broad framings of water security. Such challenges are likely to stem from the diversity of potential variables that can affect water security and the range of methods that can be used to assess water security risks, some of which are more appropriate than others in different contexts and at different scales. Cook and Bakker (2012) suggest that overcoming these operational challenges will require a shift in thinking about narrow and broad conceptions of water security as being complementary rather than mutually exclusive.

2.2 Water Governance

There is a growing consensus among researchers, water managers and policy makers of the need to situate the concept of water security within an effective water governance framework if water security is to be achieved (Rogers 2006; Norman et al. 2010; Baker 2010). The relationship between water security and water governance is often understood as a symbiotic one, where water security sets objectives for good water governance, and good water governance is needed to help operationalize water security.

Broadly defined, water governance refers to the processes by which decisions about water are made (de Loë and Kreutzwiser 2007). Norman et al. (2012: 100) provide a more specific definition of water governance and describe it as “the range of political, organizational, and administrative processes through which communities articulate their interests, their input is absorbed, decisions are made and implemented, and decision-makers are held accountable in the development and management of water resources and delivery of water services”. Water governance is conceptually distinct from water management, which is the practical, hands-on activity to distribute and regulate water. In this sense, governance considers and provides the context that ultimately enables water management (Folke et al. 2005).

Several authors (Norman et al. 2012; Bakker 2012) contend that water governance is a critical component of achieving water security, and that governance issues receive less attention than they merit. These arguments are based on the fact that achieving water security is not the responsibility of one individual, group or government organization. Rather, it requires a collective of people (i.e., decision-makers, researchers, community members, water users) working together to engage in a multitude of actions. However, because water is typically associated with a diversity of conflicting values and uses, achieving water security often requires

contentious trade-offs (e.g., between industrial development and social and environmental change) that can create conflict between actors (e.g., governments, industry, community members, environmental groups) (Grey and Sadoff 2007). The conflicting values and inevitable trade-offs inherent to water governance (and management) issues emphasize the need for an integrative, holistic and polycentric approach to water that is sufficiently robust to address conflicts between water users, sectors and governments (Pahl-Wostl et al. 2008; Bakker 2012). Water governance strategies where there is recognition and incorporation of diverse water interests, including those of both state and non-state actors, are key to enabling societies to achieve water security.

Although there is no universal model for governance strategies, several social science researchers are emphasizing the importance of adhering to a series of ‘good’ water governance principles necessary for water security (Rogers and Hall 2003; de Loë and Kreutzwiser 2007; Norman et al. 2012). Table 2 outlines eight of these key principles.

Table 2: Key Principles of Good Water Governance

Principle	Description/ Characteristics	Reference
Participatory	<ul style="list-style-type: none"> • Participation of all stakeholders (e.g., civil society, private enterprises, all levels of government), including men and women, throughout the entire decision-making process • Participation can be through direct involvement in decision-making process or through a legitimate intermediate institution such as organized public consultation 	Rogers and Hall 2003; UNESCAP 2011
Transparency	<ul style="list-style-type: none"> • Decision-making processes are open, clearly communicated and accessible so that all stakeholders can understand the steps of policy formation 	Rogers and Hall 2003; Lockwood et al. 2010; UNESCAP 2011

Accountability	<ul style="list-style-type: none"> The responsibilities of stakeholders involved in developing and implementing policy need to be clear so that actors can be held liable for their decisions and actions if their responsibilities are not met 	Rogers and Hall 2003; Furlong and Bakker 2008; Lockwood et al. 2010; UNESCAP 2011;
Equity and Inclusivity	<ul style="list-style-type: none"> Equity between and among stakeholders and interest groups needs to be monitored throughout decision-making processes in order to ensure that all actors have opportunities to participate in and influence decisions and actions 	Rogers and Hall 2003; UN-WWAP 2006; Furlong and Bakker 2008; Lockwood et al. 2010; UNESCAP 2011
Effectiveness and Efficiency	<ul style="list-style-type: none"> Decision-making processes and institutions meet stakeholders needs while ensuring the best use of resources available Transaction costs are minimized where possible so as not to impeded action 	Rogers and Hall 2003; UN-WWAP 2006; UNESCAP 2011
Responsiveness	<ul style="list-style-type: none"> Decision-making processes, actions and outcomes should have clear objectives based on stakeholder demand Governance institutions and processes should seek to serve all stakeholders within a reasonable timeframe 	Rogers and Hall 2003; UNESCAP 2011
Fairness	<ul style="list-style-type: none"> All stakeholder's views and perceptions are respected and given equal attention in decision-making processes Decision-making processes are bias-free and include a thorough evaluation of the distribution of costs and benefits among stakeholders 	Furlong and Bakker 2008; Lockwood et al. 2010
Integrative	<ul style="list-style-type: none"> Decision-making processes and outcomes must be integrated with other resource sectors Decision-making priorities, plans and activities need to be coordinated between and across different governance levels and actors 	Rogers and Hall 2003; Lockwood et al. 2010

2.3 Water Values and the Role of Valuation

2.3.1 Contextualizing Value

Understanding the multi-dimensional and complex diversity of values that people associate with water is central to creating good water governance arrangements and achieving water security (Groenfeldt and Schmidt 2013; Castro 2007; Garrido and Ingram 2011; Kashyap 2004). Only

once the myriad values that people attribute to water are identified and understood can decision-makers begin to incorporate such values into their decisions.

However, before discussing water values and valuation it is necessary to clarify what is meant by 'values'. The need for this clarification is due to the lack of consensual definition for values across disciplines and the variance in how values are conceptualized, understood and assessed in different contexts (Oyserman 2002; Hetcher et al. 1993). In the context of most social science-based research, values refer to the implicit and explicit criteria that people use to make judgments and evaluations (Hetcher et al. 1993). For example, Ng and Smith (2012:2) describe value as “‘goodness’ determined by an individual personally and culturally, and in an ethical sense. Such values are held most dear by an individual and govern what the individual does and becomes”. Oyserman (2002:16150) adopts a similar sociological-based definition of values:

patterns of regulations, accepted as desirable by persons in a given culture or family environment, and serve as guiding principles in their lives [...] they can be thought of as priorities, internal compasses or springboards for action – moral imperatives. In this way values or mores are implicit or explicit guidelines for action, general scripts framing what is sought after and what is to be avoided.

Although these definitions vary slightly, they are similar in that they portray values as something that can be conceptualized at both an individual and group level. At an individual level, values refer to the implicit moral beliefs that people evoke as the ultimate rationale for their actions. However, at a group level values are depicted as the scripts or cultural ideals shared by members of a group (Oyserman 2002). Oyserman (2002) explains that while values are the glue that makes social life possible within groups, they can also cause friction and a lack of consensual harmony when values diverge.

The primary means by which values are assessed or measured in the social sciences include individual testimony or self-reported values, inferring values from people's behavioural choices, and evaluations of social interchange to identify what is socially valued. However, these social approaches to understanding values have attracted questions about whether values can be distinguished from related concepts such as motives, goals or social structures (Osyerman 2002). Key tensions in the values literature focus on determining the appropriate level of analysis to draw conclusions about peoples' values. Social science-based approaches to understanding values have been criticized for a lack of specificity of findings due to values and not other variables such as social norms or attitudes. These criticisms point to the complexity of and difficulties that come with identifying and assessing values from a social science perspective.

The concept of value tends to have a different meaning in the context of economics. Within the realm of modern economics, the concept of value is generally defined in terms of the trade-offs that people are willing to make between different goods and services. Measures of this type of value, hereon referred to as economic value, are based on what people want – their preferences and choices. Economic theory assumes that the economic value of a good, service or state of world can be inferred through determining what a person is willing to give up in order to obtain that good, service or state of world (Hannemann 2006). The following section further discusses the differences between social and economic conceptualizations of value with respect to water.

2.3.2 Water Valuation

Although there is increasing recognition of the importance of considering water values from a social perspective, most water values research tends to employ economic methods as they are well-developed and more systematic. The concept of water valuation has emerged as a

potential means to identify and evaluate the diversity of ways in which water is valued economically. Water valuation is most often characterized in terms of a quantitative approach that assigns an economic value to water. The process to determine the economic value of a resource uses dollars as a 'unit of measure' to allow for a common comparison of different outcomes; for example, comparing the price of water pollution reduction measures to the value of the benefits of better water quality (Canadian Council of Ministers of the Environment [CCME] 2010). A common unit of measurement (i.e., currency) enables economists to assign water an economic value to non-market goods such as water, despite the good not having a direct monetary exchange value. This quantitative approach to valuing water is grounded in the concept of "monetary reductionism, that is, to reduce all costs and benefits of a project or policy to a dollar amount to be able to apply the cost-benefit rule" (Steenstra 2010:3). The cost-benefit rule refers to determining efficiency by assigning and comparing monetary weightings to the costs and benefits of competing water users. Although not originally intended for the purpose of water valuation, economic methods are frequently used to assign values to water resources so that water is allocated in a way that yields the most 'optimal' outcome (i.e., water is used in practices that maximize benefits to all of society) (CCME 2010). The monetized estimates of costs and benefits that water valuation methods provide are important for enabling decision-makers and planners to allocate water efficiently and equitably, and for helping them to assess the different trade-offs associated with water allocation decisions (Turner et al. 2004).

Understandings of water values from a social perspective tend to conceptualize value as a subjective importance or appreciation that cannot easily be measured in monetary terms. In this regard, water is often considered to be so valuable that it is beyond any form of economic measurement and thus cannot be assigned a dollar value (Mathews et al. 2001; CCME 2010).

The process of understanding and measuring the subjective value of water involves using qualitative indicators, such as people's perspectives, opinions and uses of water. Therefore, while economic metrics may offer a powerful means to assess the trade-offs between different water-use decisions, one may argue that economic approaches are not ideal for capturing and understanding the subjective ways in which people value water (Mathews et al. 2001; Barlow and Clarke 2002; Steenstra et al. 2006).

Arguments against relying solely on economic methods to understand water values are gaining support from studies demonstrating that humans are inextricably connected to water through a diversity of both tangible (e.g., health, food, economic development) and intangible values (e.g., aesthetic experience, spiritual enrichment, cognitive development) (Dietz et al. 2003; Castro 2007; Chan et al. 2012). Strang's (2004) examination of the meaning of water from an ethnographic perspective suggests that humans share a very complex relationship with water that is highly influenced by social, spatial, economic and political arrangements, cosmological and religious beliefs, knowledges and material culture, and ecological constraints and opportunities. Strang (2004) explains that water is experienced and embodied in both a cultural and physical sense and she emphasizes the associated need to consider both the material and non-material dimensions of water when dealing with environmental decisions. The growing recognition of the need to consider the human dimensions of water has made the subject of water valuation, and the use of economic methods for water valuation in particular, highly controversial.

Critiques of using economic valuation methods to understand how people value water highlight a lack of attention to the intangible and more subjective values that people often associate with water. For example, Steenstra (2010) argues that economic valuation methods

were not designed with the intention of capturing and gauging subjective water dimensions. Consequently, when economic methods are misused in the context of understanding water values, it is not surprising that such methods are unable to adequately account for cultural, spiritual and social of water values. Steenstra (2010) adds that when one chooses to use economic valuation methods to capture peoples' water values they are inappropriately assuming that such values can be reduced to monetary values, when in reality they likely cannot. Similarly, Nunes and van den Bergh (2001) and Batten (2007) argue that classical economic valuation methods are not intended to account for the less tangible and long-term values of water resources (e.g., cultural, ancestral, spiritual and subsistence values) and thus are unreliable as a basis to ensure equitable and efficient water allocation. Keeler et al. (2012) make a similar point, arguing that economic valuation methods are not appropriate to understand peoples' water values because they limit water valuation assessments to the direct use values of water (e.g., household supply, agriculture, industrial uses). This is of particular concern given that the indirect-use values of water (e.g., spiritual, culture) are often more important to people than the direct ones (Chan et al. 2012). Mathews et al. (2001) add that because economic water valuation methods involve assigning a dollar value to the costs and benefits of different water uses, such methods are not devised to provide a comprehensive account of the potential social trade-offs that stem from water allocation decisions.

These criticisms draw attention to the many challenges that emerge when economic valuation methods are used as the only means to understand how people value water. While there are clear areas of misfit between the types of values that can be captured by economic valuation measures and the diversity of ways in which people value water, it is important to recognize that using economic methods to help understand water values can offer some insight into relative

water values. For example, Mathew et al. (2001) emphasize that economic water valuation is most useful when it is used to target specific problems where trade-offs are involved. In such cases economic valuation metrics can be integrated into the decision-making and planning process to effectively evaluate water-related trade-offs. The key point here is that economic water valuation in itself is insufficient to unpack the myriad ways in which people value water, and thus must be situated within a more holistic and human-focused water valuation framework (Stenekes et al., 2008).

The need for the latter is increasingly recognized in the water policy literature. There are examples of recent work demonstrating the importance of and potential ways to rethink how economic approaches are used in the context of water valuation. For example, Feitelson (2012) argues that economic water valuation approaches can be reconciled by differentiating water pricing based on how water is used and where it is sourced. He calls for a shift in thinking about water from 'water' to 'waters' in order to distinguish between water that is needed to fulfill human needs (i.e., direct human needs, spiritual needs, environmental needs, community needs) and water that is used to fulfill wants (i.e., water used in industrial, service sectors, water for additional domestic use). Feitelson (2012) emphasizes that water needs should be supplied to people regardless of their ability to pay, while water wants should be viewed as a commodity that is priced at the full cost, including externalities. Although still preliminary, this shift in thinking about water demonstrates how economic valuation concepts may be used in conjunction with a more social approach to understanding how people value and use water.

This research study adopts a social theory approach to examine values in the context of water in a Northern Aboriginal setting. For the purpose of this research water values refer to any of the material, relational or subjective dimensions of water that people consider important in

their pursuit of living well. This approach reflects a broad view of water values that is intended to capture any associations or connections (both implicit and explicit) that people have with water and perceive as central to their ability to live a quality life. The following section provides more detail about the conceptual framework underlying the social approach used in this study.

2.4 Water Valuation Using a Social Well-Being Perspective

Several social science-based constructs are emerging as potential frameworks to make the intangible values of natural resources (e.g., cultural, spiritual, recreational) and their associated ecosystem services more explicit (see for example Daily et al. 2009; Armitage et al. 2012; Chan et al. 2012; Weeratunge et al. 2013). The livelihoods approach is one construct that has been used in this regard. The concept refers to the basic needs, processes and material assets that are necessary for maintaining a way of life. It also considers the degree of access that people have to these components (Ellis 2000; Allison and Ellis 2001; Wesche 2009;). The challenge of using the livelihoods approach as an analytical tool to assess how people value natural resources lies in operationalizing the concept. The concept is often considered too broad and comprehensive to be relevant for understanding the key assets and activities that contribute to livelihoods in specific contexts (Farrington et al. 1999; Marschke and Berkes 2006; Cox et al. 2009), and thus is likely not the most effective way to examine how people value natural resources.

Framing analysis is another analytical tool that can be used to better understand peoples' views of natural resources, particularly in the context of environmental conflict. The purpose of framing analysis is to help make sense of environmental conflicts by analyzing how such conflicts develop (Shmueli and Ben-gal 2003). The tool is based on the premise that environmental conflicts are created when stakeholders interpret, or frame, conflicts in different and diverging ways. Framing refers to “a cognitive process whereby individuals and groups filter

their perceptions, interpretations and understandings of complex situations in ways consistent with their own socio-political, economic and cultural worldviews and experiences” (Shmueli 2008:2048). The practical utility of using framing as an analytical tool to help manage environmental conflicts is to identify and clarify the values, beliefs and worldviews underlying stakeholders’ diverging frames of the situation.

Shmueli’s (2008) work on framing analysis reveals three cases of environmental conflicts in Israel where the tool was applied to better understand the underlying causes of each conflict. Her findings suggest that although there is no guarantee that framing analysis will lead to conflict resolution, it does open avenues for shared gains during negotiation processes. However, Shmueli (2008) also warns that framing analysis is a very labour-intensive and arduous task that can detract from its practical utility. The approach has also raised questions about whether the outcomes gleaned through the framing analysis process have any practical relevance in decision processes or if they just serve the interests of researchers.

The concept of ecosystem services is another construct being applied as a conceptual framework to better understand the importance of natural resources to people. Often defined as the “conditions and processes through which natural ecosystems [...] sustain and fulfill human life” (Daily 1997:3), the concept of ecosystem services focuses on assessing and classifying environmental functions that benefit humans. A keystone contributor to the ecosystem service literature is the Millennium Ecosystem Assessment (MA), which divides ecosystem services into provisioning, regulating, cultural and supporting services (see MA 2005). While these classifications are effective in providing structure to the framework, which is necessary when using the concept for economic valuation methods, the categories are restrictive in that they simplify the values that people may associate with the environment to fit into generic, largely

western-based categories. By doing this, the ecosystem services approach tends to override any specificities and differences in people's values, while also marginalizing potential interconnections between values that are central to understanding the elements that determine how people behave.

The concept of social well-being is an emerging construct that may provide a way to move beyond pre-conceived environmental value categories and a means to investigate the linkages between peoples' values and behaviours related to natural resources. Social well-being has its primary roots in two main disciplines – social psychology and welfare economics. Within social psychology, well-being reflects a transition from treating psychological problems to looking at the underlying conditions that humans require to thrive (Costanza et al. 2007; Armitage et al. 2012). In welfare economics, well-being reflects a growing recognition of the need to move beyond one-dimensional economic-based assumptions about human rationality and the desire to move beyond using only utility-based indicators of quality of life (Weeratunge et al. 2013). The concept of well-being has gained traction in public policy and decision-making as well as international development literature, particularly with respect to poverty reduction. In this regard, well-being is increasingly being applied as a means to assess poverty in a way that considers material wealth in addition to the wider socio-political, cultural and relational landscapes that affect people's ability to live well (Weeratunge et al. 2013).

Similar to the ecosystem services approach, the well-being perspective is also well established in global environmental discourse. The MA (2005) report was one of the first attempts to include the human dimensions of well-being into understandings of ecosystem dynamics. The MA (2005) refers to well-being as the combination of basic material needs, health, security, strong social relations, and freedom of choice and action. This definition frames

well-being as a development objective that encompasses both material (e.g., employment opportunities, drinking water supply) and non-material goals (e.g., preservation of cultural values) (Weeratunge et al. 2013). However, as Armitage et al. (2012) emphasize, the MA approach to well-being portrays the concept as an outcome of the interplay of different drivers of change that impact ecosystem services. While this is a step in the right direction towards making the intangible values of natural resources more explicit, the MA well-being approach still has a strong focus on the individualistic and material needs aspects of what is required to ‘live well’ (Armitage et al. 2012). Coulthard et al. (2011) suggest that this outcome-based perspective of well-being can be enhanced by focusing on a social conception of well-being that emphasizes the social and psychological conditions that humans require to thrive (in addition to the material).

A social well-being perspective situates the individualistic and basic needs aspects of well-being within the broader social, relational and cultural needs that people require to live well (Deneulin and McGregor 2010). This notion that the physical environment, social processes and subjective perceptions of one’s self all interact to influence how people construct meanings and determine what is valuable in life is also reflected in the concept of sense of place. Sense of place considers the cognitive (i.e., beliefs), affective (i.e., emotions), and conative (i.e. behavioural intentions) factors that influence people’s connection and attachment to a specific environment (Casakin and Neikrug 2008). This implies that one’s sense of place is not inherent to a physical environment itself; rather it resides in one’s subjective interpretations of the environment that they build through social and personal experiences with it. Although sense of place and social well-being are similar concepts in that they both explore the complex and multi-dimensional relationships between people and the environment (Casakin and Neikrug 2008), they differ in that sense of place tends to be more of an elusive idea rather than a defined construct like that of

social well-being (Shamai 1991). Kalternborn (1998) and Casakin and Neikrug (2008) both explain that this is largely due to diversity of ways in which sense of place is approached and understood (i.e., perceived quality of place, process by which place quality is perceived, impact of a place on an individual), which has led to a lack of consensus on how the concept should be constructed and assessed in practice.

Most definitions of social well-being refer to the work of the Research Group on Well-being in Developing Countries, which describes the concept as “[a] state of being with others, which arises where human needs are met, where one can act meaningfully to pursue one’s goals, and where one can enjoy a satisfactory quality of life” (McGregor 2008: 4). This definition acknowledges social well-being not only as an outcome, but also as an analytical lens to draw attention to the tangible and intangible dimensions of one’s life that are considered to be valuable (Copestake 2008; Armitage et al. 2012).

Social well-being is understood through three interconnected dimensions (Table 3): 1) a material dimension that considers the physical requirements that people need to ‘live well’; 2) a relational dimension that denotes the types of relations and interactions individuals require to meet their needs and achieve a good quality of life; and 3) a subjective dimension that is concerned with people’s degree of satisfaction with their own quality of life (White 2009; Armitage et al. 2012; Britton and Coulthard 2012). Figure 1 shows the interdependent relationship between these three dimensions, demonstrating that none can exist without the others (White 2008). The table portrays the critical importance of each dimension, such that a collapse in any one of the dimensions will result in a substantial decline in one’s overall well-being (McGregor 2008; White 2009; Coulthard et al. 2011; Britton and Coulthard 2013). As

such, all three dimensions must be examined in relation to one another in order to provide an accurate assessment of well-being.

A social conception of wellbeing can be used to understand some of the key drivers behind people's decisions and behaviours. First, the material dimension of the concept takes account for the tangible and economic assets that are central to well-being. Second, the concept accommodates the fact that social interactions and relationships also play a critical role in determining how people decide to act. For example, Pollnac and Poggie (2008) highlight a case where a social well-being lens was used to explain to why some fishers tenaciously continue to fish to maintain their image as 'good fishers' even if 'rational' economic behaviour would imply a change of occupation. It is important to note that this relational dimension of the social well-being perspective reflects some of the key ideas associated with the concept of social capital, which is described by OECD (2002) as "networks, together with shared norms, values and understandings which facilitate cooperation within or among groups". Putnam's (2000) work on social capital and social well-being indicates that social capital plays a positive role in enabling people to live well. The researchers found that social capital may be used as an explanation for one's sense of well-being and community function as it tends to enable community members to more easily communicate, cooperate and make sense shared experiences. Third, the inclusion of the subjective dimension recognizes that people's decisions and behaviours are influenced by their perceptions on their own quality of life (Coulthard et al. 2011). Collectively, a social conception of well-being and its three fundamental dimensions offer a useful framework to better understand people's perceptions of what it means to 'live well' and the conditions that enable them to do so.

Table 3: Dimensions, Descriptions and Example Characteristics of Social Well-Being

Dimension	Description and Sources	Example Characteristics
<i>Material</i>	<ul style="list-style-type: none"> • Practical welfare and standards of living (White 2009) • Basic human needs (Coulthard et al. 2011) • The resources people have, or the objective visible outcomes of well-being (Britton and Coulthard 2013; Gough and McGregor 2007) • What people have or do not have (McGregor 2007) • Physical requirements of life (Armitage et al. 2012) 	<ul style="list-style-type: none"> • Income, wealth, assets; • Employment and livelihood activities; • Education and skills; • Physical health and dis(ability); • Access to services and amenities; • Environmental quality <p>(White 2009; Weeratunge et al. 2013; Britton and Coulthard 2013)</p>
<i>Relational</i>	<ul style="list-style-type: none"> • Personal and social relations (White 2009) • Valued freedom or autonomy (Coulthard et al. 2011) • What people do, and how they interact with others to achieve their needs and desired quality of life (Britton and Coulthard 2013) • What people do or cannot do (McGregor 2007) 	<ul style="list-style-type: none"> • Relations of love and care; • Networks of support and obligation; • Relations with the state (law, politics, welfare); • Social, political and cultural identities and inequalities; • Rules and norms that dictate access to resources; • Aspects of violence, conflict and (in)security; • Scope for personal and collective action and influence <p>(White 2009; Armitage et al. 2012; Weeratunge et al. 2013; Britton and Coulthard 2013)</p>
<i>Subjective</i>	<ul style="list-style-type: none"> • Values, perceptions and experience (White 2009) • Quality of life (Gough and McGregor 2007; Coulthard et al. 2011) • People’s own perceptions about the quality of life they are able to achieve (Britton and Coulthard 2013) • What people think or feel (McGregor 2007) 	<ul style="list-style-type: none"> • Understandings of the sacred and the moral order; • Self-concept and personality; • Hopes, fears and aspirations; • Sense of meaning/meaninglessness; • Expressed levels of satisfaction/dissatisfaction, trust and confidence <p>(White 2009; Armitage et al. 2012; Weeratunge et al. 2013; Britton and Coulthard 2013)</p>

There is a growing interest in applying the social well-being framework to different resource contexts. For example, a social well-being lens has been used in the context of fisheries (see for example Coulthard et al. 2011) to address policy challenges associated with natural resource governance. In the context of the global fisheries crisis, Coulthard et al. (2011) argue that a social well-being lens generates insights into how effective fisheries policy and governance arrangements can be constructed. In particular, the authors argue that by widening the scope of analysis to include the values, aspirations, motivations, and social relationships that are central to people achieving their well-being, a better understanding can be developed of the competing interests in fisheries that create conflict and destabilize governance regimes (Coulthard et al. 2011). They argue that the detailed contextual understandings that a social well-being lens generates are critical to being able to identify the limitations of fisheries policy regimes that may be too focused on one dimension of well-being (e.g., material values of a fishery) and fail to properly account for the trade-offs inherent to policy implementation. Britton and Coulthard's (2013) study into the well-being of Northern Ireland's fishing society reports similar findings. The authors argue that the social well-being framework is a valuable tool to help understand the complexities of the community-dynamics inherent to fisheries as well as the subjective values associated with being a fisher. Britton and Coulthard (2013) also contend that the social well-being framework is universal in that it is equally applicable and relevant to both

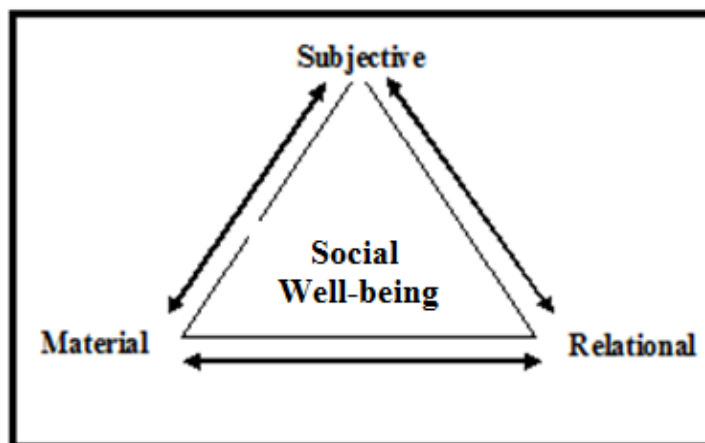


Figure 1: The Three-Dimensional Triangle of Social Well-Being (Adapted from White 2009)

developed and developing country contexts. Coulthard et al. (2011) also emphasize that while some may argue the social well-being framework fails to define well-being in any particular context, it is not its intention to do so. Rather, its purpose is to serve as a framework to indicate how the set of needs, freedoms and values that contribute to one's well-being is likely to vary under different contextual circumstances (e.g., geographical, societal, cultural).

The broad analytical potential of the multi-dimensional social well-being approach has stimulated an emerging interest among policy-makers and practitioners to apply the concept beyond the context of fisheries. For example, Marschke and Berkes (2006) provide an example where the concept of well-being was used to analyze the social dimension of social-ecological resilience in rural Cambodia. Their study finds that the social well-being framework provides an effective means to make the intangible values that people associate with natural resources more explicit (e.g., pride in replanting mangroves) and thus helps to understand the trade-offs that different resource policies have among the material, relational and subjective dimensions of people's well-being. In this regard, the authors argue that a well-being lens helps to inform better natural resource governance.

The social well-being framework is being used as analytical tool in the context of natural resource governance, but it has not yet been applied in relation to water governance. This reflects a valuable opportunity to further apply and test the concept. Given the diversity of intangible values, multiple uses, and complex meanings that people associate with water as outlined above, social well-being may provide a particularly useful tool to understand the trade-offs that must be confronted when developing and implementing effective water governance processes. It is this untapped potential that this thesis intends to explore.

However, it is important to recognize that while social well-being may be an effective way to make the human dimensions of water more explicit (Britton and Coulthard 2012; Weeratunge et al. 2013), there are some challenges when it comes to practically applying the concept. Fundamentally, these challenges lie in operationalizing the social conception of well-being in a way that is meaningful, applicable and relevant to social and environmental policy work and decision-making. While there has been conceptual progress in the well-being literature, the practical utility of the social well-being concept for natural resource governance remains fairly undeveloped. This is largely due to the fact that the concept is relatively complex, varies by context, and is highly dynamic in nature – all qualities that make it difficult to operationalize and apply in a way that it can inform policy.

Other challenges of applying a social conception of well-being are associated with the politics of how the concept is defined. For example, White (2010) argues that social well-being assumes a preoccupation of affluence, where it is the over-rich and privileged who can afford to be concerned about the quality of their already ‘full’ lives. This view implies that a social well-being perspective is inappropriate to examine situations where people are struggling to meet their basic needs, and thus have more immediate concerns than the quintessentially (e.g., relationships of love and care, sense of meaning, human rights) human dimensions of life. While there is substantial evidence to suggest that this is not a major concern (Marschke and Berkes 2006; Coulthard et al. 2011; Britton and Coulthard, 2013), the critique does draw attention to the importance of being aware of how well-being is defined and what this means for social inclusion or exclusion.

A final concern is that a focus on social well-being tends to emphasize human dynamics over ecological ones, and thus risks putting human interests ahead of ecological sustainability.

As such, a social well-being lens may ignore negative long-term ecological impacts (e.g., destruction of a beach environment from seine nets) that get traded-off against a short-term increase in social well-being (e.g., catching larger quantities of fish to sell) (Armitage et al. 2012; Daw et al. 2012). However, Armitage et al. (2012) suggest that this can be overcome by adopting a hybrid approach to social well-being that situates the concept within a more ecologically focused framework (e.g., resilience, ecosystem approach).

2.5 Chapter Summary

This chapter provided an overview of the main concepts that guide and influence the study of water and well-being in a northern Aboriginal context: water security, water governance, water valuation and social well-being. Although there are several different ways of framing and defining the concept of water security, a central theme is the need to balance human and environmental water needs while protecting essential ecosystem services and biological diversity. Increasing development pressures and changing climatic conditions are making water security issues a top priority in many of Canada's northern Aboriginal communities.

While there are technical challenges that must be overcome in order to address these concerns, an equal or perhaps more fundamental challenge is to improve water governance. Water security and water governance share a mutual relationship, where water security sets the objectives for good water governance, while good water governance enables the operationalization of water security. Water governance refers to the processes (i.e., political, organizational and administrative) through which water decisions are made. Water governance is considered to be 'good' when it extends stakeholder participation in the decision-making process to include both state and non-state actors, there is full accountability and legitimacy, and when decisions are transparent and equitable. Understanding the ways in which different people and

cultures value and use water and ensuring that such values are incorporated into water-related decision-making processes is thus central to both good water governance and water security.

Although there is increasing recognition of the importance of including Aboriginal values in water-related decision-making processes in the North, there has been little progress in this regard due to the lack of well-developed methods for understanding non-economic water values. There are several economic water valuation methods (e.g., contingent valuation method, choice experiment method) that are well suited to helping understand relative water values; however, they often fall short when it comes to accounting for more subjective values, particularly those related to culture and spirituality.

This chapter provided an overview of the concept of social well-being and highlighted previous cases where social well-being has been applied in the context of natural resource governance. Social well-being is understood through three key dimensions – material, relational and subjective – which, when taken together, can help to provide a holistic understanding of what people value in pursuit of living a quality life. This three-dimensional concept of social well-being is applied in this research as an analytical lens to unpack the ways water is valued in a northern Aboriginal context. The next chapter provides an overview of the methodology and methods that are used to carry out this research.

Chapter 3: Methodology and Methods

This chapter outlines the research methodology and methods used to explore the human dimensions of water values in a small Aboriginal community in Northern Canada through a social well-being lens. The methods employed in this study were adopted to address my three research objectives: 1) to understand the current water resource conditions and contextual circumstances impacting water use in the community of Trout Lake, NWT; 2) to examine the tangible and intangible values that people in Trout Lake associate with water resources; and 3) to understand how these values may be relevant water policy and decision-making in the NWT. The chapter is divided into three primary sections. The first section is an overview of the general methodological approach used in the study, highlighting the steps that were taken to build the relationships necessary for collaborative community research. The second section outlines the various data collection protocols and procedures employed in the study, while the final section discusses the methods used in data analysis and results reporting.

3.1 General Methodological Approach

3.1.1 Collaborative Research Approach

The subjective nature of well-being research and its associated focus on the social world draws attention to the need for cultural sensitivity (Liamputtong 2010). A collaborative and culturally sensitive research approach recognizes that there are legitimate and credible alternatives to the conventional scientific worldview. In addition to recognizing the validity of alternative ways of knowing, culturally sensitive research consciously privileges culture and context as central to the research process (Smith 1999). This type of research is highly dependent on the inclusion of cultural knowledge and experiences throughout the all stages of the research project (Tillman 2002; Agyeman 2003). Culturally sensitive methodologies are increasingly recognized as being

critical to understand how people experience the world in different ways (Tillman 2002). This is especially true in the context of cross-cultural Aboriginal research, which is often conducted by non-indigenous ‘outsiders’ who are typically accustomed to western worldviews (Gibbs 2001). Many aboriginal communities in Canada have experienced a long history of unethical research, including a lack of respect from ‘outside’ researchers, culturally inappropriate use of research methodologies, expropriation of traditional knowledge, as well as exploitative and extractive research (Smith 1999; Panel on Research Ethics 2008; Liamputtong 2010). In order to avoid these ethical issues often associated with conventional research, several researchers call for culturally sensitive methodologies that account for the issues and problems that are important to the people participating in the research (Smith 1999; Lomawaima 2000; Agyeman 2003; Cochran et al. 2008). Smith (1999) and Liamputtong (2008) emphasize the foundational role that collaboration plays in helping to ensure that the research process is culturally sensitive throughout.

Adopting a collaborative research approach requires that the researcher and those participating in the research are provided with equal opportunities to be involved with and benefit from the research process (Gibbs 2001). This requires a redefinition of the researcher’s role from the ‘principal investigator’ to a more service-focused role that accepts community direction for research priorities, data collection methods, and the dissemination of research findings (Eisner 1997). In order to be effective, collaboration must be initiated between the researcher and the participants at the start of the research process, and maintained throughout. Relationship building is a key component of collaborative research that requires ongoing communication as well as mutual trust and respect between researchers and participants (Cochran et al. 2008). Eisner (1997) adds that these types of relationships are also important for

helping encourage a sharing of ‘insider’ knowledge which, if used ethically, can enhance the experiences of those involved, while also improving the authenticity and richness of the research findings (Wesche 2008). It is important to recognize that collaboration is a long term undertaking that requires continued open dialogue and engagement, and thus it typically is more financially demanding and time consuming than conventional research. This is especially true when a collaborative approach is used in a cross-cultural research context, such as the current study (Katz and Martin 1997). Additional time and space are needed to ensure that the researcher is able to be immersed in the context of the study and has the opportunity to engage in local daily activities and experiences. Taking the time to become familiar with the study context and learn about local issues of concern plays an essential role in helping to improve cultural sensitivity, demonstrate the researcher’s commitment to the community, improve trust, and reduce apprehension with regards to extractive research (Wesche 2009).

The collaborative approach undertaken in this study was initiated during the early stages of the research development process and maintained through the duration of the project. Initial contact for my study was made through research and GNWT colleagues with previous experience working on collaborative water research projects in remote NWT Aboriginal communities. Early discussions began with the NWT Water Stewardship Advisor during the end of 2012 to begin the process of identifying priority water-related research topics and areas in the Territories. The Advisor played a key role in helping me place boundaries on the scope of my project by directing my attention to the research priorities outlined in the Water Strategy and Action Plan. Based on these research needs, my own research interests and my past research experiences, the Advisor provided suggestions for possible research directions that I may want to pursue (e.g., examining the human dimensions of environmental change in relation to water,

investigating social approaches to water valuation). In order to help me get a sense of the types of water-related research ongoing in the NWT, the Advisor suggested that I attend the NWT Environmental Monitoring Annual Results Workshop in January 2013.

The workshop was held in Yellowknife and was hosted by the NWT Cumulative Impact Monitoring Program (CIMP), GNWT and the Department of Fisheries and Oceans (DFO). While attending the event the Advisor introduced me to a diversity of water researchers, NWT decision-makers and Aboriginal community members to discuss key water issues and best research practices in the NWT. The workshop setting provided a valuable opportunity to further some of my initial ideas regarding the human dimensions of water valuation, and was essential in helping to focus this study on a water issue important to people in the NWT. In particular, the workshop highlighted the need for research that moves beyond a sole focus on the physical aspects of water resources, and towards a richer understanding of the interplay between water resources and human well-being. After reflecting on these ideas and discussing them with the Water Stewardship Advisor, I decided that the goal of my research would be to investigate the relationship between water and social well-being in a northern Aboriginal context.

The decision to use a single-case study approach (Yin 2003) to address this goal was made early in the research development process. The Water Stewardship Advisor played a key role in helping to select a suitable case by identifying NWT communities with strong water interests and by putting me in contact with a private consultant working for many communities in the NWT. The role of this consultant and the subsequent collaborative steps that ensued prior to, during and after data collection activities in the case community are discussed in the following sections (3.1.1.1 – 3.1.1.3).

3.1.1.1 Case Study Design

The decision to use a single-case study approach (Yin 2003) to address this goal was made early in the research development process. The approach was selected because it was an appropriate means to explore the relationship between water and well-being in the context of this study. As indicated by Yin (2009), the single-case study approach is ideal for investigating questions of ‘how’ and ‘why’ particular phenomena occur within contextual settings. A case-study approach was especially useful in this study because it allowed for various modes of inquiry to be used that collectively contributed to providing context-specific insights into the relationship between water and well-being (Yin 2003). The approach was also the most logistical feasibility means to carry out the study. A multiple-case study approach would have required additional time and financial resources that would have surpassed the resources available for the project.

Based on preliminary background research and input from the NWT Water Stewardship Advisor, Trout Lake, NWT, an Aboriginal community of approximately 100 people, was selected as the case-study for this research. Several factors contributed to the decision to work with the community of Trout Lake. An important factor was that the community exhibits many of the water security and governance challenges being faced by Aboriginal communities throughout the NWT. In particular, Trout Lake reflects the situations in many NWT communities where increasing pressures from local and regional development activities (e.g., oil and gas development) pose potential threats to water quality and quantity, which in turn impacts human well-being. The community also reflects growing concerns about the limited and short-term consideration that NWT water and land-use decision-makers often have for the intangible values that many Aboriginal people associate with water. Another factor for choosing Trout Lake as the

case-study was the community's persistent commitment and strong interest in protecting their culturally important watershed. In addition to being awarded the Excellence in Water Stewardship Award for the NWT in 2013 for their source water protection efforts, the community is also working through the NWT Protected Area Strategy Process to protect the Trout Lake watershed. The community was also in the process of developing a water monitoring research partnership with the GNWT to build a better understanding of the water conditions in the community. Given that the partnership process was in its early stages of its development, there was an opportunity to enhance the proposed science-based water monitoring work by bringing in a more social perspective on water values in the community. The opportunity to contribute to the partnership development process also directly fed into the water Strategy's call for more holistic and NWT relevant water valuation approaches.

Initial contact with the community's designated authority, the Smbaa K'e Dene Band (SKDB), was made through the private community consultant that the NWT Water Stewardship Advisor introduced me to in early 2013 (see above section). The consultant, who was paid as part of his services to the SKDB, acted as a liaison between myself and the SKDB and helped to communicate my preliminary research ideas to the Chief and Band Manager. The consultant also provided several suggestions for how to make the research design more culturally sensitive and context appropriate before presenting it to the community. The support and input from the community consultant and the Water Stewardship Advisor were central to the success of the case study selection process.

3.1.1.2 Community Collaboration Prior to Data Collection

Collaboration with the community of Trout Lake continued once the SKDB confirmed their interest to participate in the research project. A plain language research summary containing

proposed research objectives, methods, outcomes and benefits to the community was prepared and sent to the SKDB for input. Community support for the project emerged from the summary, as did further discussions about the scheduling and methodological details of the proposed study. The SKDB Band Manager, supported by other SKDB members, undertook the role of overseeing the project activities in the community, including interview participant recruitment and the interview progression in the communities.

Communication and engagement with the community of Trout Lake progressed during the six weeks I spent in Yellowknife during the early summer of 2013. My preliminary stay in Yellowknife enabled me to become more familiar with the context, processes and procedures associated with conducting research in northern Canada. I quickly learned about the importance of communicating with and involving the community from the early development stages of the project. As such, I spent much of my time in Yellowknife working to develop a community research agreement with the SKDB (Appendix A). The agreement consisted of a mutually agreed upon research plan to work with the community, as well as an outline of the general terms of the research project. These terms included the responsibilities associated with the use of existing documentation relevant to the study, the research procedures to be executed while working in the community of Trout Lake, and the use of the information and documents generated by the project.

Collaborating with the SKDB to establish the research agreement was essential to ensuring the research process was open and equitable, and that cultural sensitivities in the community were addressed in the research design. For example, it was determined in the agreement that interviews were the most appropriate data collection method given the predominantly oral based culture and traditions in the community. In addition to helping promote

mutual trust with the SKDB, the research agreement also played an important role in facilitating further communication with the community, gaining access to additional community water information, hiring a community research assistant and making logistical arrangements to travel to and stay in the community. Although I did not conduct any formal data collection activities while staying in Yellowknife, the trip was essential in helping to build collaborative relationships with the community of Trout Lake. Being in Yellowknife also allowed me to introduce my research proposal and receive feedback from the SKDB before travelling to the community. I was able to exchange ideas and discuss my research plans with other water researchers who have worked with the community of Trout Lake in the past. The feedback I gained from both the SKDB and other researchers was critical in helping to ensure that my project goals and proposed data collection methods were appropriate for and met the needs of the community. I was also able to attend the Annual Dehcho First Nations Assembly in Fort Providence. Although I did not perform any formal data collection while attending, the event was important for understanding the regional context, and learning about the ongoing concerns and negotiations in the Dehcho Region regarding water protection and land use planning. I had the opportunity to meet and speak with several community Chiefs at the event, including the Chief of Trout Lake. This allowed me to begin the process of building a strong, positive and trustworthy relationship with the Chief before travelling to the community.

3.1.1.3 Community Collaboration During Data Collection

Collaboration with the SKDB continued to evolve after my arrival in the community of Trout Lake to undertake formal data collection activities. Hiring a community researcher was one way that this was done. The SKDB suggested hiring one local community member to help implement the project in the community. The community researcher was involved in all aspects of the data

collection process in Trout Lake, including the development of the interview guide, building the sample list, raising awareness about the project in the community, and identifying and recruiting community members to participate in the study. She also played a key role in providing liaison services between myself, an 'outside' researcher, and community members during the initial stages of data collection. The community researcher was also essential in interpreting in Slavey, the local language spoken by many elders in Trout Lake. Hiring a community researcher was also important to create capacity-building opportunities in the community. Working on the project helped the community researcher to build her own communication and organization skills by working through the processes involved in setting up, facilitating and interpreting interviews. Her role in ensuring that the research procedures used in the community were culturally sensitive and appropriate was also critical. The research procedures employed in the community of Trout Lake are discussed in the following section (3.2).

Aside from the time I spent working with the community researcher and conducting interviews, I spent most weekdays working in the SKDB office. Being in this environment on a regular basis allowed me to maintain close contact with the community Band Manager and Chief. This contact was important for collaboration because it meant that I was able to provide the SKDB with regular updates on the status of the research project. It also meant that the SKDB could easily provide me with any input or feedback to include in the research design. For example, in one instance after updating the band manger on my interview progress, she indicated that several key community members were absent from my original list of potential interviewees. Based on the band mangers suggestion, these community members were quickly added to the list of interviewees and were interviewed before I left the community in August of 2013. In addition to helping maintain an open and transparent relationship with the SKDB, working at the office

also created numerous opportunities for me to engage in informal conversations with community members passing through the band office. Although these experiences are not considered formal data collection activities, they played a key role in helping me to understand the dynamics of the community and learn more about the context.

3.1.1.4 Community Collaboration After Data Collection

Collaboration with the SKDB continued after the data collection activities were complete through ongoing dialogue with the SKDB Manager. I provided short bi-monthly research progress updates to the Manager via email in order to assure her that the data was being analyzed and that preliminary results could be expected soon. Once the preliminary results were available they were summarized in a plain language brochure that was made available to community members (Appendix B). The brochure encouraged participants to provide feedback and comments on the results, however, few comments were received. Although it would have been ideal to return to the community to hold a public results workshop or meeting, such an event was not feasible due to funding and time constraints.

3.2 Data Collection Methods

3.2.1 Mixed Methods Approach

The focus of this research is on exploring the relationship between social well-being and water resources in a remote Aboriginal community in Northern Canada. Understanding this social-ecological relationship requires knowledge about both the human and physical dimensions of water resources. Thus while the study primarily relied on qualitative methods to gain insight into the human dimensions of water and their relevance to water policy, quantitative data was also included in order to understand how the physical dimensions of water impact the way that people use and value water. The qualitative methods used in this study included a document review, and

semi-structured interviews, while the quantitative aspect primarily involved compiling water quality and quantity data from the Trout Lake area.

This type of mixed methods approach that involves converging qualitative and quantitative data inquiry methods is an emerging research strategy that is gaining increasing recognition among social science researchers (Alexander 2008). The mixed methods approach is considered to be advantageous over single inquiry methods because it allows the researcher to capitalize on the respective strengths of both quantitative and qualitative research methods (Creswell 2003). The advantages of using the mixed approach within a broader case study design include the ability to incorporate a range of different perspectives on a particular issue, to triangulate research findings, and to use the results from one inquiry method to inform insights on a complementary method. These advantages are why many researchers argue that the mixed methods approach is able to provide the most in-depth understanding of the research problem (Tashakkori and Teddlie 1998; Creswell 2003; Johnson et al. 2007).

Using a mixed methods approach in this study enabled the incorporation of multiple types of data and collection methods at various stages of the project. During the initial stages of data collection, existing quantitative water resource data and qualitative water-related data were combined through a document review to learn about water issues and concerns in the community of Trout Lake. The quantitative and qualitative data mutually informed the design and content of the semi-structured interviews that followed the document review. The mixed method approach also allowed for the incorporation of both open- and closed-ended questions in the interview design, which was particularly effective in helping to provide some structure to the interviews while also allowing participants the freedom to discuss their own stories and thoughts. The ability to combine the data that was initially collected during the document review phase of the

study with the data collected through the semi-structured interviews also played a key role in helping to build the context necessary to fully understand the research results. Drawing on water resource data collected through the document review and interviews also allowed for some data triangulation, which is a key strength of conducting case study research (Yin 2003). The ability to incorporate multiple types of data from different sources was also key to helping understand the intricate relationship between water resources and social well-being, and to determine the policy related relevance of this understanding. I outline in the sections below further information on the various methods used in this research.

3.2.2 Document Review

Documents are central to case study research as they can provide solid and unobtrusive sources of data that record information about previous events and that can be used to support or challenge evidence from other sources (Yin 2003). Although it can be a challenge to locate and access documents containing detailed material, document reviews are often an effective way to gather the case study context information that is often needed to help situate research outcomes and findings. Document review research also provides additional practical benefits as there is no need for coordination between the researcher and potential participants. Furthermore, because documents are already in written form, the researcher is able to gain information without having to transcribe the data (Creswell 2003).

A document review was used as a secondary data collection method in this study. The purpose of the review was to synthesize existing information about the water resource conditions and changes impacting local perspectives and water use in the community of Trout Lake. Although the Trout Lake culture is largely based on oral traditions, the SKDB maintains a diversity of documents including policy documents and research reports. It is important to note

that most of these documents are considered confidential and are typically not accessible to non-community members or researchers. Permission to acquire existing community documents pertaining to water resource conditions and changes in the community was granted once the community research agreement was signed by both the researcher and SKDB. The agreement outlined the terms and conditions of how the documents would be obtained, reviewed, stored, and used by the researcher. In addition to the water-relevant research and policy documents obtained from the SKDB, the document review also included publically-available newspaper articles, monitoring reports, environmental assessments, workshop reports and management plans pertaining to water resource conditions in Trout Lake and the surrounding area. These non-confidential documents were gathered through a comprehensive website search. In total, 22 documents were gathered and reviewed to provide insight into the water issues relevant to the community of Trout Lake. Drawing on both quantitative and qualitative work pertaining to the water quality and quantity conditions in the region helped to contextualize the research study, inform the research methodology, guide the interview protocol to be used in the community and determine appropriate analytical approaches.

3.2.3 Semi-Structured Interviews

Semi-structured interviews were selected as the main data collection method because they are one of the most effective means to gathering case study information associated with human affairs (Yin 2003). Semi-structured interviews create an opportunity for specific interviewees to provide insight on a particular issue or subject, such as the relationship between water and well-being (Yin 2003). Semi-structured interviews are typically based on an interview guide comprised of a series of open-ended questions or general subjects that are discussed in no fixed sequence (Newing 2011). This type of interview is especially useful for exploratory

research in cross-cultural contexts as it allows the interviewer to tailor the interview questions to the specific situation and person being interviewed (Huntington 2000).

In the case of this study, the exploratory nature of semi-structured interviews made it possible to gain insight into the different ways that some Aboriginal people value water despite the researcher not having a full understanding of the culture. The flexibility associated with semi-structured interviews also played a key role in being able to engage participants in a conversation focused on water and well-being, while also providing interviewees with the freedom to expand on their own thoughts, perceptions and knowledge pertaining to water issues. Semi-structured interviews were conducted with two groups of people in this study: members of the Trout Lake community with knowledge about water use in the community (community interviews), and representatives from a diversity of water policy organizations and research groups in the NWT (policy/government interviews).

3.2.3.1 Community Interviews

Under most circumstances, studies that capture information stemming from traditional knowledge sources, such as elders or frequent land users, tend to be most effective if the sampling process is based on a selection of key community informants (Huntington 2000).

Baxter and Eyles (1997) discuss the importance of pursuing ‘information-rich cases’ that are able to provide a detailed understanding of a particular issue. In this study purposeful sampling was used to identify key water-related informants (i.e., elders, hunters, trappers) in the community of Trout Lake. The community researcher led the sampling process, which first involved compiling a list of community residents from the INAC Indian Registration System and the Trout Lake Band Membership Residents Summary. The community researcher collaborated with the Band Manger to identify key elders and land-users from the list of community residents. A total of 10

elders and 16 frequent land-users were selected as key informants. All of the key informants were initially contacted in person through a preliminary household visit or through informal contact in the community. During the initial contact the potential participants were provided with an overview of the study and details about what their participation would involve. At this time interested participants arranged an interview time and location that was most convenient and comfortable for their needs. A poster containing information about the project and the need for participants was also posted in the community Band Office, general store and recreation centre (see Appendix C). The poster was important in helping to create awareness about the project in the community.

An information letter with written consent was obtained from all participants prior to conducting each interview (see Appendix D). All of the interviews were conducted in person, and depending on the participants' preference, interview data was collected either through written interview notes or a taped audio recording. A standard semi-structured interview guide was used to guide the discussion during the interviews and provide conversation prompts as needed (see Appendix E). The interview conversations focused on asking community members' about their perceptions on the role that water plays in the material, relational and subjective dimensions of their well-being. Although the interview questions were based on preconceived ideas of these three well-being dimensions, it is important to recognize that the dimensions were not explicitly addressed in the interviews. The semi-structured nature of the interviews allowed participants to develop and articulate their own ideas and perceptions about the link between water and well-being. Participants were encouraged to share any stories or memories that illustrated their connection to water or signified the importance of water to their quality of life.

The key informant interviews were conducted during the first three weeks of my stay in the community of Trout Lake. Of the 26 key informants initially identified, 21 agreed to participate, while 5 were unavailable or unwilling to participate in the study for various reasons. After further consultation with the SKDB Manager, seven other community members were identified as secondary informants. The same interview procedures applied to the key informants were used with secondary informants. Once all of the interviews were completed, all interviewees were provided with a \$75 financial honorarium, which was a rate determined in collaboration with the SKDB Manager. The honorarium was delivered to each participant in their household, which allowed me to personally thank all of the interviewees and remind them of the importance of their insights. The practice of financial compensation for participation in research studies has been standardized in most of Canada's northern communities, including Trout Lake.

3.2.3.2 Policy/Government Interviews

A second group of semi-structured interviews was conducted with representatives from a diversity of water policy organizations and research groups in the NWT. The purpose of these interviews was to understand the practical and political relevance of the water value information collected in Trout Lake, particularly with regards to the Water Strategy and corresponding Action Plan. Potential interview participants were selected from the GNWT's list of water stewardship partner organizations. Water partners refer to anyone who has a role in enhancing water stewardship in the NWT and has been actively involved in the creation and implementation of the Water Strategy. The direct involvement of water partners in the development of the Strategy made them key informants for learning about the relevance of the Trout Lake water value information for water stewardship in the NWT.

Based on discussions with and recommendations from the NWT Water Stewardship Advisor, 23 water partners were invited to participate in an interview. These individuals represented several water-related organizations and groups in the NWT, including Aboriginal Affairs and Northern Development Canada, Mackenzie Valley Environmental Impact Review Board, Mackenzie Valley Land and Water Board, Water Strategy Aboriginal Steering Committee, Government of the Northwest Territories, Ecology North, Aboriginal Aquatic Resources and Oceans Management, Dehcho First Nations, and private consulting groups. Initial contact with potential participants was made through a recruitment email that provided an overview of the research project, a rationale for seeking their participation, details about the nature of their participation and a request for a response regarding their interest in an interview. Interviews were scheduled via email and telephone for the nine participants who indicated they were willing to participate. Five participants indicated they were unable to participate due to lack of time, while the remaining eight did not respond to email and telephone requests.

An information letter and consent letter was given to all participants before each interview (see Appendix F). All of the interviews were conducted in November 2013, and all except for two telephone interviews (due to location logistics) were conducted in person in Yellowknife, NWT. All participants gave consent to have their responses recorded through a taped audio recording. A semi-structured interview guide was used to structure the discussion and prompt conversation as needed (see Appendix G). The interview questions were designed to elicit a discussion about the structure of existing regulatory and decision-making processes for water issues in the NWT, the challenges associated with accounting for diverse water interests in the NWT, and to gain some insight into how a better understanding of the relationship between water and well-being could be used as a basis for water-related decision-making in the NWT.

Respondents were given a preliminary summary of the water value and well-being information from Trout Lake as part of their invitation to participate in the interview (Appendix H). During the interview they were asked to reflect on the relevance of the information to water policy and decision-making processes in the NWT, and to consider how some of the intangible water values included in the document may be translated in a way that they can be understood and discussed in a policy-context. Interviews usually ranged from 45 minutes to one hour.

3.2.4 Ethics

All data collection methods were undertaken with respect to following the main principles outlined in research guidelines pertaining to indigenous community-based research (SKDB Traditional Knowledge Policy; CIHR 2007; Dene Cultural Institute 1991) and the Northwest Territories research licensing process as outlined by the Aurora Research Institute (2008) (Appendix I). This project was also reviewed and approved by a University of Waterloo Research Ethics Board (Appendix J).

3.3 Data Analysis

All of the recorded interviews were transcribed semi-verbatim using a computer audio player and Microsoft Word. This meant that the transcripts were cleaned-up to exclude cases where the respondent stuttered, had false starts to sentences or used redundant words and sounds such as “um, “ah”, or “uh”. In instances where the participant did not give consent to be recorded, notes were taken by hand during the interview, which were then typed and supplemented with additional notes I made immediately following the interview. In cases where an interpreter was needed for the interview, only the English language portions of each interview were transcribed.

The interview transcripts were imported into NVivo, which is a qualitative research software designed to assist researchers undertake qualitative data analysis (Ishak and Bakar 2012). Several factors influenced the decision to use qualitative research software to support the data analysis process rather than relying solely on manual methods. A major consideration was the large quantity of transcripts to be analyzed and the limited time available to analyze them. The time efficiency of using qualitative data analysis software over manual methods to store, organize, manage, reconfigure and reflect on the data was the primary reason for using software assistance. Other advantages included the ability to apply more than one code to a single passage of text, code smaller passages of text within larger passages of coded text, and incorporate multiple similarly coded portions of text under one broader code (Welsh 2002). Being able to quickly identify, collect, display and examine similarly coded passages of text, key words and important concepts is another advantage that qualitative research software offers over manual paper and pencil data analysis (Saldana 2013).

In terms of program selection, NVivo was preferred over other research software (e.g., ATLAS, XSIGHT, Weft QDA) because it provides an organized workspace to classify, sort and arrange data from various sources. NVivo also offers many query modes and includes an option for the researcher to reflect on and record emerging themes in the data through research a 'memo' function (Ishak and Bakar 2012). NVivo was also chosen because it is relatively simple software to operate and is compatible to import transcripts from Microsoft Word.

The data analysis process within NVivo began with coding. The purpose of coding was to reduce and organize the raw interview data into more manageable pieces. Coding is an iterative process that involves reading and assigning codes to the dataset multiple times for different purposes, most often for a descriptive and an analytic purpose (Ellinger and Watkins 2005). In

the case of this research, the first reading used open-ended coding to apply descriptive-based codes that identified common content and general themes within the data (i.e., water values, water concerns, drinking water sources, local observations of water conditions, water and family relationships, water stories and legends). Subsequent readings applied more detailed codes within each broad theme, which were then arranged in hierarchical categories and sub-categories. This process led to the establishment of a manageable suite of initial descriptive codes that outlined the general content of the interview. In addition to helping familiarize me with the interview data, this coding process illuminated valuable contextual information about the community of Trout Lake and its water issues. This information, which is presented in Chapter 4, provided an important foundation that was necessary for more analytically focused coding.

Simultaneous coding was applied in many cases throughout the initial coding process where the transcript content suggested multiple meanings that required more than one code. Passages of text with multiple codes were examined in further detail in subsequent rounds of coding which focused on identifying and refining relationships among existing codes. For example, in the community interviews, one respondent indicated that they felt a personal connection to the land and water in Trout Lake because of the strong spiritual significance of the water in her life. Based on the preliminary codes at the time, this passage necessitated both a “personal connection” and “spiritual significance” code. During more detailed analysis, the application of both codes in this case indicated that there is likely a strong relationship between the value people associate with the spiritual significance of the water and the personal connection that they feel with the land and water surrounding them. Similar types of connections were explored further through the application of axial coding, which was used to link the initial descriptive codes to the social well-being framework outlined in Chapter 2.

According to Benaquisto (2008: 51), axial coding is “the phase where concepts and categories that begin to stand out are refined and relationships among them are pursued systematically”. In the case of the community interviews, the axial coding process involved re-organizing and re-coding the interview data into categories and sub-categories based on the key parameters of the three social well-being dimensions outlined in Table 3 of Chapter 2. I began this coding process by using the three well-being dimensions (i.e., material, relational and subjective) as broad ‘umbrella’ codes which I manually applied to relevant sections of text. Through subsequent readings, I applied more detailed codes within each of the three umbrella codes which were frequently renamed, redefined and rearranged as new insights emerged. The coding structure that emerged from this process was used to organize the water values presented in Chapter 5.

In the case of the government/policy interviews, axial coding was used to examine the potential relevance of the community water value information for water policy and decision-making processes and groups in the NWT. Through successive readings, categories and subcategories were reconfigured to reduce the data further and identify key themes and relationships that aligned more closely with the research objectives (Patton 2002). Analytic memos were kept throughout the data analysis process within Nvivo in order to link specific themes to examples and relationships within the data. The results from this analysis are presented in Chapter 6.

Verbatim quotations were included throughout the interview results presented in Chapters 5 and 6 in order to provide more detail and context to the interpreted results. The use of direct quotations is important because allows readers an opportunity to see how participants create and express meaning, while also helping to maintain the original context associated with participants’

responses. I specifically attempted to include quotes from a range of individuals in Chapters 5 and 6 in order to reduce bias and illustrate different perspectives. Percentages are included in brackets throughout Chapters 4, 5 and 6 to indicate the proportion of total respondents that the results statement refers to. The purpose of including the percentage is to give the reader a sense of how peoples' perspectives about water are distributed within the community.

Secondary data collected during the document review were used to support the interview data and fill data gaps necessary to understand the context of the study. The information collected through the document review was particularly useful in helping to provide the supporting information necessary to properly interpret the data collected during the interviews. For example there were several cases with the community interviews where participants focused on discussing the environmental changes and social impacts they have experienced as a result of particular development or event, without explaining the nature of the development or event. In most of these cases documents provided the information to fill these types of voids.

3.4 Methodological Limitations and Challenges

Despite efforts to reduce the shortcomings of this study, it is important to note that there are some inherent limitations associated with the project design and the selected research methodologies. A common limitation of adopting a single case study approach lies in the generalizability of the research results (Johnson 1994). Although case study research is valuable in providing context rich information, it is often criticized for generating results that are not transferable to different contexts. However for the purpose of this study, focusing on a single Aboriginal community case study allowed for an in-depth examination that would not have been possible with additional case studies given time and financial constraints. It is also important to note that while the emphasis was on a single community, there were also eight NWT water

partners interviewed who represent and spoke about regional, territorial and federal perspectives regarding Aboriginals within the wider water policy context.

There may also be replicability limitations associated with selecting Trout Lake as the case community for this research. One of these potential limitations stems from the fact that the community of Trout Lake keeps relatively strong water records and has hosted several water researchers in the past, both technical and social scientists. Although many other communities in the NWT share these qualities, it is important to acknowledge that this is not the case for all northern communities. Consequently, there may be some challenges with replicating this study in communities that have poor water records or have not experienced working with external water researchers. The other potential limitation is associated with the community of Trout Lake's recognition as having proactive water attitudes compared to others in the NWT. Although many communities in the Dehcho Region have a similar reputation, it is important to note that these attitudes may cause some potential bias among responses that do not reflect the views of other communities in the NWT.

There were also some limitations associated with the design of the semi-structured interview guide used in the Trout Lake community interviews. The likert scale questions included in the design were difficult for community members to understand and thus may have hampered their ability to respond accurately. The style of the questions were unfamiliar to most participants because they did not allow respondents provide open answers and thus limited their ability their ability to share their thoughts. In order to address this limitation, the original interview guide was adapted throughout the data collection process in order to allow for more open-ended questions that community members were more familiar with.

Furthermore, although this chapter has highlighted many strengths of using a collaborative research approach, it is important to acknowledge the challenges and limitations associated with its use. In the case of this research, the challenges of collaboration relate to the greater care and time required to build and maintain collaborative relationships, particularly those within a cross-cultural research setting. The processes associated with identifying, contacting and maintaining communication with potential research collaborators (i.e., NWT Water Stewardship Advisor, private community consultant, SKDB) was a time intensive processes. Ensuring that everyone involved in the research process had adequate time to provide their input and finding practical ways to consolidate this information into the research design required more time than anticipated. Consequently, this reduced the length of my stay in the community of Trout Lake from two months to one.

Reduced time in Trout Lake made it difficult to fully understand the complex and intricate beliefs, opinions and norms rooted within the community. Although I made a conscious effort to engage in informal conversations with community members, partake in local practices and involve myself in community activities, I found that my understanding of local customs and cultural norms was still fairly limited. Aside from time in the community, language barriers and linguistic challenges were another factor that contributed to this feeling. In cases where the participant was not comfortable speaking English, the community researcher was responsible for translating questions, ideas and concepts between the participant and I. While interpretation was entirely necessary for the purpose of this project, it is important to acknowledge how the flow of words and lexical differences between cultures influenced the study. For instance, interpretation meant that I was removed from directly accessing the information I was seeking from participants. This forced me to rely on the community researcher's interpretation of their

responses. Thus while I was generally able to understand what people were communicating to me through the interpreter, I often felt that there was a chance I may not have been grasping some of the hidden meanings and nuances in people's statements.

Another issue that emerged from the cultural and language differences in the research setting was related to my choice of words in each interview. After conducting several interviews I found that I received different responses to similar questions depending on the words I used. For example, I found that people were willing to discuss 'cultural traditions' associated with water, but were reluctant to discuss some of the same issues if they were deemed 'spiritual traditions'. This was largely due to the fact that it is a local cultural norm in the community of Trout Lake for elders to discuss stories and traditions pertaining to water and spirituality. As such, most participants who were not elders felt uncomfortable responding to a question about 'spiritual traditions'. Learning about these types of cultural norms and consciously ensuring that I am respecting them throughout the research process was challenging.

Different cultural concepts of time and scheduling also affected the research. In the community of Trout Lake, livelihood activities (e.g., fishing, hunting, trapping) and daily schedules were always being adjusted based on changing weather conditions. For example, fishers would wait until a time when the lake was calm, and then immediately decide to go fishing, regardless of other commitments. This made it challenging to schedule interviews in advance, and often resulted in time-consuming efforts to track people down. It also meant that I always had to be prepared to conduct interviews with little notice.

Given the cross-cultural nature of this research it is also important that I reflect on my own positionality in the research process. In some cases I found that the responsiveness of

community interview participants was influenced by my identity as a young, female, non-Aboriginal student researcher in a remote Aboriginal community. However, these influences were not always the same. For example, for some participants it seemed that my status as an outside-student researcher made it difficult for them to relate to me. The differences in personal characteristics between me and many respondents made it challenging to establish a rapport with some participants. In some cases my identity also seemed to take away from my perceived authority. In such cases respondents were less engaged in the interview, eager for the interview to end, and not as willing to share personal experiences or opinions, perhaps due to a lack of trust and confidence. In contrast, some participants saw me as powerful and potentially influential in being able to voice their water-related concerns to Government representatives. Although respondents who perceived me in this way were highly responsive, they tended to focus on discussing their concerns in the community and their feelings of distrust in Canada's political system, regardless of the question asked.

3.5 Chapter Summary

This chapter provided an overview of the methodological approaches used in this research, outlined the various data collection activities, described the data analysis processes and noted important limitations and challenges with the research design. The chapter highlighted the central role that collaboration played both before and during data collection activities in the community of Trout Lake. While the research primarily focused on collecting qualitative data through two different groups of interviews, relevant physical science data pertaining to water quality and quantity information was also incorporated where necessary. Community interviews were conducted in Trout Lake between July and August 2013, whereas the government and policy interviews were carried out during November of 2013 in the city of Yellowknife. Both

groups of interviews were transcribed in Microsoft Word and were coded using NVivo. Codes were applied through multiple transcript readings for both descriptive and analytic purposes. Information collected through the document review were used to corroborate the interview data were required. The following chapter draws on both interview and document review data to provide background information about the community of Trout Lake.

Chapter 4: Community of Trout Lake

This chapter contributes to the first research objective stated in Chapter 1, which is to understand the contextual circumstances and water resource conditions that may impact local water use and perceptions in the community of Trout Lake. The chapter draws on information collected through the document review and community interviews and builds on the case study context briefly outlined in Chapter 1. The first part of the chapter outlines the location of Trout Lake, describes the way of life in the community, and explains its political and economic structure. The latter part of the chapter focuses on water issues in the community, highlighting common water concerns, and summarizing past and current water-based research in the community. Additional information about the broader water policy context in the NWT is provided in Chapter 6.

4.1 Location

Geographically, the community of Trout Lake is located in the Dehcho Region of the NWT along the shores of Trout Lake (Figure 2). The community covers an area of approximately 119 square kilometers and is located about 160 kilometers southeast of Fort Simpson, just north of British Columbia and to the east of Fort Liard (CA & CES 2005). The community's location is unique in comparison to the other five communities in the Dehcho (Fort Liard, Nahanni Butte, Jean Marie River, Fort Simpson and Wrigley) in that it is situated on a lake rather than the Mackenzie or Liard rivers, and because there is no road access – only a winter road that is open for two to three months of the year. The location of Trout Lake makes it one of the most remote communities remaining in the NWT, and with a population of approximately 100 people, it is also considered to be one of the smallest.

While the community of Trout Lake is geographically located along the south shore of Trout Lake, it is important to recognize that the community's primary traditional land use area covers approximately 10,600 square kilometers (CA & CES 2005). According to the oral tradition and the results of MacKay's (2006) archaeological study of the area, people have been occupying and living off the vast lands surrounding Trout Lake for more than 1200 years. Although permanent housing was eventually built in the 1960's to establish the current community of Trout Lake, most community members are still heavily reliant on the Trout Lake traditional land use area for subsistence purposes (i.e., hunting, trapping, fishing). The area is also highly valued for the historic, cultural, and spiritual connections that many community members have with the landscape.

The importance of the Trout Lake traditional land use area is reflected in the many traditional place names that the people use to mark different features or special locations throughout the area. As of 2009, there were a total of 285 traditional place names surrounding Trout Lake (CA & CES 2005). While many of these traditional names represent various physically important locations (e.g., historical fishing locations, historic trap line sites), they also embody many intangible cultural, spiritual and historical values that people associate with the area. The importance of water to the community is particularly evident in the frequency of place names that reference water. Of the total 285 Trout Lake traditional place names, 199 (70%) include at least one term that refers to water, a type of water body (i.e., lake, river, pond, creek, bay), an aquatic species (i.e., fish, beaver), an aquatic feature (i.e., shoreline, reef, island, beach), or a water-based activity (i.e., boating, fishing) (SKDB 2009). These place names and the community's commitment to continue using them in everyday language reflect the central role that water plays in the lives of people living in Trout Lake.

Northern Canada

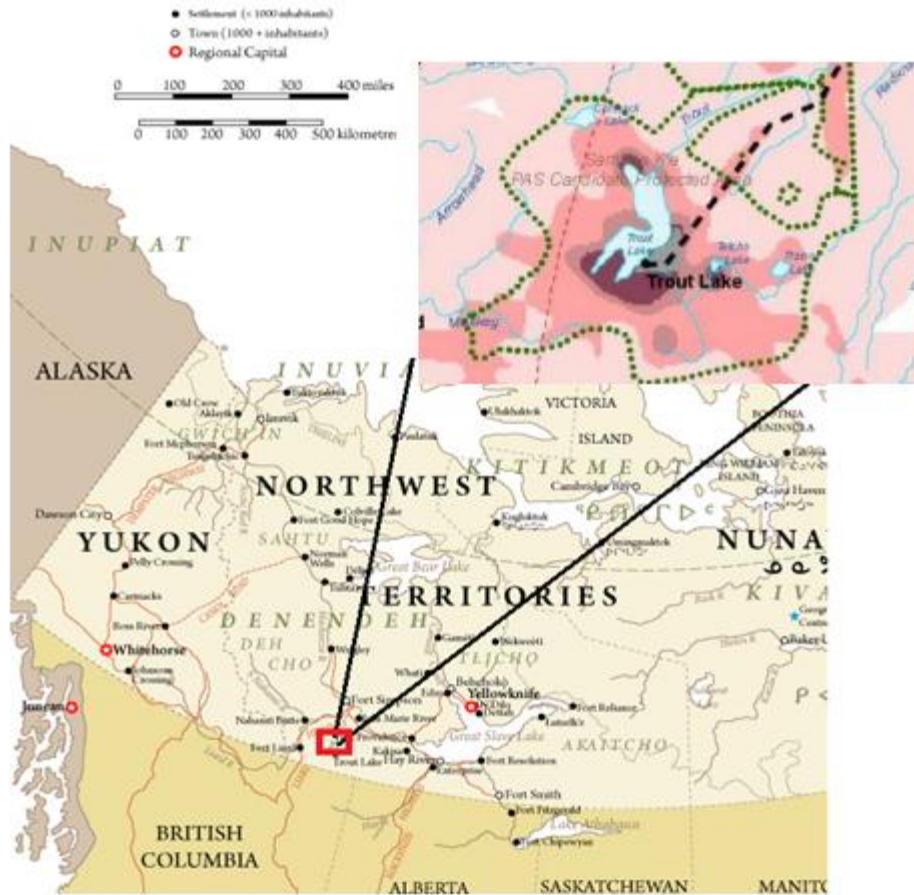


Figure 2: Map showing the location of the community and traditional land use area of Trout Lake (Adapted from SNES Consultants Limited 2011; and Deh Cho Drum, n.d.)

4.2 Way of Life

The remote location and small population of the community of Trout Lake are two factors that contribute to making Trout Lake one of the most traditional communities remaining in the NWT where subsistence land use activities are continued by most people. The community has a strong socio-cultural attachment to the land and most of the community still relies to a great extent on subsistence fishing, hunting and trapping activities. Common traditional foods consumed in the community include moose, woodland caribou, grouse, porcupine, beaver, trout, pickerel, duck,

geese, and several types of berries. Traditional foods are rarely bought or sold within the community as it is common practice for community members to share their harvests with others in the community (CA 2009). It is also customary for people in Trout Lake to offer tobacco and say a short prayer to give their gratitude and respect for the land and water resources on which they depend. Hunters often offer tobacco to the land after harvesting an animal for food, while boaters and fishers typically feed the lake with tobacco and offer a short prayer to assure their safe return.

Drinking water is delivered to community households three times per week from the local water treatment facility. The facility draws water from Trout Lake throughout the year and stores it in an outdoor reservoir before it is put through a chlorination process for treatment. Despite this service, many elders and young people prefer drinking water from traditional land-based sources, including muskeg water, snow or ice water, rain water, and water directly from the lake or local streams.

People in Trout Lake take pride in their strong land skills and traditional values. Elders' knowledge and skills are highly valued in the community and it remains traditional practice for elders to pass their wisdom on to younger generations through stories, legends and land-based activities. Most traditional stories make reference to one of the many water bodies or geographical features in the Trout Lake area that are highly valued for their historical, cultural and spiritual meanings. Many sites are still visited for personal healing and cleansing purposes today.

Livelihood activities, such as hunting, fishing and trapping, are one of the main sources of income for people living in Trout Lake. There are also skilled craftspeople in the community

who make and sell traditional clothing, snowshoes, drums, and a range of artistic crafts such as birch bark and spruce root baskets. The number of permanent employment opportunities in the community is fairly limited as only the community band office and the Samba K'e Development Corporation (SKDC) offer full-time positions. However, there are occasional seasonal positions, such as forest fire control, construction, and tourism guiding. The SKDB ensures that all families have an equal opportunity to earn some employment-based income by providing job sharing activities for these seasonal positions. This type of system is preferred by most community members because it still allows subsistence harvesters time to practice traditional land-based activities (i.e., hunting, fishing, trapping).

The traditional dialect in Trout Lake is South Slavey. Relative to many other Dehcho communities, South Slavey remains strong in the community, and is most often spoken by elders, frequent land-users, and middle-aged parents. However, the community appears to be experiencing a language shift as English is now the most common language spoken by the community's younger generation.

4.3 Political and Economic Structure

The SKDB is the designated authority for the community of Trout Lake under the Dehcho First Nations (DFN) government. The band serves as both a First Nation and a municipal government and receives core funding from AANDC at the federal level, and from the Department of Municipal and Community Affairs (MACA) at the territorial level. The SKDB consists of a chief, four councillors, and one elder and one youth representative. Community meetings are held as needed to discuss and debate issues related to lands, traditions, planning, resource development and other governance matters. Although not listed as formal band member

representatives, elders are expected to play an active role in advising on community decisions. In terms of staff, the SKDB consists of a band manager, a chief, a financial manager, a receptionist, a municipal foreman and truck driver for water, sewage and garbage services.

The SKDC is the economic body of the SKDB responsible for helping the community to create and maintain a healthy local economy that reflects traditional and cultural community values. Current priorities for the SKDC are to expand the Trout Lake Lodge to increase community tourism, develop the community's art and crafts and retail sector, boost local involvement in the management of the winter road, and improve the local store. These priorities reflect the community's resistance to relying on non-renewable resource activities for economic development (see section 5.1.4).

At the regional level, Trout Lake is currently engaged as a member community in the Dehcho Process, which is a claims-based negotiation process about land, resources and governance between the DFN, the federal government, and the GNWT. Negotiations have been ongoing since 1999. In 2001 all parties signed an Interim Measures Agreement to clarify the role of the DFN in resource management decisions in the Dehcho while negotiations continue. These measures remain in place, and a draft Dehcho Land Use Plan (Dehcho Land Use Planning Committee 2006), has been developed and is currently under revision. Community consultation is a key component of the revision process that has been ongoing in the community of Trout Lake (CA & CES 2005). Many community members have used the consultation process as an opportunity to express their desire to protect their traditional land and waters and to communicate some of their main concerns with development. Chapter 6 provides a more detailed overview of the water policy context in which this research is situated.

4.4 Community Water Concerns

The community of Trout Lake is particularly concerned about the impacts that industrial and municipal activities may be having or will have on the water resources in their traditional land use area. Although Trout Lake community respondents expressed a range of water concerns, the majority (85%) relate to one or more of the following four sources of impacts: oil and gas exploration and extraction; historic industrial waste; community waste and spills; and climate change. A more detailed summary of community water concerns is provided in Table 4 to demonstrate the diversity of concerns. The table categorizes respondents' concerns into four primary areas of concern, including water quality, which was the most frequently mentioned type of concerns, followed by aquatic species health, water quantity and other concerns.

Table 4: Summary of Community Water Concerns

	<i>Concerns</i>	
Water Quality	<ul style="list-style-type: none"> • Community fuel spills and leaks • Lack of water monitoring near pipeline • Sewage lagoon contamination • Acid rain • Fish disposal on shore • Increasing algae cover • Increasing water temperatures 	<ul style="list-style-type: none"> • Global air pollution • Garbage along lake shores • Waste from historic camp and drilling sites • Potential for future seismic and fracking activities • Imperial oil pipeline contamination from leaks and corrosion
Water Quantity	<ul style="list-style-type: none"> • Community's overconsumption of water • Extraction of drinking water for commercial sale 	
Aquatic Species Health	<ul style="list-style-type: none"> • Less frequent fish runs • Non-sustenance overfishing • High mercury levels in fish • Other contaminants in fish 	<ul style="list-style-type: none"> • Loss of second fish runs • Declining fish populations • Declining animal health due to water contamination
Other	<ul style="list-style-type: none"> • Cumulative impacts from many sources • Climate change impacts on water ecosystem 	

4.4.1 Oil and Gas Exploration and Extraction

The environmental impacts associated with previous and potential future oil and gas development activities are a primary concern in the community of Trout Lake. Community members are especially worried about the surface water impacts of the Imperial Oil (formally Enbridge) pipeline that was built through Trout Lake traditional lands, from Norman Wells, NWT to Zama, Alberta in 1985. The pipeline is buried underground and runs near Trainor Lake, which is an area that many community members described as an important subsistence fishing and hunting location prior to pipeline construction. Several respondents (63%) indicated that they are worried about the possibility of the pipeline leaking and contaminating local waterways, particularly those that flow towards the community and empty into their main fishing and drinking water resource – Trout Lake (Interviewee A and B). Additional concerns about the pipeline are specifically related to surface water quality impacts of the pipeline and declining animal health. Harvesters and elders are reporting dramatic declines in local animal health conditions and population sizes (i.e., fish, beaver, birds) that they believe are linked to water contamination from a pipeline leak or exploratory drilling activities (Interviewee C, D and E).

People in Trout Lake also expressed concerns about the lack of trust they have for the information they are given from outside sources (i.e., GNWT, Imperial Oil) regarding the condition of the pipeline. Community members indicated that they think the pipeline is unsafe and contaminating local water ways despite consistently being told that the pipeline is in good condition and not in need of repairs. These concerns are largely driven by observations from local harvesters and elders who reported seeing signs of erosion, leaks and corrosion around the pipeline. Some respondents (30%) indicated that they feel that the pipeline should be monitored

more frequently, and that it should be conducted by an external environmental monitoring body rather than Imperial Oil (Interviewee E and F).

The uncertainty associated with potential future oil and gas exploration and extraction activities in the Trout Lake traditional land use area is another concern in the community. The majority of the Trout Lake traditional area is considered to have “very high” hydrocarbon potential and community members are worried about the possible surface water impacts and associated wildlife implications that additional development activities may have on the area in the future (CA and CES 2005). The recent hydraulic fracturing activities and shale gas facilities being developed in Alberta and British Columbia were also mentioned as a growing water quality concern in Trout Lake. Some community members described their concerns about the impacts that the hydraulic fracturing activities in southern provinces are going to have on their water and land, while others indicated they are more worried about future hydraulic fracturing developments occurring in their traditional land (Interviewee A and G).

4.4.2 Historic Industrial Waste

Trout Lake community members also shared concerns about the potential environmental impacts of historic industrial waste products left from several sources. Many concerns relate to water quality changes due to contaminants leaking from hazardous waste that was left at an old WWII U.S Army Air Force outpost along the shores of Trout Lake, near the community lodge. When the outpost was operational fuel drums were regularly flown over Trout Lake and dropped at the site to fuel large diesel generators. There are reports that several fuel barrels burst on impact, while others fell to the bottom of the lake (Lafontaine 2012). According to SNES Consultants Limited (2011), the findings of a GNWT-led Archaeological study revealed that in addition to the old fuel barrels, the area also contains additional hazardous materials such as buried batteries,

cans, and a small dump of anthracite coal. Water contaminants from these materials were often mentioned as a source of concern for water quality and fish health in the community. Community members also indicated that they are concerned about the abnormal physical changes they are continuing to observe in the water and fish species near the old army outpost (Interviewee A and H).

4.4.3 Community Wastewater and Spills

The community wastewater facilities in Trout Lake are another area of water-related concern among community members. Wastewater in the community is trucked to the local sewage lagoon three times per week where it is left to be filtered through the muskeg and occasionally decanted. Most concerns regarding wastewater in the community are related to the close proximity of the sewage lagoon to local water waterways and the potential for surface and ground water leaching and contamination. Other concerns were linked to the limited capacity of the sewage lagoon and fears about the safety of the decanting process in terms of water contamination risks (Interviewee A, E, G and I).

The sewage lagoon in Trout Lake has been a longstanding concern since the early 1990's when several water monitoring studies indicated that the lagoon was likely the source of a water contamination event that exposed many people to skin rashes and caused many fish to die (Lafontaine 2012). A study by INAC in 1991 (now AANDC) reported that total coliform counts were above acceptable limits at all seven sites tested, and that the source of bacteria was likely human rather than animal (Swyripa et al. 1993).

Recent fuel spills also raised concerns about water contamination in the community. In May 2008, 10,000 litres of diesel leaked from the local power station's fuel tanks and spilled into

drainage ditches throughout the community and onto the frozen surface of Trout Lake (CBC News 2008). Despite clean up efforts to remove the contaminated soil, community members reported that it is still a concern and that they no longer use the area because they feel the health risks are too high (Interviewee I and J). Community members also spoke of another spill that occurred from a fuel transport truck during the winter of 2011-2012 while travelling on the winter road. The concerns with this incident are that the spill was not dealt with properly and that additional monitoring activities along the impacted waterways are needed (Interviewee K).

4.4.4 Climate Change

Although not mentioned as frequently as other concerns, some respondents (20%) indicated they are worried about the impacts of climate change on lake water quality and fish populations. There are specific concerns about how increasing global temperatures are affecting water temperatures, water levels and fish health in Trout Lake, and how these trends may continue into the future. Observations of changing water temperatures and reported increased sightings of dead fish in Trout Lake are the primary basis for these concerns. Others also raised questions about how increasing global temperatures might be disturbing aquatic species populations and causing unusual weather events (Interviewee B and L).

4.5 State of Water Research and Knowledge in Trout Lake

4.5.1 Existing Water Research in Trout Lake

Several water research and monitoring programs have been developed and implemented in the community of Trout Lake in response to increasing concerns about the health of their waterways. Some of these programs are designed in accordance with western science-based water research and monitoring, while others are more community-based and aimed at documenting traditional

knowledge about water. Together, these different types of water monitoring activities have helped to generate a breadth of information about the state of water in Trout Lake. This information is central to help address some of the community water concerns discussed in the previous section. Table 5 provides an overview of the community- and government-led programs the community of Trout Lake has been involved in since the early 1990's.

Table 5: Summary of Previous and Current Water Research Activities in Trout Lake

Time Period	Program Name	Program Description
<i>Community-led programs:</i>		
Ongoing	Dehcho AAROM Community-Based Fish Monitoring Program	<ul style="list-style-type: none"> • SKDB is working with Dehcho AAROM to identify and address community water concerns, and develop a fish monitoring program geared towards addressing community concerns • So far the program has focused on monitoring activities in Trout Lake, such as wildlife and bird population counts, lake temperature profiles, and harvest counts
2012 – Present	WLU Water Quality and Wastewater Impact Assessment	<ul style="list-style-type: none"> • SKDB is working with WLU geochemist, Dr. Scott Smith, to assess the impact of municipal sewage lagoon and decanted waters on the surrounding water bodies • Samples have been sent out to be analyzed for the presence of sewage • Additional daily samples are being collected and tested for pH, dissolved oxygen, sediment, conductivity, and temperature
2012	AAROM & Environment Canada's Trout Lake Sediment Core Analysis	<ul style="list-style-type: none"> • SKDB partnered with Dehcho AAROM to gather sediment cores from Trout Lake to analyze composition of sediment layers within the core over the past 500 years • Budget reductions at Environment Canada has created some uncertainty with whether the cores will be analyzed
2011 – Present	Sambaa K'e Municipal Water, Wastewater & Waste Management Practices and Monitoring Program	<ul style="list-style-type: none"> • SKDB is working with Ecology North to develop a community watershed protection plan • In 2012, the community focused on developing a monitoring program for source water quality • Four sites of concern were identified and a plan was developed to assess the water quality at each

2010 – Present	GNWT-ENR and Dehcho AAROM Water Quality Monitoring	<ul style="list-style-type: none"> • SKDB is working with GNWT-ENR and Dehcho AAROM to carry out a water monitoring program with Trout Lake monitors • Water testing for several parameters (pH, dissolved oxygen, sediment, conductivity, and temperature) is done daily at four sites
2006 - 2012	Protected Area Strategy Assessments	<ul style="list-style-type: none"> • Several assessments were conducted as part of the Trout Lake Protected Area Strategy process. Those that involved water research to water include: <ul style="list-style-type: none"> o An ecological assessment o Renewable resource assessment o Socio-economic assessment o Traditional knowledge study
<i>Government-led programs:</i>		
1991 – Present	AANDC’s Northern Contaminants Program	<ul style="list-style-type: none"> • Trout Lake has also been a part of the Northern Contaminants Program which aims to address community concerns related to increased levels of contaminants in commonly harvested wildlife species • The program provides funds for research projects on human health and environmental contaminants monitoring
1995 – Present	NWT Drinking Water Quality Database	<ul style="list-style-type: none"> • Trout Lake is one of the many communities where GNWT MACA samples drinking water for several concentrations (i.e., alkalinity, turbidity, several nutrients, organics, minerals and ions, metals) • Five locations around the Trout Lake community are tested monthly

Most of the programs listed in Table 5 are linked to scientific studies aimed at measuring water quality, water quantity and fish health parameters in the Trout Lake traditional area. A summary of the parameters studied, along with the associated study location and time period is provided in Table 6. Although there is not a complete database that compiles all of the data pertaining to the parameters listed, Lafontaine (2012) has summarized specific results. Given that is it beyond the scope of this thesis to review all of the original data, the following section focuses on providing an overview of significant conclusions and findings from past water research results near the community of Trout Lake.

Table 6: Summary of Available Water Quality, Quantity and Fish Health Data in Trout Lake

Parameters	Location	Time Period	Source
<i>Water quality parameters</i>			
pH, dissolved oxygen, secchi, conductivity and water temperature	Trout Lake	2010 to present	SKDB and AAROM
Turbidity/sediment levels	Island River, Moose River, Trout River	2010 to present	AAROM
Sediment deposition	Trout Lake (close to community)	2012 (cores can be analyzed for sediment deposition over the past 500 years)	AAROM and Environment Canada
19 parameters: physical, microbiological, total metals and nutrient	Trout Lake, Island River	1990 to 1991	INAC (now AANDC)
pH, turbidity, colour, conductivity	Trout Lake	1992	Lee Maher Consulting
34 parameters: physical, nutrients, major ions, total metals, fecal coliform and phenols	Trout Lake	1993	Vista Engineering
19 parameters: physicals, nutrients and total metals	Trout Lake	1993	M.M. Dillon Ltd.
21 parameters: chemical, physical, metals, major ions and nutrients	Trout Lake (at water intake)	1995	MACA
pH, water colour, nutrient levels, conductivity, phenolic, total recoverable hydrocarbons, total metals	Trainor Lake	2004	Mackenzie Gas Project water license application
31 parameters: physicals, nutrients, major ions, microbiology, total metals, and cyanide	Rain and snow water from house containers and community muskeg hole	2011	Ecology North
<i>Water quantity parameters</i>			

Longitudinal water flow	Trout River	1969 to present	Environment Canada Water Office Data Base
Water level	Island River	1990	GNWT Department of Public Works
Lake depths	Trout Lake	2009	Dehcho AAROM
Groundwater depths	Various locations within 5 km of the community	1995	SKDB
<i>Fish health parameters</i>			
Mercury concentrations in lake trout and yellow walleye	Trout Lake	1977, 1990, 1991, 2003, 2008, 2011, 2012	AAROM
Baseline fish species documentation	Trout Lake, Island River, Moose River, Poplar River, Cornmack Lack, Tetcho Lake, Trainor Lake	Early 1970's	Original Mackenzie Gas Project Proposal

Source: Adapted Lafontaine (2012)

4.5.2 Significant Findings

During the summer of 1989 many Trout Lake community members reported seeing a large number of dead fish floating in Trout Lake, while others indicated that they were experiencing skin rashes after swimming in the lake. These concerns prompted several water quality and fish health studies in Trout Lake, including the Trout Lake Water Quality Study that INAC (now AANDC) conducted in 1990 (Swyripa 1993). The study found several sites in Trout Lake to have high levels of iron and bacteriological parameters that exceeded Canadian Water Quality Guidelines and Guidelines for Canadian Drinking Water. In fact, total coliform count levels were above guidelines in all seven sites tested, with especially high levels at the Island River and Moose River locations (Lafontaine 2012). Similar studies conducted the following year in 1991 reported that the community's sewage lagoon and landfill site were likely the

source of the bacteria that caused the contamination. Subsequent studies conducted by INAC showed that bacteria concentrations declined overtime and the water was deemed safe to drink (Swyripa et al. 1993).

However, the results from the INAC studies were enough to make the GNWT decide to relocate the landfill and sewage lagoon in 1993. Despite the relocation, samples collected in 1994 again tested positive for fecal coliform bacteria. Results indicated that the sewage lagoon and individual pit privies were likely the source of the bacteria (Lafontaine 2012). The samples also showed high levels of turbidity and iron, which were attributed to nearby muskeg and swamp drainage carrying organic materials into Trout Lake.

Additional water quality tests were performed on the Trout River in 2002 as part of the Environmental Impact Statement for the Mackenzie Gas Project. Most parameters were found to be normal, with the exception of turbidity and total aluminum levels which exceeded the drinking water guideline.. In 2004, similar water quality tests were done in Trainor Lake as part of the Mackenzie Gas Project water license application (Mackenzie Gas Project 2005). The results indicated that all parameters were within guideline limits except for colour, cadmium and chromium, all of which were above the Canadian Council of Ministers of the Environment (CCME) guidelines for freshwater aquatic life (Lafontaine 2012).

In 2004, high algae levels were reported by both traditional knowledge and scientific-based studies. A traditional knowledge study in 2004 reported that community members were observing a correlation between higher algae levels in Trout Lake, and warmer water temperatures, longer ice-free seasons and lower water levels (SKDC 2004). These observations were consistent with results from two studies – one conducted by GNWT Public Works and

Services and one by Vista Engineering – that reported seasonal problems with algae blooms in Trout Lake during the summer. The algae blooms were blamed for contributing to ongoing problems with water colour, turbidity, iron, and poor taste reported by Trout Lake community members (Lafontaine 2012).

The results from several fish mercury studies conducted in the community of Trout Lake between 1977 and 2012 showed increasing mercury concentrations. In 2008 mercury concentrations in lake trout and yellow walleye caught in Trout Lake surpassed the higher commercial sale guideline of 0.5 µg/g (Low 2007). This prompted GNWT Health and Social Services to issue a consumption advisory for lake trout and yellow walleye caught in Trout Lake (Bell 2010). Subsequent studies conducted in 2011 showed declining mercury concentrations, although close to half of those sampled remained over 0.5 µg/g.

Since 2010, Dehcho AAROM and the SKDB have been working together to collect water temperature data for Trout Lake. The results indicate that the water temperatures at the bottom of the lake are well above the expected normal of four degrees Celsius. Higher than normal temperatures at the bottom of the lake reduces the summer habitat for lake trout, which are cold-water fish (Low 2011). This is particularly worrisome for the people in Trout Lake because they depend on lake trout for a large portion of their diet.

4.6 Chapter Summary

This chapter expanded on the case study context discussed in Chapter 1 to provide a more detailed overview of the community of Trout Lake and the contextual factors that may impact community members' perceptions about water. The chapter began by providing background details of the community, including location, way of life, and political and economic structure.

Trout Lake is considered to be one of the most traditional communities remaining in the NWT as most people share a unique relationship with their surrounding landscape and the natural and spiritual resources that it embodies. Most community members continue to rely on sustenance fishing, hunting and harvesting activities, although some seasonal employment is available through the SKDB.

The latter half of the chapter focused on water concerns and water research in the community of Trout Lake. The chapter highlighted a number of concerns that community members expressed with regards to water quality and aquatic ecosystem health in their traditional land use area. Oil and gas exploration and extraction, historic industrial waste, community waste and spills, and climate change were among the most commonly mentioned water concerns. The final section of the chapter provided a brief summary of the water-related research programs that have been implemented in the community of Trout Lake to address some of the community's concerns.

Together, the contents of this chapter provide the background contextual information necessary for the subsequent chapters to build on. Chapter 5 will present the findings from applying social well-being approach to understand community water values in Trout Lake. Chapter 6 will discuss the relevance of the Trout Lake water value information in helping to improve NWT water governance as articulated by government and policy interviewees, while Chapter 7 will provide a summary of the thesis.

Chapter 5: Social Well-being and Water Values in Trout Lake

This chapter contributes to addressing the second research objective of using a social well-being lens to examine the tangible and intangible values that people associate with water resources in the community of Trout Lake. Results from the 28 community interviews conducted in Trout Lake are presented based on respondents' perceptions of the importance of water to each of the three social well-being dimensions outlined in Chapter 2 (i.e., material, relational and subjective). Although the three dimensions are highly interconnected and often overlap, for the purpose of this chapter they are presented independently. Dividing the interview results into broad sections pertaining to community members' insights and ideas about how they connect with water for each social well-being dimension is important in order to effectively unpack the myriad ways in which water is valued in the community. Figure 3 at the end of the chapter provides an overview of these values according to each social well-being dimension. Additional insights about the primary strengths and challenges associated with using the social well-being approach in the context of water valuation are provided in Chapter 7.

5.1 Material Well-being

As described in Chapter 2, the material dimension of social well-being considers the physical requirements of life that people need to live well. Based on the social well-being framework described in section 2.4, the key parameters associated with this dimension include environmental quality, livelihood activities, physical human health, and income and wealth. This section draws on Trout Lake community members' perceptions of how water relates to each of these key material well-being parameters to better understand the material values they associate with water.

5.1.1 Environmental Quality

The interdependencies between water, environmental quality, and human well-being are well recognized (Dasgupta 2001) and highly valued in the community of Trout Lake. Community members frequently spoke about their strong dependence on having access to healthy ecosystems and the range of services they provide, including food, climate regulation, disease control, and natural filtration. Water was often described as the ‘blood’ of the natural environment that enables ecosystems to maintain their structure and functionality. Although there are other resources important for sustaining healthy environments, respondents described water as the most critical because of its life-providing capabilities that are essential for ecosystem health.

When asked to elaborate on the importance of the linkages between water, environmental quality and their own pursuit of well-being, respondents explained that water provides them with both direct and indirect benefits that contribute to their ability to live well. In terms of direct benefits, respondents spoke about the critical supporting role that water plays in creating a habitable environment for themselves and the animals on which they depend.

Water is important. It doesn't matter where. It's important for all living things on earth. All the people and all the animals. We depend on the water and everything it does for us to live. Without water we have nothing. We are nothing without it. We have to protect it. (Interviewee N)

The rivers are like the blood veins of the whole environment. If anything goes wrong with the water, then all the animals and land are affected everywhere. The whole ecosystem will crash. It will hurt everyone. (Interviewee B)

In terms of indirect value, respondents explained that water plays a central role in supporting healthy ecosystems as a precondition for other material benefits that they gain from water. These benefits, which are described in further detail below, are mainly related to livelihood activities, physical human health, and income and wealth.

5.1.2 Livelihood Activities

Many respondents (86%) described hunting, trapping and fishing as important livelihood activities central to living well in the community of Trout Lake. Respondents explained that their longstanding dependence on these activities continues for several reasons. One primary reason is the dietary importance of being able to access traditional country foods (see section 5.1.3). Another reason is the cultural and social significance of hunting, trapping and fishing in the community. These activities play a key role in enabling community members to maintain social and family relationships, as well as their cultural identity (see section 5.2) and traditional way of life.

Although there are a number of factors that influence community member's ability to participate in these livelihood activities (i.e., access to fuel, gear, transportation, weather), water was often described as the most influential. Respondents described three primary ways in which water impacts their ability to fish, hunt and trap. Some spoke about the critical role that water plays as the life-giving entity that sustains the wildlife resources on which they depend. Respondents explained that their quality of life would suffer substantially if something happened to the water because there would not be any fish or wildlife to harvest.

Everyday we use water even if we don't think about it. We harvest fish, beaver, muskrat, ducks to eat and they all need water. They live on water and we live on them. We crave it. It is our way of life. If it is taken away, then nothing about us will ever be the same. (Interviewee B)

Others spoke about the important role that waterways play in providing transportation routes that enable them to fish, trap and hunt. In some cases waterways are used as a direct means to access fishing, hunting, and trapping areas via boat or snowmobile. As one person explained "We go boating all the time to hunt for moose and anything I can't get from land, beavers too. That's how we survive" (Interviewee E). In other cases waterways are used to transport camp

equipment, gear and materials that are required to set up fishing, hunting or trapping camps. For example, one person indicated that “for fishing and trapping camps and stuff it is usually along rivers and lakes because it is easy access for groups of people to transport large amounts of camping gear and stuff” (Interviewee F). The significance of waterways to local hunting strategies was also discussed. Community members explained that during certain times of the year, there are some animals that are attracted to specific river and lake environments that hunters and trappers rely on as indicators of animal activity and location.

Everything is related to water. Like when they [hunters] are going somewhere, they wouldn't go straight into the bush they would find water. Because the animals go to the lakes and stuff like that so they [hunters] check out all the lakes when they go hunting. Like in the fall time when they go hunting, they would scout out the lakes and see if there are any signs or anything that tells them that moose is around there and then that is how they do their hunting. They go to one lake and if they see no anything like in the tracks or anything around the lake then they just go to the next one and that's how they do it. [Interviewee S]

5.1.3 Physical Human Health

Physical human health is another key parameter of material well-being that community members described as water-dependent. Respondents explained that there are several factors that affect their physical health while living in the community of Trout Lake, many of which are directly tied to water quality and quantity. The importance of healthy waterways for supporting traditional food sources was the most frequently mentioned factor, followed by the importance of clean drinking water for human hydration, and in the growth and processing of many medicinal plants. Although this section highlights respondents' views on the relations between water and their physical health, it is important to recognize that health is viewed as a holistic construct that also includes emotional, mental and spiritual aspects. These additional aspects of health and their relation to water are described in more detail in section 5.3.

5.1.3.1 Traditional Food

For the people living in Trout Lake, consuming traditional foods is fundamentally important for human health. Several respondents (55%), particularly elders, explained that traditional foods are far healthier than store-bought foods because traditional foods provide more nutrients, contain less fat and sugar, and have no preservatives or additives in comparison to processed ‘market foods’. When asked about the role of water in supporting a traditional diet, respondents indicated that water quantity and quality are critical factors impacting the availability of traditional foods. In their responses, community members described both direct and indirect links between water quantity and quality, traditional foods, and improved human health.

The direct links community members spoke about referred to the traditional foods that community members harvest directly from local waterways and wetlands. These include several different species of fish (i.e., burbot, trout, walleye, suckers, northern pike), ducks, geese, and beavers. Given that these species require an aquatic habitat to live, there is a clear link between their health, and the quality and quantity of the water they live in. Consequently, community members’ dependence on these species as a traditional food source also makes community members dependent on water quality and quantity for traditional foods. One elder compared the high value that Trout Lake community members associate with water as a source of food to the lack of respect that is given to water in southern Canada, where few people rely on water for food:

In the south there is all this damage to the water, pollution, bad water quality. They don’t need it for food. We depend on the animals up here, and depend on them for traditional food. That’s why water so important, that’s where we get our traditional food from and we need it. (Interviewee E)

The indirect links that Trout Lake community members discussed with respect to water, traditional foods, and improved human health referred to the habitat provisioning and biological

support services of water that enable other traditional food sources to thrive in the Trout Lake area. These sources include moose, caribou, grouse, porcupine, and several types of berries.

Many respondents explained that although these species are not aquatic animals, they still require ‘healthy’ water to live. Many respondents (85%), such as Interviewee H (below), described how their dependence on these food sources also makes them indirectly dependent on the water these animals need to live.

Everything lives by water, not just people. Whatever animals around here that we depend on for food need water to live... Because if our animals drink something that is contaminated it is going to carry down to us through ducks, rabbit, and whatever we eat... moose, caribou (Interviewee H).

Community members explained that these links between water, traditional foods and human health are one of the main reasons why they are concerned about environmental changes impacting their local waterways. Respondents indicated that they have already observed many changes in the water that are affecting the availability of important traditional foods. For example, one elder explained that

[her] son noticed in the winter that there are lots of ponds in the area that used to have lots of beaver houses and winter feeding places. But now there is nothing. No signs of beaver, no winter feeding sights. The beaver habitat is declining. In the Island Lake area where my brother in-law goes in the spring and the fall, he noticed the same thing. There are so many dried up points and stuff. I think it is from the oil and gas. And we use and rely on beaver for our food. So we are losing an important food source. (Interviewee D)

Others who shared similar observations voiced serious concerns about the human health impacts they may face if this type of trend continues into the future and they are forced to rely on store-bought foods (Interviewee S).

5.1.3.2 Drinking Water

Community members also spoke about the importance of clean and abundant drinking water for their long-term health. When asked about the role of water in human health, many

respondents described water as a resource that their body requires to function, and thus is something they cannot physically live without. As Interviewee M explained,

Water is very important because without water you cannot live. Without groceries maybe you will live for 20 days. But without water you cannot live at all. It has got to be healthy to keep you healthy because it goes through your system... That's how important the water is.

Other respondents (40%) alluded to this same idea about a person needing to drink 'healthy' water in order to be a healthy person. For example, in reference to drinking water, one respondent stated that "if it continues to be healthy, I will continue to be healthy" (Interviewee N). Another person questioned how a person can be healthy if their drinking water is not healthy: "well if the water is not good how can a person live and be healthy, right?" (Interviewee L).

The source of the water was the main variable that people used to assess the healthiness of water for drinking (i.e., naturally sourced water, treated tap water, bottled water). Natural drinking water sources such as lake water, muskeg water, rain water, and snow water were often described as healthier than treated or bottled water. Healthiness was one of the main factors influencing many community members' preference to collect and drink naturally sourced water rather than consume treated tap water or bottled water. Natural drinking water sources were most often associated with good health, whereas the treated tap and bottled water were commonly linked to sickness.

All these years, we get snow water, lake water, rain water and stuff like that as an everyday thing. We have been doing that for so many years, until today even, and never come across any sickness or stuff like that. Drinking lake water never caused any sickness and stuff like that. In fact it keeps us healthy. Drinking the water from snow doesn't cause any sickness either. (Interviewee X)

Even when they put in the water reservoir, you can taste the old water smell from it. It isn't healthy and people, some of them, they get stomach aches and stuff" (Interviewee J).

The reservoir has no fresh water in and out like a stream. So no flow, just settled there. Algae. Doesn't look like healthy water to drink so don't drink it. Prefer muskeg water that's more fresh and healthier than reservoir. (Interviewee Q)

5.1.3.3 Traditional Medicine

An interesting link between physical health, water and traditional medicinal plants was also identified by respondents (see Alves and Rosa 2007). Many traditional plants are still used in the community to treat common ailments and symptoms associated with chest colds, headaches, tooth aches, stomach aches, sore throats, fevers, diabetes, and vomiting. According to respondents, medicinal plants play an essential role in helping people to maintain a healthy life while living in Trout Lake. When asked about the relationship between water and traditional medicines, community members described two primary links.

One of the main links they described was related to the importance of healthy waterways for the survival of aquatic medicinal plants such as rat root (*Acorus calamus*). For example, one elder acknowledged that “without water we wouldn’t have traditional medicines. Everyone in the community shares traditional medicine from the water. Especially rat root. It grows along the lake in swamp areas”. (Interviewee E). Rat root was the most frequently mentioned water-based medicinal plant that community members continue to rely on to treat a variety of physical health problems. Community members also explained that healthy water is an essential ingredient required to make the traditional plants they harvest into a medicinal tea. Respondents explained that this is typically done by boiling parts of the traditional plant in water collected from a natural source (i.e., lake, muskeg, snow water or rain water). One community member described this process with respect to rat root:

It comes from a swampy place. You dig it out and then got to let it dry. Kind of like a long dry stick. And you can just cut in chunks and boil it in healthy water and then you drink it. The stronger the better they say. (Interviewee P).

Others explained that they also depend on water in the same way to make medicinal teas from land-based plants such as willow roots, wild mint, spruce trees, birch trees and wild onions.

5.1.4 Income and wealth

Income and wealth are two additional parameters of material well-being. In many contexts, these parameters are considered to be essential indicators of material well-being, where greater income implies increased well-being (OECD, 2011). However, for the people living in the community of Trout Lake, money is perceived more as an added benefit than a necessity for living a quality life. Community members' perceptions about the use of water to generate an income through industrial development activities and tourism suggest that money is not a primary well-being priority in Trout Lake. Respondents indicated that although industrial development and tourism may help community members earn more income, such activities can also threaten the health of the waterways on which community members depend. All of the community members who were interviewed agreed that the health of the water is more important than money, although respondents did express slightly different views with respect to the degree of acceptable risk to the water.

Some respondents indicated that because they value the health of the water more than money, they are opposed to any economic activities that may contaminate their waterways. Most people spoke specifically about their feelings related to the risk of water contamination from industrial development activities. They indicated that the risk of contamination from such activities is not worth the potential economic gain.

I don't like the idea of oil and gas. The water is more important than the money. The money is nothing to us. It is not worth the risk. (Interviewee Q).

Others in support of the same view felt that if they were to allow development near their waterways they would essentially be assigning the water an economic value equivalent to the

potential income that could be through development. They argued that water is too important to their well-being to be reduced to any economic value.

To place a dollar figure on this water here, there isn't a high enough number for it. They could offer me 5 billion dollars and I still wouldn't sign my name on it. (Interviewee U)

You can never put a dollar value on water. I mean once it's gone it is gone. It is like, that's what it is. Once it is gone it is gone. You cannot change it once the damage is done it is done. (Interviewee S)

However, others indicated that they are more open to pursuing industrial development as a viable source of income if it is done 'right'. Perceptions of industrial development done 'right' varied among respondents, but the criteria typically included development that has stricter environmental policies and regulations, is more accepting of input from First Nations communities, is long-term, uses improved technologies that minimize environmental impacts, is located a safe distance from water resources, and adheres to the original agreement and regulations understood by the community. The detail and specificity of these criteria reflect the fact that although these community members are willing to consider industrial development as an economic opportunity, they are only interested in pursuing it if there are adequate safeguards to ensure that the risk of water contamination is minimal. Respondents explained that they feel that some development, if it adheres to the aforementioned criteria, would benefit the community by providing income necessary to purchase the modern goods that they have come to rely on. These goods include boats for fishing and travel, trucks for hunting and travel, fuel for livelihood activities and travel, and income for technologies such as phones and computers.

We need more policy and regulations on oil and gas development and things that are polluting our waterways. We need more environmental protection. Some development is okay, but we need to minimize the impact. We need development to be long term. And we need more balance. We do need some money to maintain ourselves today. We got ourselves into this modern system and we need money to survive. But only some money. So some development is okay if it is done right. (Interviewee B)

We are not against development. But as long as it is done right. When we look at the environment part of it, money will come later. Money is not an issue. But the environment is the main part of it. That is what we live on. We can't eat unless money is at the end. We will starve! We protect the land, it is good for the future generations and that, and then when the money comes then it will come. (Interviewee A)

In terms of tourism, nearly half of respondents (48%) implied that they are highly supportive because it offers a more environmentally sound source of income in comparison to industrial development. For example, when asked about the importance of water in supporting community tourism efforts, one respondent replied:

Yep, through the lodge. That's how we can make our money. And then we can use the money back here, to I don't know, help the community grow. (Interviewee O)

However, others explained that these perceptions are starting to change in response to recent incidents where tourists were found disrespecting the lake and ignoring the cultural water-related rules in the community. Community members referenced an incident where tourists were caught urinating in Trout Lake despite several warnings from community members not to do so. This was perceived as a serious breach of trust between tourists and community members. In another case, the community

found out that the tourists put their late grandfather's ashes in the river, and they didn't tell the community. They didn't get approval from the community before doing that and a lot of people were not happy with that at all because it is big sign of disrespect to the lake. (Interviewee J)

Incidents such as these are making some community members question whether the income from the lodge is worth the risk of tourists damaging and disrespecting the lake. Respondents explained that the community is considering different options for how to address this problem without eliminating tourism services altogether.

5.2 Relational Well-being

The types of relations and interactions that enable people to meet their own needs and live their desired quality of life are captured in the relational dimension of social well-being (see section 2.4). This section examines how water influences the relationships and relational interactions that people in the community of Trout Lake require to live well. The structure of the section reflects the types of relationships that community members identified as important in their pursuit of well-being, including social, cultural and political relations. These also reflect some of the key parameters of relational well-being that emerged from the literature review in section 2.4 (i.e., relations of love and care; networks of support and obligation; social, political and cultural identities; cultural rules and norms; political relations with the state; scope for collective action and influence).

5.2.1 Social and Cultural Relations

Positive social relationships were identified as a key factor impacting Trout Lake community members' ability to live well. When asked to define what constitutes a 'life well lived' in the community of Trout Lake, respondents frequently emphasized the importance of strong family and community relations. Community members explained that they derive strength, security, happiness and a sense of identity from these relations, but rarely differentiated between family and community relationships. This was because the community is primarily made up of three large extended family networks that community members described as feeling like 'one large caring family'.

This blurred distinction between family and community is reflective of the collectivist culture and small population in Trout Lake, where social cohesion and community connectedness are stressed over notions of individualism. When asked to elaborate on the

importance of community cohesion and connectedness in their personal lives, respondents explained that they would feel lost, alone, and weak without their interconnected family and community relationships. Others spoke about the impact that poor social relationships would have on the community. They explained that without strong social relationships, the community would be fragmented and dysfunctional as the interdependent ways that have ensured the survival of their ancestors over multiple generations would be lost or threatened. These findings are consistent with other studies in northern communities which reflect the critical role that cohesion and social relationships play in shaping and supporting such communities (Ensign et al. 2014; Duhaime et al. 2004).

Of particular interest here, however, is the way in which community members identified how water can impact community cohesion and connectedness in Trout Lake. They explained that water physically brings people together; unites people through a common cultural identity; and encourages reciprocity and sharing between community members. These relationships are further outlined in the sections below.

5.2.1.1 Physical Togetherness

Physical togetherness was deemed an important component of positive supportive social relationships among family and community members living in Trout Lake. Respondents described a range of experiences where water was the main medium for bringing people in the community together. These experiences typically included participation in traditional livelihood activities, traditional teachings, and water-based recreational activities.

Water-based recreation activities were the most frequently mentioned way that water helps to bring community members together, and was almost always mentioned first. Community

members explained that during the summer months children of all ages, both female and male, spend a substantial amount of time together water skiing, swimming, tubing and boating. They indicated that the children foster a sense of togetherness and build connections through these activities. However, when respondents were asked to consider other ways that water brings people in the community together, they indicated that livelihood activities and traditional teachings were the most influential on community cohesion over time. Some respondents (22%) explained that when their family practices livelihood activities together on the water they feel more connected to one another and the land.

It brings our family together. The water connects us with the land and our family. We fish together, shoot moose together – we all gather on the water together. We have a strong connection.(Interviewee N)

For me it does. Especially travelling and being all together and travelling on the boat on the water. Yourself and the water connects, like there is a connection and there is a connection with the whole group, with whoever you are with. But that's how I feel. (Interviewee R)

Several respondents (61%) spoke specifically about the role that water plays in bringing together community members during the spring and fall culture camps and community hunts. They explained that these camps and hunts are largely dependent on water resources for harvesting and travel purposes, and thus help to unite people through their common dependence on water. This was often linked to the importance of water in bringing together community members, particularly elders and youth, to teach and learn about water-related traditional skills.

Respondents described many traditional skills that are taught on the water, including a variety of hunting, fishing, ice fishing and dry fish-making skills, and explained that these teaching interactions are critical for strengthening family bonds and making the community feel united as one.

Yea the water helps to strengthen the family and helps with family bonding. You can teach out there and tell them what to do and stuff, lots of things... Whether they are going duck hunting or fishing or if you are at the camp, they are always teaching kids stuff and they are usually on the water for a lot of things. It brings us all together and we have a good life here. (Interviewee X)

5.2.1.2 Cultural Identity

Cultural identity was also described as playing a central role in enabling community members to build positive social relationships with each other and feel a sense of belonging to the community. Respondents explained that water plays an important role both in helping to define and maintain their cultural identity across generations.

In terms of water helping to define their cultural identity, respondents explained that they all share similar relationships with and understandings of water that are difficult for many outsiders to understand. They described their relationship with water as spiritual and symbiotic, where they care for the water and the water cares for them. For example, one community member explained that they treat water like it is part of them.

It is part of our life. Like the wind, sun, moon and stars. Its part of us. For traditions we feed the water with tobacco because we believe the water will take care of us. It will keep us safe from disaster and other bad things. We care about the fish and the water and we want to keep it safe for them too.(Interviewee B)

This relationship of mutual caring between people and water reflects community members' shared understanding of water as an element that is holistic and connected to all aspects of life. Respondents indicated that they derive feelings of social connectedness and belonging from knowing that the rest of the community shares the same relationships with and perceptions of water. These feelings are a result of a collective identity that is supported by the unique relationship that community members share with water.

This collective identity is anchored around a set of water-related norms and rules that teach community members about the importance of respectfully using and caring for water in Trout Lake. For example, it is a cultural norm for community members to offer tobacco to water before travelling across it or after harvesting fish. It is also a known cultural rule that females do not swim in the water when they are on their moon as a sign of respect to the water. Community members indicated that these types of internal social norms and rules about water help to bond members of the community together by linking individuals to a collective cultural understanding about how water should be respected. They suggested that this collective understanding helps community members to generate a sense of belonging through community acceptance when they adhere to these norms and rules. In essence, these shared values and norms act as symbols of a collective cultural identity that unites people in the community and differentiates them from outsiders who are accustomed to different norms and rules about water. This collective identity plays an important role in enabling community members to feel a sense of membership in the community, which is central to the development and maintenance of positive social relationships within it.

Water was also described as being integral to allowing community members to convey their beliefs and values that are central to their cultural identity. Many respondents (36%) specifically emphasized the important role that water-related traditions and stories play as forms of cultural expression. They explained that while these forms of expression help to unite community members in the current generation by fostering feelings of group identity, they are particularly critical to the continuity of their cultural identity across generations. Respondents explained that water-related traditions and stories must be continuously practiced and shared in order to keep their cultural identity and associated sense of community cohesion alive.

All the stories and traditions about it [water] they have been taught must be carried on. I still strongly hold on to that. And pass it on and continue what the ancestors have been doing because it's important. So I do a lot of praying through water and animals. I do it the way I have been taught. Not just for me, but for everybody. So whatever I have been brought up with will be carried on through the future through future generations and our culture will continue. (Interviewee E).

Water is important for family. Stories about water get passed down through families so it helps people connect with ancestors. My ancestors told me about things that I then passed on to my daughter and so on. Water is very important for family. In terms of stories that have been passed down to me... A lot of stories and legends and stuff that have to do with water. (Interviewee A)

However, some respondents (11%) pointed out that because the many norms and rules about water in Trout Lake are incorporated into their customary traditional laws, breaking such laws can put tension on social relationships in the community and detract from peoples' ability to live well. For example, one community member described a case where she was upset by the actions of another community member who was urinating in the water and thus breaking customary laws about how water should be respected. She explained how this situation led to an uncomfortable confrontation between her and the person that was not complying with community norms.

A lot of times I will see some people, especially when the kids go swimming, I look at them and you know, one day I seen one of the little boys urinating in the water and I turn around and I told him that can you just go out on the land or somewhere. It is just that this is our water and the mom was kind of upset with me. But then I told her that this is nothing new. You know.. do you have any respect. I sort of raised my voice but later on I tried to apologize to her but it is very important for our .. What if one day we can't get water... (Interviewee I)

In other cases community elders commented on the increasing number of times they have observed children, particularly females recreating in the water (i.e., swimming, tubing, water skiing, etc.). While some elders have accepted this modern change from the traditional uses, norms and rules associated with water, others perceive it as going against cultural traditions and values. These examples illustrate the importance of recognizing that while water plays an important role in helping to strengthen social relationships through the construction of a unique

cultural identity, it can also strain relationships when there is a clash between the values upon which their cultural identity is built. This social phenomenon is consistent with Oyserman's (2002) work on values that was discussed in Chapter 2. Although not specific to the context of water, Oyserman (2002) explained that while common values can act as the glue that holds groups together, they can also set the stage for friction and lack of consensual harmony when the values of some group members diverge.

5.2.1.3 Reciprocity

Sharing and reciprocity were also described as key action necessary to help strengthen and maintain social relationships in Trout Lake. They explained that reciprocity helps to establish relationships of mutual sharing in the community, where something is given for something taken. Reciprocity in the community of Trout Lake is usually expressed through an exchange of services and material goods, many of which they associated with water. Sharing drinking water and goods harvested from and near the water (i.e., fish, moose and traditional medicines) were the most commonly mentioned acts of reciprocity in Trout Lake.

Nobody sells the fish. We all just share it or give away. Like when we get moose too. We share. We like to give it away to make the other person happy. And it makes us happy to give it to them. Like a family. Some people want money. Not us. (Interviewee G)

Yea.. Some people they collect rain water or melt ice on the lake when there is still ice and some people.. I don't melt my own water, I get it from my grandma's water supply...Everybody usually shares water and fish around here. Nobody ever goes hungry or thirsty, that's for sure. (Interviewee F)

Everyone in the community shares traditional medicine from the water. Especially rat root. (Interviewee V)

Fishing labour was also commonly shared or included in reciprocal interactions in Trout Lake. Most of the subsistent fishing in the community was done by one family who distributed fish to others in exchange for groceries or tobacco.

We just depend on now, like certain people for fishing. Freddy and Clint supplies the community with the fish and that. So it is good for everyone. We all are connected. (Interviewee A)

Community members indicated that when these acts of sharing and reciprocity take place, the people involved in the interaction engage not only in a material transaction, but an important social transaction that helps to create and sustain a continuous connection between them. Respondents explained that sharing and reciprocity are expressions of trust, cooperation, love and care, all of which are fundamental to the maintenance of positive social relationships between people and groups of people in the community. These reciprocal relationships are also central to the structure and functionality of the social system in Trout Lake. These connections are consistent with other social capital-based work that demonstrates the critical importance of social networks (i.e., social interaction between community members, groups of friends, informal interest groups), trust and reciprocity in enabling people to more easily cooperate, communicate and make sense of shared experiences together (see OECD 2002). Reciprocity creates informal social networks of mutual obligation and responsibility that play a foundational role in the community's social structure. Respondents indicated that reciprocity is an important part of their collective culture because it establishes social support networks by making community members obliged to ensuring that other community members' needs are being met. These findings are consistent with other studies that illustrate the importance and centrality of reciprocity in Aboriginal culture (see Hart 2010) and the key role that reciprocity plays in building social capital, and in turn, social well-being (see Putnam 2000).

However, some respondents (11%) indicated that these social networks are starting to collapse in response to changing community norms associated with sharing good harvested from the water. Respondents explained that rather than sharing, which is a traditional norm in the community, people are starting to expect more in return for goods that they provide to others.

One elder suggested that this social shift is likely due to changing water conditions associated with climate change that are making it more difficult to frequently harvest healthy fish. He suggested that community members are responding to these changes by sharing less fish in order to ensure that they each have an adequate supply for themselves.

We always share the fish people catch in the community. It brings us together. With all the water changes from climate change today – that's probably why people are starting to change their way of living too. There is less sharing now. People are starting to expect more stuff in return instead of sharing.

5.2.2 Political Voice

Although community members indicated that their quality of life is heavily dependent on their social relationships within the community, they also mentioned the importance of having an influential political voice on local, regional, and territorial matters that concern them. However, responses about the relations between water, political voice and well-being were quite variable and thus it is difficult to capture a single perspective. This section provides a broad overview of the diverse responses.

Some respondents (18%) specifically emphasized the importance of having a strong political voice to influence territorial and federal decisions about local water resources. They explained that because their quality of life is inherently linked to the state of their water resources, it is critical that they are involved in making and influencing decisions that may affect water in their traditional territory.

Several participating elders indicated that they feel the community's voice on water issues is not being taken seriously by the territorial and federal governments. They explained that it seems as if the governments are trying to silence their opinions and values about water, which is in turn detracting from their ability to live well.

But when we voice our concern about water in the community the governments don't listen. Seems like they don't take it seriously. That's why everyone is talking about water because our voice is not being heard. And it affects our whole lives you know. (Interviewee Y)

It seems like the government is telling the community what to do. The government doesn't listen to the community. All agencies, even Canada. They tell us what to do. It shouldn't be like that it should be what the community wants. Water is not owned by the government and they didn't create it so why do we have to suffer from their decisions. (Interviewee E)

Other respondents suggested that although they derive some satisfaction from being able to assert a voice in water-related decisions, it is the outcome of such decisions that ultimately impacts their ability to live their desired quality of life. For example, if community members feel they are involved in the decision-making process, but the outcome does not reflect their values and needs, then it can lead to feelings of increased stress, disempowerment and hopelessness. When asked how they felt about the outcomes of past water-related decisions involving the government, one community member replied “the government will do what they want to do anyways so what is the point in even trying?”. This response reflects the views of several other community members who also indicated that their lack of success in working with external governments on water issues has disempowered and discouraged them from attempting to assert a political voice on such issues. Two respondents showed signs of being visually and verbally frustrated and upset when discussing their feelings about the degree of influence they have on the outcomes of water-related decisions involving external governments.

They act like they own it and the water is theirs. It is just breaks my heart you know, how the government can take advantage of Aboriginals. It is a serious head ache for everyone. (Interviewee R)

What does the government have to do with water? They don't know shit about water. They don't know how important water is to the Dene people. They work like in an office in the city and they don't know shit about people here. I mean the things that people do as a Dene person, the things that they do everyday like relating to the water and living in a traditional way and living in the modern world is totally different and how do they know what is important for the people.. they don't. They have to live in the community to know what they are talking about because over and

over we will stress how important water is but to them it is like they have all these policies and that's how they do it. You know, I just don't agree with that, not at all. (Interviewee M)

These types of statements illustrate how water issues can create feelings of mistrust and constrain political relations between the people living in Trout Lake and the federal and territorial governments. However, two elders explained that this tension between community members and external governments can also put stress on internal relationships between community members and the local community government. They indicated that this additional internal stress is a result of community members taking out their frustration with the community's weak political influence on the local government. Several people explained that they are now starting to question the ability of the community government to convey their views and insights in territorial and federal water-related decisions. For example, one community member explained that

I think it's just the chief and council saying what they want to say that's got to be it. When they go out to meetings about water I don't even know what they are talking about or what decision they are taking from the community and saying, I don't know what's going on half the time or why the chief is going to the meeting or what happened at the meeting. (Interviewee E)

Feelings such as these demonstrate how strained political relations outside the community can weaken internal community relations and negatively impact peoples' feelings of community connectedness.

However, some respondents (18%) indicated that water issues also have the potential to positively influence external and internal political relations in Trout Lake. Respondents explained that when they are involved in water-related decisions and the outcomes correspond with their preferences and values, such decisions can help to rebuild the community's relations with external governments and strengthen feelings of community connectedness. For example, two community members commented on the positive influences that the new drinking water

treatment facility and increased water monitoring activities have had on community and external government relations.

I think our relationships with the government are better now with the water treatment service. They are also testing the water here more too. The government people come here a lot more too to sample the water. This is a good thing for us to live good. (Interviewee V)

The government usually listens to the people about water issues now. That's why the people come and test the water quality now which helps us a lot. (Interviewee W)

Respondents explained that these types of positive water-related outcomes are typically achieved through some form of collective action, where community members coordinate their efforts to unify their voices on water issues. By joining community members through a shared goal to protect water, collective action creates opportunities for the community to strengthen their political voice and degree of influence on water-related decisions. The strong social relations and collective sense of responsibility to protect water in the community of Trout Lake (i.e. social capital - see section 5.2.1) plays an important role in enabling community members to take collective actions. Some respondents (22%) recalled taking collective action to lobby against the proposed location of the Imperial Oil (formally Enbridge) pipeline that was built through Trout Lake traditional lands, from Norman Wells, NWT to Zama, Alberta in 1985. At the time, community members agreed that the proposed location was too close to Trainor Lake and they successfully influenced government and industry to move the pipeline further away from the lake. Respondents indicated that these types of successful collective efforts to protect water help them to live well by strengthening community cohesion and stimulating feelings of empowerment, hope optimism, and trust.

5.3 Subjective Well-being

The subjective dimension of social well-being is concerned with people's self-reported level of satisfaction with the quality of life they are able to achieve (see Chapter 2). This section draws on Trout Lake community members' articulations of their psychological and emotional connections with water to examine the subjective aspects of the resource they value in pursuit of well-being. The section is divided into five subsections based on the key parameters of subjective well-being that were drawn from the social well-being framework discussion in section 2.4. The parameters include spirituality, sacredness, healing, freedom and autonomy, and sense of meaning. A more detailed description of the process used to select these parameters is provided in Chapter 3.

5.3.1 Spirituality

Aboriginal spirituality is rooted in the historic cultural belief that all elements of life, both animate and inanimate, are connected through a vast web of interconnected relationships (Grieves 2008). It is based on the philosophy that everything, including people, plants, animals, landscapes and spiritual bodies, has meaning, purpose and is interrelated. For people in the community of Trout Lake, spirituality is one of the most important factors influencing peoples' quality of life. Several respondents (65%), particularly elders, indicated that water, both in the form of water bodies (i.e., lakes, rivers, streams, ponds) and meteorological elements (i.e. rain, snow, clouds), is central to their spirituality. In the community of Trout Lake water is believed to provide community members with a tangible link between themselves as living humans, and the unseen spiritual world that is critical to their ability to live well. Sustainable access to healthy and natural water was often described as an essential part of being able to maintain a healthy

spiritual life. In fact, several people indicated that they feel the spiritual value of water is the most important reason to protect the resource.

However, it was challenging for some respondents to explain the importance of their spiritual connections to water in detail. Individual spiritual relationships with water are entrenched in traditional ways of life, and thus it is not something that people consciously think about nor easily explain (Interviewee M). Two community members also indicated that they were uncomfortable discussing the spiritual nature of water in detail because they were taught to protect this type of knowledge from outsiders (Interviewee A). In most cases, respondents focused on explaining different physical expressions of their spiritual relationship with water including traditional practices, stories and legends.

Just over half of respondents (55%) spoke about offering tobacco to water, which is a tradition still commonly practiced in the community of Trout Lake. People in the community have deep spiritual connections with tobacco because they see it as a sacred substance that enables them to communicate with the spiritual world. Tobacco offerings were made to water for several different reasons in Trout Lake. In some cases community members offered tobacco to the water before travelling on it as a way of expressing their advanced appreciation for their safe return. As one respondent explained, “for traditions we feed the water with tobacco because we believe the water will take care of us. It will keep us safe from disaster and other bad things especially on long trips” (Interviewee A). In other cases people offered tobacco to water to show their respect for the resource and express their appreciation for its life sustaining qualities. Hunters and harvesters often spread tobacco over water to give thanks to the Creator for allowing them to take something from the animal or spiritual world. As one elder explained, “anything I get from the water or land, I always do a prayer first to thank the creator for all the things that are

given to me that has to do with water” (Interviewee E). People also indicated that they make tobacco offerings to water when they are seeking guidance and advice from the Creator.

The deep spiritual connections that Trout Lake community members have with water are also expressed through many traditional stories, legends and myths. Many respondents (65%) made reference to the spiritual creations story that describes the formation of the Trout Lake landscape by the cultural hero Godehle. According to the story, Trout Lake was formed when Godehle laid down to rest on the muskeg. The shape of the lake resembles the shape of the giant’s sleeping body, with his curled legs at the south end of the lake and head at the north end. He laid there until he was awakened by a muskrat biting him on the ankle. His ensuing actions are believed to have created many important geographical features in the Trout Lake traditional area:

This place is where the giant laid and all the water came to where it laid. Like in a muskeg, that’s why there is a whole bunch of muskeg here. The water went to where it laid and that’s how the lake formed. So the giant was sleeping sideways. And I guess way up there at Tetcho and Trainor lake they say that he dipped water in the pond and he brought it to here, dropping water to this lake and I think there was another one in there somewhere. Yea that and between here and Fort Simpson there is a land that is hard like you can see a mouth in the Nahanni Mountains. And that’s where they said a giant crushed all of the rocks over there to form a ridge and that’s where you see all the lines in the mountains. In Simpson you will see that going into the Nahanni Mountains, and that’s what they say is where the giant formed the mountains (Interviewee O).

Many of the geographic features created by the actions of Godehle are reflected in Trout Lake traditional place names. For example, K’eotsee Yihi (a place he dug out a ridge) refers to the large ridge that was formed from the rocks crushed and dug out by Godehle. The lakes formed by the giant dripping the water he scooped from another lake is known as Tsalieh (Tetcho Lake).

The land and water formation story of Godehle is well known in the community of Trout Lake. The narrative continues to provide a strong spiritual link between community members and the original formation of the surrounding lakes they depend on. The value of this spiritual relationship is reflected in high level of respect that community members associate with the lake as the place where the giant slept. One respondent explained that women are not allowed to swim in the lake when they are on their cycle because it is a sign of disrespect to the giant's bed:

The lake is where the giant slept so we were told not to go in the water. Never went swimming or walk in the water even. Always told to stay away from going in the water. Can't go in the water because it was the giant's bedding. Can't go in the water because of the moon cycle and females. (Interviewee T).

Another respondent spoke about a story that her grandma told her where people travelling with children in their boats were not supposed to travel across the lake; instead they were expected to move along the shore. She explained that it is disrespectful to cut through what was once the giant's bed with a child on board. Others commented on the sacred nature of the lake because of its formation by Godehle:

Well the lake is very sacred. There are stories told about how the lake was formed by a giant. And that it is sacred. You are supposed to respect the lake because it is where the giant slept. (Interviewee J)

We made [an] agreement that we would protect the water because its sacred water where the giant laid and so is a very special place. It is very sacred to everyone. Always abide by what we have been told from our elders to protect it. (Interviewee E)

Community members also shared more recent traditional stories about water spirits living in Trout Lake. According to the stories, there are two giant, serpent-like fish that live in the Lake and serve as protectors of the water. It is believed that the creatures only break the water surface when the lake is not being treated with respect. One community member described the fish-like creatures as water enforcers that need to be protected to ensure that people are not disrespecting

the lake. He shared a story about a group of tourists that were visiting Trout Lake and failed to respect the water:

And we have creatures that still live under the lake. It has been spotted several times. We had tourists here, they were fishing and yelling and that and we told them not to do that because with respect you have to be quiet and that. But they were partying and yelling and that.. The next day they were doing that this big thing came up and they said it just looked like a dog head or a big serpent or whatever. And it just came up grabbed a fish and went down. They all got scared. They left their equipment, got their tent sleeping bag and everything, jumped in a plane and took off. Those kinds of things still exist and so we want to protect that too. (Interviewee A)

Another respondent explained that people are not supposed to swim near or across the mouth of the river that runs alongside the community because it is where one of the creatures lives. She described the mouth of the river as a sacred place that people are supposed to avoid as a sign of respect to the water and the spirits that live in it.

One elder spoke about the significance of the spiritual water creatures in the context of environmental change. The elder indicated that he has observed many changes in the lake overtime, which have corresponded with seeing large pieces of fat from the creatures' bodies. He explained that the changes happening to the water are negatively impacting the health of the water spirits that live in the lake and help to protect it (Interviewee N).

The critical spiritual relationship that the people in the community of Trout Lake have with water is reflected through traditional water practices and stories. In addition to helping strengthen the spiritual values community members associate with water, these practices and stories provide the fundamental lessons and rules that teach them to care for and respect the water. The guidance embedded within these practices and stories is critical in helping people move towards living what they consider a 'good life' – one where they are able to live harmoniously with nature.

5.3.2 Sacredness

The important spiritual connections that Trout Lake community members have with water are closely related to their perceptions of water as a sacred resource. Although there may not appear to be obvious distinctions between ‘spirituality’ and ‘sacredness’, it is important to note that community members usually use the terms in reference to different contexts about water. Whereas spirituality is used to describe peoples’ beliefs and relationships with water (see section 5.3.1), sacredness is used in reference to describing an important water body or space. This section discusses the latter.

For the people in Trout Lake, water is viewed as a sacred gift from the Creator that must be revered, valued, and treated with eternal respect. Community members (Interviewee B, N, O and P) explained that water is the lifeblood that brings life to everything living on Earth and that rivers are the arteries and veins that deliver life. As one community member explained “the rivers are like the blood veins. If anything goes wrong with the water, then us, all the animals and land are affected everywhere. It will hurt everyone and everything. Like having no blood” (Interviewee B). Others briefly spoke about water being important for their well-being because it gives life to and sustains their culture, traditions, and spirituality. As a sacred life providing resource, water is viewed as something that must be protected and kept healthy forever.

The sacred value of water in Trout Lake is also reflected in community members’ view of water as a living being itself. Because water is viewed as a living entity, community members believe it must be treated with the same degree of respect and reverence as a human being. As one elder explained, “how we treat ourselves is how the water should be treated” (Interviewee C).

Although water was most frequently described as a sacred resource in general, some respondents (22%) made reference to specific water bodies in the Trout Lake traditional area that constitute special sacred places. The sacred significance of these water bodies was typically linked to their role in a traditional story or sacred healing powers. Trout Lake was frequently described as a sacred lake because of its association with the Godehle creation story (see section 5.3.1).

The lake is a very sacred because there are stories told about it. They kept telling stories about how the lake was formed by a giant. And that is why it is sacred. You are supposed to respect the lake because of that. (Interviewee J)

Two respondents spoke specifically about two specific sacred water sites at the southwest end of Trout Lake known as ‘moose wallows’. These are areas of calm water where natural springs empty. Many animals, particularly moose, rely on these areas for food and water. Some community members (Interviewee M, Q) explained that the water in the ‘moose wallows’ is even more sacred than the lake water because of its strong healing powers. When asked about the importance of the two sites to the community, most people replied by explaining the special spiritual rules that apply to the ‘moose wallows’ because of its sacred value.

They[the spirits]don’t want you to tamper with it and stuff. They tell you that you are not allowed to go into the areas like that because they don’t want anything to happen to it. They don’t want you to tamper with it. Things like that, it is sacred so you don’t tamper with things like that. (Interviewee M)

Some respondents (30%) explained that the sacred value of water and special water sites can be lost if they are contaminated or disturbed. For example, many people described the water that is pumped out of Trout Lake and into the drinking water storage reservoir as ‘dead water’. In contrast to the natural and undisturbed lake water, the water in the reservoir is considered to be

dead because it was removed from its natural environment and contained in a stagnant, artificial basin.

It's like dead water. Not sacred. No flow in and out. Big pond, plastic layers inside like pool. No fresh water in and out like a stream. So no flow, just settled there. Algae. Doesn't look like healthy water. It's not alive. It's dead. (Interviewee Q)

Similar perceptions were expressed with regards to bottled water because of its extraction from the natural environment and containment in a plastic bottle. The inability of bottled water to flow and breathe naturally is the primary reason why people also describe it as 'dead water'.

Yea it is sitting in a bottle and you don't know how long it has been sitting there, sitting there, sitting there, and it cannot breathe in that bottle. The water can't breathe in the bottle so what is the use of drinking the water. It's dead. Its life is gone. It's not sacred. (Interviewee R)

The same philosophy was also used to explain why some people are unhappy with the local chlorine-based water treatment system. To these community members, the addition of chlorine to the otherwise sacred and pure lake water is seen as an unnecessary process that disturbs the water and detracts from its sacred value (Interviewee I).

The strong sacred value that Trout Lake community members associate with water appears to play a key role in influencing peoples' subjective well-being through shaping feelings of happiness and sadness. As described in Chapter 2, one's self-reported feelings of happiness and sadness are two key indicators of one's subjective well-being. The responses from several community members suggested that undesirable changes to sacred waters or sacred water sites are a trigger for feelings of sadness and thus can impact peoples' subjective well-being. The emotional connection that community members have with water was particularly evident when respondents discussed their community water concerns (see Chapter 4). Some respondents, mostly elders, became visibly upset and emotionally disturbed when discussing the changes that have been happening to their sacred waters overtime (Interviewee E). Others described feelings

of sadness they experience when they think about how such changes are going to impact the ability of future generations to benefit from the sacred waters and sites in Trout Lake (Interviewee R). However, respondents also indicated that happiness can be derived from visiting sacred water sites, which has a positive influence on subjective well-being.

The need to protect water and specific sacred water sites from disturbances and potential sources of contamination was echoed by many people in Trout Lake. Several respondents (60%) spoke about the sacred importance of water in the community and the associated need to protect water and special water sites.

We made agreement that we would protect the water because its sacred water where the giant laid and so is a very special place. Very sacred to everyone. Always abide by what we have been told. We do not throw garbage or anything in the water because it is so sacred. When we had garbage, we took it way out on the land to discard. Even in the rivers – we don't throw anything in the rivers because it flows to the sacred lake. (Interviewee E)

It's a sacred lake that needs to be protected. For today and future. When we talk about water, its important to us. (Interviewee Q)

The water in the lake is very sacred.. very spiritual. That is why when nobody feeds the lake it gets rough.. Because it is telling you that you are not respecting it and we need to respect it always because it is sacred. (Interviewee J)

5.3.3 Healing

The life sustaining qualities of water were often discussed in conjunction with the healing properties and applications of water. Trout Lake community members provided several examples of how water from natural sources can have psychological healing effects on people, and in turn, increase their life satisfaction. For example, drinking pure, clean, and natural water was the most common practice that community members referenced when asked about the healing effects of water. It was explained that the healing process associated with this practice is linked to their spiritual connections with water, the Creator, and their ancestors. Drinking the water that was

gifted to them by the Creator and that has sustained their ancestors for many generations is viewed as a psychological healing process. Many respondents (40%) indicated that this healing process helps generate increased feelings of security, positivity and healthiness.

I saw the water spirit. It is a protector. And a traditional healer said that to see the water spirit is very, very rare. So that's why I drink the lake water. And because I drink it, that water spirit has guided me just like it guided my ancestors when the waters were rough. It heals me. (Interviewee U)

Water helps them if they are mentally not well, physically, emotionally. Trout Lake is a blessed lake. People go to the lake and they drink a cup of the water. The water has positivity when you drink it. The Lake heals you when you do this. It has power. (Interviewee V)

Drinking muskeg water is good – clean, clear fresh. It's a blessing, the water that you drink from the land keeps you healthy. It's pure. (Interviewee E)

The same spiritual healing philosophy associated with drinking pure and natural water was applied to the use of water in making traditional medicines. Several (30%) community members explained that traditional medicines have to be made with pure and natural water in order for the medicines to have any healing power. As one community member explained, “All medicine we get it from the land. But we have to use our natural water in order to make the potion or whatever we are supposed to use to make medicine. It has to be from the lake if it is going to heal us” (Interviewee I). This view reiterates the same message expressed in the statements above regarding the importance of natural, clean and undisturbed waterways in community healing processes.

While most respondents gave relatively general explanations of their healing experiences with water, some were more detailed in explaining their deep emotional healing relationships with water. One community member explained that water is believed to have psychological cleansing and purify powers that help to heal the mind. Washing with pure lake water and wading in local rivers were described as the two primary practices that people turn to for

psychological cleansing. The belief is that the purifying powers of water help to carry away people's negative feelings and emotions. Although these practices are no longer as common in the community as they were in the past, it was explained that some people continue to wash their face with lake water because of this traditional belief (Interviewee H).

Other community members reported having experienced feelings of psychological relief after spending time on or near local water bodies. Trout Lake was mentioned as one of the many water bodies that community members frequently visit because of the calming and relaxing effects they feel water has on their minds and bodies. Several people described the comfort that comes with living near a water body that ultimately enables them to reflect on their lives and feel at peace with themselves.

There are natural places all around where the water is special. People travel to these special places to get healed. Trout Lake is a healer too. It has to be respected and taken care of if we want to heal from it (Interviewee B).

The water kind of puts you at peace. It's just that when you go to the beach you get this sense of peace that calms over you and you don't have nothing to worry about or to trouble you. Yea, and like if you sit by the shore and stuff in the evenings, or just quietly, if something is bothering you, you just sit by the lake and be at peace. It calms you down (Interviewee J)

You can feel the connection when you are near it. It is just the water, you know it is like pure, still life. It is just like calm. And that is how like for me, that is how I feel. It heals me and makes me feel pure and calm (Interviewee R)

However, for some, the psychological healing effects of water extend beyond feelings of calmness and relaxation. One community member explained the critical role that water and land play in helping him to cope with mental health challenges.

Water builds the persons healing. It is part of healing to go out on the land and water. To go out on the lake makes you feel healthy and it heals you. Without going out on the lake, out on the land, there is no healing for me. There was one incidence when I was feeling really down. And I didn't want to be around people too much. I just had to go. And I would go on the water, boating, whatever, don't matter what time or year or time of the day, I just had to get out. Trying to deal

with depression is very difficult. I have been battling it, by going out on the water and land. It helps me. That is how I cope. Its relief. (Interviewee U)

There are several studies that indicate that these feelings of mental relaxation, calming and healing from water are not necessarily specific to community members in Trout Lake. For example, Wheeler et al. (2012) found a correlation between peoples stress levels and the amount time that they spend in close proximity to coastal areas, where increased time near the coast correlated with decreased stress levels. However, Trout Lake community members implied that the calming feelings and healing they experience from water are more acute in the community given that they live in a physical and cultural context where their relationship with water can be maintained more directly.

The views expressed about water and healing in Trout Lake illustrate to the diversity of ways in which people in the community heal from water. Although most community members are similar in that they value water for its mental healing powers, they differ in terms of the degree to which they depend on water for healing, the frequency that they practice water healing rituals, the types of healing practices they engage in, and the psychological benefits that they derive from their healing experiences.

5.3.4 Self-sufficiency

Community members often made reference to the important role that water plays in enabling them to maintain a traditional subsistence lifestyle. For the people in the community of Trout Lake, water is life; it is the bloodline of Mother Earth that makes the environment habitable and allows them to live off the land. When asked about their satisfaction with living in the community of Trout Lake, community members explained that their happiness and quality of life is dependent on their ability to live a subsistence lifestyle. This lifestyle was often linked to

feelings of self-sufficiency and freedom, which according to many respondents, are central to living well in Trout Lake.

I like it here. I have lived here all my life. I like the freedom to travel on the land, and there are no limits on my yard. We have all the land. We can gather all that we need off of the land... I like it here because there are so many things to get from the water and in the community. Everywhere else you have pay for everything. Here we depend on what the water and land gives up and we can go on the land to get it whenever we want. That's what we need to have a good life. (Interviewee D)

I like being out on the water and land, going here and there and just basically more like living off the land. Everything you get you don't have to run to the store. You just go to the store for basic things that you need. Any traditional food that you need you just go out and get it. And that is a lot healthier. Like you are surrounded by all of these things that you can get and you don't really need anything from the store. (Interviewee S)

To live off the land is just part of Dene life. Our well-being and us and the people and the way we are free to live from the land are all related. That's the way we were raised... We need to live off the land and stuff like that to have a good life. (Interviewee W)

The sense of freedom and self-sufficiency that community members derive from living a subsistence lifestyle were described as comforting feelings that are unique to the community of Sambaa K'e, and something that they cannot live without. These feelings were often contrasted with feelings of confinement and restraint that respondents experience when visiting different environments that impede on their ability to live off the land. As one elder explained:

People are doing well when they have clean water and can live our traditional way of life. Here it is quiet, relaxing. People do well here because they can do their own thing. If companies want to build here and make big buildings, we refuse because it would change everything and we wouldn't do well anymore. In Fort Nelson it is different. That's why I can't go back there for more than a week. I can see a big difference. There it is like living in a box. In Nelson they are building things and I can't stay there. The lifestyle is too different than here. (Interviewee N)

5.3.5 Sense of meaning

Community members also explained that water plays an important role in helping people to feel they have a sense of meaning. This sense of meaning was typically associated with a type of 'giving behaviour' that comes when people feel they are contributing to their culture and

community. Elders explained that people derive meaning from feeling responsible to protect their traditional waters on behalf of the Creator who gifted them the resource.

Well what they say is that our ancestors used to, our grandparents and ancestors used to say is that whatever the Creator put on Earth is not to be disturbed. You are supposed to respect it. It is forbidden to pollute what the Creator gave you. But now all of a sudden oil and gas came along and just starting ruining it for us. And they are just disturbing it and destroying it and knocking trees after trees. We have to protect the water from that. (Interviewee R)

Everything needs water. Everything that lives has to have water. Animals, birds, plants, everything. But nobody made the water. It's not ours. It's nobody's. It's the Creators. God is the one that created this earth and everything that is on the land. Everything. It belongs to God. We are here to protect it from development because of that. (Interviewee T)

The sense of meaning community members experience from protecting water is rooted in their feelings that they are contributing to the sacred responsibility that all Dene people have to protect the water gifted to them by the Creator.

Other respondents (30%) explained that they also gain a sense of meaning from the responsibility they feel to ensure that future generations have sustainable access to clean water. This feeling is rooted in the belief that because the current generation was provided healthy water that enabled them to live quality lives, future generations should be entitled to the same opportunity. As such, the current generation feels that it is their purpose and duty in life to carry on the legacy of ensuring that future generations have the same safe access to clean water as they did. As several community members explained...

We are protecting the land and water because of future generations. There are going to be a lot more kids born and the population is going to increase. We have been protecting the water for so long, and they need to keep doing it. (Interviewee E)

We don't want any development on our land for future generations. The elders want our kids to experience what we experienced, like to live on the land and use the water and get traditional foods on the land and water and things like that, they want to protect for future generations to use. We want whatever we did to continue for the future generations. (Interviewee S)

As several individuals explained, this sense of duty means that the current generation will likely experience less happiness due to having to fight to protect water resources in the present, but it is something they feel compelled to do as part of their responsibility to future generations. This willingness to accept less happiness for the benefit of future generations reflects the satisfaction and sense of meaning that the current generation derives from protecting water resources for the future. As one elder explained,

Even with all these younger generations, all these things and decisions the elders are talking about today. It's not only for today, it's for the future. The future of the kids that are growing up. So that they don't have to go through what we are today. But the government doesn't listen to us. They want what they want. They don't know what the community wants. We want to stop all of that for the future. We don't want them to have to go through what they are putting us through.
(Interviewee E)

Some community members also spoke about the sense of meaning they derive from the spiritual connections they have with water. These connections, which were explained in greater detail in section 5.3.1, enable people to feel attached to something beyond themselves and their community. This spiritual attachment to water plays an important role in helping people to feel secure in their life purpose and enables them to experience a strong sense of belonging. These feelings of security and belonging are central to helping people feel that their lives are full of meaning and purpose.

The views expressed in this section illustrate the diversity of ways in which people in the community of Trout Lake procure a sense of meaning from water. Although people may have different motivations that inspire this sense of meaning (i.e. protecting water as a gift from the Creator, protecting water as a responsibility to future generations, or spiritual connections to water), they are united by the feelings of fulfillment and purpose that they gain through their unique relationships with water.

5.4 Chapter Summary

This chapter applied a social well-being lens to examine the tangible and intangible values that people living in Trout Lake associate with water resources. Overall, the results indicate that Trout Lake community members value water for many diverse and highly interconnected reasons. These reasons range from more apparent material values of water such as those related to livelihood activities, traditional foods, and drinking water, to less tangible values linked to social and political relationships, and personal values associated with peoples' own perceptions about the quality of life they are able to achieve (i.e., spirituality, sense of meaning, healing, self-sufficiency, sacredness). The views expressed in this chapter indicate that while the people living in Trout Lake consider water to be critically important to their material well-being, they also associate strong relational and subjective values with water that are just as, if not more important than the material values.

Figure 3 summarizes community members insights and ideas about the diversity of ways in which water enables Trout Lake them to live their desired quality of life. Although used in a different context, Figure 3 is similar to other diagrams that reflect Traditional Knowledge and community values comparable to those emphasized in this research (see Turner and Berkes 2006). It is important to note that although the values in Figure 3 are presented as distinct entities, they should be viewed as an interdependent set of values to reflect the overlap and interconnectedness of the material, relational and subjective dimensions of well-being. However, for the purpose of analysis it is necessary to categorize the three dimensions as separate entities in order to examine each in detail and make more explicit the water-related values that people associate with them. The values outlined in Figure 3 form the basis of discussion for the

following chapter, which is geared towards examining water-related policy and government perceptions on how such values may be relevant to water policy or decision-making in the NWT.

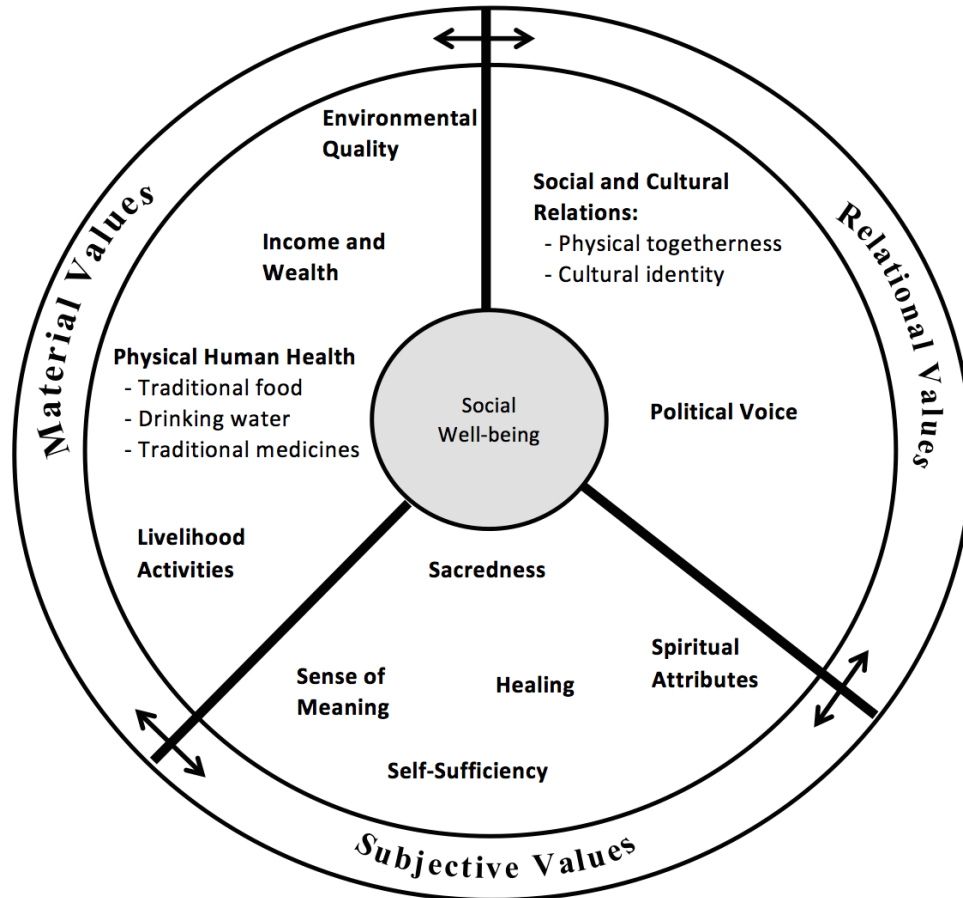


Figure 3: Summary of Community Water Values Based on Social Well-Being Framework

Chapter 6: Water Values and Governance

This chapter addresses the third research objective of examining how a more explicit understanding of the non-market water values (i.e., relational and subjective) presented in Chapter 5 may contribute to more effective water-related decision-making processes in the NWT. The content of the chapter is based on the experiences and insights of eight water policy actors in the NWT who were asked to review the Trout Lake water value information and reflect on the potential relevance of such values for NWT water decision-making processes. The individual participants included representatives from DFN, GNWT-ENR, AANDC, Ecology North, NWT CIMP and AAROM.

The first section of the chapter provides a brief description of the water governance structure and regulatory system in the NWT. A brief overview of the Water Strategy and associated Action Plan is also provided in the first section. The following section highlights the main challenges that the water policy actors described with respect to the effectiveness of the current decision-making processes for water issues in the NWT. The remaining sections of the chapter examine the different ways in which a clearer understanding of the Trout Lake water values discussed in Chapter 5 may help to address some of these water governance challenges. It is important to recognize that this chapter reflects the circumstances that existed at the time of the water policy actor interviews (November 2013), which was prior the federal water responsibilities being devolved to the territorial government (April 2014).

6.1 Water Governance Structure

The NWT has a unique water governance structure in comparison to most Canadian provinces. Prior to April 1, 2014, which is when this research was undertaken, the GNWT did not have any

general water management legislation. Unlike Canadian provinces, where provincial governments play a predominant role in water management, water in the NWT is part of the federal government’s Crown land ownership. As such, the federal government has authority to legislate water in the territories. These federal responsibilities are part of the Northwest Territories Water Act (1992), which gives Aboriginal Affairs and Northern Development Canada (AANDC) the mandate to manage water resources in the NWT. AANDC's responsibilities in the NWT water governance system, which are outlined in Table 7, are similar to those held by most provinces in Canada. As such, AANDC performs a quasi-provincial role in NWT water management. Although the federal government is the water manager in the NWT, it is important to recognize that the GNWT, through various departments, is responsible for regulating and protecting public water supplies within the territory. MACA, ENR, HSS (Health and Social Services), and PWS (Public Works Services) are the primary departments with public water responsibilities in the NWT. The roles of these departments are outlined in further detail in Table 7.

Table 7: Primary Water Policy Actors Involved in Water-Related Decisions in the NWT (prior to April 1, 2014)

	<i>NWT Water Policy Actors</i>	<i>Involvement, Roles and Responsibilities Related to Water in the NWT</i>
Federal Government	AANDC	<ul style="list-style-type: none"> • Develops and implements water policy and legislation in the NWT • Reviews, evaluates and provides comments on water licenses and development proposals • Inspects industry compliance with issued water licenses • Collects baseline water quantity and quality information • Conducts strategic long term planning for water use and protection in the NWT

Territorial Government	ENR	<ul style="list-style-type: none"> • Supports programs and initiatives outlined in the Water Strategy <ul style="list-style-type: none"> ◦ This includes community-based water monitoring and trans-boundary water negotiations • Supports programs geared towards source water protection
	MACA	<ul style="list-style-type: none"> • Provides information on community drinking water sources • Offers water treatment training programs and operator certifications • Provides information for community water treatment plant operators
	HSS	<ul style="list-style-type: none"> • Regulates drinking water safety • Develops regulations for the development and operation of municipal water treatment plants and drinking water systems • Performs drinking water sampling and testing • Implements boil water advisories when required
	PWS	<ul style="list-style-type: none"> • Develops and disseminates technical standards and guidelines on water, wastewater and community waste disposal to communities across the NWT • Conducts inspections and operational reviews of municipal water supply systems
Land and Water Boards	MVLWB	<ul style="list-style-type: none"> • Regulates water and the disposal of waste into water through issuing water licenses in the Dehcho, South Slave and North Slave regions. • Responsible for ensuring that water is used in a way that will provide maximum benefit to the public while also considering the importance of water conservation to maintain Aboriginal well-being and way of life
	Wek'èezhii Land and Water Board	<ul style="list-style-type: none"> • Same as above for the Wek'èezhii region
	Sahtu Land and Water Board	<ul style="list-style-type: none"> • Same as above for the Sahtu region
	Gwich'in Land and Water Board	<ul style="list-style-type: none"> • Same as above for the Gwich'in region
	NWT Land and Water Board	<ul style="list-style-type: none"> • Same as above for the Inuvialuit Settlement Region
Environmental Review Boards	MVEIRB	<ul style="list-style-type: none"> • Conducts preliminary screenings, environmental assessments and environmental impact reviews of proposed developments or water licenses that have been referred to them in all of the NWT, except for the Inuvialuit Settlement Region
	EIRB	<ul style="list-style-type: none"> • Same as above except only for the Inuvialuit Settlement Region

Water Researchers	Environment Canada	<ul style="list-style-type: none"> Collects, analyzes, publishes and disseminates surface water quality and quantity data across the NWT, but primarily focuses on National Parks and Reserves and the Mackenzie Valley
	CIMP	<ul style="list-style-type: none"> Coordinates, supports and conducts environmental research (including water-related research) aimed at understanding how different uses of land and water and waste deposition affect the NWT environment currently and in the future
	AAROM	<ul style="list-style-type: none"> Develops and implements several programs and initiatives geared towards building capacity for aquatic resource management in regions in the NWT where DFO is responsible for managing fisheries, such as the Dehcho
	University researchers	<ul style="list-style-type: none"> Often play a key role in supporting water-related research and monitoring activities in the NWT by providing a range of academic, technical and scientific expertise
Other Water Policy Actors	Industry	<ul style="list-style-type: none"> Often the proponents for industrial development projects that require water licenses from the appropriate water board and occasionally approval through the environmental assessment process
	Aboriginal Governments	<ul style="list-style-type: none"> Plays an active role in ensuring water in their traditional territory is well stewarded and that obligations under land, resource and self-government agreements are fulfilled. Agreements require that the waters flowing through a territory remain substantially unaltered in water quality, quantity and rates of flow.
	Communities	<ul style="list-style-type: none"> Can play a diversity of roles in water-related decisions depending on their desired involvement. Some roles include: <ul style="list-style-type: none"> Source of Traditional Knowledge relevant to decisions about proposed development activities that may impact water resources Initiator for community-based water monitoring activities Interveners for proposed development activities open for public comment and review
	NGO's	<ul style="list-style-type: none"> Often play important roles as project collaborators in water-related initiatives <ul style="list-style-type: none"> For example, Ecology North is heavily involved in a number of water-related research projects associated with the Laurier – NWT partnership agreement Occasionally play an important advocacy role in helping to ensure that community concerns and questions about water are adequately addressed Provide programming and activities
	Aboriginal Steering Committee	<ul style="list-style-type: none"> Provides ongoing guidance with the implementation of the Water Strategy

The regulatory system regarding water in the NWT also differs from provincial arrangements in other ways. In contrast to the provincial decision-making framework where water-related regulatory decisions are often made within government departments, such decisions in the NWT are made by land and water boards. These boards are sometimes referred to as co-management boards, but in operational terms function as semi-autonomous ‘Institutions of Public Government’ (White 2008). There are five land and water boards throughout the NWT that are responsible for regulating water use and effluent disposal through the issuance of water licenses within their geographical jurisdiction: The MVLWB (Mackenzie Valley Land and Water Board), The Wek’èezhii Land and Water Board, The Sahtu Land and Water Board, and the Gwich’in Land and Water Board) and one board (i.e., The NWT Water Board) responsible for regulating water in the Inuvialuit Settlement Region. The MVLWB is responsible for issuing water licenses in areas in the Mackenzie Valley with unsettled land claims, including the Dehcho region where the community of Trout Lake is located. The Gwich’in, Sahtu, Wek’èezhii and NWT Land and Water Boards issue water licenses in their respective jurisdictions, which are areas with settled land claims. These boards were established under the NWT Waters Act and Regulations, and the Mackenzie Valley Resource Management Act.

The land and water boards make the final decision regarding water license applications in their respective management areas, but their decisions are heavily dependent on data and information provided by other parties. Given that most water licensing proceedings in the NWT have and continue to relate to industrial and mining development proposals, industry is an important water policy actor in the NWT as they are often the proponent to engage in the regulatory system. Industrial water license applications also draw in several additional water policy actors who must be consulted before a water license can be issued. For example, industry

has a responsibility to consult with and obtain feedback from communities in the project area before submitting a water license application to the land and water board. Furthermore, once applications are submitted, it is part of the evaluation process for the applications to be sent to various governmental departments and agencies (including affected Aboriginal governments), affected First Nations and local governments for their review. Through this review process these actors have the opportunity to provide feedback and voice any concerns they have with the application. Scientists and researchers from a variety of institutions (i.e., Environment Canada, CIMP, AAROM, various Universities) also play a role in the water licensing review process through their scientific expertise and contribution of water quality and quantity data in the NWT.

Depending on the requested type of water license, some applications require a public hearing and/or environmental assessment process (see below) that allows people and organizations with a vested interest to express their views on the proposed development. These actors typically include concerned citizens, First Nations governments and NGO's such as Ecology North and CPAWS. The various sources of input from these groups form part of the preliminary screening process that the land and water boards use to determine if the proposed development should be granted a water license. The board can then choose to reject the application with justification, approve the application and submit the license for the minister's approval, or refer the application for further review through an environmental assessment.

The environmental regulatory system in the NWT includes two additional public boards that are responsible for conducting environmental assessment and environmental impact reviews on various development proposals, including water license applications referred to them by land and water boards. The MVEIRB (Mackenzie Valley Environmental Impact Review Board) is responsible for assessing proposals within the Mackenzie Valley region, while the

Environmental Impact Review Board is responsible for reviewing proposals in the Inuvialuit Settlement Region. The ultimate role of the two boards is to determine if the proposed development is likely to cause significant adverse impacts on the environment or be a cause of public concern. The evaluation process used by both boards includes a public review period where interested parties can comment on the development proposal. In the case of the MVEIRB, which includes the community of Trout Lake in its jurisdiction, the board can either approve the application (with or without conditions) and recommend it be submitted for the minister's approval, recommend the application be rejected, or order an environmental impact review which would subject the application to a more intense review. In the latter case the MVEIRB is responsible for appointing the panel to conduct environmental impacts review. More detailed overviews of the environmental assessment regime in the NWT are provided elsewhere (see for example, Armitage 2005a).

6.1.1 NWT Water Stewardship Strategy and Action Plan

Although it is not a part of the regulatory system for water in the NWT, it is important to recognize the role of the Water Strategy and the associated Action Plan in the NWT water governance structure. As discussed in Chapter 1, the Water Strategy was developed to bring all levels of government, agencies and the public together to help sustain NWT waters and encourage action towards improved water stewardship decisions in the Territories. The Water Strategy was designed with the intension of setting out a clear vision for NWT waters in a way that reflects the deep relationships that residents have with water. The Strategy seeks to identify ways in which the NWT can make best use of its existing capacity to make sound water decisions and highlight areas where capacity is lacking and needs to be built. Community members across the NWT were encouraged to contribute ideas, voice concerns and provide input

related to water stewardship as part of the Strategy development process. The Strategy was released to the public in May 2010.

The need to understand and respect the diversity of values that people in the NWT associate with water was one of the primary themes that emerged from Northerners' input into the Strategy, and thus it is well-recognized in the Strategy. The Strategy's first guiding principle for effective long-term water stewardship is to ensure that "Water stewardship decisions respect values held and various lifestyles chosen by NWT residents" (p. 10). The need to better understand and account for peoples' diverse water values in the NWT is also reflected in one of the Water Strategy's four key approaches to guiding water stewardship, which is to "understand and account for the value of water and watersheds" (p.11). The Strategy clearly recognizes that water values in the NWT are unique, and need to be identified and defined so that they can be used to support water-decisions that are better informed, more transparent, accountable, and reflective of all water interests in the NWT.

A water stewardship Action Plan document (GNWT 2011) was released one year after the Water Strategy was published. The Action Plan expands on the broad principles and approaches identified in the Water Strategy and outlines a series of action items necessary to implement the Strategy. The actions are divided into four components of water stewardship in the NWT which are referred to in the Action Plan as 'keys to success'. These include work together, which refers to actions that ensure a cooperative setting to facilitate information sharing; know and plan, which denotes actions that ensure the development of programs that incorporate various types of knowledge (i.e., traditional, local, and science); use responsibly, which includes actions that ensure decision-makers have the tools required to make informed decisions; and check our progress, which refers to actions designed to ensure that progress is

being made towards the implementation of the Strategy. Actions geared towards addressing the need for a more effective means to account for and understand the diversity of water values in the NWT are included under the ‘know and plan’ keys to success (2.1 E), which state the need to “work with knowledgeable partners [to] assess current strategies and develop a NWT relevant approach in valuation of water and ecosystem services” (p. 14).

The Aboriginal Steering Committee (ASC), which is comprised of Aboriginal representatives from each region in the NWT, played an important role in guiding the development of the Strategy and ensuring that it was representative of Aboriginal water views. The ASC continues to provide guidance and oversight with the implementation of the Strategy through the Action Plan, and thus acts as a third, although non-regulatory venue through which community members can express their views about water.

6.2 Water Governance Challenges

Although the Water Strategy and associated Action Plan (see section 6.1.1) have made substantial progress towards identifying and minimizing the challenges associated with water stewardship-related decision-making in the NWT, there are some that remain. This section draws on the perceptions and experiences of eight water policy actors in the NWT to identify the primary challenges that persist within the NWT water governance and regulatory system. The section includes reflections and connections between the challenges identified and the degree to which such challenges are addressed by the Water Strategy and Action Plan.

Interestingly, all of the challenges identified by the water policy actors were directly or indirectly related to the level of involvement and engagement that NWT communities have in making decisions about water. Most respondents (75%) spoke specifically about the challenges

associated with the two primary venues that community members can use to express their views and perceptions about water in the regulatory process. The first and most frequently discussed venue was the water licensing process. As described in section 6.1 this process allows community members in a proposed project area to voice their concerns and feedback about potential water impacts associated with the project. The second venue mentioned was the public consultation process that is required when water license applications are referred to the environmental assessment process. These two consultation processes were identified as the primary ways through which people in the NWT can express their water-related concerns and opinions about a proposed development. The water policy actors indicated that although it is positive that these two venues exist, there are a number of challenges associated with the processes within and leading up to them that detract from their overall effectiveness. These are outlined below and include communication challenges, conflicting worldviews, capacity issues and other broader governance challenges.

6.2.1 Consultation Challenges

6.2.1.1 Communication

Three of the eight respondents referenced a case where they attended a public consultation event for either an industrial water license application or an environmental assessment hearing. Based on their experiences they explained that it is often a major challenge for community members to understand and interpret the scientific language and technical jargon that often dominates the consultation processes. A researcher often consulted to provide background and baseline water quality information during such hearings explained that...

some of the information we gather and present is very technical and often it is difficult for people to interpret. So you are never quite sure if there is a complete understanding of the information we

are giving. In fact in some cases I have trouble understanding it that well, and if I am not able to then probably a lot of the people from communities are not quite getting it either. (Water Actor 1)

In addition to preventing community members from fully comprehending the consultation discussion, this lack of understanding also makes it challenging for them to join the conversation and contribute their insights. One respondent explained that the latter is an ongoing challenge she often witnesses when attending public water license hearings:

I have been at public hearings where the boards come in and they have done a public hearing on a mining application, for example Canadian Zinc, because they needed all of their water licenses and they all had their different reports on how they were going to go about mining and what they were going to do with their tailings and how they were going to take water out of the stream and how they were going to put water back in and how they were going to monitor it to make sure they were not making that water body toxic. So you really need to be able to understand and speak that technical and science language so that what you are saying is actually valued in their decisions. And that is difficult for many people. (Water Actor 2)

These reflections are consistent with findings from other studies and reviews of the NWT water governance structure. For example, a review of the role of INAC (now AANDC) in non-renewable resource development in the NWT reported that the NWT's water licensing process fails to provide adequate clarification and guidance on some of the technical terms used in water governing legislation and water quality standards (Office of the Auditor General of Canada, 2005).

It was explained that the aforementioned communication challenges are often exacerbated by the fact that decision-makers tend to rely on quantitative measures and information to gauge the potential outcomes of their decisions. This reliance on quantitative information makes it difficult for community members to communicate their water-related concerns and values in a way that decision-makers can interpret and meaningfully incorporate them into their decisions. Much of this challenge stems from the fact that many NWT communities are hesitant to quantify their water values because they feel water is invaluable and its importance cannot be expressed

in numeric terms. As such, they tend to communicate their water values in qualitative terms or narratives which are difficult for decision-makers to understand and include in their decisions.

As one participant explained,

if you go in there as a community member and share your valuation of water and how that water might be valued, or how you might have a spiritual connection to that water, it is nearly impossible for them to take that qualitative testimony on water and have that influence the way they make decisions. However, I think it is really difficult to put a price or dollar value on something like quality drinking water. And I know it is a major challenge that policy makers and decision makers have to contend with is how do you appropriately or best take into account the non-quantitative aspects of something like water, and I definitely don't pretend to have the answers to that. (Water Actor 2)

These challenges point first to the lack of common language around water that persists in the NWT between concerned community members and water-related decision-makers. As several respondents explained, this diversion in language makes it difficult for community members to bring their cultural and social water values to the decision-making table in a meaningful way. Some respondents mentioned that this communication barrier can also inadvertently create opportunities for other parties who do not face such challenges (i.e., industry) to overshadow the voices of those who do (i.e., communities).

The need for improved communication among NWT water partners, which as described in section 3.2.3.2, refers to anyone who has a role in enhancing water stewardship in the NWT and has been actively involved in the creation and implementation of the Water Strategy, is strongly emphasized in the Water Strategy and Action Plan. Under the ‘work together’ key to success, the Water Strategy (2010: 16) states that

the success of the strategy requires water partners to build a cooperative environment for all involved. This means improved communications, information sharing and capacity building. We must consider current realities that hinder working together and address these issues if we are to achieve our vision and goals..

Although this recognition of need to improve communication between NWT water partners is important for helping to address the communication challenges identified in this section, the Strategy's communication goals remain broad and general. This section highlights some of the more specific areas where communication improvement efforts should be focused in order to help water partners work together (i.e., building a more common language around water within water license consultation events).

6.2.1.1 Conflicting Worldviews

Conflicting water worldviews is another factor that can limit NWT community members' ability to meaningfully voice their water values in regulatory based decision-making processes. Three of the eight respondents indicated that many community members feel that the water governance system in the NWT obliges communities to engage in a westernized system that is dominated by western values. The respondents explained that many of the more traditional people in the territories view the western consultation system as a foreign, complicated and overwhelming process that does not reflect with their traditional values or worldviews. As such, many people tend to avoid participating in such processes, and hence their voices are not heard at the decision-making table. As one actor explained,

We have imposed a very westernized system on Aboriginal communities so I think you get a certain percentage of the population that is actually participating in these processes and then there is this assumption that they are representative of everybody in the region and they are totally not. So whether or not the folks who are more of the traditional land users, there are questions about whether their voices are being heard. It is a real challenge and struggle. (Water Actor 3)

Other respondents added that many communities in the NWT also feel that because the water consultation processes are a western concept, the processes fail to provide adequate and meaningful opportunities for different water worldviews (i.e. Aboriginal worldview) to be discussed and considered in water-related decisions. They explained that the western nature of

the system tends to limit the degree of legitimacy that Aboriginal views of water receive within the consultation processes. The latter is also due to the fact that the consultation processes are designed to gather input specific to the development proposal at hand, and thus the discussion tends to revolve around technical and scientific knowledge about water rather than traditional, experiential and cultural knowledge. One respondent explained that despite good intentions, the consultation processes

are still very development focused and do not give much detail about alternatives to resource development or other socio-cultural issues that could be brought to the decision-making table. So we do not have a good forum where both world views can interact. When you have a proposal for a specific development, that is what you are looking at. So we don't get an opportunity to ever say well this is the type of development we want and this is what we want it to look like. (Water Actor 2)

This technical and science-based focus of the water consultation processes is also emphasized in Armitage's (2005b) review of the NWT's environmental assessment process. The review explains that most environmental assessment processes remain technically oriented because they are specifically focused on conferring the environmental impacts of development activities and the suitability of possible mitigation actions. Armitage indicates that when consultation processes have a technical focus, they fail to account for broader worldviews, values and goals that need to be considered in development decisions.

Although this challenge is not directly addressed in the Water, the Strategy does identify many of the underlying elements and approaches that are required to do so. For example, as mentioned in section 6.1.1, the Strategy explicitly acknowledges that there are a diversity of water views and values in the NWT (i.e., spiritual, cultural, social, physical and historical) that must be accounted for in order to support well-informed water stewardship decisions. The critical importance of considering all types of water knowledge (i.e., traditional, local, and

western scientific) in decision-making and the associated expectations that many Aboriginal people have to be involved in water-related decisions is also explicitly acknowledged in the Strategy.

6.2.2 Broader Governance Challenges

Although most participants focused on describing the challenges that exist within the two main water consultation venues, they also acknowledged that many NWT communities face broader water governance challenges outside these two venues. It was explained that communities often struggle with communication challenges within their own government structures that can hamper the transfer of community water values to the regulatory system. Although it is the role of the regional governments to communicate with their member communities in order to accurately represent them in political decisions, there can often be a disconnect between the two. For example, a representative from the DFN, which is the regional aboriginal government for the community of Trout Lake, explained that

One of the constant challenges in our offices is trying to improve two way communication between the regional office and the communities. Sometimes there can be a disconnect between us and the communities and so that is kind of one of the constant challenges that we face is trying to best represent the communities. It is our intent as the regional office to be the regional representative of all those communities on the major issues facing the Dehcho, especially water. But we are a big region and we have limited funding, so capacity is a huge challenge. (Water Actor 2)

One of the consequences of this disconnect is that it is not uncommon for water values and concerns at the community level to get lost in the communication process (or lack thereof) between communities and regional Aboriginal governments. As explained above, the primary reason for this communication disconnect is typically resource capacity issues that ultimately limit the degree to which the regional governments are able to consult with their member communities on some subjects, including water. The task of consistently consulting and

communicating with several communities on an ongoing basis is often beyond the financial and staffing capacity of most regional Aboriginal governments in the NWT.

Some respondents added that communities can also face their own capacity challenges that limit their ability to meaningfully communicate their water values to the broader water governance system in the NWT. They explained that such capacity challenges frequently emerge when communities try to consolidate their water values and views into a clear message intended for the public water consultation processes (i.e., water licensing application, environmental assessment review). They explained that in some cases community members share different views and values of water (for example, see discussion of varied responses about the relations between water, political voice and well-being in Chapter 5), which makes it difficult to ensure that all the views are heard at the decision-making table.

There are quite a lot of communities in the region and sometimes the community members can have slightly different views on a certain issue about water and so trying to consolidate and represent them as a best reflection is challenging for them. (Water Actor 2)

In other cases where community members share similar views and values of water, communities tend to still lack the resource capacity to organize their water values and views in a way they will be understood in the decision-making arena. As one respondent explained,

organization within communities seems to be a big challenge. So if a community were to get organized and go in to the consultation process as an organized group than people would likely pay more attention to them. (Water Actor 4)

This lack of organization within communities is often a result of communities being over-taxed with consultation and feedback requests for various types of development proposals. One of the respondents indicated that based on her experiences,

it seems that the regulatory structure is well designed for Aboriginal groups to be a part of the process, but there are capacity issues for the Aboriginal groups to provide feedback on all of the

proposals and applications and things that they are asked to provide feedback on within the regulatory system. (Water Actor 5)

The consequence that often occurs because of this capacity challenge is an unclear or non-representative view of water being brought forward into the consultation and decision-making process.

As mentioned in section 6.1.1, one of the primary goals of the Water Strategy is to build capacity in areas where it is lacking. Consistent with most of the challenges identified in this section, the Water Strategy (2010: 16) specifically acknowledges that

Since the NWT covers a vast area while the population is so small, one of the biggest challenges in the NWT is capacity. This includes limited human resources and adequate training at almost all levels.

In response to this challenge, the Water Strategy Action Plan (2011) states that water partners' capacity to actively participate in water stewardship initiatives need to be routinely assessed and associated shortfalls must be addressed. This section is highly relevant to this action item as the section has identified several capacity issues that are limiting the degree to which many NWT communities are able to participate in water licensing consultation events.

Respondents also reflected on the challenges associated with the overall structure of the NWT water governance and regulatory system. They emphasized that there are limited conduits for communities to engage in the system and regulatory process beyond consultation on active development proposals. They explained that the consultation processes for water licenses and environmental assessments are designed to foster input and comments specific to the water license application for the proposed development, rather than broader views about water. One water actor explained that

when proponents apply for water licenses they allow Aboriginal organizations to comment on their licenses, but it is not a perfect process because they are not specifically asking for what do you think or value about water, they are asking for specific concerns with the application. But their applications are very technical so it does not do consultation in a way that it would bring out water values or views. (Water Actor 2)

This narrow focus tends to prevent communities from expressing their social and cultural views about water because such views are generally perceived as not being directly relevant to the specific development. As such, these views are often not brought up in the consultation process. However, the water governance system in the NWT lacks an alternative forum or venue where community members can bring their social and cultural values of water to the decision-making table.

As mentioned in section 6.1.1, the Water Strategy and associated Action Plan both recognize the need to develop an improved method or venue to account for Aboriginal water values in NWT decision-making. Although the Action Plan clearly identifies this need as a priority action item for improving water stewardship in the NWT, there is a gap with respect to the ‘how to’ aspect of achieving this goal in practice. Section 6.3 below discusses how the results of this thesis may provide some insights relevant to filling this gap.

This section has identified a number of specific and broad challenges (i.e., communication, conflicting worldviews, capacity, lack of opportunity for expression) that many NWT communities face when trying to voice their water values and views in water-related decision-making processes. All of the respondents agreed that the NWT water regulatory structure does provide two primary venues through which community members can enter the decision-making process, but the nature of the discussions (or lack thereof) that take place before and during these processes are such that community members’ voices are usually not being meaningfully incorporated into decisions. There was a strong consensus among respondents that

the latter is a serious ongoing issue that needs to be addressed. However, it is a substantial challenge with few easy solutions. Consequently, although the participants did not have any concrete answers, many provided suggestions for how the water values identified in Chapter 5, and the SWB approach that was used to unpack these values, can help address the issue. These suggestions are presented in the following section.

6.3 Water Values, Social Well-Being and Improved Governance

Eight NWT water policy actors were asked to reflect on how the Trout Lake water value information discussed in Chapter 5 may be relevant to water-related decision-making processes in the NWT. Communication and language issues were often identified as the most important and addressable challenges associated with the existing water governance structure and immediately indicated that the water values would be most effective if used as a water value communication ‘aid’. Respondents explained that although it would be ideal to push for a change in the water regulatory structure, such a goal is not realistic given the current government and the number of processes that already exist in the system. For this reason, the respondents focused on discussing different ways in which the Trout Lake water values and associated social well-being approach may be relevant as a communication ‘aid’ to help strengthen the presence of Aboriginal water values in NWT decision-making processes.

6.3.1 Reemphasizing non-economic water values

Several respondents spoke about the critical importance of unpacking and documenting NWT Aboriginal water values (such as those presented in Chapter 5) in order to ensure that such values are not forgotten or overlooked in water-related decision-making processes. Respondents explained that many people in the NWT are becoming fixated on viewing water as an economic entity and are in turn losing touch with the social, cultural and spiritual dimensions of water that

dominate most Aboriginal worldviews. Several community members referenced the increasing support that residents in the Sahtu Region of the NWT now have for economic development. They indicated that the latter is primarily due to increasing industrial development activities across the north that have ultimately led to economics being the primary basis for decision-making. The respondents acknowledged that while economics will likely continue to guide most water-related decisions in the NWT, it is critical that such decisions incorporate information on the social and cultural values of water that are often lost when decision-making is simplified through economics. As one respondent explained,

Economics completely drives everything that happens in the NWT just like it does anywhere else, and if you want to target the audience that is actually making the decisions than you have to talk about the economics side. But I think if you bring in social well-being... I mean that is the thing with economics. The question is always how simple are we making this equation. It is rather expedient to make it quite simple, and then you forget about all the externalized costs. So if you can bring those social and cultural values of water we are forgetting in through social well-being than I think that is very useful. (Water Actor 3)

This point was echoed by other water policy actors who explained that by documenting a more explicit understanding of Aboriginal water values, the results of this study can play an important role in reminding people about the significance of social and cultural water values. They explained that the water values presented in Chapter 5 will help to generate conversations and create new opportunities for people to discuss water as a cultural and spiritual entity rather than an economic one. The latter was described as the critical first step in encouraging people to recognize and reconnect with the non-economic dimensions of water that are overlooked when decisions are made based on economics.

Whatever influence you can have with this project in reminding people about the social and cultural values that they hold so dear right now then it will be very helpful in getting those values heard and remembered. The more you can add to that conversation and discussion by documenting these values, the better.(Water Actor 6)

It is really basic that people realize the social and cultural value and spiritual value of water. I think it is probably one of the prime issues, if we even think about them at all and I think that's probably the one we need to think about the most. The values here from this study will go a long way in getting people to think about talk about the importance of these. (Water Actor 1)

The importance of creating conversation about cultural and spiritual values of water is also emphasized in the Water Strategy (see section 6.1.1). The Strategy acknowledges that such values are often overlooked in broader water and land-use decisions in the NWT, and thus calls for more dialogue regarding the values, particularly stemming from the community level.

6.3.2 Means to better account for water values

The idea of using the water values presented in Chapter 5 and the associated social well-being approach to develop a more effective means to account for and articulate Aboriginal water interests was suggested by several respondents. Most respondents recommended the development of a water value communication tool with the specific purpose of improving the transmission of water values from community members to water licensing and associated environmental assessment consultation processes. Although respondents shared similar ideas about the general purpose of the tool, there were different suggestions for how the tool should be implemented, particularly with respect to the target scale and audience. Some respondents indicated that the tool would be most effective if implemented at the community scale where community members are the primary audience of the tool. However, others felt that the tool should be implemented at the land and water board scale and that the primary audience should be those who are attending water license consultation events.

6.3.2.1 Community water consultation tool

Half of the respondents indicated that the SWB approach applied in Trout Lake would be most effective if adapted into a water consultation tool that communities or regional Aboriginal

governments can use to consolidate and organize community water values. The intent of such a tool would be to provide communities with a more structured way to document the different water interests among their members. The respondents explained that by doing so, the tool would help communities better account for the many less explicit water values and interests – particularly the relational and subjective water values discussed in Chapter 5 – that are currently not being accounted for when land and water boards are granting water licenses. The idea is that the tool would ultimately help community members compile their water interests in order to formulate and communicate a clear message during water-related consultation processes. Those in favour of such a tool also explained that the tool would play an important role in helping to strengthen communities’ voices in the consultation processes and enhance the amount of attention that community voices receive. For example, one respondent explained that he

would be hesitant to suggest a new process just because there are so many now. But as you were talking I was thinking that organization seems to be the big thing. So if a community were to have a tool they can use to get organized.... If you go in as one voice you're not that loud, but if you go in as an organized group then people tend to pay more attention to you. I think that is important for community.. I mean and I am sure this is in the community conscience, but I think it is helpful if it is just put into paper or put into sort of organized [way] so that when new development comes up or land use planning comes up, you're not starting from square one and asking those questions now that you have done. Almost like a community baseline. (Water Actor 4)

As indicated at the end of the above statement, such a water consultation tool would be most effective if used in preparation of a water-license or environmental assessment consultation event. The respondents explained that by applying the tool in order to gather water value information before a consultation event, communities will likely be more prepared to participate in such events. Furthermore, given that the overall intent of the tool would be to help communities consolidate their members’ water values and interests, it is unlikely that the resulting water value information would change substantially over short periods of time. Consequently, the water value information generated by the tool could be used as a basis for

multiple development consultation processes. In other words, the tool would not have to be repeatedly applied for each development proposal they are asked to provide feedback on. This would help to alleviate some of the current resource capacity challenges that many communities face with providing comprehensive feedback to frequent development proposal requests (see section 6.2.2).

6.3.2.2 Land and water board water consultation tool

The other half of respondents suggested that the social well-being approach that was applied in Trout Lake should be used to develop a water consultation tool that NWT land and water boards can use to collect preliminary water value information from communities before formal water licensing consultation events. They explained that the benefit of developing and applying such a tool for use by the land and water boards is that it would enable the boards to provide consultation participants with baseline community water value information before formal discussions begin. By doing so the tool would essentially help to set the stage for the consultation process so that all of the participants would have a general understanding of where communities stand on the proposed development before engaging in the consultation process. Research respondents indicated that this would help to improve the current consultation process because it would mean that such processes would not be starting from scratch each time. The idea is that because the participants would already have a general understanding of community water values, the processes would be able to direct more focus towards discussing different ways in which the known community water interests and values can be incorporated into decision-making.

6.3.2.3 Tool Design

Although both groups of respondents generally agreed on the need for and purpose of a water consultation tool to better account for community water values, there was some divergence with respect to how the Trout Lake water value information and SWB approach should be used to develop such a tool. Some respondents suggested that the tool should be a survey or interview instrument similar to the social well-being approach applied in Trout Lake. They suggested that such a survey instrument should use the social well-being approach to ask community members a series of questions about their values, uses and opinions on certain water bodies. Others suggested that the tool should take the form of a water body classification tool where community members are asked to classify potentially impacted water bodies based on the level of disturbance they consider acceptable for the water body. They explained that the water value classification tool would essentially be used to gain a better understanding of the relative values that community members associate with different water bodies. This information would then be used by the land and water boards to help set site-specific water quality objectives for the proposed development. As respondent explained,

It would be a classification system that would classify a water body as either a 0, 1, 2, 3, 4. 0 would be 100% protected, you don't mess with it and you don't put anything into it. And then 1 would be very important and you really don't want to change it but you can put stuff in as long as you don't change it. 2 being okay, it is somewhat important, but we can have some change and then the highest number, whether it is 3 or 4... and that would be a non-fish bearing lake and you are basically saying it is okay to destroy it. It is a questionnaire that could be developed, and then for each answer there would be a scoring system and then in the end it would spit out a number, either a 0, 1, 2, 3, 4, 5 that would be used for setting water quality objectives based on people's values. (Water Actor 7)

One respondent expressed his support this type of tool and explained that it is ideal for the NWT because...

Basically it allows community members to say that this is an area that we want to reserve for traditional cultural practices and we don't want anything in this area. Or that this is an area where we would consider some sort of change or work in this area. Or that this is an area where we already use it a lot, everyone else uses it a lot and so just go to town with it. The tool doesn't say that this area is worth \$250,000 or anything like that, you are just setting it as off limits based on their values. (Water Actor 4)

Despite the lack of consensus regarding the type of tool that should be developed, there were some common criteria among the proposed two tool ideas (i.e., questionnaire, water body classification tool). For example, all of the respondents agreed that the tool should include a mix of both qualitative and quantitative components. Tools that are entirely quantitative in nature were deemed as inappropriate and unsuitable for the NWT given the diversity of social and cultural water values that people in the NWT associated with water. On the other hand, solely qualitative based tools were regarded as incompatible with meeting the needs of decision-makers who often have difficulties interpreting such forms of information.

I think it we need a tool that has a mix between a quantitative and qualitative approaches. It cannot be a quantitative thing in terms of putting a value on water, and it cannot be a strictly qualitative thing so it has got to be a mix of both if it is going to work. (Water Actor 6)

There was also agreement regarding the need for the tool to provide a tangible output that decision-makers can easily interpret and incorporate in their decisions. The respondents explained that without an obvious output, it will be difficult to have the buy-in necessary to successfully implement to use of such a tool. Respondents also agreed that the tool should aim to incorporate some sort of data collection component geared towards collecting water value information from community members. They explained that it is important to directly target community members for input in order to ensure that they are given an opportunity to express their views. In terms of applying the tool, there was also a consensus that regardless of its design, the tool would be most effective if used prior to a water consultation event. The respondents agreed that the purpose of the tool should be to collect some form of baseline water value

information from community members as a way to set the stage for consultation discussions. Finally, all of the respondents implied that the ultimate goal of the developed tool should be to help create a more common language around water between communities and decision-makers. One respondent summarized this by stating that,

what it comes down to is getting the right conversation going on that overlaps somewhere and trying to identify that overlap to have a coherent conversation about water. We need a tool that does that. That is step one. (Water Actor 3)

6.4 Chapter Summary

This chapter began with a brief overview of the water governance and associated regulatory structure in the NWT, and a summary of the Water Strategy and Action Plan. The overview revealed that there are two primary regulatory venues through which NWT community members can voice their water-related concerns in decision-making processes (i.e., water license consultation and environmental assessment consultation). The following section drew on the insights and experiences of eight NWT water policy actors in order to discuss the range of challenges that exist within the current NWT water governance system. Interestingly, all of the respondents spoke about challenges that directly or indirectly related to the two consultation venues identified at the beginning of the chapter. Poor communication, a lack of common language and conflicting worldviews were among the most frequently mentioned challenges associated with the consultation processes themselves. Additional challenges related to a lack of capacity and organization within communities were also discussed as barriers limiting the degree to which community voices are heard in water-related decisions. Although the respondents did not have any concrete answers for how to address these issues, many provided insights on how the water values identified in Chapter 5 and associated social well-being approach may inform some solutions. Although there was some variation among the suggestions, most revolved

around two primary uses of the Trout Lake water value information and social well-being approach. The first was to remind and encourage people in the NWT to reconnect with the social and cultural dimensions of water that are often overlooked when decisions are made based on economics. The second was to inform the development of a water consultation tool designed to better account for and improve the articulation of community members' water values in the consultation processes.

Chapter 7: Conclusions

Understanding the relationship between water and people's well-being is a well-recognized challenge that needs to be addressed in the NWT. This thesis was designed to help address this need by applying a social well-being lens to make the values that northerners associate with water more explicit. The first section of this concluding chapter revisits the research objectives and summarizes how these were addressed in Chapters 1-6. The following section provides a brief overview of the main conclusions drawn from the study and reflects on the main findings in light of relevant literature. The key conceptual and practical contributions of the research are highlighted in the subsequent section, after which the chapter concludes with suggestions for future research.

7.1 Summary of Thesis and Research Objectives

Chapter 1 introduced the concept of water security as a balance between water resource protection and human uses of water for livelihood enhancement (Grey and Sadoff 2007; Cook and Bakker 2012). An inability to access the quantity and quality of water required to satisfy physical, cultural and spiritual needs was described as a serious ongoing concern in many of Canada's northern Aboriginal communities. In Chapter I explained that while there are technical obstacles that need to be overcome to address these growing concerns, an equal or perhaps more substantive challenge is that of improving water governance. Water governance was described as a particularly challenging issue to address in the north due to the diversity of competing interests and values among the many water-related actors in the region. Ensuring that all Aboriginal interests and values of water are recognized and incorporated into decision-making processes was described as a key step in improving water governance in northern Canada's Aboriginal

communities. However, I outlined that the methods to identify and understand the non-monetary values of water are not well developed, and thus most decisions tend to be based primarily on the economic value of water. The need for improved methods to better understand and account for the non-economic ways that people value water was identified as an ongoing challenge in the NWT that is well recognized within the Water Strategy (see section 6.1.1).

The goal of this study was to help address this challenge by applying a social well-being lens to help make more explicit the intangible values that many Aboriginal people associate with water. Three primary objectives guided this research:

- 1) To understand the current water resource conditions (e.g., quality and quantity) and contextual circumstances (e.g., community culture, history, traditions) impacting local water use and perceptions in the case community
- 2) To use a social well-being lens to examine the values that people associate with water resources in the NWT
- 3) To examine how an understanding of these water values may be relevant to policy and decision-making processes in the NWT

The remaining sections of the chapter outlined the research design and provided contextual information relevant to the community of Trout Lake and the Dehcho Region.

Chapter 2 provided an overview of the conceptual literature that was used to inform the research. Water security, water governance, water valuation and social well-being were the primary concepts discussed in the chapter. Water security was described as a multi-faceted concept that involves a balance between water resource protection and water for human needs,

whereas water governance was described as the processes (i.e., political, organizational and administrative) through which water decisions are made. I explained how water security and governance have a mutual relationship, where water security sets the objectives for good water governance and good water governance enables the operationalization of water security. This relationship was used to explain why a strong understanding of the different ways that people value water is critical to both water governance and water security. This led to a discussion about the role of water valuation methods and an overview of the most common approaches, most of which are primarily economic-based. Chapter 2 concluded with an overview of the social well-being framework which was applied in this research as an analytical lens to unpack the material, relational and subjective ways in which northern Aboriginal communities may value water.

Chapter 3 was an outline of the research methodology and methods used in this research. The chapter began with an overview of the general types of methodological approaches used in this research and a description of the central role that collaboration played both before and during data collection activities in the community of Trout Lake. The next section outlined the various data collection activities used in this research, including a document review and two groups of semi-structured interviews. The data analysis processes were also described, which included a combination of qualitative techniques to code and interpret the interview transcripts. The chapter concluded with a brief summary of the limitations and challenges associated with the research design.

Chapter 4 drew on information collected through the document review and semi-structured community interviews in order to address the first research objective – to understand the contextual circumstances and water resource conditions that may impact local water use and perceptions in the community of Trout Lake. The first half of the chapter was a community

profile of Trout Lake, including a description of its location, way of life, and political and economic structure. The latter half of the chapter focused on explaining current and past water issues in the community, highlighting common water concerns and summarizing the types and extent of water-based research that has been conducted in the community.

Chapter 5 addressed the second research objective of using a social well-being lens to examine the tangible and intangible values that people associate with water resources in the community of Trout Lake. The chapter presented the results from the 28 community interviews conducted in Trout Lake. The results were divided into three primary sections based on respondents' perceptions about the importance of water to each of the three social well-being dimensions outlined in Chapter 2 (i.e., material, relational and subjective). The first section presented the material values that community members associated with water resources. Four key values were identified: environmental quality, livelihood activities, physical human health (traditional food, drinking water, traditional medicines), and income and wealth. The next section examined the relational values that community members associated with water, including those associated with social and cultural relationships (i.e., creating physical togetherness and building cultural identity) and political relations. The final section of the chapter discussed the subjective values that Trout Lake community members associated with water. Five key values were identified: spiritual attributes, sacredness, healing, self-sufficiency, and sense of meaning. The water values presented in Chapter 5 served as a basis for discussion for Chapter 6.

Chapter 6 was dedicated to addressing the third and final research objective of examining how a more explicit understanding of the non-market water values presented in Chapter 5 may be relevant to water-related decision-making processes in the NWT. The content of the chapter was based on the experiences and insights of eight water policy actors in the NWT who were

asked to review the Trout Lake water value information and reflect on the potential relevance of such values for NWT water decision-making processes. The chapter was divided into three primary sections, the first of which provided a brief overview of NWT water policy actors as well as summary of the overall water governance structure in the NWT. The second section highlighted the water policy actors' views on the main challenges associated with the effectiveness of the current decision-making processes for water issues in the NWT. Four primary challenge areas were identified: communication, capacity, conflicting worldviews and limited conduits to express social and cultural views of water. The final section of Chapter 6 provided an overview of water policy actors' insights and suggestions for ways in which the Trout Lake water values discussed in Chapter 5 and associated social well-being approach may help to address some of these water governance challenges. Although there was some variation among the respondents, most of these suggestions revolved around the use of the Trout Lake water value information and social well-being approach for two main purposes. The first was to remind and encourage people in the NWT to reconnect with the social and cultural dimensions of water that are often overlooked when decisions are made based on economics. The second was to inform the development of a water consultation tool designed to better account for and improve the articulation of community members' water values in the consultation processes. The following section expands on the main conclusions from Chapter 5 and 6 identified here and reflects on the findings in light of existing relevant literature.

7.2 Main Conclusions

Several conclusions regarding Aboriginal water values and the relevance of such values to NWT decision-making can be drawn from this study. This section summarizes these conclusions and draws connections to relevant literature associated with water values and social well-being.

7.2.1 Water Values

The community interview results that were presented in Chapter 5 revealed a rich understanding of the myriad ways in which Trout Lake community members value water. The values were identified through applying the social well-being framework outlined in Chapter 2. Although the concept of social well-being has yet to be applied in the context of water, the results indicate that the framework is highly relevant to helping address the challenges associated with unpacking and understanding people's diverse relationships with water. The following three sub-sections highlight some of the main conclusions about the water values that were identified through applying a social well-being lens in this regard.

7.2.1.1 Material Values

When it came to understanding the link between material well-being and water in the community of Trout Lake, there was a clear consensus that water's material role in supporting and maintaining environmental quality is a critical value. The high value that was associated with water's relation to environmental quality was due to community members' perceptions of water as a critical precondition for the other values they associate with water (i.e., values linked to livelihood activities, physical human health, social relationships, and other subjective values). Community members explained that healthy water is needed to support the healthy environment on which their lives depend.

However, most community members indicated that income and wealth are the lowest priority among material water values. This is largely because Trout Lake is a traditional community with strong ties to a subsistence lifestyle, and thus money is generally perceived more as an added benefit of water rather than a necessity for living a quality life in the community. Several community members explained that although these perceptions are still primarily true in Trout Lake, there are concerns that such perceptions may soon change if people lose touch with their traditional values of water, particularly those associated with livelihood activities, emotional attachments and spiritual connections. These concerns suggest why community leaders and elders in Trout Lake are particularly worried about younger generations becoming disconnected from traditional water uses, practices and norms in the community (see section 7.2.1.1 below for more detail about generational tension). Similar types of shifts from traditional values to more western-based values have been noted elsewhere in the NWT. For example, Wesche and Armitage (2013) indicate that such changes have been ongoing in the community of Fort Resolution, where lifestyles have become more sedentary, traditional land-based activities have decreased, and Western education systems have become the norm. The people living in the community of Trout Lake are aware of these types of changes, and thus are trying to ensure that their community members do not lose touch with traditional values.

7.2.1.2 Relational Values

The relational values that community members associate with water were less explicit than the material water values. This was to be expected given that the material values generally tend to have a physical or tangible component to them (e.g., traditional medicines from water, travelling via boat across a lake, etc.) whereas relational values are linked to less tangible interactions between people, and thus are more difficult to identify. When initially asked about the general

importance of water to their relationships, most community members found it difficult to articulate the connections between water and people's relationships. This was largely due to the fact that such connections are entrenched in their way of life, and thus it is not something they think often think consciously about. However, the open and loose structure of the social well-being framework gave respondents the freedom to share detailed stories and experiences that helped to illuminate different ways in which water influences relationships that are important to people. Unpacking the rich connections between water and people's relational well-being would not have been possible if respondents were restricted to pre-conceived categories of values, which as explained in Chapter 2, is often the case with economic-based approaches.

Applying the social well-being framework in the community of Trout Lake revealed that water is important to community members' relational well-being because of its role in influencing their social, cultural and political relations. The importance of water in helping to strengthen social and cultural relations was consistently prioritized over its role in political relations. This is primarily due to the collectivist culture and small population in Trout Lake that make strong community and family relationships central to being able to live well in the community. Water was highly valued for its ability to help build community and family cohesion through physically bringing people together (i.e., through recreation activities, sharing stories, etc.); uniting people through a common cultural identity (i.e., water norms, rules and traditions that unite community members); and encouraging reciprocity and sharing among community members (i.e., fish, drinking water, traditional medicines etc.).

An interesting conclusion is that water issues have the potential to influence social, cultural and political relationships in both positive and negative ways. Most of the results in Chapter 5 indicate that water generally tends to help maintain and strengthen social and cultural

relationships in the community. However, unpacking the ways in which water helps to connect community members through a common cultural identity revealed a nuance regarding generational tension between Trout Lake elders and youth. From the perspective of most community elders, water is critical to relational well-being because it is associated with several norms, traditions and rules that act as symbols of a collective cultural identity that unites community members and ensures the continuity of their cultural identity across generations. However, several elders noted cases (see section 5.2.1.2) where they felt the youth in the community were not following the social water norms upon which much of their cultural identity is built. From the perspective of community elders, following traditional water norms and traditions is critical to maintaining the community's cultural identity across generations, which is central to their well-being. In contrast, the results suggest that many youth in the community consider the link between complying with traditional water norms and cultural identity to be less important to their well-being. These differences in perceptions about well-being appeared to create tension between generations within the community. These findings are similar to a study on Canada's Blood Tribe (Fox 2004), which reported generational tensions caused by community elders becoming frustrated with the lack of respect and compliance that youth have for cultural norms and traditions. The study suggested that the latter is likely due to the disappearance of non-western ways of learning in the daily lives and educational systems of the youth.

7.2.1.3 Subjective Values

The subjective values that Trout Lake community members associate with water were the most challenging values to unpack and understand. However, these difficulties were anticipated given that previous social well-being work (Coulthard et al. 2011, Britton and Coulthard 2013)

explains the subjective dimension as something deeply rooted in people's psychological and emotional feelings of life satisfaction. In order to address this challenge I used Coulthard et al. (2011)'s suggestion to use a subjective line of inquiry and asked respondents what it means to live well in the community of Trout Lake. I found that it was particularly useful to encourage community members to think about how their idea of a good life in Trout Lake would likely differ from someone living in an urban environment such as Toronto or New York. I encouraged respondents to think about how water fits in with their vision of a good life in the community of Trout Lake and asked them to reflect on how satisfied they are with their progress towards this vision. As Coulthard et al. (2011) also found, using this type of subjective inquiry illuminated many aspects of peoples' lives that are critical to their well-being but are not encompassed by narrow economic-based approaches.

The results from using this means of inquiry to understand community members' subjective connections to water indicate that they associate a diversity of subjective values with water, including values related to spirituality, sacredness, freedom and autonomy, healing, and sense of meaning. Although these subjective values of water were the most difficult to unpack, there are indications that suggest community members may prioritize the subjective values over other water values, particularly those associated with material well-being. For example, many elders tenaciously continue to drink untreated water from around the community (despite past fuel spills and observations of poor water quality) rather than the treated drinking water delivered to their home. Although 'rational' behaviour from a western perspective would imply drinking the treated water, many elders continue to drink the untreated water because of the strong spiritual values they associate with untreated or 'raw' water. This example demonstrates the greater value that some community members associate with the subjective dimensions of water

(i.e., spirituality) in comparison to the material dimension (i.e., drinking treated water for physical health). The example also illustrates how people's decisions and behaviours can be influenced by their perceptions of their own quality of life. These findings are consistent with other social well-being studies which reflect the degree to which people's subjective well-being can influence their behaviours, decisions and actions (Armitage et al. 2012; Britton and Coulthard 2012).

7.2.2 Relevance of Water Values to Decision-Making

The need for a more explicit understanding of NWT water values to support better-informed decision-making is well-recognized in the Water Strategy and Action Plan (see section 6.1.1) (GNWT 2010). However, as discussed in Chapter 6, there is also a large disconnect between community water values and the views and interests that are actually incorporated into NWT water-related decisions. This challenge was largely attributed to a problem of articulation characterized by communication and capacity issues that complicate and hinder the transmission of water values from the community level to the decision-making arena. Recognizing that it is not realistic to expect a single or straightforward solution to these challenges, the water policy actors suggested some potential strategies where the water value information in Chapter 5 may help to address some aspects of these challenges.

Generally, the results indicated that the water value information would be most effective to help address the articulation challenge if used to help improve the degree to which Aboriginal water values are included in water-related decisions in the NWT. Two primary ways in which the water value information may help to achieve this goal were identified. The first is to re-emphasize among NWT residents and relevant governments (i.e., GNWT, AANDC) the importance of non-economic water values to ensure that such values are not forgotten or

overlooked in water-related decision-making processes. The second way, and perhaps the one with the most practical traction, is to use the values to help develop a water consultation tool to better account for and articulate Aboriginal water interests. Additional conclusions and reflections about the potential development of such a tool are discussed below.

7.2.2.1 Reflections on Water Consultation Tool

As discussed in Chapter 6, the policy and government interview results indicated that there was a general consensus that the purpose of the tool should be to provide a means to better account for community water values and help decision-makers make sense of such values. This projected purpose seems appropriate given that it is well aligned with helping to address the water valuation needs identified in the Water Strategy and Action Plan (see section 6.1.1) as well as the overall need for greater inclusion of community water values in decision-making. The latter was identified as a primary weakness in the NWT's current water governance structure by several water policy actors (see section 6.2).

Despite consensus on the purpose of the tool, there were a range of recommendations regarding the most effective design of the tool and the target scale at which it should be implemented. As discussed in section 6.3, some water policy actors suggested that the tool would be most effective at fulfilling its intended purpose if it were developed as a questionnaire or interview instrument that communities can use to consolidate and organize community water values. The idea is that the tool would be used in preparation of a water-license or environmental assessment consultation event so that communities would be more prepared to communicate their members' water values and interests during such events. This type of tool would be based on the same social science-based conceptualizations of water values that were discussed in

Chapter 2. The idea of the tool would be to use a mix of qualitative indicators such as people's perspectives, opinions and uses of water to capture the subjective importance of or appreciation that community members have for the resource.

In terms of practical utility, this type of tool would share a similar purpose to that of the framing analysis tool described in Chapter 2 – elucidating stakeholder views regarding a social and environmental issue. However, there are some important differences between the two tools and their intended applications that should be noted. For example, the framing analysis tool is designed to help resolve existing environmental conflicts, while the tool suggested by the water policy actors would be aimed more towards conflict prevention. Whereas the framing analysis tool is used to work backwards to better understand how an existing conflict developed, the suggested water consultation tool would be used to help prevent environmental conflicts from occurring by providing a means for communities to enhance the presence of their values and views during consultation. Thus, while the information and knowledge gained through applying the framing analysis tool is typically used in the context of negotiations, the outcomes from the suggested tool would be used in the context of consultation. Furthermore, as mentioned in Chapter 2, it can be a very labour-intensive task to apply the framing tool in practice. In comparison, the tool suggested by the water policy actors would have to be user-friendly and not resource-intensive so that communities feel comfortable working with it. The latter points to a distinct difference in scale and breadth between the two tools, where the frame analysis tool is typically conducted at a much higher scale and with a substantially wider focus than that of the suggested water consultation tool.

In contrast to the interview or questionnaire-based water consultation tool, other water policy actors suggested that the tool should be designed in a way that land and water boards can

use the tool to collect preliminary water value information from communities before formal water licensing consultation events. In this case the tool would be developed as a water body classification tool where community members would be asked to classify potentially impacted water bodies based on the level of disturbance they consider acceptable for the water body. This type of tool would be based on some of the same key principles underlying the economic conceptualization of water discussed in Chapter 2. Although this tool would not result in assigning an economic dollar value to water, the tool would essentially ask community members to indicate the level of water disturbance they are willing to trade-off in exchange for the potential benefits of a development. As explained in Chapter 2, economists define value by the trade-offs that people are willing to make between different goods and services. Therefore, although this tool would not use dollars as a unit to measure and compare the values that people associate with water, it would provide a relative value estimate for different water bodies.

Although these two tool suggestions offer useful insights, I have some additional input about the potential development of such a tool. In the remainder of this section I reflect on the tool design and implementation ideas suggested by the water policy actors above and provide my own suggestions for how the tool may gain the most traction in practice.

Based on my water-related research experiences in the community of Trout Lake and Yellowknife, I too feel that the insights gained through this thesis should be used to develop a tool to better account for community water values in decision-making. In terms of implementation, I suggest that the land and water boards make the tool a requirement that proponents must fulfill as part of the water license application process. There are two primary reasons for why I suggest that the tool be implemented at the land and water board scale rather than at the community level as some water policy actors suggested (see section 6.3). The first

relates to capacity. As discussed in section 6.2, many communities are often already over-taxed with consultation and feedback requests for various types of development proposals. Some communities also often struggle to find the time and financial resources necessary to organize their water values and views in a way they will be understood in the decision-making arena. As a result of these challenges, it is unlikely that most communities will have the time or financial capacity necessary to launch and lead the application of a water consultation tool in their community. The second reason relates to communication. Given the communication challenges that often exist between communities and their regional governments that are responsible for relaying information to the land and water boards (see section 6.2), it is unlikely that the insights gained from applying the tool will be effectively communicated from the community level to decision-makers. With these challenges in play, it seems logical that it should be the responsibility of the land and water boards to ensure that water license proponents collect and account for relevant community water values prior to water license consultation events. As part of this responsibility I suggest that the land and water boards also provide guidelines to help proponents implement the tool.

In terms of design, it seems that the tool would be most effective if developed into a short workshop (maximum one day) exercise that water license proponents can conduct in potentially impacted communities. The main goal of the workshop would be to focus on applying a water body classification tool similar to the one suggested by some of the water policy actors (see section 6.3.2.3). As explained in Chapter 6, the purpose of such a classification tool would be to provide community members with an opportunity to classify potentially impacted water bodies based on the level of disturbance they consider acceptable for the water body. Although the overall structure of the workshop will likely vary based on community members' interests,

concerns and goals, it is critical that the workshop includes a mapping exercise. The purpose of such an exercise would be to allow community members to visually discuss their concerns about and the importance of specific water bodies that may be impacted by a potential development. The insights gained through conducting this type of workshop exercise would provide a detailed understanding of the relative values that participating community members associate with the examined water bodies. This information would then be consolidated so that it can be used in water licensing proceedings to help set site-specific water quality objectives for the proposed development.

There are four main reasons for why I propose that the tool be designed and applied in this way. First, I suggested that the tool be applied in the context of a community workshop in order to help build trust and establish mutually beneficial relationships between community members and the proponent. In order for the tool to be successful, it is essential that the proponent invests time and effort into visiting the community they intend to work with. Doing so helps to improve cultural sensitivity, demonstrate the proponents' commitment to the community, improve trust, and reduce apprehension with regards to extractive research (Wesche 2009). Second, I emphasized the importance of incorporating a mapping exercise into the workshop partly because it provides a central source of discussion that all participants can engage in, but also because most Aboriginal cultures are more comfortable with and accustomed to visual-spatial learning styles (Rasmussen et al. 2004; Ruby Jumbo, personal communication, August 2013). Third, I recommended that the tool be designed as a water body classification instrument so that there is a clear tangible output that decision-makers can easily interpret and incorporate in their decisions (i.e., numbers indicating the relative degree of importance that community members place on potentially impacted water bodies). Finally, the tool design suggested above would also

help to address some of the consultation-related water governance challenges that were highlighted in section 6.2. For example, by designing the tool as a community workshop dedicated to gathering community members' insights on relative water values, the tool provides community members with an accessible venue to voice their water interests and concerns. As a result, the tool will also likely result in increased participation among community members who are currently not aware of or involved in water licensing consultation processes.

7.3 Key Contributions

This section discusses how the research makes both conceptual and practical contributions to the literature.

In terms of conceptual contributions, this research provides four unique additions to the relatively new and limited literature on the use of the social well-being framework to better understand peoples' relationship with the natural environment. The first addition relates to providing insights on the use of the social well-being framework in the context of water.

Although the social well-being framework has been used as an analytical lens in the context of fisheries and social-ecological resilience (Marschke and Berkes 2006; Coulthard et al. 2011; Britton and Coulthard 2013), it has yet to be used in a water management setting. This research suggests that there are three primary ways in which the framework can contribute to improved understanding of non-economic water values and better water management overall. One way is by providing a more systematic and comprehensive way to account for the many non-economic values that people associate with water in their pursuit of living a quality life. The social well-being approach was particularly useful to help unpack the deeply-rooted subjective and relational values of water that are often missed when economic methods are used to account for water values. This benefit is linked to the fact that the social well-being approach offers a social theory

approach to the issues as opposed to a purely economic one. In addition to helping identify a broad range of water values, the social well-being framework can also help to provide a deeper understanding of such values, as well as the connections and relationships between them. This research found that the social well-being approach provided a well-structured means (i.e., three well-being dimensions) to conduct a detailed analysis of each water value individually, which helped illuminate the interactions and relationships between such values. Finally, by providing a broader and deeper understanding of peoples' water values and the interactions between them, the social well-being lens can help to provide insights into how and why people use and think about water. These types of insights are critical requirements for supporting well-informed water-related decisions.

The second primary contribution that this research makes to the existing social well-being literature is related to the addition of a northern Aboriginal perspective. By demonstrating that the social well-being framework can be an appropriate and effective tool in a northern Aboriginal context, this research has widened the application potential for the framework, while also providing a starting point for subsequent research aimed at gaining a better understanding of the elements that people require to live well in an Aboriginal context. These findings expand on the work of Britton and Coulthard (2013) and Coulthard (2011), both of which conclude that the social well-being framework is applicable and relevant to both developed and developing country contexts. This study illustrates that the framework is also applicable in a northern Aboriginal context.

The third primary addition that this research makes to the social well-being literature is associated with the practical relevance of applying a social well-being lens in the context of water. The findings of this research demonstrate that the insights gained by applying the social

well-being framework may have the potential to inform the development of a practical tool or instrument that can be used to collect critical water value information required to make well-informed decisions. These findings build on the work of Marschke and Berkes (2006) who assert that the social well-being framework provides an effective means to make the intangible values that people associate with natural resources more explicit, thereby helping decision-makers understand the trade-offs and impacts of their decisions.

This research also contributes a better conceptual understanding of the potential challenges associated with applying the social well-being framework to help understand the myriad ways in which people value water. One of the primary challenges that emerged while using the social well-being approach to better understand Trout Lake water values was managing the time and resource demands of collecting and analyzing the appropriate data. The labour-intensive nature of the coding and analyzing required to unpack the detailed values that community members associate with water may be a disincentive for those considering using the social well-being approach in the context of water. The latter is particularly likely to be a challenge that researchers encounter when applying the social well-being framework in a cross-cultural context such as the case with this research. This is primarily due to the critical need to develop a strong understanding of the research context in order to draw accurate interpretations of the data collected. However, these are certainly challenges that can be overcome with adequate planning and additional resources.

Further potential challenges of using the social well-being framework in the context of water values stems from the fact that the social well-being literature does not yet consider the broader implications of the outcomes from applying the framework, particularly with respect to trade-offs. For example, one of the challenges that emerged while analyzing the Trout Lake

water values is that the framework does not have an effective means of accounting for cross-scale trade-offs between individual and community well-being. More specifically, I found that the social well-being framework does not have a specific mechanism to deal with the trade-offs that can occur in situations where something that may be good for the well-being of a community is not good for all the individuals within that community. For example, if a proposed development was disapproved near Trout Lake, it would likely increase the well-being of the community by protecting an important water body, but it may also result in a loss to the well-being of local workers dependent on the employment opportunities of such developments. In such a situation the social well-being approach would likely struggle to account for the well-being trade-offs and associated implications that would occur between the individual and community scale.

In terms of trade-offs, it is also likely that researchers may encounter challenges when attempting to account for the potential trade-offs that emerge between social well-being and other types of well-being (i.e., community well-being increasing at a loss to ecological well-being). For example, this type of trade-off would occur in a situation where a community associates strong values with using water to gain economic benefits through fracking operations. While the community may experience improved material well-being through increased employment and resource royalties, such gains would occur at a cost to the ecological well-being of the fracking area. It would be difficult to account for these types of trade-offs using the social well-being framework because it tends to focus on human dynamics over environmental ones, and thus is not entirely explicit in identifying the feedback effects and associated trade-offs between social and ecological well-being. However, Armitage et al. (2012) suggests that this can

be overcome by adopting a hybrid approach to social well-being that situates the concept within a more ecologically focused framework (e.g., resilience, ecosystem approach).

Lastly, some researchers may find it challenging to work with the social well-being framework due to its lack of definition for well-being. Although the concept of well-being is often associated with different meanings depending on the context and scale in which it is being applied, it is important to recognize that the social well-being framework is designed to accommodate these differences. For this reason, the framework is broad and flexible so that it can be adapted to reflect how well-being is defined in different contextual circumstances (i.e., geographical, cultural).

There are several additional practical contributions that stem from this research. For example, the results of this study contribute an increased understanding of the myriad ways in which water is valued in a northern Aboriginal context. As explained in Chapter 1, there is an important knowledge gap in the NWT related to understanding the diversity of values and interests that Aboriginal communities associate with water. The findings of this research add an empirically grounded understanding of Aboriginal water values specific to the community of Trout Lake. The research also brought to light some of the major weaknesses associated with the NWT water governance structure that make it challenging for community members to voice their water values and interests in a meaningful way. Many water policy actors who participated in this research indicated that one of the greatest, and perhaps most difficult challenges to address, is the lack of mechanism or process to help translate Aboriginal water values in a way that they can be understood by decision-makers. This research provides several suggestions for how the water values identified in Chapter 5, and the social well-being approach that was used to unpack those values may help to address this challenge. These contributions directly feed into the Water

Strategy and associated Action Plan (2011: 15), which states the need to “work with knowledgeable partners [to] assess current strategies and develop a NWT relevant approach in valuation of water and ecosystem services”. This research helps to begin to answer the questions associated with “what” are Aboriginal water values, and “how” can they be better incorporated into water-related decisions in the NWT.

7.4 Future Research

This study has also created several opportunities for future research that can add to the existing conceptual and practical contributions discussed in section 7.3. First, this research has opened an interesting opportunity to further explore and expand on the preliminary ideas regarding the development of a water consultation tool to better account for community water values in the NWT. This study has provided some initial ideas about the types of audiences (i.e., community members, water license consultation participants) and potential scales (i.e., community level, land and water board scale) at which such a tool may be most appropriate. A study aimed at developing and pilot testing a water consultation tool based on the insights of this study and additional research would be a valuable extension of this current work. The need to develop an NWT relevant water consultation tool was highlighted as one of the keys to success for implementing the Water Strategy. Further development of the tool would be very practically significant in the NWT.

Research aimed at conducting a study similar to this one in another Aboriginal community may also extend the contributions of this research in several ways. For example, such a study would help to determine if the water values unpacked and documented in this study are representative of other Aboriginal communities either in the NWT or communities within different geographical, historical and cultural contexts. An additional case study may also help to

draw further conclusions about the myriad ways in which water is valued in a northern Aboriginal context. Furthermore, such a study may help to strengthen conclusions outlined here about the utility of the social well-being framework as a water consultation tool in a community context.

There are also additional avenues for research that seeks to repeat this study once the water governance changes associated devolution in the NWT have taken full effect. It would be particularly useful to compare the water governance challenges discussed in Chapter 6.2 before and after the effects of devolution. Likewise, it would be useful to repeat a similar study to this thesis following the full implementation of the Water Strategy. The Water Strategy is designed to mitigate water governance challenges in the NWT, and thus it would be valuable to compare the water governance challenges discussed in Chapter 6.2 before and after the Strategy was implemented. Such a study would likely provide some valuable insights on the success of the Strategy.

Finally, there are also opportunities for future research focused on conducting a detailed examination of water governance models and best practices that do an effective job of integrating Aboriginal water values into Western water governance institutions at various scales. Additional inquiry is needed to identify cases in Canada and internationally where Aboriginal communities feel that their water values are successfully being incorporated into the governance system. Future research could examine specific policies, regulatory instruments and funding models that make the case successful. An examination of such cases could serve to inform best practices in other Aboriginal communities.

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Appendices

Appendix A: Student – Community Research Agreement

This document outlines the terms of a general research agreement between Blair Carter, a Master's student at the University of Waterloo pursuing research in the community of Trout Lake, NWT, and Sambaa K'e Dene Band (SKDB), the designated authority for the community of Trout Lake. The document includes:

- An overview of the research project plan for working with SKDB
- An outline of the research agreement and responsibilities associated with the use of existing documentation relevant to the project, the procedures while working in Trout Lake and the use of the information and documents generated by the project

Research Plan

- I (Blair Carter) plan to review existing documentation that is relevant to the proposed research project prior to travelling to Trout Lake (e.g., information of water resource conditions, water use, water values in Trout Lake and the surrounding area)
- I plan to arrive in the community of Trout Lake in the first half of July, 2013 (exact dates to be determined), and plan to stay in the community for approximately 4 to 6 weeks
- I plan to pay a lodging fee for my accommodations while staying in the community (this is likely to be through a billeting relationship or through local accommodations available in the community)
- I plan to use my time in the community to build relationships and meet with community members to learn about the importance of water and the different ways and reasons it is valued
- I plan to hire two local research assistants to help with the project
- I plan to communicate the research findings through a Master's thesis, journal articles, book chapters and conference presentations.

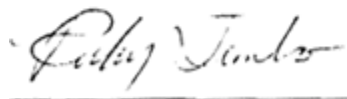
Research Agreement

I hereby commit to the following conditions. I will:

- Ensure that the research project has received full ethics clearance from the University of Waterloo Ethics Review Board (ORE # 18929 – May 6, 2013)
- Ensure confidentiality of existing documents provided by SKDB and new research materials
 - Digital copies of existing documents identified by SKDB as being confidential will only be viewed by the researcher and associated research committee, and will be stored in password protected files on a password protected computer
 - Hard copies of existing documents that are identified by SKDB as being confidential will be reviewed in Yellowknife and/or Trout Lake and immediately returned to SKDB or its representatives – permission will be obtained before photocopying any portions of the documents
 - Digital audio recordings of interviews with SKDB informants will be deemed confidential and will only be accessed by the researcher and associated research committee, and will be stored in password protected files on a password protected computer


- Once the research is completed, all digital and/or hard copy documents that are in the possession of the researcher will either be returned to SKDB or destroyed, with notification to SKDB. Digital audio files will be returned to SKDB.
- Pay a lodging fee for my accommodations while living in Trout Lake
- Hire two local research assistants nominated by SKDB to help with the project during the 4-6 weeks I am in Trout Lake
 - One assistant will be hired as an interpreter for interviews that require translation (to be paid between \$75 per interview, as needed)
 - A second assistant will be hired on a more consistent basis and will likely help with tasks such as creating awareness about the project in the community, recruiting community members for interviews and determining the most appropriate means of disseminating information to the community (to be paid \$25 per hour for 75 to 100 hours of work over 4-6 weeks)
 - Both assistants will be paid weekly through SKDB which will then invoice the researcher
- Ensure that informed oral consent is obtained prior to interviewing participants
 - This process will include consent for the interview discussion to be audio recorded
- Provide interview participants with an honorarium valued at \$75 to thank them for sharing their time and thoughts
 - Participants will be paid through SKDB, which will then invoice the researcher
- Take preventative measures to ensure that a breach of participant confidentiality is avoided and that the identity of research participants is protected throughout the duration of the project
 - Unless an alternative agreement is made with the interview participant, findings that are reported from the study will only be based on grouped responses from participants and individual participant identifier information will not be reported in the findings
- Ensure that the community is given an opportunity to review and validate the information gathered in Trout Lake before it is published and considered publically available
- Provide the community with a copy of the results from the project in the form of a Master's thesis, and as a plain language summary of the findings.

Agreement Signatures:



(SKDB)

Date: 06/14/2013



(Student Researcher → Blair Carter)

Date: 06/19/2013

Appendix B: Preliminary Results Brochure

Water and Well-Being in Smbaa K'e

Research Project Progress Update

March 2014



Blair Carter from the University of Waterloo, Ontario, has been working on a research project about water and well-being in the community of Smbaa K'e since May 2013. This pamphlet provides an update on the progress of this project as of March 2014. Contents include:

- Project Background
- Project purpose
- Project activities
- Project status
- Early results

Page 1

Project Background

Water is a very important part of northern Dene culture, community and livelihoods. Water is highly valued in many communities in the NWT for it's:

- spiritual importance
- use in traditional activities
- human health benefits
- ecological significance
- recreation

The importance of Dene values to water management in the NWT is recognized. How to include these values in water decision-making is still a challenge. Dene water values are not easily communicated to or always understood by decision-makers. My research project tries to address this challenge by working with the community of Smbaa K'e to better understand Dene water values. In my project I look at the relationship between water and people's well-being in the community. I focus on understanding how water helps people be physically well, how water affects people's relationships with each other, and how water helps people in the community spiritually and emotionally.

Project Goals

- Use the concept of social well-being to better understand how water is valued in Smbaa K'e
- Identify possible ways that these values can be better incorporated into NWT water related decision-making processes

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Major Project Activities

Community Interviews

In July and August of 2013, with the help of Phoebe Punch, I interviewed 28 community members in Samba K'e to understand how people value, use, and connect with water in the community. Early results from these interviews are summarized at the end of this document in the Early Results section.

Policy/Government Interviews

In November and December of 2013 I returned to Yellowknife to interview eight representatives from different water policy and decision-making groups in the NWT, including: GNWT, ENR; AANDC; DFN AAROM; and Ecology North. The representatives were asked questions about the incorporation of Indigenous water values in NWT water-related decisions.

Project Status

- **Completed:** Community interviews and policy/government interviews
- **Ongoing:** Summarizing results from community interviews
- **Upcoming:** Summarizing results from policy/government interviews

Early Results

Early results from the community interviews in Samba K'e show that community members value water for the physical benefits it provides to people, the positive impacts that water has on people's relationships with others, and for spiritual and emotional reasons. The early results are summarized according to these values below.

Physical Benefits

Water provides many physical benefits to the people living in Samba K'e that make the resource a key part of being able to live well in the community. These include:

- **Environmental quality:** Clean water is needed to make the natural environment healthy and inhabitable for people and all the living things that they depend on, including plants, trees, and animals.
- **Livelihood activities:** Healthy waterways are required to support livelihood activities that people in the community depend on, including hunting, fishing and trapping. Waterways also provide transportation routes that allow community members to practice these activities.
- **Physical human health:** Clean water is needed to support the ecosystems that community members depend on for harvesting food (i.e., berries, moose, fish, beaver, ect.), gathering medicinal plants (i.e., rat root, beaver apple), and collecting drinking water (i.e., lake water, muskeg water, rain water, ice water).

- **Income and wealth:** Many community members rely on healthy water bodies so that they can trap animals and sell their fur for income. Others rely on healthy waterways for tourism purposes. Water is not highly valued for its potential use in generating income through oil and gas developments because the risk of water contamination is not worth the potential economic gain.
- **Education and skills:** Water is an important resource that community adults and elders rely on to teach younger generations' traditional water-based knowledge and skills.

Relationships

Although not as obvious as the physical benefits, water plays an important role in supporting the family and community relationships that people in Samba K'e depend on to live well. Water impacts these relationships through:

- **Physical togetherness:** Water is an important medium for physically bringing together family and community members. People unite to do traditional activities together on the water (i.e., hunting, trapping, fishing), teach traditional skills on the water, tell stories and legends about the water, and share goods harvested from the water.
- **Collective action:** The need to protect water resources in the Samba K'e traditional area is an issue that unites community members and encourages them to act and voice their concerns as one. Water also unites communities in the NWT because they all depend on it and thus must work together to protect it.

- **Ancestral spirits:** Many people in Samba K'e feel that water helps them feel less alone by connecting them to their ancestors through spirits.
- **Responsibility to future generations:** Many people in Samba K'e feel that water connects them to future generations because it is something that they can leave behind and offer to future generations.

Spirituality and Emotions

Many Samba K'e community members have deep spiritual and emotional connections with water that enable them to live quality and happy lives. These connections are explained below:

- **Spirituality:** Water is seen as an invaluable spiritual entity that connects community members to the spiritual world. The spiritual importance of water is expressed through many stories and legends, traditional activities (i.e., feeding the water), and in some people's drinking water choices (i.e., choosing to avoid the treated water because it is 'dead').
- **Sacredness:** Water is seen as a sacred gift from the Creator that must be revered, valued, and respected forever. Water is considered to be the lifeblood of the Earth that provides life to living beings, spirits and their traditional culture. The sacred value of water is reflected in many Dene laws and traditions.

- **Sense of purpose:** Many people in Sambiaa K'e feel that they have been entrusted with the responsibility to care for and protect water for future generations. This sense of responsibility often gives people a sense of meaning in life.
- **Calmness:** Many community members feel that water has a calming effect over their emotions that put them at peace during stressful or difficult times in their lives.
- **Happiness:** Happiness is an emotion that many people in Sambiaa K'e derive from being on the water, near the water, watching the water, or thinking about water.
- **Freedom and solitude :** The vast water bodies and undeveloped nature of the Sambiaa K'e traditional area makes many people in the community feel a sense of freedom and solitude. These are comforting feelings that several people described as being unique to the community of Sambiaa K'e, and something that they cannot live without.
- **Healing:** Water plays a central role in the traditional healing process that many people in the community depend on as part of their well-being.



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Please contact me if you have questions, concerns, comments, or further ideas that would like to contribute to the project. Your input is greatly appreciated!

Contact Information:

Blair Carter
University of Waterloo, Waterloo, Ontario
Phone: 416 – 906 – 6562
Email: blcarter@uwaterloo.ca

Derek Armitage
University of Waterloo, Waterloo, Ontario
Phone: 519 – 888-4567 Ext. 35795
Email: derek.armitage@uwaterloo.ca

This project could not have been undertaken without the ongoing support from the community of Sambiaa K'e. Mahsi Cho for hosting me in your community!

Appendix C: Community Interview Recruitment Poster

INTERVIEW PARTICIPANTS NEEDED FOR RESEARCH IN WATER VALUES

My name is Blair Carter, and I am a research student visiting Trout Lake for 4 months from the University of Waterloo, Ontario. I am looking for volunteers to take part in a study to examine community perspectives on the value of water resources.

As a participant in this study, you would be asked to participate in an individual interview. Your participation would involve one session lasting about 1.5 hours. An honorarium of \$75 will be paid to each interviewee.

For more information about this study, or to participate in this study, please contact:

Blair Carter – Lead Researcher

OR

Phoebe Punch –Community Research Assistant

OR

Ruby Jumbo – Band Manager, Sambaa K'e Dene Band

Phone: (867) 206-2800, Ext. 12

Email: manager@sambaake.org

*This study has been reviewed by, and received ethics clearance through
a University of Waterloo Research Ethics Committee.*

Appendix D: Community Interview Information and Consent Statement

University of Waterloo Information and Consent Statement

Water and Well-being in the Northwest Territories

Thank you for your interest in participating in this study. The purpose of this research project is to gain a better understanding of the various ways that Smbaa K'e community members value and connect with water. This research is intended to benefit the Smbaa K'e community by eliciting a better understanding of why water is so important to the community, and providing a means to help voice and integrate these values into NWT water-related decision-making processes. This research project is being undertaken as part of my (Blair Carter) Master's degree in the Department and Environment and Resource Studies at the University of Waterloo under the supervision of Professor Derek Armitage.

Over the course of this project, approximately 25 community members will be invited to participate in interviews and/or focus groups. The purpose of doing these activities is to gain information about how community members perceive water in terms of the role that it plays in supporting and enhancing well-being. Often it is only the economic values of water that are well integrated in decision-making processes over the long term, and thus the findings of this study are intended to help illuminate the non-economic values that people in the NWT associate with water. This session focuses on gaining information about the usefulness of a proposed set of water valuation measures. The aim is to learn about the degree to which the suggested measures capture the ways in which people in the NWT value water. The session will be facilitated by Blair Carter and community research assistant, Phoebe Punch.

Participation in this session is voluntary and if you agree to participate, will involve approximately 120 minutes input and discussion of ideas regarding water valuation. All information that you provide will be considered anonymous, as your name will not be included or associated with the data collected in this research. Your name will not appear in any thesis or report resulting from this study, however, with your permission anonymous quotations may be used. Your responses will be considered confidential and will be grouped with responses from other participants. The data collected from this study will be stored in a locked office, and will only be accessible to the two researchers involved and to community research assistants who agree to keep confidentiality. Please note that you are free to decline to answer any of the questions if you wish, and also may decline contribution to the session in other ways at any point of completion without any negative consequences. If all participants approve, the interview will be audio recorded in order to ensure accurate collection of information, and will later be transcribed for analysis purposes. Given the group format of this session we will ask you to keep in confidence any information that identifies a participant and their comments. There are no known or anticipated risks to you as a participant in this session. If you are willing to participate in the session, we would like to thank you for sharing your time by providing you with an honorarium of \$75. The amount received is taxable. It is your responsibility to report the amount received for income tax purposes.

Results from this study will be summarized and disseminated back to the community during community meetings and through summary reports, posters, and community radio. A synthesis of the findings will be prepared and made available to interested participants towards the end of this study (April, 2014). The research findings may also be communicated through a Master's thesis, journal articles, book chapters and conference presentations.

If you have any questions regarding this study or session, or would like further information, you may contact either researcher at the Department of Environment of Resource Studies, University of Waterloo by phone (519.888.4567 ext. 35795) or by email at blcarter@uwaterloo.ca or derek.armitage@uwaterloo.ca.

I would like to assure you that this research study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee. If you have any concerns or feel that you have not been treated based on the descriptions outlined in this form, please contact Dr. Maureen Nummelin, the Director, Office of Research Ethics, at 1-519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca.

Do you have any questions about this research?

Do you agree to participate in this study? *[document response below]*

YES NO

Do you agree that the information you provide can be written down? *[document response below]*

YES NO

May I audio record our discussion for analysis purposes? *[document response below]*

YES NO

Do you agree to the use of anonymous quotation in any thesis or publication of this research?
[document response below]

YES NO

Participant Name : _____

Participant Signature : _____

Dated: _____

Appendix E: Informal Community Interview Guide

Part A: Individual Information

Note to Inform Participants: Before discussing the questions related to water, I will ask you a few questions about yourself. The purpose of asking these questions is to be able to get a general understanding of the people I am speaking with. I will not use these responses to identify individual participants in any way.

1. Were you born in Sambaak'e or the surrounding area? Roughly when?
 - o If no, how long have you lived in Sambaak'e?
 - o If no, does living in Sambaak'e differ from living elsewhere? How so?
2. Did you go to school in Sambaak'e? If no, did you go to school somewhere else? Where?
3. What do people in Sambaak'e do to earn money?
4. When not working, what types of things do you do during a normal day?

Part B: Material Well-Being

5. (a) Where do you get your drinking water from (*you may check more than one*)? For each one, how would you rate its quality? Why?

€ Delivered water

1	2	3	4	5
<i>Very Poor</i>	<i>Poor</i>	<i>Adequate</i>	<i>Good</i>	<i>Excellent</i>

€ Water your family collects from the lake

1	2	3	4	5
<i>Very Poor</i>	<i>Poor</i>	<i>Adequate</i>	<i>Good</i>	<i>Excellent</i>

€ Rainwater

1	2	3	4	5
<i>Very Poor</i>	<i>Poor</i>	<i>Adequate</i>	<i>Good</i>	<i>Excellent</i>

€ Ice from the lake in winter

1	2	3	4	5
<i>Very Poor</i>	<i>Poor</i>	<i>Adequate</i>	<i>Good</i>	<i>Excellent</i>

€ Bottled water

1	2	3	4	5
<i>Very Poor</i>	<i>Poor</i>	<i>Adequate</i>	<i>Good</i>	<i>Excellent</i>

€ Other (please indicate): _____

1	2	3	4	5
<i>Very Poor</i>	<i>Poor</i>	<i>Adequate</i>	<i>Good</i>	<i>Excellent</i>

(b) Is there a certain source of drinking water that you prefer? Why?

6. (a) How often do you get a chance to be out on the water (i.e. fishing, boating)?

(b) Are you satisfied with being out on the water this much, or would you change it in any way if possible?

7. What comes to mind when you think about water? Are there any particular stories or memories that come to mind?

I would like to get a better idea of the importance of water to the community of SambaaK'e. I am going to read a series of statements, and I want you to tell me whether you disagree or agree with the statement, using the following pattern:

1 = Strongly Disagree 2 = Disagree, 3 = Not Sure, 4 = Agree, 5 = Strongly Agree

8. (a) Water is important for harvesting activities carried out by you and your family for personal use.

1 2 3 4 5
Strongly Disagree *Disagree* *Not Sure* *Agree* *Strongly Agree*

(b) What things do you or your family harvest for personal use from the water, on the water, or associated with water?

9. (a) Water is important for harvesting activities carried out by you or your family for trading or selling things to make money.

1 2 3 4 5
Strongly Disagree *Disagree* *Not Sure* *Agree* *Strongly Agree*

(b) What things do you or our family harvest to trade or sell from the water, on the water, or associated with water?

10. (a) Water is important to the community of Sambaak'e for its use in making money through resource development activities (i.e., oil and gas exploration and development)

1 2 3 4 5
Strongly Disagree *Disagree* *Not Sure* *Agree* *Strongly Agree*

(b) Water is important to the community of Sambaak'e for its use in making money through tourism activities (i.e., Trout Lake Fishing Lodge)

1 2 3 4 5
Strongly Disagree *Disagree* *Not Sure* *Agree* *Strongly Agree*

11. (a) Waterways (lakes and rivers) are important for transporting people, equipment, or other items in or out of the community, including to camps on the land.

1 2 3 4 5
Strongly Disagree *Disagree* *Not Sure* *Agree* *Strongly Agree*

(b) What things do you or your family move in or out of the community using waterways (rivers, lakes)?

(c) Where do you mostly move things from and to?

12. (a) Waterways (lakes and rivers) are important to the people of SambaaK'e for recreational purposes (i.e., swimming, boating, ski-dooing, sport fishing).

1	2	3	4	5
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Not Sure</i>	<i>Agree</i>	<i>Strongly Agree</i>

(b) What types of recreational activities do you or your family use water for?

13. (a) In SambaaK'e, water is important because it provides you and your community with a sense of identity.

1	2	3	4	5
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Not Sure</i>	<i>Agree</i>	<i>Strongly Agree</i>

14. (a) In SambaaK'e, water is important because people rely on it for its use in cultural ceremonies and traditions.

1	2	3	4	5
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Not Sure</i>	<i>Agree</i>	<i>Strongly Agree</i>

(b) What types of cultural ceremonies and traditions is water used in?

(c) How frequently is it used for these purposes? (i.e., daily, weekly, monthly, seasonally, annually?)

15. (a) Water is important to people in SambaaK'e because it has special healing properties.

1	2	3	4	5
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Not Sure</i>	<i>Agree</i>	<i>Strongly Agree</i>

(b) What types of healing practices is water used for?

(c) Are there any water-based plants that are important to the community of Sambaak'e for medicinal and healing purposes? If so, what are they? (i.e., rat root?)

16. (a) Water is important to people in Sambaak'e because it has spiritual features and connections.

1	2	3	4	5
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Not Sure</i>	<i>Agree</i>	<i>Strongly Agree</i>

(b) Do you feel comfortable explaining the significance of some of these spiritual connections associated with water?

17. In Sambaak'e, it is important to protect water so that it can be passed on for future generations to use.

1	2	3	4	5
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Not Sure</i>	<i>Agree</i>	<i>Strongly Agree</i>

18. Are there any other ways water is used or valued that we have not discussed yet?

19. Is the water in and around Sambaak'e capable of meeting all of the community's needs at this time?

20. Do you feel comfortable that the water in and around Sambaak'e will be able to meet all of the community's needs in the future?

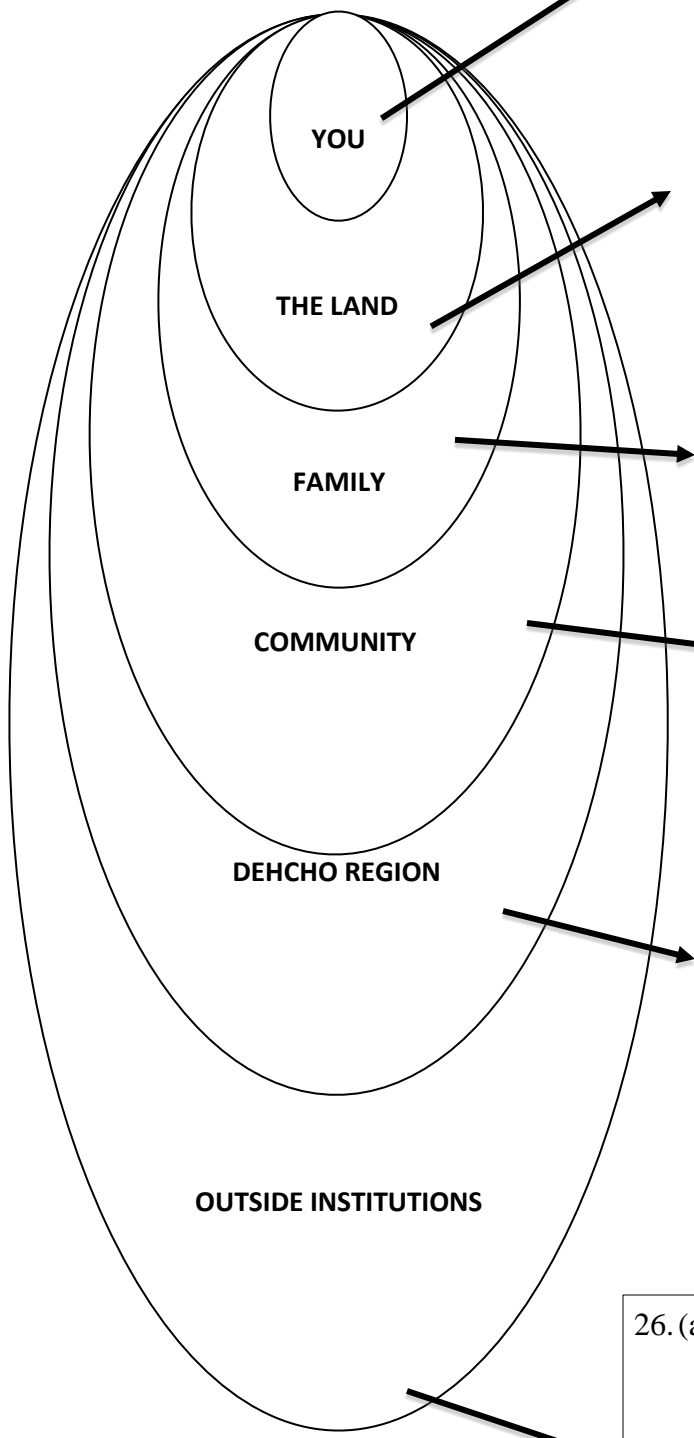
21. (a) Do you feel that your water is at risk? From what? Why? How?

(b) What steps can be taken to reduce these risks?

Part C: Relational Well-being

I would like to learn more about how water may connect you or shape your relationship with the land, your family, the community, the region, and other institutions (governments or industry).

- Questions 22 – 26 included in relational diagram below



22. (a) How would you describe your relationship to the water in and around SmbaaK'e?
 (b) Do you consider water to be a part of the land or separate or different from the land?

23. (a) What role does water play in your relationship with your family?
 (b) How does time spent sharing, using, or being on or around water with your family affect family relationships?

24. (a) What role does water play in community relationships?
 (b) How does sharing, using, or being on or around water with others in the community affect community relationships?
 (c) What community events use water, or take

25. (a) What role does water play in the relationships between the community of SmbaaK'e and other communities in the Dehcho Region?
 (b) Do you feel that water issues in the Dehcho Region have a positive or negative impact on regional relationships?
 (c) How does sharing, using or being on or around water with people from other communities in the Dehcho Region affect regional relationships?

26. (a) How does water and water issues impact the relationship SmbaaK'e has with outside institutions? (e.g. government, industry)
 (b) Do outside institutions impact the way that you use/share water in SmbaaK'e?

27. Of all the different relationships we discussed, which ones (*up to three*) does water have the largest impact on? (*Relationships discussed: Personal relationship with the land, Family relations, Community relations, Regional relations, Institutional relations*)
28. Do you think that any of the relationships we discussed need to be improved? Which ones? How so?

Part D: Subjective Well-Being

29. (a) In general, how would you describe the life of a person that is doing well in SambaaK'e? (i.e., what would he/ she have, do, what sort of person would he/ she be, what might others feel towards that person)
- (b) What are the top three most important things to having a good life in SambaaK'e?
-
30. (a) Are you satisfied with your current quality of life here in Sambaa K'e? Why or Why not?
- (b) Does water play a role in your feelings of well-being here in Sambaa K'e? What role does it play?
- (c) For you and/or your family, what is the most important reason to protect the water in Samabaa K'e?
-
31. Do you have any final comments on water and the value of water to yourself, your family, and the community?

Appendix F: Policy/Government Interview Information and Consent Statement

University of Waterloo Information and Consent Statement

Water and Well-being in the Northwest Territories

Thank you for your interest in participating in this study. The purpose of the study is to gain information about how the values that people in the NWT associate with water can be used to enhance water governance and foster stronger water security in the NWT. More specifically, we are interested in better understanding the myriad ways in which water is valued in the NWT, and in determining how such values may fit into NWT water-related decision-making processes. This research project is being undertaken as part of my Master's degree in the Department and Environment and Resource Studies at the University of Waterloo under the supervision of Professor Derek Armitage.

Over the course of this project, approximately 15 representatives from a diversity of water policy and decision-making groups in the NWT will be invited to participate in an interview. The purpose of doing these interviews is to gain information on how water values are being or could be integrated into water and related-land use decision-making processes in the NWT. The interview will focus on discussing the potential decision-making relevance and utility of a proposed suite of water valuation measures that will be sent to participants in advance of the agreed interview date.

Participation in this study is voluntary. If you choose to volunteer in this study, you would be agreeing to an interview of approximately 25 minutes in length to take place at a mutually agreed upon date and time. All information that you provide will be considered anonymous, as your name will not be included or associated with the data collected in this research. Your name will not appear in any thesis or report resulting from this study, however, with your permission anonymous quotations may be used. It will involve an interview of approximately 60 minutes in length to take place in a mutually agreed upon location and at an agreeable time. The data collected from this study will be stored in a locked office, and will only be accessible to the two researchers involved and to community research assistants who agree to keep confidentiality. Please note that you are free to decline to answer any of the questions if you wish, and also may decline contribution to the session in other ways at any point of completion without any negative consequences. Please note that you are free to decline to answer any of the questions if you wish, and also may withdraw at any time during the interview completion without any negative consequences. If you approve, the interview will be audio recorded in order to ensure accurate collection of information, and will later be transcribed for analysis purposes. Shortly after the interview has been completed, I will provide you with a copy of the transcript in order to confirm the accuracy of our discussion and provide any additional clarification. There are no known or anticipated risks to you as a participant in this study.

A synthesis of the findings will be prepared and made available to interested participants towards the end of this study (April, 2014). The results may also be shared with the community of

Sambaa K'e through various avenues including presentations and radio. The research findings will also be communicated through a Master's thesis, journal articles, book chapters and conference presentations.

If you have any questions regarding this study or procedures, or would like further information, you may contact either researcher at the Department of Environment of Resource Studies, University of Waterloo by phone (519.888.4567 ext. 35795) or by email at blcarter@uwaterloo.ca or derek.armitage@uwaterloo.ca.

I would like to assure you that this research study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee. If you have any concerns or feel that you have not been treated based on the descriptions outlined in this form, please contact Dr. Maureen Nummelin, the Director, Office of Research Ethics, at 1-519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca.

Do you have any questions about this research?

Do you agree to participate in this study? *[document response below]*

YES NO

Do you agree that the information you provide can be written down? *[document response below]*

YES NO

May I audio record our discussion for analysis purposes? *[document response below]*

YES NO

Do you agree to the use of anonymous quotation in any thesis or publication of this research?
[document response below]

YES NO

Participant Name : _____

Participant Signature : _____

Dated: _____

Appendix G: Informal Policy/Government Interview Guide

Part A: Existing Water Governance Structure

1. Can you briefly describe you and your organization's role in water policy and/or decision making in the NWT? What is the current focus of your organization/group? What are the main concerns/goals your organization tries to address?
2. What would you consider to be the biggest challenge that your organization/group faces in addressing these concerns/water issues more broadly in the NWT?
3. Who are the main individuals/organizations that influence water policy formation and implementation in the territories? What are their roles?
4. What influence do communities have in decisions over their water and water management in the NWT?
5. Are you aware of any formal rules or processes used in land and water management regime to account for the diversity of water interests and values present in the NWT?

Possible discussion prompts:

- If so, what is it? Can you explain how the process works? Provide examples?
 - Is the process fully utilized and as effective as it could be? Why or why not? Do you think it can be improved in any way? How?
 - If no, why do you think this is? Do you think it should be a priority?
6. Do you think that there is space or openness in the existing NWT water policy framework to implement a new process/improve the existing one to ensure that these values are fully captured in decision-making or policy-shaping process? Any ideas what that would or should look like?
 7. What do you consider to be the most important/common concerns that communities in the Dehcho Region have with respect to water?

Part B: Smbaa K'e Water Value Relevance

8. Do you see any relevance in using the SWB approach or any of the values derived from it to help implement parts of the Water Strategy?

Possible discussion prompts:

- Do you think that the SWB approach/water values derived from it have any relevance to water policy and decision making processes more broadly in the NWT?
 - Could the approach/water values derived from it be helpful to your organization in any way? How?
9. Do you think it would be valuable to have similar information for the other in the NWT? Why? How?
10. Often one of the challenges associated with some of the more subjective and relational values of water is that they are difficult to communicate and convey in a policy context. Have you found that this is a challenge when it comes to decision-making about water resources in the NWT?
11. Based on your experiences, do you have any insight into how we might be able to translate and present these less tangible values so that they can be understood and discussed in a policy context?
12. Some people have proposed using a quantitative approach that uses specific measures/metrics to capture and represent water values in a policy context. What are your thoughts on the idea of using a suite of measures or metrics to capture and represent the deeply-rooted relational and subjective values that many Aboriginal people associate with water resources? In your opinion, do you think that it is appropriate to use measures/metrics for this purpose?

Appendix H: Preliminary Research Summary - Policy/Government Interviews

A social well-being approach to water valuation in the NWT

You are invited to participate in a research project aimed at addressing the need for improved water valuation measures in the NWT. This research brief provides a brief overview and status update of the project.

A Need for Action:

Understanding the deeply held values that Aboriginal people associate with water and how to better integrate those values into water related decision-making processes is an ongoing challenge in the Northwest Territories (NWT). The NWT Water Stewardship Strategy and corresponding Action Plan both recognize the urgency of addressing this challenge in order to move towards improving water stewardship in the Territories.

Action Plan Key to Success 2.1 E:
“work with knowledgeable partners [to] assess current strategies and develop a NWT relevant approach in valuation of water and ecosystem services”

Addressing this Need for Action Requires:

- A more socially-focused water valuation method to better understand the diversity of ways that Aboriginal people in the NWT value and use water
- Insight into how to these values can be translated into a suite of measures or principles that:
 - 1) Accurately reflect the myriad ways that Aboriginal people ‘value’ water
 - 2) Serve as a medium to translate such values into a policy calculus

Taking Action Through Research:

A research project has been developed and is now being implemented to address the requirements outlined above. Two primary research objectives guide the project:

Table 1: Summary of research objectives, methodological approaches, and status towards their completion

Research Objectives	Methodological Approach	Current Status
1) To examine the linkages between water resources and social well-being (SWB) in an Aboriginal community in the NWT	<ul style="list-style-type: none"> • Use the concept of SWB as a lens to unpack the ways water is valued in an Aboriginal context • Data collection method: <ul style="list-style-type: none"> ○ Semi-structured interviews • Case study community: <ul style="list-style-type: none"> ○ Sambaa K’e (Trout Lake), NWT • Target participants: <ul style="list-style-type: none"> ○ Community elders and frequent land-users 	Data Collection: <input checked="" type="checkbox"/> 28 semi-structured interviews completed (July/August, 2013) Data Analysis: <input checked="" type="checkbox"/> Preliminary review of results completed
2) To gain insight into how an understanding of Sambaa K’e water values may be relevant to policy and decision-making processes in the context of the NWT Water Strategy and Action Plan	<ul style="list-style-type: none"> • Review preliminary Sambaa K’e water values and discuss their relevance in helping to develop a more socially-focused and NWT relevant water valuation method • Data collection method: <ul style="list-style-type: none"> ○ Semi-structured interviews • Target participants: <ul style="list-style-type: none"> ○ NWT water partners 	Data Collection: <input type="checkbox"/> Seeking your participation in a semi-structured interview (Fall, 2013)

Why We Need Your Input as an NWT Water Partner:

As an NWT water partner involved in the development of the Water Strategy and Action Plan we are seeking your input on:

- The relevance that Smbaa K'e water values information may have to the Water Strategy
- How the data collected in Smbaa K'e may be transformed from information to understanding to action; looking at what has been learned; reviewing, understanding and discussing the relevance of this information to the Water Strategy; and then using this understanding to guide the development of a holistic and NWT relevant approach in water valuation

Understanding more about the potential transition from water values to water valuation measures was identified by NWT water partners as an action item fundamental to the overall success of the Water Strategy.

Participating in the Project:

- If you choose to participate you will be asked to:
 - Complete a semi-structured interview (approximately 45 minutes)
 - Discuss topics pertaining to the existing water-related decision-making processes in the NWT and the potential relevance of the Smbaa K'e water value information to the Water Strategy, and water governance more broadly
- Interviews are scheduled to take place in the Yellowknife area during November of this year

If you are interesting in participating, or would like more information about the project, please contact:

Blair Carter

Email: blcarter@uwaterloo.ca

Phone: 416-906-6562

Preliminary Findings from Smbaa K'e:

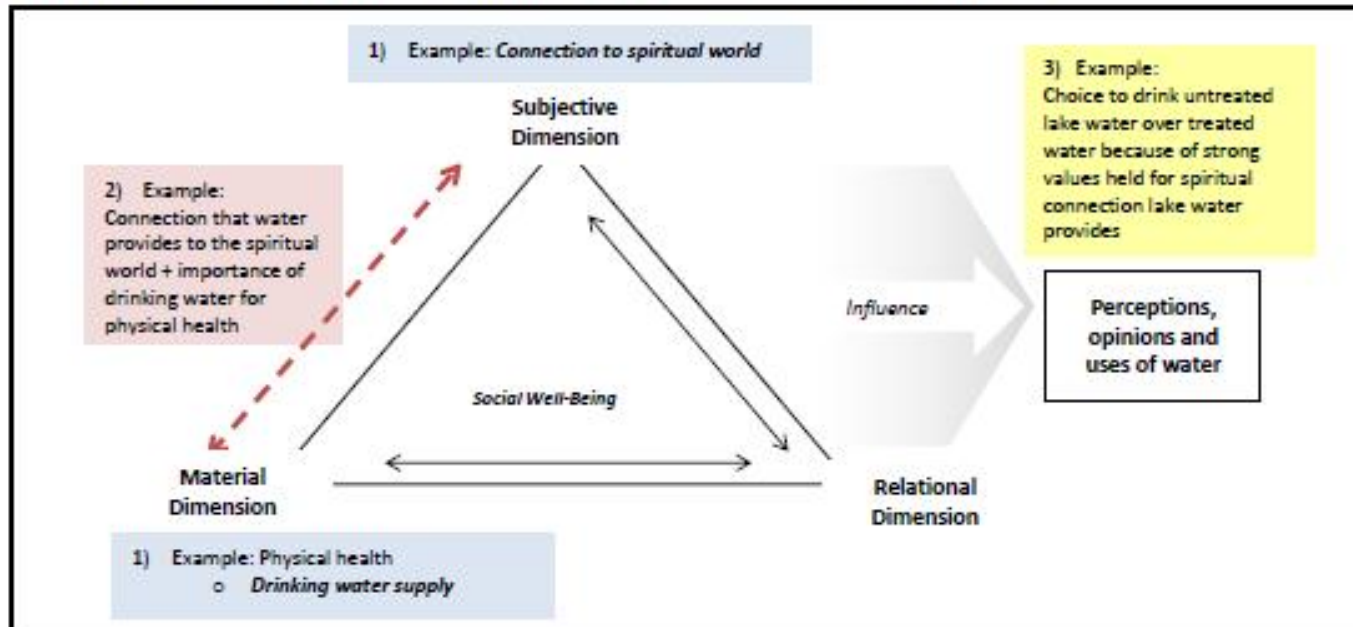
Preliminary results from the interviews in Smbaa K'e suggest that the SWB lens could contribute to an improved NWT water valuation method in three ways:

Table 2: Summary of SWB lens contributions towards improved water valuation in the NWT

<i>Contribution</i>	<i>Description</i>
1) A broader analysis of water values	Providing a more comprehensive way to draw out and properly consider the many ways that Aboriginal people value water in pursuit of living well, particularly the deeply-rooted subjective and relational values of water often missed by conventional economic water valuation techniques
2) A deeper understanding of interactions between values	Helping to unravel the complex interactions and relationships between the different water values at play in people's pursuit of living well (both within and between the three SWB dimensions – material, subjective, relational)
3) Insight into use, perceptions, and attitudes of water	By providing a broader and deeper understanding of Aboriginal water values and the interactions between them, the SWB lens helps to provide insight into how and why people use and think about water

* Note: Coloured boxes and numbers correspond to the diagram below which provides a visual representation of the SWB framework and a specific example of how it may provide three contributions highlighted above. See attached chart for more detailed account of preliminary values identified in Smbaa K'e using the SWB lens.

Figure 1: Visual representation of SWB framework and potential contributions to more socially focused water valuation



Moving Forward With the Project:

- If the SWB lens is able to make these contributions and provide an understanding of the many ways water is valued in an Aboriginal context, and how these values influence perceptions, opinions and uses of water, what comes next? How do we communicate these values to a policy context?
- As an NWT water partner, we would like your input in learning how an understanding of Sambaa K'e water values may be relevant to policy and decision-making processes in the context of the NWT Water Strategy and Action Plan!



Table 3: Preliminary list of water values account for using SWB lens in Sambaa K'e, NWT

*It must be noted that these examples are not exhaustive of all values that are associated with water in Sambaa K'e

Values Associated with Material Dimension of SWB	Values Associated with Relational Dimension of SWB	Values Associated with Subjective Dimension of SWB
<ul style="list-style-type: none"> - Supports physical health <ul style="list-style-type: none"> o Adequate and clean drinking water o Medicinal plants - Transportation <ul style="list-style-type: none"> o Moving goods to and from community and camp - Food security <ul style="list-style-type: none"> o Subsistence hunting o Subsistence fishing o Subsistence trapping - Recreation - Bathing 	<ul style="list-style-type: none"> - Community cohesion <ul style="list-style-type: none"> o Community events bring people together on water o Builds community identity o Sharing resources harvested from the water - Family bonding <ul style="list-style-type: none"> o Time spent on water together o Sharing stories and legends about water o Teaching traditions associated with water - Sense of continuity between generations <ul style="list-style-type: none"> o Fulfilling duty to protect water for future generations o Connection to ancestral spirits o Carrying forward oral traditions - Cultural legacy <ul style="list-style-type: none"> o Practicing Dene laws related to water o Use of traditional water place names - Regional connections between communities <ul style="list-style-type: none"> o Water flows from TL to Mackenzie & thus connects TL to communities along Mackenzie 	<ul style="list-style-type: none"> - Mental healing - Connections to spiritual world - Pride - Personal identity - Sense of freedom - Self-worth

Appendix I: Aurora Research Institute Research License

Licence No. 15303
File No. 12 410 958
August 01, 2013

2013

Northwest Territories Scientific Research Licence

Issued by: **Aurora Research Institute – Aurora College**
Inuvik, Northwest Territories

Issued to: Ms. Blair Carter
University of Waterloo
9 Wenonah Drive
Mississauga, ON
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Phone: (416) 906-6562
Fax: (519) 746-3051
Email: blcarter@uwaterloo.ca

Affiliation: University of Waterloo

Funding: Canadian Institutes for Health Research (CIHR): Adaptation to a Changing Climate:
Communities, Ecosystem Services and Policy
Northern Scientific Training Program
Social Sciences and Humanities Research Council (SSHRC) - Master's Scholarship

Team Members:

Title: **Water and Social Well-being in the Northwest Territories**

Objectives: To gain an understanding of the current water resource conditions (e.g., quality and quantity) and contextual circumstances (e.g., community culture, history, traditions) impacting local water use in the Deh Cho Region of the NWT; to translate these understandings into a suite of measures that reflect the myriad ways that people 'value' water; and to examine how the identified measures may be relevant to policy and decision making processes in the context of the NWT Water Stewardship Strategy and corresponding Action Plan.

Dates of data collection: July 31, 2013 to September 30, 2013

Location: Trout Lake; Yellowknife

Licence No.15303 expires on December 31, 2013
Issued in the Town of Inuvik on August 01, 2013

*** original signed ***

Doug Robertson,
Director, Aurora Research Institute

Appendix J: University of Waterloo Ethics Approval

UNIVERSITY OF WATERLOO OFFICE OF RESEARCH ETHICS

Notification of Ethics Clearance of Application to Conduct Research with Human Participants

Faculty Supervisor: Derek Armitage

Department: Environment & Resource Studies

Student Investigator: Blair Carter

Department: Environment & Resource Studies

ORE File #: 18929

Project Title: Water and Well-being in the Northwest Territories

This certificate provides confirmation the above project has been reviewed and are considered acceptable in accordance with the University of Waterloo's Guidelines for Research with Human Participants and the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. Thus, the project now has received ethics clearance through a University of Waterloo Research Ethics Committee.

Note 1: *This ethics clearance is valid for one year from the date shown on the certificate and is renewable annually, for four consecutive years. Renewal is through completion and ethics clearance of the Annual Progress Report for Continuing Research (ORE Form 105). A new ORE Form 101 application must be submitted for a project continuing beyond five years.*

Note 2: *This project must be conducted according to the application description and revised materials for which ethics clearance has been granted. All subsequent modifications to the project also must receive prior ethics clearance (i.e., Request for Ethics Clearance of a Modification, ORE Form 104) through a University of Waterloo Research Ethics Committee and must not begin until notification has been received by the investigators.*

Note 3: *Researchers must submit a Progress Report on Continuing Human Research Projects (ORE Form 105) annually for all ongoing research projects or on the completion of the project. The Office of Research Ethics sends the ORE Form 105 for a project to the Principal Investigator or Faculty Supervisor for completion. If ethics clearance of an ongoing project is not renewed and consequently expires, the Office of Research Ethics may be obliged to notify Research Finance for their action in accordance with university and funding agency regulations.*

Note 4: *Any unanticipated event involving a participant that adversely affected the participant(s) must be reported immediately (i.e., within 1 business day of becoming aware of the event) to the ORE using ORE Form 106. Any unanticipated or unintentional changes which may impact the research protocol must be reported within seven days of the deviation to the ORE using ORE form 107.*


Maureen Nurmmelein, PhD
Director, Office of Research Ethics

OR
Susanne Santi, MMath
Senior Manager, Research Ethics

OR
Julie Joza, MPH
Manager, Research Ethics


Date

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