

# Youth Involvement in Participatory Watershed Planning

Understanding the relationships between well-being, participatory governance, and watersheds

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## Foreword

This Major Paper (MP) represents a serious inquiry into the politics of including marginalized voices in land use planning at the regional scale. The research helped to fulfill each of the three components of the area of concentration and several of the learning objectives outlined in my plan of study (POS). The area of concentration was described in the POS as “planning for ecological integrity and human wellness”, and included a plan to focus on three components which included environmental planning, planning for human wellness, and environmental governance.

*Component 1: Environmental Planning.* The goal was to gain an understanding of the role of the planner in facilitating participatory environmental planning and collaborative governance. The learning objectives of this component included gaining field experience and practical skills in environmental planning, exploring the human connection to nature, and studying the links between environmental degradation and human wellness. While conducting the field component of this study, I gained valuable experience conducting stakeholder engagement as I worked to connect with a variety of citizens from the Nechako watershed including students, teachers, regional government representatives, members of civil society, and people living in rural and remote areas of the watershed. The interviews I conducted with these stakeholders allowed me to explore human connections to the watershed and listen to stakeholders’ perspectives on environmental issues in relation to their own well-being.

*Component 2: Planning for Human Wellness.* This MP helped to fulfill two of the learning objectives for this second component including a review of the literature regarding the connections between human well-being and healthy ecosystems, and a basic understanding of land use planning for ecosystem health and human wellness. This MP was guided by “ecosystem approaches to health”, which are fundamentally rooted in examining the relationships between the environment, society and human health. Thus, the conceptual framework which guided the study envisioned linkages between the well-being of youth, participatory watershed governance, and healthy ecosystems, and led to a review of the literature based on the relationships between each of these components. An explicit effort was also made to investigate these relationships in the interviews with study participants. This led to a series of recommendations for including youth in watershed planning with the ultimate goal of improving human well-being and ecosystem integrity.

*Component 3: Environmental Governance.* Learning about the land use planning system in British Columbia, and investigating opportunities for youth to engage with the development of the Nechako Watershed Roundtable (NWR) helped to contribute to two learning objectives in this third component. These objectives included gaining a basic understanding of Canadian environmental legislation, as well as gaining in-depth knowledge of progressive governance models. While conducting background research for this MP, it was necessary to gain an understanding of land use planning legislation in BC, as well as the major pieces of legislation governing water and watershed management. This enabled me to understand how collaborative governance at the community level fit in to the bigger picture, and allowed me to gain an understanding of the relative power or legitimacy of initiatives such as the NWR. The NWR is an example of a progressive and collaborative governance model which includes members of local and regional government, provincial and human health agencies, academia/non-

government organizations, civil society, and First Nations. In tandem with the field research component of this MP, I had the privilege of helping to organize an event for the launch of the NWR, and participate in its first business meeting.

Overall, I feel I have gained valuable experience and an increased understanding of how a planner might contribute to planning for human wellness and ecosystem integrity. There are many facets of this area that a planner could tackle, but I have gained considerable interest in focusing on public outreach, including citizen science and awareness building in my future career.

## Abstract

The Nechako watershed is a vast landscape in north-central British Columbia that is sparsely populated, and characterized by extractive industries such forestry and mining. Due to the construction of the Kenney Dam in the upper Nechako River in the 1950s, the watershed faces unique socio-ecological challenges in balancing natural resource development, ecosystem management, and human well-being. With less than 60% of the natural flow remaining in the Nechako River, the ecosystem struggles to support the sturgeon, chinook, and sockeye salmon that were once plentiful. A major trans-national corporation owns 100% rights to the water of the Nechako river, and the people of the region struggle to regain power and influence to govern the lands that support their livelihoods.

In the fall of 2015, community members in the Nechako watershed expressed a desire to better include youth in watershed planning, which resulted in this action research project. The research design was guided by the “ecohealth” approach, and employed a series of semi-structured interviews to inform a strategy for meaningful youth engagement in the watershed. Individual interviews were conducted with youth as well as adults considered allies. A group interview was also conducted with youth at a local school. An inductive analysis of the interview transcripts was conducted for each group for emergent themes using initial and focused coding methods. The three groups shared similar major themes including but not limited to: 1) place-based values; 2) benefits of youth participation; 3) barriers to youth participation; 4) opportunities for youth participation; 5) youths’ awareness and concerns; 6) youths’ passions and motivations; 7) opportunities for engagement with the Nechako Watershed Portal; and 8) strategies for success.

The result is a snapshot in time of the perspectives of both youth and their allies on the involvement of young people in watershed planning in the Nechako, as well as a set of recommendations to move forward with meaningful youth engagement in the watershed. Interview data revealed that youth in the Nechako are knowledgeable, concerned, and aware of regional socio-ecological issues, and eager to be part of the solution. The data also revealed that though people of all ages believe that youth participation is important, the variety and complexity of barriers facing young people may not be well understood. This lack of understanding may contribute to less beneficial opportunities for youth to engage in watershed planning, and should be a significant point of consideration for any initiatives seeking to include youth meaningfully in governance processes to enhance well-being and improve watershed management.

*Keywords:* Nechako; watershed planning; water governance; youth participation; ecohealth; marginalized voices.

## Dedication

*This work is dedicated to the youth of the Nechako watershed, and their allies. It is also dedicated to all the young people in the world today who are facing one of the most important yet overwhelming challenges ever faced by humankind: to restore the health of the biosphere to preserve life on Earth for generations to come.*



## Acknowledgements

My time in the Faculty of Environmental Studies (FES) has changed my life. I came into the program as an ecologist, and I feel that I am leaving with a greater understanding and appreciation for the complexity of this world, and the diversity of people who live within it. Shifting into the social sciences was challenging at first, but I am glad I did it. Looking back, I can no longer imagine taking a siloed approach to solving the complex problems we face in this world. My mind has been challenged, and I feel open and eager to understanding many ways of knowing.

I would like to thank each of my professors who had such a profound impact on my way of thinking by exposing me to so many new ideas. Thank you to FES for accepting Ms. Julianne Kucheran into the program the same year as me. She has become one of my closest friends, and I honestly cannot imagine my life without her. Thank you to my family for supporting me during the two years that Dan, my now loving husband, was living in Thunder Bay. You gave me not only a roof to live under, but delicious home-cooked meals, and all the love and support that I needed. Thank you to Dan, as always, for supporting me from afar, and even when he was dealing with the stresses of law school far away from friends and family.

Thank you to Dr. Martin Bunch for supervising me and taking me under his wing as a research assistant and as a coordinator for CoPEH-Canada. Thanks to Martin I discovered the field of ecohealth, which suited my research interests to a 'T'. Working under Martin I have explored in-depth, the human connections to nature that sit at the core of my academic and personal curiosities. Thank you to Margot Parkes for her support and insights while I embarked on the field component of my project while living in Prince George. Thank you to Kate and Shayna for your friendship and support, and to all the people I met and worked with in the Nechako. I learned an incredible amount from you, and I sincerely hope that my research will help create a space for youth to participate meaningfully in regional stewardship and decision-making processes. Overall, I hope that this degree is a stepping stone to a fulfilling life and career where I can contribute to our society finding ways to live *with* nature, by helping people to respect and re-connect to the beauty, diversity, and interconnections of life on Earth.

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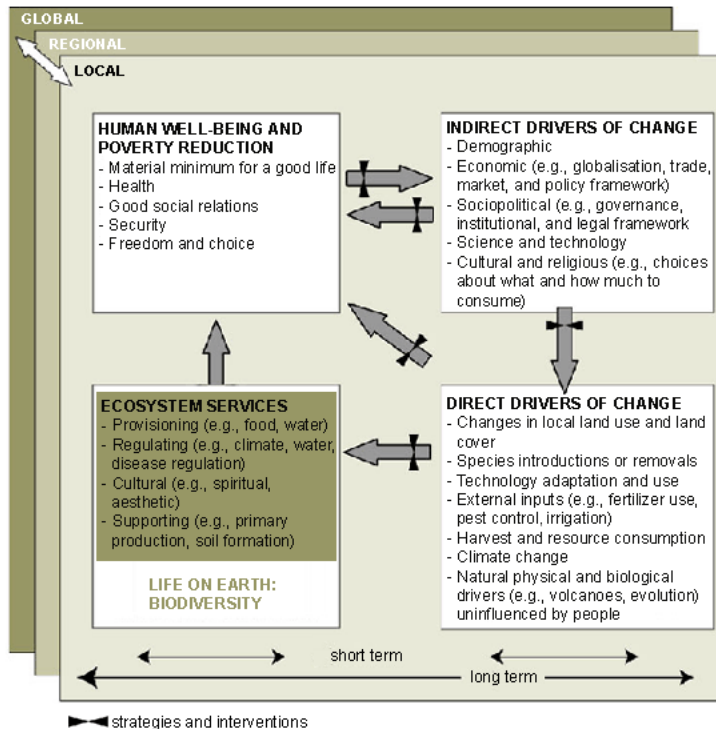
# Chapter 1: Introduction

## Introduction and theoretical framework

The interdependence of human well-being and ecological integrity forms the basis of contemporary definitions of sustainability. The most frequently cited definition from the report, *Our Common Future*, defines sustainability as, “...development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987). This definition is commonly referred to as the “Brundtland” definition, and “emphasizes the dynamic balance between human development and environmental protection, as well as intra- and intergenerational equity” (Wu, 2013, p. 1001). Thus, the biosphere in which we live, is fundamentally complex and combines ecological and social components, which include economic systems, institutions and organizations (Berkes, Colding, & Folke, 2014; MA, 2003; Figure 1). As the human population grows, increasing development pressures on natural systems are being compounded by drivers such as changes in land use and land cover, external inputs, harvest and resource consumption, and climate change (Millennium Ecosystem Assessment, 2003; Figure 1).

## Human well-being and ecosystem services

The Millennium Ecosystem Assessment (MA) was based on the fundamental concept that human well-being is dependent on natural systems (or “ecosystem services”; MA, 2003). The MA determined that ecosystem services (which it defined and categorized as provisioning, supporting, regulating and cultural; Figure 1) are indispensable to the well-being and health of people globally, and focused on deriving formal assessment procedures for policy and program development to alleviate poverty and environmental degradation (MA, 2003). Well-being is generally defined as “a state of complete physical, mental and social well-being” (World Health Organization, 1948), and includes both material and experiential factors (Butler & Oluoch-Kosura, 2006). The Millennium Ecosystem Assessment (MA, 2003) describes human well-being



**Figure 1.** Conceptual Framework of how human well-being and health is impacted by changes in ecosystems, at local, regional, and global scales. From "Ecosystem goods and services for health", World Health Organization (WHO). Copyright (2016) by WHO.

to include needs such as the minimum material for good life, health, good social relations, security, and freedom and choice (Figure 1).

### Ecosystem-based management

With an emphasis on

maintaining the integrity of

ecosystems as the means of human

well-being, a shift to ecosystem-based

management has been occurring since

the 1990s (Christensen et al., 1996;

Munang et al., 2013). Ecosystem-

based management designates the

ecosystem as the basic unit of

analysis and emphasizes the need to adapt economic, political and social processes to fit within

the ecological constraints of the system (Brandes, 2005). This contrasts with the mainstream

approach to environmental management which evolved in western capitalist countries to treat

nature as separate from the human experience and as a "resource" to drive economic growth by

the most efficient means possible (Kapoor, 2001).

### The Watershed Context

One particularly popular application of ecosystem-based management is occurring at the

scale of watersheds. Bunch et al. (2014) state that watersheds are gaining attention as settings

for simultaneously achieving human well-being and environmental objectives:

*The spatial form of the watershed unit is created as water carves its path through the landscape and is, therefore, linked to health and well-being through multiple pathways, underpinning not only all living systems, but also*

*livelihoods, lifestyles, and every aspect of our social interactions with landscapes in which people reside. (Bunch et al., 2014, p. 241)*

Guided by the principles of ecosystems-based management, which recognize humans as an integral part of ecological systems (Brandes, 2005; Waltner-Toews, Kay, Neudoerffer, & Gitau, 2003), watershed management focuses on managing people and their interactions with the environment (Brandes, 2005).

Since the 1960s, there has been a shift away from top-down agency controlled management to increase meaningful public participation in water management. At the watershed scale, this is occurring in forms of collaborative and integrated water management involving a variety of governmental and non-governmental stakeholders (Sabatier et al., 2005). River Basin Organizations (RBOs) have largely been responsible for implementing a strategy referred to broadly as Integrated Water Resource Management (IWRM). IWRM has been defined by the Global Water Partnership as a “process which promotes the coordinated development and management of water, land, and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (Mitchell, 2005, p. 1335). When conducted at the watershed scale, IWRM is considered to be a form of place-based governance (Parkes et al., 2010), which uses place-based identities to motivate civic engagement for progressing social and ecological sustainability (Edge & McAllister, 2009). Combining the IWRM approach with ecosystem approaches to health (a.k.a., ecohealth) has been suggested as an effective means of navigating the complex synergies between ecosystem services, well-being and society (Bunch et al., 2014; Bunch, Morrison, Parkes, & Venema, 2011).

## The Role of Governance

Critical to the discussion of ecosystem services in relation to sustainable development and well-being are the effects of socio-political systems and institutions as indirect drivers of change (Figure 1). The MA acknowledges the potential of instruments, institutions,

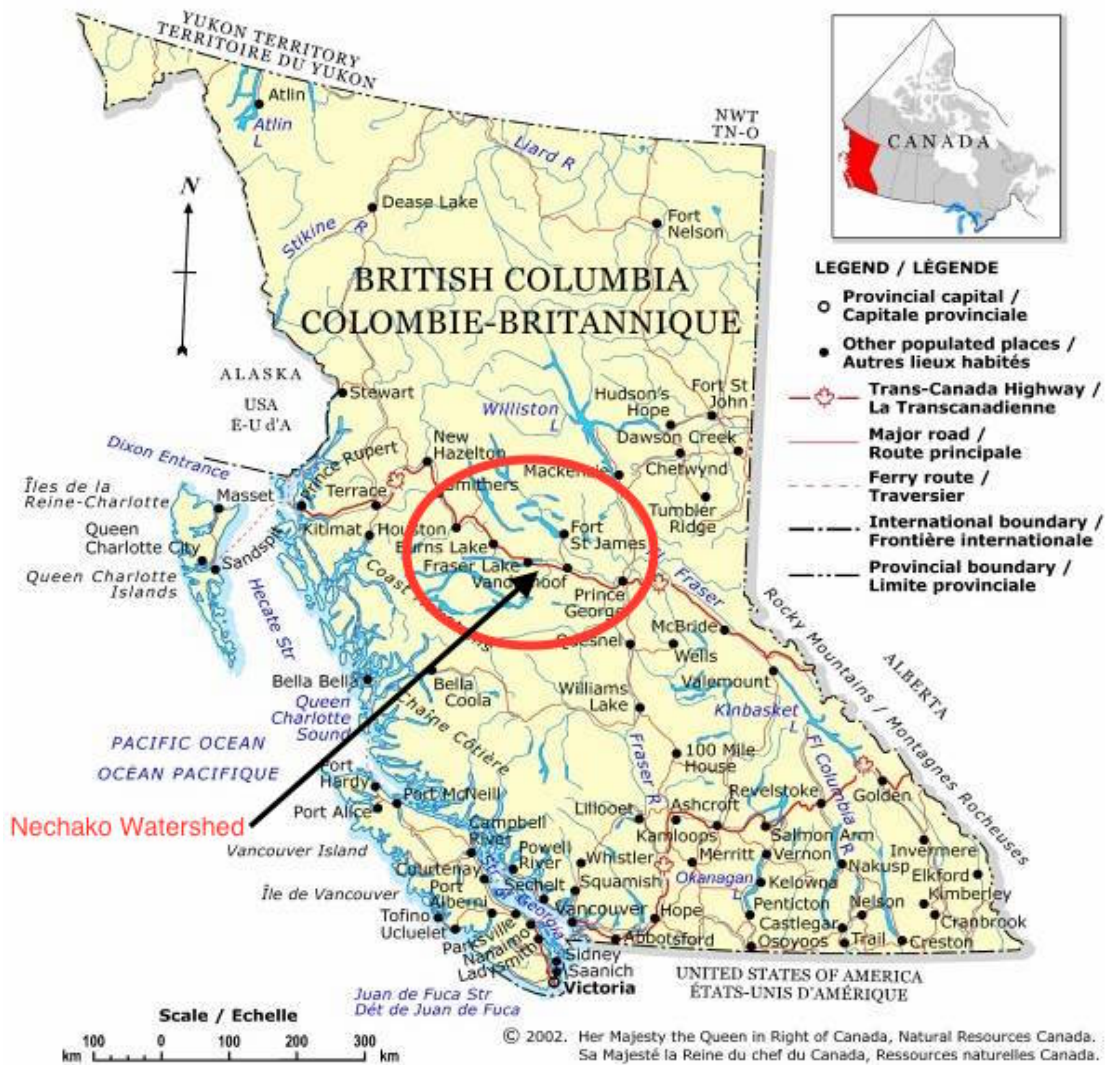
organizations and technology to support sustainable human interactions with ecosystems to enhance wellbeing, but also makes it clear that these benefits are neither automatic nor often very equitable. The MA states that responsible governance and participatory decision-making are necessary to create institutions that can contribute to freedoms and choice and increase economic, social and ecological security (MA, 2003). Political institutions play a critical role in mediating access to, use, and distribution of ecosystem services (MA, 2003; Berbés-Blázquez et al., 2016; Ernstson, 2013), however, Berbés-Blázquez, Gonzalez, & Pascual (2016) point out that the MA does not specifically address the significance of power relations within its framework of participatory sustainable development.

Many water management strategies are thought to have failed because they did not include the range of perspectives and values among water users or agencies in the watershed (Heathcote, 2009), and there are concerns that collaborative and participatory processes are replicating the effects of the top-down administration they were meant to replace (Wessells, 2010). One of the reasons participatory approaches may be replicating the power dynamics of top-down processes is because process organizers sometimes view civil society as a homogenous group. This obscures the realities that marginalized groups in society may be facing unique or more severe issues (Butler & Adamowski, 2015). Thus, questions remain about what it means to be a stakeholder and to engage or participate meaningfully in the watershed governance process.

Broadly speaking, this major paper will focus on participatory governance and its relation to sustaining both ecosystem services and human well-being. More specifically, it will focus on exploring strategies to empower marginalized voices within participatory watershed planning.

## Definition of the Research Problem

The research problem for this major paper emerged as a component of a much larger action research project taking place in the Nechako watershed located in north-central British Columbia (BC; Figure 2). The larger project, led by researchers at the University of Northern British Columbia, is creating a web-based, geo-spatial tool to inform land and water decision-making in the Nechako river basin. The Nechako Watershed Portal will provide a single point of



**Figure 2.** Location of the Nechako watershed in north-central British Columbia. Adapted from “Location”, by the City of Prince George, 2013. Copyright (2002) by Her Majesty the Queen in Right of Canada, Natural Resources Canada.

access to information about the Nechako including documents, pictures and videos to act as a collaborative tool for communities and interest groups in the watershed (Integrated Watershed Research Group, 2016b). The early stages of the portal's development aligned with the launch of a new collaborative RBO in the Nechako called the Nechako Watershed Roundtable (NWR). A workshop was held at its first business meeting to discuss the prospects of the portal with interested members.

At this first meeting, youth were identified as a missing voice in the watershed. Several members voiced an interest in including youth in the NWR's efforts going forward, and in addition, expressed a general interest in including youth more significantly in stewardship programs and activities throughout the watershed. Shortly after, the NWR secured a seat on the core committee for a youth representative. During this early period of field observation, the research question was defined:

*How can youth meaningfully participate in the watershed planning process through the development of the Nechako Watershed Roundtable and the Nechako Watershed Portal?*

The purpose of this research inquiry was primarily to provide a series of recommendations to the NWR to develop a strategy for youth engagement in the Nechako. This is typical of action research where a collaborative or participatory study is formulated with local actors and informs the next stage of operations for social change (Miles & Huberman, 1994). The inquiry was informed by an ecohealth framework which formally recognizes the connections between environment, society and health, and is grounded in the principles of systems thinking, participation, transdisciplinarity, sustainability, gender and social equity, and knowledge to action (Charron, 2011).

## Major Paper Outline

Following this introductory chapter, Chapter 2 provides a synopsis of the background and research context for the project. The chapter explores the natural environment and human impacts in the Nechako including the ecology, vulnerable species, the settlement history,



natural resource development and current land use. The chapter also reviews watershed governance in British Columbia, as well as collaborative governance initiatives in the Nechako watershed.

Chapter 3 reviews the academic literature focusing on the main themes outlined in the introduction: 1) ecosystems and human well-being; 2) watershed-based management and ecosystem approaches to health; 3) youth participation and well-being; and 4) youth participation in regional land use planning. The literature review provides a conceptual background for the research and highlights relevant gaps in the literature pertaining specifically to youth engagement in land use planning and resource management.

Chapter 4 outlines the methods used in the study. The chapter begins with a description of the researcher's philosophical approach and presents a conceptual framework to situate the research problem in the social-ecological setting. The chapter describes and justifies the qualitative approach including an overview of the design of semi-structured interviews with youth and adult allies, and an additional group interview with elementary students at a local school. Lastly, the chapter reviews data analysis procedures as well as access, ethics and informed consent with research participants.

Chapter 5 presents the results of the individual and group interviews with youth and adults. The interview data were analyzed in three groups including individual interviews with youth, the group interview with youth, and the individual interviews with adults. Initial and focused coding methods were used to develop a template to hierarchically organize the data for analysis in each of the three groups.

Chapter 6 discusses the implications of the interview data with a focus on a series of 9 recommendations to inform a youth strategy in the Nechako watershed.

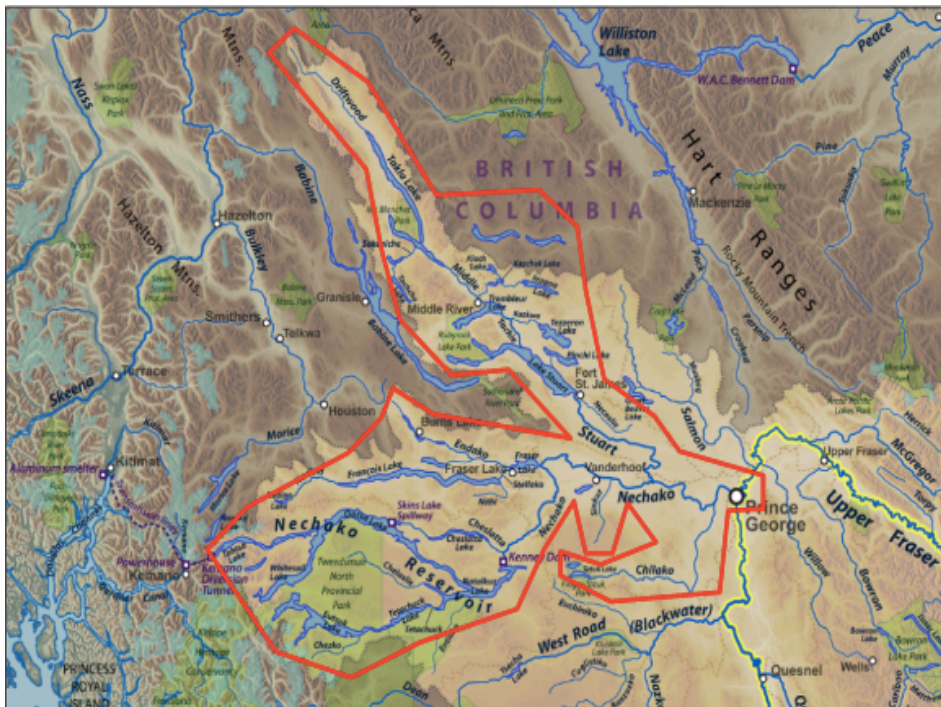
The Appendices contain supplementary research assembled during the literature review process, sample copies of interview materials, samples of participant information letters and consent forms, and detailed tables of interview coding results.

## Chapter 2: Background and Research Context

The following is an overview of the natural and human history of the Nechako watershed to provide context to the research inquiry. A summary of the relevant provincial policy, a review of local watershed governance organizations, and current planning projects are also included.

### Overview of the Nechako Watershed

The Nechako watershed is the traditional territory of the Carrier Nation (Wood, 2013) and is comprised of the drainage basins of the Nechako River and its major tributaries: the Stuart, Chilako, Endako, Nautley and Cheslatta Rivers (Figure 3). The major event in the history of the river was the construction of the Kenney Dam in the early 1950s, which diverted large quantities of water out of the watershed, altered the hydrology of the river, and created a complex web of socio-ecological issues whose consequences are still felt by those living in the watershed today.



**Figure 3.** The Nechako Watershed (sometimes referred to as the Stuart-Nechako watershed) and its main tributaries. Map adapted from “Fraser River”, by Pfly, 2015. Copyright (2015) under the Creative Commons Attribution-Share Alike 4.0 International license.

The Nechako River is an important tributary of the Fraser River, flowing eastward to its confluence with the Fraser River at the city of Prince George. The Nechako River contributes approximately 8.3% of the Fraser River's total flow volume, and 23% of the Fraser River's total population of sockeye salmon (Benke & Cushing, 2005; CSTC, 2007). The Fraser River is the largest undammed river in North America and is the third largest in terms of overall flow volume (Benke & Cushing, 2005; Matthews, Picketts, Déry, Parkes, & Sharma, 2015). It is undoubtedly the most important river in British Columbia and has a rich history of supporting transportation and human settlement.

The geographic area of the Nechako watershed is vast and is said to be comparable to the country of Switzerland (M. Parkes, personal communication, n.d.), encompassing approximately 52,000 km<sup>2</sup> of land area (Benke & Cushing, 2005). In terms of political boundaries, the Nechako watershed encompasses the eastern portion of the Bulkley-Nechako



**Figure 4.** Major settlements in the Nechako watershed. From “Climate Change and Resource Development Scenarios for the Nechako Watershed: Workshop Report May 2015”, by Matthews et al. (2015).

Regional District and the western portion of the Fraser-Fort George Regional District.

Vanderhoof is the largest town within the watershed and is located near the confluence of the Stuart River with the Nechako River (Figure 4). Prince George is the only city in the watershed and is located at the confluence of the Nechako River and the Fraser River (Figure 4).

## Natural Environment and Human Impacts

The main source of pollution in the watershed is domestic waste, and this issue is particularly problematic in the Stuart River downstream of the sewage treatment plant for the town of Vanderhoof. Though the Nechako watershed is sparsely populated, there have been agricultural and commercial forestry operations ongoing for at least the last 100 years (Benke & Cushing, 2005). Currently, hydroelectric power, forestry, and agriculture are the region's most significant industries, with mining, oil and gas developments increasing in frequency (CSTC, 2007; Picketts, Déry, & Parkes, 2014).

The Nechako River, whose name originates from the Indigenous Dakelh term meaning, "big river", was originally 440 kilometers before being dammed. The Nechako originates in the coast mountains of the northern portion of the Interior Plateau of British Columbia and connects with the Fraser further to the southeast (Matthews et al., 2015). Before being dammed in 1952 for hydroelectric power generation, the Nechako was the largest tributary of the Fraser River (Wood, 2013), but since being dammed, it is now the second largest tributary (Fraser Basin Council, 2015). The two largest tributaries of the Nechako are the Stuart and Nautley rivers (Figure 2; Benke & Cushing, 2005).

## The Ecology and Vulnerable Species

The Nechako watershed is classified as a North Pacific Coastal Freshwater Ecoregion (Benke & Cushing, 2005), and as a "sub-boreal spruce biogeoclimatic zone combined with parts of the Mountain Hemlock and Englemann Spruce-Subalpine Fir zones" (CSTC, 2007). The sub-boreal spruce zone is known to be the centre of abundance of moose in British Columbia (CSTC, 2007). The region is home to approximately 26 fish species including salmon, trout, and

sturgeon (Fraser Basin Council, 2015). These fish are important to the history and culture of the region and include chinook and sockeye salmon, as well as rainbow trout, dolly varden trout, kokanee (a landlocked form of sockeye salmon), mountain whitefish and northern pike minnow. The sockeye salmon who travel to the Nechako for various life stages contribute approximately 23% of the total sockeye that travel back through the Fraser to the Pacific Ocean each year (CSTC, 2007). The Nechako and Stuart Rivers are also home to white sturgeon that show genetic divergence from sturgeon living further downstream in the Fraser River system (Benke & Cushing, 2005).

The Nechako Watershed is dominated by coniferous forests (Picketts et al., 2014). These forests are home to many birds and mammals including deer, mountain sheep, caribou, moose, bear, wolves, lynx, beaver, mink, marten, rabbit, mice, marmot, porcupine, squirrel and great horned owls (CSTC, 2007; Fraser Basin Council, 2015; Matthews et al., 2015). There are two active populations of caribou in the Nechako including the Takla and Tweedsmuir herds.

The riparian forests of the Nechako are composed of black cottonwood, balsam poplar, aspen, Sitka alder, and willow, with an understory of thimbleberry, American fly honeysuckle, and cow parsnip. Riparian dependent vertebrates include beaver, muskrat, river otter, moose and mink, and birds which are associated with the river include osprey, merganser, bald eagle and goldeneye duck (Benke & Cushing, 2005). Other birds which are known to the watershed include hawk, owl, songbirds, grouse, ptarmigan, and waterfowl (CSTC, 2007).

### *Vulnerable Species*

Species at risk in the Nechako include 12 red-listed and 64 blue-listed plant and animal species at the provincial level. At the federal level, there are 12 species listed under the Species at Risk Act (SARA) including 3 mammals, 5 birds, 1 amphibian/reptile and 2 plants/lichens. Species with finalized recovery plans under SARA include caribou, the long-billed curlew, white sturgeon and the cryptic paw lichen. Of importance to the river is the white sturgeon population that is genetically distinct from white sturgeon elsewhere in the Fraser system. The Sturgeon

population of the Nechako has been designated as “critically imperiled” and is estimated around 600 individuals with few to no individuals less than 15 years of age. It is hypothesized that the altered flow regime and diminished habitat is a primary cause of the sturgeon’s troubles (Benke & Cushing, 2005). The population has been estimated to include approximately 600 adults over the age of 45 years, but very few juveniles (Fraser Basin Council, 2015).

## Settlement History

The Indigenous peoples of the Nechako region are the Dakelh-ne, Yinka Dene or Yinka Whut'en peoples (CSTC, 2007) or the Ta-cullies, meaning "people who go upon water" (Wood, 2013), also referred to by the anglicized term, "Carrier" (CSTC, 2007). The Carrier have occupied a vast area of north-central British Columbia since time immemorial, and are described in three regional groupings as the southern, central and northern Carrier (CSTC, 2007). Throughout history, the northern and central Carrier inter-mixed through marriage and trade with the Sekani peoples (CSTC, 2007). This history is now reflected in the regional name which describes the First Nations of the Nechako watershed: the "Carrier-Sekani". The Carrier and Sekani are Athapaskan-speaking peoples (CSTC, 2007) and the three major Indigenous languages spoken in the region include Dakelh, Sekani and Wet'suwet'en (Fraser Basin Council, 2015).

The Carrier-Sekani nations are allied, but each nation maintains its own territorial boundaries, which usually correspond to a watershed or lake system. “Keyohs” or “Keyahs” (in the Takla Lake territory), refer to geographically specified land bases including lakes and waterways owned by an extended family group and cared for via the authority of a hereditary chief. Indigenous “land use planning” and resource management aims to maintain perpetual yields based on traditional knowledge and sound environmental principles (CSTC, 2007).

The first contact the Carrier Nations had with European settlers is recorded to have occurred in 1793 when Alexander Mackenzie explored the region for fur-trading. In the late 1800s, the Omineca Gold Rush brought many more prospectors and miners to the Carrier and

Sekani territories, and it was not until 1903 that rumours of a railroad being built from Winnipeg to Prince Rupert brought many more white settlers and land speculators to the area (CSTC, 2011). Since this time the population of British Columbia has increased 100 fold, and the population of the Nechako Watershed is now estimated at approximately 105,000, with approximately 83,000 of these people living in the greater Prince George area (Picketts et al., 2014). Between 2001-2014, the population of the Nechako watershed decreased by about 1.5% compared to a provincial growth average of about 13.5%. Though the population is aging, in 2014, two of the largest segments of the population were between 15-19 and 25-29 years of age, where the largest segment of the population was between 50-60 years of age (Fraser Basin Council, 2015). The major non-First Nation communities in the watershed include Vanderhoof, Burns Lake, Fraser Lake, Fort St. James, and Prince George (Figure 4; Picketts et al., 2014).

## Natural Resource Development

Though the Nechako watershed is relatively sparsely populated, natural resource development over the last 100 years has caused significant alterations to the landscape as well as very direct and negative effects on the people and organisms whose lives depend on the natural environment on a day-to-day basis. The Nechako watershed is already experiencing the effects of climate change. Projections indicate that the region is likely to see an increase of 2 degrees Celsius from baseline levels (1961-1990) by the 2050s, and predicts increased precipitation and decreased snowfall (more rainfall in the winter; Picketts et al., 2014). Climate change may exacerbate the effects of natural resource development and pose additional complications with regards to future watershed management planning initiatives. The following sections will review resource development in the Nechako with a focus on the construction of the Kenney Dam.

### *Early Resource Development*

The Nechako watershed was once dominated by healthy coniferous forests and productive rivers and streams, which made it a particularly rich area for explorers hunting and



trapping for furs, and later, for the development of the timber industry. In the late 1700s, the first white man, Alexander MacKenzie, traveled through the Carrier and Sekani territories looking for fur trading areas for the North West Company. Between 1805-1807, four fur trading posts were established in Fort McLeod, Fort George (now Prince George), Fort St. James, and Fort Fraser (CSTC, 2007).

The first recorded farmer in the area was D. William Harman who settled in the Fort St. James area around 1811. In 1871, the Omineca Gold Rush brought prospectors and miners to the Carrier and Sekani Territories, and it was not until 1903 that rumors of a railroad being built from Winnipeg to Prince Rupert brought the first rush of white settlers and land speculators to the Prince George area. In 1909, the first sawmill was built in the Prince George area, and soon after the first Forest Service Office opened in Prince George. By 1927, 18 sawmills were operating in the Prince George forest region (CSTC, 2011).

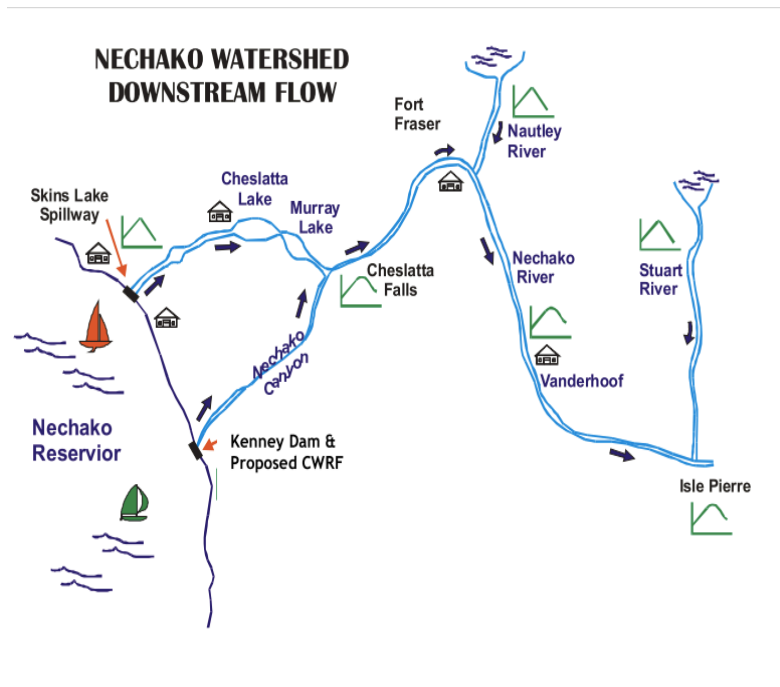
#### *The Kenney Dam and Alcan*

In 1950, the BC Government granted the rights to all of the water in the Nechako River to the Aluminum Company of Canada (Alcan; Robertson, 1991). Alcan (later re-named, 'Rio Tinto Alcan') built a 93-metre high clay-core, rock-filled dam system (the Kenney Dam), which was completed in 1952, approximately 280 km upstream of the confluence with the Fraser River (Benke & Cushing, 2005; Boudreau, 2005). Its purpose was to impound the waters of the Nechako River, diverting approximately 60% of the inflow to the 906 km<sup>2</sup> reservoir westward to generate hydroelectric power in Kemano, BC to support aluminum smelting operations in Kitimat, BC (Benke & Cushing, 2005). The creation of the Nechako reservoir resulted in the flooding of nine lakes and six rivers (CSTC, 2007) including the Ootsa, Tetachuk, and Tahtsa Rivers. These rivers were once eastward-flowing tributaries of the Nechako, but following the construction of the dam, they were effectively reversed, as their waters began to flow westward (Robertson, 1991). As of 2015, 70.7% of the total volume of water allocated in the Nechako



watershed was for the Rio Tinto Alcan license at the Nechako reservoir (Fraser Basin Council, 2015).

Currently, there is no water release facility at the Kenney Dam, and any excess waters not required for power generation or any waters Alcan is required to release on a seasonal basis



**Figure 5.** Map showing the direction of flow from the Nechako reservoir through the Murray-Cheslatta system and Skins Lake Spillway. From “Nechako Watershed Council Report: Assessment of Potential Flow Regimes for the Nechako”, by K. Boudreau, 2005.

for salmon migration and spawning, are released through the Skins Lake Spillway (Figure 5). The Skins Lake Spillway releases water into the Cheslatta River which flows into Cheslatta Lake, Murray Lake, and finally, into the Nechako River at Cheslatta Falls (Figure 5). Since there is no water release facility at the Kenney Dam, the Nechako Canyon located downstream of

the dam is essentially de-watered, and any water present in the Nechako Canyon is from natural inflow (Fraser Basin Council, 2015; Figure 5).

The Kemano Completion Project (a.k.a., Kemano II) was a proposed second stage of the development of the Kenney Dam and would have doubled power generating capacities, but the BC Government cancelled the Kemano Completion Project in 1995 (Picketts et al., 2014). A cold-water release facility was considered at various stages of the dam's history (including as part of the Kemano Completion Project) to fulfill several purposes including power generation at the Kenney Dam, better fisheries (and particularly salmon) management, better flooding/erosion control, and in general, as an overall effort to restore the health of the Nechako River system.

This project, however, has never come to fruition, and was cancelled by the Government of BC in 1995 (Boudreau, 2005; Robertson, 1991; Wood, 2013).

#### The Impacts of the Kenney Dam on the Cheslatta Carrier Nation

When the Kenney Dam was first put into operation it completely stopped the flow of the Nechako River for 4-5 years to fill the Nechako Reservoir (Nechako Fisheries Conservation Program, 2005; Robertson, 1991). The Department of Fisheries and Oceans (DFO) ordered that something be done to sustain the populations of chinook and sockeye salmon who migrate up the Nechako to spawn each year. It was decided that a temporary weir system would be built in the Murray-Cheslatta system to create a reservoir large enough to provide critical flows to the salmon populations while the Nechako reservoir filled. The Cheslatta Nation lived on the shores of Murray Lake and Cheslatta Lake and were only given a few days of notice to evacuate the area. The dam at Murray Lake caused the levels of both lakes to rise, completely flooding the Cheslatta's settlement areas and territory (Robertson, 1991). The Department of Indian Affairs (DIA) and Alcan forced/forged signatures on documents the First Nations did not understand, authorizing the surrender of the Cheslatta's land to Alcan. The Cheslatta's grave sites were completely flooded, and buildings and gravehouses were set on fire by contractors hired by Alcan and the BC Ministry of Forests (Robertson, 1991). Not only were the Cheslatta's settlements destroyed, but the areas where they had traditionally hunted and set their trap lines were flooded, and the waterways which were a great food source were greatly altered (Robertson, 1991). Problems have continued as the Skins Lake Spillway (the discharge outlet for the Nechako Reservoir) releases large flows of water into the Cheslatta River which causes flooding in Cheslatta Lake on an annual basis. This flooding has caused human remains to be washed ashore on at least five occasions during a two-year period, causing additional grief and sadness for community members of the Cheslatta Carrier nation (Hager, 2013).

## The Impacts of the Kenney Dam on Waterways and Important Fish Species

The reduction in flow of the Nechako River to approximately 40% of its original volume has caused degradation of the water systems, and has had particularly noticeable effects on chinook, sockeye and sturgeon populations (Benke & Cushing, 2005; CSTC, 2011), as habitat capability has been limited by fluctuating flows, turbidity and channel structure change (Boudreau, 2005). This decrease in natural flow has caused temperature increases which have been particularly troubling for the reproductive capabilities of some species (Fraser Basin Council, 2015). The Chinook salmon have been of primary concern as they are known to spawn downstream of the dam and the numbers of chinook in the Nechako River have decreased since the dam was built. The sockeye salmon are also a concern because they require the lower Nechako to migrate to the Stuart River to spawn (Benke & Cushing, 2005).

The Summer Temperature Management Program (STMP) was initiated as part of the 1987 Settlement Agreement between the Government of BC, the federal government and Alcan. The STMP was the only program planned specifically to benefit salmon and is part of a larger program called the Nechako Fisheries Conservation Program (NFCP). The STMP includes specific measures to conserve the chinook of the Nechako and migrating sockeye. Sockeye salmon are particularly sensitive to summer temperatures for migration and spawning (Benke & Cushing, 2005). The program has been partially successful at lowering the number of days that the river water temperature exceeds 20 degrees Celsius (Fraser Basin Council, 2015).

Unfortunately, however, the annual release of water for salmon from the Skins Lake Spillway into the Cheslatta River system has increased the flushing of the lakes, and caused large amounts of erosion and flooding to occur, washing away river banks and carrying sediment, trees, rocks and debris downstream (Hager, 2013; Robertson, 1991). In some areas of the Cheslatta River, its bed has been scoured up to 20 meters below the original valley floor (Boudreau, 2005). The increase in fine sediment in the river has changed the limnology of the

system and decreased the system's productivity overall (Benke & Cushing, 2005; Boudreau, 2005).

### *Overview of Current Land Use and Natural Resource Operations*

Though hunting and trapping were initially the predominant land uses in the Nechako watershed, the dominating land uses now include hydroelectric power generation (please see “The Kenney Dam and Alcan” above), forestry, agriculture, oil and gas development, and mining. Other less dominant land uses include fishing, renewable energy development, recreation and tourism (Picketts et al., 2014). For a more detailed overview of agriculture, forestry, the Mountain Pine Beetle, and the oil and gas sector in the Nechako watershed, please see Appendix A-1.

### Watershed Governance in British Columbia

Governance is defined by the processes and power of who and how individuals, institutions, and civil society collectively make choices to realize societal goals and to hold those who make decisions accountable (Brandes & O’Riordan, 2014; Institute on Governance, 2016). Watershed governance refers to governance structure and function within the boundaries of a geographically defined watershed, river basin or catchment area.

Though not specifically listed, the *Canadian Constitution Act, 1867* delegates responsibilities associated with watershed management to federal, provincial and territorial governments (referring mainly to land use legislation and planning), with many activities being further delegated to local levels (Brandes and O’Riordan, 2014). Though there are some federal responsibilities related to water management (mainly regarding fisheries, navigation and transboundary waters which are laid out in the *Federal Water Policy, 1987*), these policies remain largely unimplemented, and most water-related decision-making processes are led by the provincial government (Brandes and O’Riordan, 2014; West Coast Environmental Law, 2011).

Currently in British Columbia, there are no required watershed-based land use planning processes (Fraser Basin Council, 2011), and land use and water management decisions are dispersed and fragmented between four levels of government and several pieces of legislation, thus rendering decision making regarding socio-ecological issues in watersheds challenging and complex (Brandes and O'Riordan, 2014). In British Columbia there are three main areas of policy development which have influenced and continue to influence watershed management: (1) At the uppermost level, provincial legislation informs and directs policy and implementation at regional, sub-regional, local, and municipal scales; (2) at regional and sub-regional scales there are strategic land and resource management plans and growth management plans; and (3) at the local and municipal scales there are site-specific or resource-specific management plans and Official Community Plans (OCPs).

### Provincial Legislation

The significance of the *Water Act* and the *Water Sustainability Act* to watershed planning in British Columbia are reviewed below. For a brief review of additional legislation relevant to watershed planning (as listed by Brandes and O'Riordan, 2014), please see Appendix A-2.

#### *Water Act, 1909*

The *Water Act, 1909* was the main legislation governing water use and allocation in British Columbia until very recently. The *Water Act* was focused on extraction more than sustainability, as it was based on a “First in Time, First in Right” approach, which “decouple[d] allocation from any kind of ecological or social context, lack[ed] formalized instream flow protection, and create[d] pernicious incentives to waste water through ‘use it or lose it’ requirements or ‘beneficial use’ defined strictly in terms of economic benefits” (Brandes and O'Riordan, 2014, p. 10).

The *Water Act* allowed the Minister of the Environment to designate an area as a Water Management Area (WMA) and require a Water Management Plan (WMP) to address conflicts

between water users, between water users and inflow requirements, and due to risks in water quality. WMPs, however, were not necessarily consensus-based, as it was up to the Minister to set out the requirements of the planning process (West Coast Environmental Law, 2011). Overall, they were not a successful strategy as only one municipality (Langley) went through the process of adopting a WMP (Fraser Basin Council, 2011).

With the release of the Living Water Smart Strategy in 2008, communities across B.C. had high hopes that the new *Water Sustainability Act* (WSA) would enable collaborative watershed governance, as the policy proposal included provisions for delegating some functions of governance to “watershed governance arrangements” (Brandes and O’Riordan, 2014).

#### *Water Sustainability Act (WSA), 2016*

The preliminary regulations for the WSA came into force on February 29, 2016. Though the new legislation responds in part to many of the concerns raised by community members and stakeholders across B.C., the Council of Canadians (CoC) has expressed that the legislation falls short of enabling community and consensus-based water governance that recognizes water as a human right, water as a public trust, indigenous title, and jurisdiction to water, Free Prior and Informed Consent (FPIC), or strong enough regulations for conservation of water quality and quantity for both human and ecosystem health. In addition, the legislation only requires the notification (instead of consultation) of those who will be directly affected by a change to groundwater withdrawals, but not to any other people in the watershed. In addition, there is no automatic trigger for a public consultation session (it is up to the "decision maker" to decide if this is necessary; Darwish, 2014)

A positive aspect of the WSA is that it does enable Water Sustainability Plans (WSPs), which are area-based management schemes designed to address the impacts of land-based activities on water and ecosystem health. Unfortunately, WSPs are not required and are only completed if the Minister decides it is necessary to resolve conflicts among stakeholders due to water use or environmental flow needs, risks to water quality, or risks to aquatic ecosystem

health, or finally, to identify restoration measures in relation to a damaged aquatic ecosystem (*Water Sustainability Act*, 2016). At the time of writing, only the first phase of regulations had been put into force (Government of BC, 2016f).

## Regional Land Use Planning

Approximately 94% of all land and resources in British Columbia are unceded First Nations territory, otherwise referred to as “Crown Land” by the Government of British Columbia (Brandes and O’Riordan, 2014; Joseph, 2014). Land use planning of “Crown” lands has seen three distinct phases in British Columbia. The first phase is described as having taken place prior to the 1990s when land use planning was undertaken by provincial government representatives and incorporated public input from consultations. Land use plans were not completed on principle, but in response to resolving conflicts among resource users. Most of these plans were completed at the watershed scale, and some were completed at a larger, forest-management scale. The land use plans that were completed during this phase of resource management in BC were referred to as Integrated Watershed Management Plans (IWMPs), Coordinated Access Management Plans, Coordinated Resource Management Plans and Local Resource Use Plans (Forest Practices Board, 2008).

Due to a recognized need, and mainly in response to the “war in the woods” (the controversy between environmentalists and the forestry industry in Clayoquot Sound), the second phase of land use planning in British Columbia began when the provincial government introduced a program in 1992 to complete strategic land use planning at the regional scale based on a model of consensus decision-making. The Commission on Resources and Environment (CORE) was created to be responsible for developing strategic land use plans with a specific mandate of doubling the province’s parks and wilderness areas. The plans that CORE completed were for Vancouver Island, the Cariboo-Chilcotin, and Kootenay-Boundary (Forest Practices Board, 2008; Resource Management Division, 1997). The consensus-making aspect of

the process led people to believe that the objectives for areas outside of parks and wilderness areas would be implemented (Forest Practices Board, 2008).

Following planning attempts at the regional scale, the province decided to attempt comprehensive, consensus-based planning at the sub-regional scale beginning in 1994. Sub-regional plans were mainly referred to as Land and Resource Management Plans (LRMPs) (Forest Practices Board, 2008; Resource Management Division, 1997). LRMPs, while providing a greater level of detail than regionally-based plans, were used to specify management guidelines to implement the intent of provincial and regional policies and plans, and provided guidance to local-level plans, and resource management decisions at more detailed scales (Resource Management Division, 1997). LRMPs were also meant to be completed using a consensus-based decision-making process, and as of 2008, approximately 85% of British Columbia was covered by 26 LRMPs, where 60% were consensus-based (Forest Practices Board, 2008; West Coast Environmental Law, 2011). There are LRMPs for the Prince George area as well as the Bulkley Valley.

Though the consensus-based plan-making process was successful in 60% of the province, the challenge was plan implementation, where the process of creating detailed, and legally-enforceable objectives from broad-sweeping and largely inspirational objectives proved nearly impossible in most cases. LRMPs were meant to be translated into more detailed plans which were legally enforceable with the designation of Resource Management Zones (RMZs) through the *Forest Practices Code of BC Act* (FPCA). However, due to the complexity of this process, it was completed in at most, 50% of the province (Forest Practices Board, 2008).

In 2004, the *Forest Practices Code of BC Act* was replaced by the *Forest and Range Practices Act* which reduced the regulation of forestry and range licensees and put more focus on non-legal mechanisms for compliance such as maintaining or acquiring "social license". In 2005, the Integrated Land Management Bureau (ILMB) was created to take over the responsibilities for strategic land use planning. Ministries that have played key roles in regional land use



planning initiatives led by the ILMB are the Ministry of Forests and Range, Ministry of Environment, Ministry of Community Development, and Ministry of Aboriginal Relations and Reconciliation (West Coast Environmental Law, 2011). In 2006, the ILMB announced a "New Direction for Land Use Planning in BC" which in summary, turned the focus to developing new relations with First Nations and developing strategic land use plans in areas where a "business case" necessitated the process. The "new direction" which was implemented in 2008 was reported by the Forest Practices Board (2008) to be the end of comprehensive, provincially-based, consensus-based land use planning. Another element of the province's new strategy is the role of the public stakeholder which has changed from one that is consensus-based to one who is consulted by the proponent (West Coast Environmental Law, 2011).

Several factors contribute to the challenge of governing the land at the watershed level including the fact that 94% of the province is Crown land, there are various unresolved treaty and land claim processes with First Nations, a patchwork of existing regional land use plans, and a lack of tools to assess cumulative watershed impacts (Brandes and O'Riordan, 2014, p.7).

### Local or Municipal Level Land Use Planning

Part 26 of the *Local Government Act* of British Columbia permits the authority of municipalities to adopt an Official Community Plan (OCP). In contrast to LRMPs or other regional or sub-regional plans that primarily deal with Crown land, regional districts and municipal governments in B.C. develop plans that consider human settlement and development on privately owned lands within their boundaries. The purpose of an OCP is to clarify for residents, businesses and institutions, the primary goals and objectives with supporting policies, which help the municipality meet its goals for development (Municipality of North Cowichan, 2013; Resource Management Division, 1997). Municipalities and local governments are encouraged to integrate their municipal OCP with other sub-regional and regional plans such as LRMPs (Government of BC, 2016c).

OCPs are required to contain a set of policies outlined by the legislation and have the option of including policies on a range of other issues. Neither "watershed planning" nor "watershed management" are listed in the legislation regarding OCPs, however, there are several issues listed that are integral to watershed planning of which some are mandatory and the others optional. The mandatory policies for OCPs which are related to watershed management include: 1) restrictions on the use of land that is subject to hazardous conditions or that is environmentally sensitive to development; and 2) the approximate location and area of sand and gravel deposits that are suitable for future sand and gravel extraction (Government of BC, 2016c). Optional policy issues include: 1) policies relating to social needs, social well-being, and social development; 2) a regional context statement (if the plan area is in a regional growth strategy area); 3) policies respecting the maintenance and enhancement of farming on land in a farming area or in an area designated for agricultural use in the community plan; 4) policies relating to the preservation, protection, restoration and enhancement of the natural environment, its ecosystems and biological diversity; and 5) Development Permit Areas (DPAs), which can be used to achieve objectives identified in the OCP to protect agricultural land, protect the natural environment, or achieve climate action goals including energy conservation, water conservation or greenhouse gas reduction (Government of BC, 2016c).

## Collaborative Watershed Governance and Research Initiatives

Several organizations are acting outside of formal governmental processes to initiate and facilitate collaborative watershed governance processes and research in the Nechako watershed. Since 1950 when Alcan began to build the Kenney Dam, various organizations have been advocating for collaborative and sustainable watershed management including the Fraser Basin Council, the Carrier-Sekani Tribal Council, the Nechako Watershed Alliance (NWA), the Nechako Watershed Council (NWC), the Nechako Environment and Water Stewardship Society (NEWSS), the Integrated Watershed Resources Group (IWRG) at the University of British Columbia, as well as the newly forming Nechako Watershed Roundtable (NWR). Please see

Appendix A-3 for a description of the research, planning and governance initiatives being undertaken by these organizations.

## Chapter 3: Literature Review

A review of the literature focusing on youth participation in watershed planning was conducted through an ecohealth lens. Thus, an understanding of the broader socio-ecological system was recognized as integral to maximizing the utility of the results for the residents of the Nechako watershed, as well as for its contribution to theory in the academic literature. Thus, the purpose of conducting this literature review was threefold: first, an understanding of the socio-ecological theories and factors helped to generate ideas for the overall research design and interview guides; second, it helped to contextualize the significance of the research question and results within the broader discussion of participatory watershed governance and well-being; and third, it served to identify any knowledge gaps related to engaging youth voices within the field of Integrated Watershed Management (IWM).

The literature review focused on four components and a series of relationships which were relevant to the study's conceptual framework: 1) Human Wellbeing and Ecosystems; 2) Integrated and Collaborative Water Management; 3) Youth Participation and Wellbeing; and 4) Youth Participation in Regional Land Use Planning.

### Human Well-being and Ecosystems

Human societies must govern their interactions and effects on the natural environment because of their ultimate dependence on the natural processes that maintain the biosphere. Humans have co-evolved with these processes and “the biosphere and its ecosystems provide life support to all species” (MA 2003, p.72). Thus, when considering human wellbeing, environmental context must be considered as a critical element, as humans can no longer be regarded as separate from the ecosystems within which they live (Taylor & Hochuli, 2014).

### Defining Wellbeing

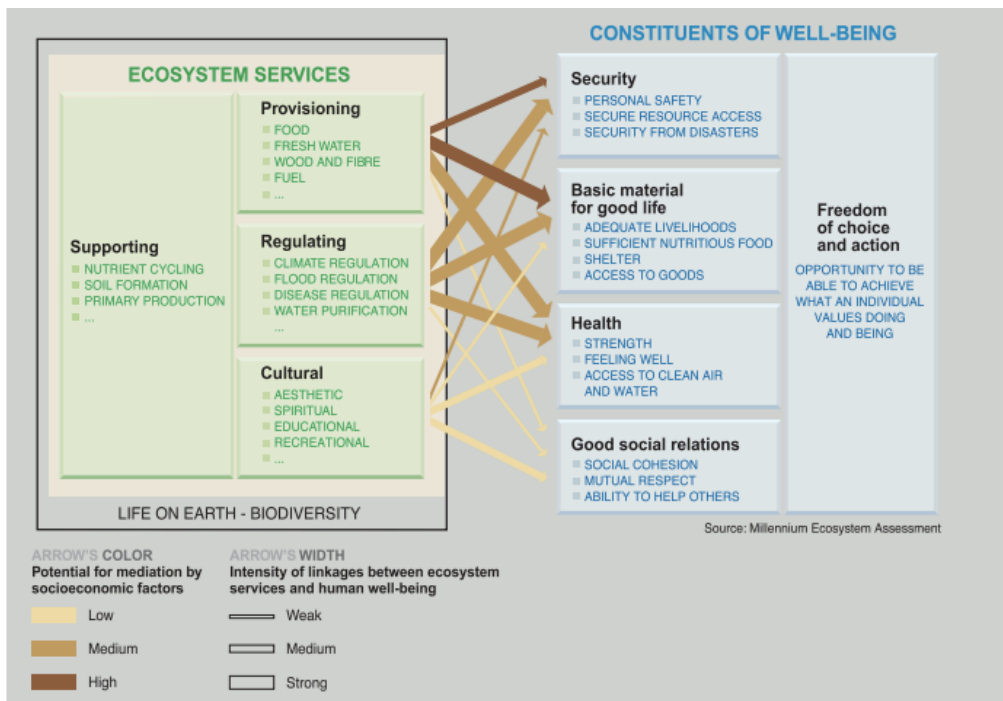
The World Health Organization (WHO) defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (World Health Organization, 1948). Defining well-being has been discussed in the literature as being

challenging (Dodge, Daly, Huyton, & Sanders, 2012), and no single definition of the term exists (Centers for Disease Control and Prevention, 2016; MA, 2003). Early definitions of well-being were unidimensional and referred mainly to the financial situation of people living in poverty or deprivation. More recently, definitions have evolved to include measures of health, education, and material living standards to represent a more holistic evaluation of the human condition (Agarwala et al., 2014). Though there are varying descriptions of the components of well-being, one definition that stands out as having relevance to the study of IWRM is provided by Marks and Shah (2004). The authors describe wellbeing as, "...a flourishing society, where citizens are happy, healthy, capable and engaged...well-being is more than just happiness. As well as feeling satisfied and happy, well-being means developing as a person, being fulfilled, and making a contribution to the community" (Marks & Shah, 2004, p. 2). Another definition from the field of psychology describes wellbeing as, "a state of affairs in which the personal, relational, and collective needs and aspirations of individuals and communities are fulfilled (Evans & Prillelrensky, 2007, p. 681). The relationships between ecosystems, governance systems, and wellbeing which are embedded in these definitions are described by the conceptual framework employed in the Millennium Ecosystem Assessment (MA) and explored in-depth in the literature.

### Relationships between Ecosystems and Well-being

The Millennium Ecosystem Assessment (MA) provides a clear overview of the relationships between ecosystem services and well-being, which can be applied in most if not all contexts, as its conceptual basis represents the most fundamental aspects of the importance of ecosystems to human well-being. The MA recognizes that human well-being is dependent on ecologically sustainable and socially equitable ways of living and summarizes these into five basic components: 1) basic materials for a good life; 2) freedom and choice; 3) health; 4) good social relations; and 5) personal security (Figure 6). The MA recognizes the essential role that the natural environment plays in providing these five components of well-being, and refers to

these relationships as "ecosystem services". The MA organizes ecosystem services into four categories: 1) provisioning (products obtained from ecosystems such as food, water, fuel or fibre); 2) regulating (benefits obtained from the regulation of ecosystem processes such as climate regulation or water purification); 3) cultural (nonmaterial benefits obtained from ecosystems such as spiritual values or benefits to mental health); and 4) supporting (services necessary for the production of all other ecosystem services such as soil formation or primary production; Figure 6). The presence or absence of ecosystem services can have direct, immediate, indirect or lagged effects on human well-being. An example of a direct and immediate effect on provisioning services might be locally contaminated drinking water that causes immediate deterioration of health. An example of a more lagged or indirect effect might be a new dam that disturbs supporting services such as nutrient cycling which in turn affect the aquatic system's regulating services, causing a shift in the relative abundance of microorganisms leading to an outbreak of infectious disease in human populations. How supporting, provisioning, regulating and cultural



**Figure 6.** A schematic describing ecosystem services, the determinants and constituents of well-being, and the relationships between them. From, "Ecosystems and Human Well-being: Health Synthesis", Corvalan et al., 2005. Copyright (2005) by WHO.

services benefit any one person is highly unique to the individual, the overall context, and that individual's situation. Some of the factors influencing these dynamics include geography, ecology, age, gender and culture (MA, 2003). Figure 6 depicts the relationships between ecosystem services and the determinants and constituents of well-being.

There are many recent studies that focus on the relationships between ecosystem services and human wellbeing. The majority use the conceptual framework presented in the MA (2003). Because the relationships between well-being and ecosystem services are context and situation dependent (as discussed above), most studies published in the academic literature focus on a very specific case or context. Since more than three-quarters of the world's population live in urban environments, a large body of literature focuses on the relationships between well-being and urban ecosystems. These discussions tend to emerge in the urban design and city planning literature (e.g., review by Barton, 2009), however, as Taylor & Hochuli (2014) point out, most discussions focus on the non-material (or 'cultural') benefits humans derive from ecosystems, such as the benefits of being exposed to green space on physical and mental health (e.g., Nisbet & Lem, 2015). Taylor and Hochuli (2015) emphasize the importance of the often-ignored benefits of biodiversity and ecosystem function to human wellbeing in urban ecosystems. The authors urge city planners to address these benefits to avoid inadequate attention to human wellbeing: "...in order to make a genuine impact on human wellbeing, urban ecosystems should have the ecological integrity required in order for them to function" (Taylor & Hochuli, 2014, p. 757). Another context-specific study of the relationship between ecosystems and human well-being is illustrated by Fagerholm et al. (2016) who examine the relationships between the distribution of ecosystem services and self-reported well-being using public participation GIS (PPGIS) in an agroforestry landscape. The authors found that a mosaic of landscapes provide more cultural and provisioning ecosystem services than agroforestry landscapes alone. They also found that overall, landscapes contribute to well-being through people's interactions with the land, such as providing a peaceful setting, as well as providing a

setting for people to people relations including those with family and friends (Fagerholm et al., 2016). At this stage, it appears that research on the connections between human well-being and ecosystems is at the point of having convinced policymakers that the two are inextricably linked (Berbes-Blazquez et al., 2016), and that we are in the process of trying to fully comprehend the complexities that are required to address context-specific socio-ecological problems related to human well-being, land use planning, and natural resource management.

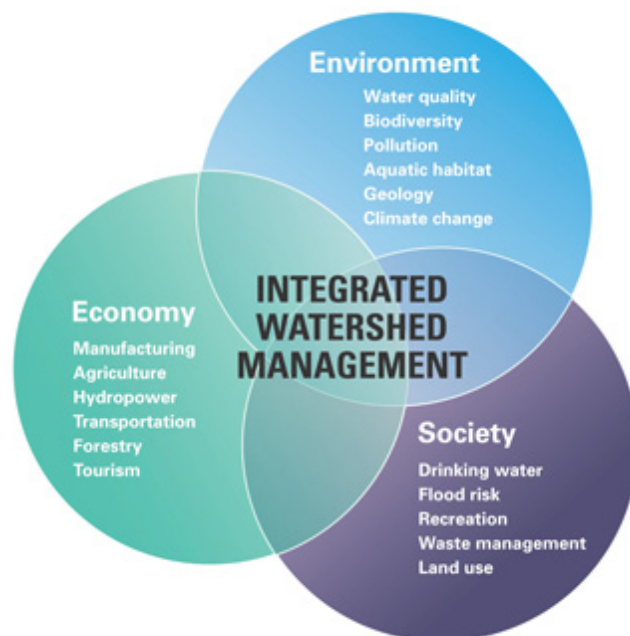
One important discussion occurring in the literature presently is the important role of governance in mediating the sustainable flow of ecosystem services (stocks) equitably. Referring to Figure 6, it becomes clear why access and equitable distribution are important to the attainment of security, basic materials for a good life, health and good social relations, and consequently, to the relative determination of one's freedoms and ability to have social choice. The MA introduces the term "ecological security" which is defined as "the minimum level of ecological stock defined by communities through a participative and open process, to ensure a sustainable flow of provisioning, regulating, and cultural ecological services" (MA, 2003, p. 83). The power dynamics and institutions that govern land use both formally and informally play a large role in determining people's ability to access ecosystem services that serve their needs fairly and equitably (MA, 2003; Berbes-Blazquez et al., 2016). The relationship between participatory governance and the sustainable flow of ecosystem services is the subject of the next section.

## Watershed-based Management

Watershed-based management (a.k.a., integrated watershed management, integrated water resources management, etc.) approaches are based on the widespread acceptance that watershed boundaries denote highly desirable planning units (Bunch et al., 2014; De Steiguer, Duberstein, & Lopes, 2003). A watershed is defined as a geographic unit in which "rainfall is collected and drained through a common confluence point", and includes all the water, soil, and vegetation, as well as the social, economic and cultural aspects of people's livelihoods (Federal



Democratic Republic of Ethiopia, 2015, p. 9). The relationships between geography, hydrology, and ecology within watersheds provide opportunities for holistic and effective management of environmental matters through governance, public policy, population, and climate change strategies (Bunch et al., 2014). Integrated watershed management strategies are holistic in that they consider the interdependencies between science, policy, and public participation, and aim to protect and restore the physical, chemical and biological integrity of aquatic ecosystems and human health while providing for sustainable economic growth (De Steiguer et al., 2003; Figure 7)



*Figure 7. The three pillars of Integrated Watershed Management (IWM) including the Environment, Economy, and Society. IWM seeks to address ecological, community and water user' interests holistically through multi-stakeholder processes. From, "Your Watersheds, Our Great Lakes", Conservation Ontario (2016).*

Watershed-based management systems use biogeographic boundaries to designate areas where specific groups of people are responsible for making decisions regarding resource management (Berkes et al., 2014). Integrated Watershed Management (IWM) is defined as:

*...the process of managing human activities and natural resources in an area defined by watershed boundaries [and as] an evolving and continuous process through which decisions are made for the sustainable use, development, restoration and protection of ecosystem features, functions and linkages. (Conservation Ontario, 2010, p. 65)*

IWM is a process that considers a variety of community and water users' interests to reflect wholly the values of water to the environment, economy, and society (Conservation Ontario, 2012; Figure 7). The Canadian Government states that:

*IWM in Canada brings together the work of federal and provincial/territorial governments, Aboriginal peoples, and other stakeholders -- municipalities, industry, energy, agriculture, non-governmental organizations, community groups, and research teams -- into full partnership in the processes of planning, decision-making, management, and implementation. (Government of Canada, 2010)*

An example of a collaborative, transboundary IWM governance group is the International Joint Commission for the Great Lakes between Canada and the United States. The Conservation Authorities of Ontario are another well-known example.

## History and Development of Integrated Watershed Management

Berkes et al. (2014) cite evidence of watershed-based management in indigenous societies and especially those of southeast Asia and Oceania. In each of the examples, “the social group inhabiting the ecosystem unit was considered to be a part of the system, and affiliation with a certain area was considered to be a part of a person’s identity” (Berkes et al., 2014, p. 1255). While many authors agree that watershed-based management practices are “ancient”, Barham (2001) disagrees. Barham thinks it is much more likely that indigenous societies operated at the level of the sub-watershed or across multiple sub-watersheds, but did not necessarily conceptualize their practices as being “watershed-based”. Barham makes this point to emphasize that watershed-based management is not necessarily “tried and tested”. Other authors, however, cite evidence of hydrological mapping at the watershed scale as far back as the third century BCE China, as well as areas of Spain and France in the mid-1800s (Blomquist & Schlager, 2005; Cohen & Davidson, 2011).

Nevertheless, prior to watersheds being recognized as appropriate units for governance and management, engineers and hydrologists focused at the watershed scale to manage flooding, irrigation, drainage, and power production. Though watershed-based management schemes gained popularity on the global development and policy scene in the 1990s (Rhoades, 1998), examples of watershed governance during the 20th century include the Tennessee Valley Authority in 1933 and the International Water Conference in Mar del Plata in 1977 (Biswas, 2004; Engle, Lemos, & Nelson, 2011; Stålnacke & Gooch, 2010). Since the Dublin Conference and Earth Summit in Rio de Janeiro in 1992, participatory watershed-based resources management has evolved in various countries under a variety of names including Integrated Water Resources Management (IWRM), Integrated Catchment Management (ICM), and Integrated Systems for Knowledge Management (ISKM; Rhoades, 1998). These approaches all focus on coordination among water sectors and are based upon the Dublin principles which recognize water as a finite and essential resource; the importance of participatory management; the importance of women's roles in water management; and the importance of recognizing the economic value of water (Stålnacke & Gooch, 2010).

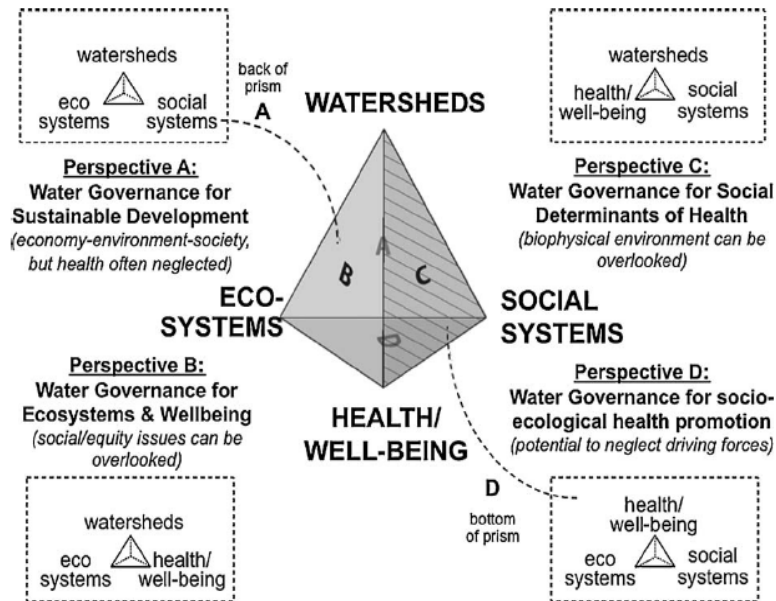
IWRM appears to be the most commonly used term, and is defined by the Global Water Partnership (GWP) as: “a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (Biswas, 2004). IWRM is defined as being:

*...geared toward decentralizing institutions around major river basins, or a particular watershed scale, and joining together various elements of water resources planning, such as groundwater and surface water, water quantity and quality, and socio-economic, hydrological, and ecological aspects of water management...it strives to integrate management across multiple scales while incorporating a multitude of stakeholder interests. (Engle et al., 2011, p. 20)*

By forming partnerships and breaking down silos through collaboration, it is reasonable to expect that integrated approaches such as IWRM will be more effective and more efficient than non-integrated approaches (Mitchell, 2006).

## Integrating IWRM and the Ecohealth Approach

There is no agreement among policy makers or activists about how to develop and implement participatory, watershed-based policies and programs (Blomquist & Schlager, 2005). One suggestion on an approach to IWRM is to combine its main tenets with those of ecosystem approaches to health, or the “ecohealth” approach (discussed in Chapter 4). Bunch et al. (2014) suggest tackling inter-sectoral synergies between the environment, society and health by combining the ecohealth and watershed-based approaches such as IWRM and IWM. The authors contend that the efficiency and effectiveness of integrated watershed governance can be improved when social and environmental issues are discussed in terms of their relationships to the determinants of health and wellbeing. The "Prism Framework", introduced by Parkes et al. (2010) provides a guide to the conceptual linking of watershed-based and ecohealth approaches



**Figure 8.** The Watershed Prism Framework guides the integration of IWRM and an ecohealth approach through perspectives A-D. Source: Parkes et al. (2010).

(Figure 8). The Watershed Prism is a tool that can be particularly useful for defining a given project's "problem-shed", which involves developing an appreciation of the natural and spatial-temporal scales of the relationships associated with a problem or situation (Bunch & Waltner-Toews, 2015), so as not to overlook important components of health, the biophysical environment, social and equity issues or driving forces at the watershed scale. Taking advantage of these synergies can help to solve multiple problems at different scales in a single approach.

### The Importance of Public Participation

Perkins (2011) highlights evidence of “minimal participation by women, and by lower-class otherwise marginalized people in public processes which are ostensibly meant to represent everyone in making public decisions... and often have the gravest impacts on those who participate least” (Perkins, 2011, p. 205). Participatory based management evolved and gained popularity due to problems throughout recent history with top-down decision-making and management regimes. Sectoral (siloes) and top-down management has often left communities struggling to obtain information and materials, have questions answered, gain a platform for meaningful discussion, and suffering from the consequences of any poor decisions that were made (Camacho, 2005). In addition, top-down approaches have been known to apply uniform and formulaic solutions inappropriate for unique local situations (Duram & Brown, 1999). Other top-down strategies prioritize national needs over local concerns (De Steiguer et al., 2003).

“Good governance” serves to realize societal goals and is defined by who has power, who makes decisions, and how a variety of players have their voices heard in the decision-making process (Institute on Governance, 2015). Watershed governance is a form of “place-based” governance (Lant, 2003; Parkes et al., 2010), which uses local or regional place-based identities to motivate civic engagement in decision-making processes focused on progressing social and ecological sustainability (Edge & McAllister, 2009). Participatory governance (a variant or subset of governance theory that seeks broad and equitable civic engagement) is somewhat

inherent to watershed or place-based governance but focuses more specifically on democratic engagement of marginalized groups through deliberate practices (Fischer, 2012).

Participation is defined as the "full involvement of local populations in the identification of priority problems and potential solutions with teams of scientists, planners, and development specialists" (Rhoades, 1998, p. 3). Arnstein's (1969) definition focuses more on equity:

*...the redistribution of power that enables the have-not citizens, presently excluded from the political and economic processes, to be deliberately included in the future...the strategy by which the have-nots join in determining how information is shared, goals and policies are set, tax resources are allocated, programs are operated, and benefits like contracts and patronage are parceled out. (Arnstein, 1969, p. 216)*

Broad public participation and stakeholder involvement are essential to sustainable watershed management (Conservation Ontario, 2013; De Steiguer et al., 2003; Perkins, 2011), and especially when addressing complex problems (Duram & Brown, 1999). Often the people who need to implement solutions are opposed to regulations imposed by the state or national regulatory bodies, so local decision-making that is recognized as legitimate by local people aids compliance (Adams et al., 2005).

A review of numerous applications of integrated watershed management projects worldwide by the National Research Council found that to succeed, "...integrated watershed management must be participatory, adaptive and experimental, integrating all the relevant scientific knowledge/data and user-supplied information regarding the social, economic and environmental processes affecting natural resources at the watershed level" (De Steiguer et al., 2003, p. 737). Respecting local voices and incorporating local knowledge makes decisions on research and management questions more sustainable and locally-relevant which can be more easily implemented (Rhoades, 1998).

When it comes to participatory frameworks, however, participation is a gray area that can be implemented to the benefit or detriment of citizens, and the way that participation is granted is important to avoid replicating hierarchical top-down governance structures. Arnstein

(1969) illustrates a typology of citizen participation with a ladder framework composed of eight steps. From the highest degree of citizen power to non-participation, the degrees of participation are defined as citizen control, delegated power, partnership, placation, consultation, informing, therapy, and manipulation (Arnstein, 1969). Though the ladder typology is a simplification, it serves to bring an awareness to the gradation of citizen participation, and the variation that can occur in the design of participatory watershed planning processes.

Overall, participatory governance theories and discussions of public participation in the academic literature are reflective of criticisms of traditional management and planning processes regarding ineffective or unsatisfactory stakeholder consultation (Dragičević & Balram, 2004). Because issues of water management are complex (involving social, economic, legal, environmental and political factors at local, regional, national and international levels), water policies and issues are now thought to be better assessed, analyzed, reviewed and resolved within an overall societal and developmental context (Biswas, 2004). Making decisions within the complexity of IWRM requires that people involved in water resource governance span boundaries that may be institutional, cultural, spatial and/or temporal, and it requires viewing the social-ecological-hydrological system as dynamic rather than linear (King & Thornton, 2016). Stakeholder involvement is said to generate management strategies that are acceptable to all parties, more locally relevant, and therefore, more likely to be supported and adopted (Bonnell & Koontz, 2007).

### The Challenges Ahead

Several authors have recognized the challenges inherent to IWM and other participatory-based integrated watershed management strategies (e.g., Biswas, 2004; Engle, 2011; Rhoades, 1998). Most IWM projects are complex with multiple stakeholders, conflicting goals, long time-scales, and require co-learning methods and computer-based tools, which can make success elusive (Rhoades, 1998).

### *Challenges associated with participatory frameworks*

Though public involvement is cited as integral to the success of IWRM, it is also cited by Heathcote (2009) as the most difficult and controversial aspect of the process (De Steiguer et al., 2003). Many progressive activists and scholars critique “democratization” and “public participation” in environmental and development policy, pointing out that it both hides and perpetuates deep socio-political inequities (Perkins, 2011). Perkins documented the processes, challenges, and outcomes of popular participatory watershed management strategies from around the world. She emphasized that the appeal of participatory environmental management and governance may be so strong that we fail to think critically about what constitutes participation, and how to realize the benefits through the implementation of wide-reaching public input. She summarizes a diverse set of academic papers discussing the challenges associated with public participation including inter-jurisdictional problems, internal oppression of marginalized groups, reinforcing the opinions and objectives of elites, and empowering government agencies to offload complex and challenging multi-stakeholder consultation processes onto non-governmental or grassroots organizations. However, in the end, Perkins (2011) sees a discussion of these challenges as crucial to the eventual success of broad and equitable public participation.

An example of an internally marginalized group within a participatory process was the inclusion of women in the land use planning processes carried out by the Commission on Resources and Environment (CORE; also discussed in Chapter 2) in the 1990s in forestry communities in British Columbia. CORE designed its collaborative model to be "sector-based", and to participate, a sector had to prepare a statement of the interests it sought to have addressed during the planning process. Since the forestry industry is quite gendered, this sector-based approach marginalized homemakers, unemployed people, and small business owners who were most frequently represented by women (Reed, 2004).



Other critiques discuss the fact that scholars often focus on the barriers to individual participation while neglecting the actual demand from the public for these opportunities. This discussion is framed within theories of collective action in which the net benefit to individuals from participating is often not enough when compared to the relative cost (time, money, effort) of participating (Rydin & Pennington, 2011). Rydin and Pennington (2011) assert that one must first examine and if necessary, re-orient the governance structure so as to provide adequate incentive for participation by generating social capital (e.g., extent of social networks, density of relationships within social network, obligations or responsibilities between individuals or organizations within the social network, levels of trust, etc.), as opposed to arguing simply from an individual rights-based perspective, which may leave environmental governance initiatives with insufficient community involvement (Rydin & Pennington, 2011).

#### *Challenges associated with legitimacy*

One of the problems that sometimes deters participation from civil society is the inability for watershed planning organizations to implement the decisions made, as well as their reliance on voluntary power. In addition, watersheds do not conform to political boundaries and, thus, watershed planning groups struggle to gain political legitimacy and legal authority (Adams et al., 2005; Bonnell & Koontz, 2007). As a result, many watershed groups are considered weak in that they lack autonomy and comprehensive function with broad implementation powers (Blomquist & Schlager, 2005). Rydin and Pennington (2011) suggest working at the sub-watershed level to generate the social capital required to overcome some of the challenges associated with legitimacy and the participatory aspects of IWM.

#### Youth Participation and Wellbeing

Checkoway (2011) defines youth participation as, “the power of young people as a group that is usually underrepresented in the political process...the strategy by which they are involved in goal setting, resource allocation, and program implementation...[and] the means by which they influence the opportunities and outcomes of the larger society” (p. 341).

Well-being is defined as it was at the beginning of the chapter, but to supplement this understanding of well-being, a definition referencing youth is cited from Evans and Prilleltensky (2007): "well-being may be defined as a state of affairs in which the personal, relational, and collective needs and aspirations of individuals and communities are fulfilled" (p. 681). Elements of personal well-being which are particularly important for youth include self-determination, and a sense of self-control, self-efficacy, physical and mental health, optimism, meaning and spirituality. Aspects of relational well-being that the authors cite as being significant for youth include caring, respect for diversity, reciprocity, nurturance and affection, support, collaboration and democratic participation in decision-making processes. The sense of collective well-being the definition refers to is comprised of and influenced by people's individual and relational well-being and includes elements such as gender and race equity, access to a clean environment, fair and equitable bargaining powers, and resources and obligations in society (Evans & Prilleltensky, 2007).

### Overview of Youth Participation

Approximately 30% of the world's population is less than 18 years of age, however, they are seldom considered consistently in community and environmental planning (e.g., Checkoway, Pothukuchi, & Finn, 1995; Frank, 2006; Hood, Martin, McLaren, & Jackson, 2011; Zurba & Trimble, 2014). This is beginning to change, however, as the fields of planning and sustainable development are increasingly recognizing youth as important stakeholders as well as community resources (Frank, 2006). A review of the community and land use planning literature by Frank (2006) found that youth were interested in participating in land use planning, demonstrated technical, communicative, and collective decision-making skills, as well as an ability to exercise sociopolitical strategy. Youth are undergoing rapid physical, psychological and social development, and therefore, meaningfully including youth in decision-making processes benefits individuals and their communities presently, as well as into the future (Frank, 2006).

In addition, Checkoway (2011) points out that children and youth have the right to participate in order to obtain the necessary information to make decisions affecting their own lives. Participation is important to youth since their generation will face the consequences of current decision-making for much longer than the majority of adults (Frank, 2006; United Nations Conference on Environment and Development, 1992). Overall, an increased interest in youth involvement in community planning has coincided with both the Convention on the Rights of the Child and the sustainability movement (Frank, 2006). Checkoway (2011) surveys the literature and delivers eleven key propositions that summarize “what is known” about youth participation (Table 1). Checkoway (2011) also highlights two important research gaps: 1) “Which strategies of youth participation have the most potential to empower young people? and 2) Which competencies will prepare young people for active participation in a democratic society?” (p.343).

<p><b>Table 1. Eleven propositions defining youth participation (Checkoway, 2011).</b></p> <p><b>What is Youth Participation?</b></p> <ol style="list-style-type: none"> <li>1) Youth participation is a right protected by the Convention on the Rights of the Child</li> <li>2) Youth participation is a process of involving young people in the institutions and decisions that affect their lives</li> <li>3) Youth participation refers to active engagement and real influence of young people, not their passive presence or token roles in adult agencies</li> <li>4) Youth participation assumes that young people are competent citizens rather than passive recipients of services</li> <li>5) Participation has various objectives, outcomes, and assessment criteria</li> <li>6) Participation has several strategies</li> <li>7) Young people have limitless issues, including schools and education</li> <li>8) Many young people are uninvolved or minimally involved in public affairs, and small groups of people are extremely active (those who are most active are not representative of the general population)</li> <li>9) Lower income people participate less than higher income people in formal politics, but instead participate in ways that are appropriate to their present situation</li> <li>10) Youth participation is facilitated by youth leaders and adult allies</li> <li>11) There are obstacles to youth participation and also opportunities for strengthening their involvement in the future</li> </ol>
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Overall, several lessons have been learned from the individual case studies that have been published over the years. Frank (2006) summarizes these lessons as including giving youth responsibility and voice, building youth capacity, encouraging youthful styles of working,

involving adults throughout the process, and adapting the sociopolitical context (Frank, 2006). Lastly, Heath and McLaughlin documented improved capacity of both youth and adults for participating in community development initiatives where people of different generations worked together (Checkoway et al., 1995).

## Defining Youth

The United Nations Education, Scientific, and Cultural Organization (UNESCO) recognizes the variability of persons qualifying as youth, depending on various socio-economic and cultural circumstances. UNESCO describes youth as between the ages of "leaving compulsory education, and finding their first job", and for statistical purposes, defines youth as between the ages of 15 and 24 (United Nations, 2016). The United Nations stresses the fluidity of youth, that it is not a fixed age group, and that it varies particularly with changes in demographic, financial, economic and socio-cultural settings (United Nations, n.d.). Thus, youth is inevitably a gray area including both 'old' children and 'young' adults. Several United Nations entities have varying definitions of youth (Table 2).

<i>Table 2. Definitions of 'youth' used by various entities of the United Nations. Adapted from "Definition of Youth" (United Nations, n.d., p. 2).</i>	
<b>UN Entity</b>	<b>Definition (age, in years)</b>
UN Secretariat/UNESCO/ILO	15-24
UN HABITAT (Youth Fund)	15-32
UNICEF/WHO/UNFPA	Adolescent, 10-19 Young people, 10-24 Youth, 15-24
UNICEF/CRC	Child until 18
African Youth Charter	15-35

Countries such as Canada are realizing that young people are making the transition from childhood to independent adulthood later than they typically have in the past. This is attributed

mainly to longer periods of schooling to fulfill knowledge requirements to enter the workforce. Various federal government agencies in Canada have extended their definition of youth to reflect this shift in society, with the largest age range being 15-35 by the Department of Foreign Affairs and International Trade (Doucette, 2010).

### International Recognition of the Rights of Youth

International organizations such as the United Nations (UN) and IBEROAMERICA have long considered and promoted the importance of the full participation of youth socially, economically and politically to succeed in the eradication of poverty, and to move towards a more peaceful and sustainable world. In 1965, the UN endorsed a declaration on the *Promotion Among Youth of the Ideals of Peace, Mutual Respect, and Understanding Between Peoples*, and in 1985, the UN declared International Youth Year (United Nations, 2010). The United Nations International Children's Emergency Fund (UNICEF) has also focused specifically on children's rights and well-being since the 1940s.

The Convention on the Rights of the Child (CRC) began to change how children were perceived by the world. Article 12 of the Convention states: “a child who has the capability to form his or her own views has the right to express those views freely in all matters affecting the child, the views of the child being given due weight in accordance with the age and maturity of the child” (United Nations, 1990). Article 15 of the Convention states that children have the right to “freedom of association and to freedom of peaceful assembly” (United Nations, 1990), implying the right to express political opinions, engage in political processes and participate in decision-making (Checkoway, 2011). The CRC has been recognized in land use planning literature as providing a basis for increasing governmental and community efforts to include youth meaningfully in decision-making processes (Checkoway, 2011; Frank, 2006).

The Earth Summit in 1992 was another international assembly of the United Nations which recognized the rights of youth with regards to decision-making. Chapter 25 of Agenda 21 from the Earth Summit directs participating nations to involve youth in environmental and

development decision-making and implementation (Frank, 2006). The chapter refers to the imperative that youth from all parts of the world participate actively in all relevant levels of decision-making processes, and recognizes their intellectual contribution, ability to mobilize support, and ability to bring important and unique perspectives (United Nations, 1992, sec. 25.2). The chapter recommends governments establish a number of procedures to carry out the objectives of Chapter 25 including consultation procedures for involving youth at local, national and regional levels; promoting dialogue with youth organizations during the preparation of environment plans; incorporating recommendations of youth conferences or forums into relevant policies; ensuring access to education which incorporates environmental awareness, sustainable development and increases practical skills; creating alternative employment opportunities in cooperation with youth and relevant ministries; and establishing task forces of youth and non-governmental organizations to educate other youth through public outreach (United Nations, 1992, 25.9).

The year 2010-2011 was declared once more by the United Nations as the International Year of Youth. The UN General Assembly met to conduct a high-level meeting on youth entitled, "Youth: Dialogue and Mutual Understanding" (United Nations, 2011). In 2015, UNICEF produced their annual report, *The State of the World's Children*, which reported on children's well-being on the 25th anniversary of the CRC. The report documents progress and continuing challenges, and highlights key questions that remain unanswered: 1) how can children and young people be engaged in the process of innovation? 2) what measures must be taken to protect children involved in the process of developing and implementing solutions? How should children be compensated for their time and effort? 3) what kinds of education or training can help foster children's creativity and critical thinking? and 4) how do we ensure that the poorest and most marginalized children are not excluded from such opportunities? (UNICEF, 2014). Though there have been positive changes for young people since the CRC in 1989, children's and young people's rights are not universally recognized. UNICEF reports that

Article 12 of the CRC (which addresses children's rights to have a voice in decisions that affect them) is disrespected on a regular basis and that its legitimacy is questioned by many (Seymour, 2009).

### The Barriers to Youth Participation

Frank (2006) provides a synopsis of both the structural barriers to youth participation inherent to the planning system, as well as several deeply-rooted societal barriers. The four societal barriers are described as “developmental, vulnerable, legal, and romantic”.

The developmental view assumes that youth lack knowledge, skills, and capacity, and assumes that youth are unable to contribute meaningfully to decision-making processes, and require adults to act on their behalf. The vulnerable societal view labels youth as powerless and incapable of effecting the necessary political leverage to see their ideas come to fruition, thereby risking disenchantment and disengagement. Related to this is the idea that if youth are powerless, they may be easily taken advantage of in terms of being manipulated or becoming victims of tokenism (Frank, 2006). The legal view simply assumes that youth are unworthy of being given influential roles in society (if they are less than the age of majority), treats youth as "citizens-in-training", and focuses on educating youth as opposed to giving them any real responsibility or influential role. Kalnins et al. (2002) point out that young people recognize themselves as marginalized in an adult society, and that their perception is that adults don't take them seriously. This fact could easily amplify the developmental, vulnerable and legal barriers youth face.

Finally, the romantic view assumes the opposite of many of the assumptions inherent to the developmental, vulnerable and legal views, in that it assumes youth are superior and have capabilities that are distinct from adults such as enhanced levels of creativity, curiosity, enthusiasm and concern for community well-being. The assumption associated with the romantic view can have a divisive effect on both youth and adults who perceive themselves as unable to see “eye-to-eye”. A common feeling reported throughout the literature was that in

general, youth feel frustrated by a lack of adult responsiveness in community development scenarios (Frank, 2006).

## The Benefits of Youth Participation

*Youth participation is important, because when young people participate, it draws upon their expertise, enables them to exercise their rights as citizens, and contributes to a more democratic society. It also promotes their personal development and provides them with substantive knowledge and practical skills. (Checkoway, 2011, p.340)*

The literature is beginning to shed light on the fact that youth are a substantial community asset and should be regarded as critical resources in community planning (e.g., Frank, 2006; Kalnins et al., 2002). This is an important point because much of the time youth engagement is focused on personal development (i.e., the charitable model) as opposed to challenging the status quo or social injustice, and realizing that communities can benefit immensely from involving youth (Evans & Prillelrensky, 2007). As pointed out by Frank (2006), we cannot assume that an adult-oriented approach to planning serves youth well because youth are very different from adults and so by default, have very different needs and preferences.

The literature review by Frank (2006) presents a summary of the benefits to youth and to the community of youth participation in land use planning from the literature. The studies Frank reviewed are all in the field of community and urban land use planning, but the lessons are valuable nonetheless. Benefits to youth from participating included having a voice in public affairs and feeling connected to their community and the environment. Youth learned how to create community change, and attitudes and behaviours became more confident and assertive. Overall, youth appeared to develop an enthusiasm for planning and community participation (Frank, 2006). Checkoway et al. (1995) reported positive effects on youth mental health and well-being including enhanced self-efficacy, civic competence and experiential education and skills development.

The positive effects of youth participation also benefit the rest of the community indirectly (Evans and Prilleltensky, 2007) by both educating young people, improving the



overall well-being of young individuals, and increasing the capacity of young adults. Other aspects of youth participation that benefit the community include the fact that youth concerns are addressed in the larger community, youth generate new information and illustrate their preferences, adults generally improve their perception of youth, youth present feasible recommendations, and the work of youth produces tangible impacts (Frank, 2006).

## Youth Participation in Regional Land Use Planning

Documented cases and theoretical discussions of youth involvement in land use planning are heavily dominated by those in the urban and community planning literature. The lessons learned from these studies have largely been summarized in the previous sections of this chapter. While several papers discuss the involvement of youth in the general field of natural resource management, very few papers focus specifically on the participation of youth in regional or watershed planning. The next section will review the handful of published examples involving youth in the areas of natural resource management and watershed planning.

While there appears to be some consensus in the literature that youth involvement in natural resource management and watershed planning is important, there are very few tangible strategies for engaging youth. Though several studies report on youth involvement, they do not critically address *meaningful* engagement of youth voices in decision-making processes involving adults. Additionally, there do not appear to be any evaluations of participatory processes which involved youth voices in watershed planning or natural resources management in the academic literature.

## Youth Involvement in Natural Resource Management

The majority of authors discussing youth involvement in more general natural resources management note specifically that the involvement of youth is poorly addressed. Hood et al. (2011) point specifically to the lack of research regarding rural and remote youth in collaborative resource management theory, and begin to fill that gap by interviewing youth in a remote area of the east coast of Canada about their perceptions of the environment and future

role in environmental stewardship. Zurba and Trimble (2014) report on two case studies and focus their attention on the effects of environmental crises on opportunities for youth, as well as the perspectives of people of all ages regarding youth engagement in collaborative natural resource management.

Hood et al. (2011) focus their paper entirely on attempting to fill a gap in the academic literature pertaining to the perspectives of rural youth on the environment and stewardship. The authors point out that there is some research on the perceptions of urban youth, but that their study is the first to focus specifically on rural and isolated communities. Through semi-structured interviews, the authors determine that though most of the youth they spoke to had a developed sense of attachment to their home community, other socio-economic factors were likely to draw the youth away as young adults for education or career-related objectives. The authors proposed that the array of wireless technologies available to the public be utilized to provide opportunities for youth to engage as stewards of the land from afar (e.g., information on development proposals on a website, or an online youth forum to generate discussion and comments, etc.).

Zurba and Trimble (2014) note that academia has given much attention to power dynamics and the actors involved in resource management, but that there is a significant gap pertaining to youth involvement in these processes. Somewhat blatantly, the authors state: “...policies for natural resources management have been predominantly intergenerationally blind, disregarding the involvement of youth in resource-based activities, and their contributions to the social-ecological systems they belong to” (Zurba & Trimble, 2014, p. 79).

To begin to address youth involvement in resources management, the authors conducted interviews in a forestry-based community in northern Ontario, and a coastal fisheries community in Uruguay. The purpose of the interviews was to gather perspectives from both youth and adults on participation in natural resource activities, and the role of environmental crises in producing opportunities for participation. In the fisheries study, adults who were

interviewed reported the following explanations for a lack of youth participation: 1) unsuccessful transmission of “social codes” of the fishery to youth; and 2) a disinterest in fisheries initiatives. Young fishers in the same community reported the following reasons for their own lack of involvement: 1) conflicting time commitments; 2) priorities involving family issues; 3) a lack of skills to participate; and 4) that previous meetings and projects did not lead to positive outcomes (Zurba and Trimble, 2014, p.83).

In the case study in northern Ontario, community members’ explanations for a lack of participation by First Nations youth included: 1) problems with the types of incentives to complete training programs; 2) lack of stable employment opportunities; 3) challenges in community life; 4) a lack of interest in forestry activities; 5) values and cultural connections to the forest that are not aligned with industrial forestry; and 6) a lack of First Nations people in leadership and mentorship positions.

In their discussion, the authors note several parallels between the case studies that had both similar and opposing effects on youth participation. Their research indicated that a perceived lack of interest from youth could be rooted in various complex socio-cultural or socio-economic factors and that the design of incentives or participatory programs must first seek to understand these underlying dynamics. In the Canadian context, the authors suggest that education and mentoring opportunities are important for youth to engage in leadership, and build the necessary knowledge and capacity for long-term collaboration. The authors conclude by encouraging "future researchers and policy makers to take steps to understand the potential for long-term collaboration by conducting investigations with the inheritors themselves" (Zurba and Trimble, 2014, p.86).

## Youth Involvement in Watershed Planning

Two papers specifically addressed youth participation in water resources management and planning. The first was a case study which took place in an urban context (Wessells, 2010),

and the other was a report pertaining to youth involvement in a watershed-based education program in the eastern United States (Miner, Elshof, Redden, & Terry, 2007).

Wessells (2010) examined the quality of stakeholder participation in watershed management and reported that one ingredient for typically marginalized voices to engage effectively is through collective socio-ecologically based identities to water and place. The case study analysis involved in this research included a soccer team of youth who required space to play soccer in a park area that was undergoing review for commercial development. The youth found that some of their place-based relationships with the park on the river were held in common with the local environmental stewards group. The combined efforts of the two groups increased their ability to engage effectively in a largely utilitarian and economically driven planning process.

This paper identified two important points: 1) that youth are often marginalized in terms of having their voices heard in urban watershed management; and 2) that in order to attain equity in watershed management, “it matters profoundly who has the opportunity to form place-based relationships with urban waterways and their riverbanks and lakeshores” (p. 539). For youth who are not intimately engaged with the land due to their family’s livelihood or personal activities (e.g., agriculture, forestry or fishing), education-based initiatives provide an obvious and fertile ground for developing place-based identity.

Miner et al. (2007) report on an educational program run on the east coast of the United States which brings "watershed teams" from the region together during the summer to learn about the interconnectedness of watersheds and the dependence of human well-being on their continued health. The educational component focuses on environmental science and civic engagement including the skills required to present to municipal council, planners, and the public. At the end of the summer session, the teams go back to their home communities to implement the strategies they put together. According to the program facilitators, the experience "cannot help but improve both their well-being and the quality of the watershed

communities in which they live" (Miner et al., 2007, p.26). This example of an education-based initiative to increase the participation of youth in watershed management appears to integrate many of the important components of youth participation including education, planning processes, and civic engagement that are often siloed (see Frank, 2006, p. 354).

Overall, this review of the literature assisted in the development of a conceptual framework for the study, highlighted key knowledge gaps in the literature, and supplemented the researcher's knowledge of the field. The research design which followed is the subject of the following chapter.

## Chapter 4: Methods

### Overview of the Inquiry

Guided by ‘Ecosystem Approaches to Health’ (also known as ‘ecohealth’), the research paradigm for this study employed qualitative methods, and incorporated action-oriented and participatory research strategies. The study began with the researcher's interest in the inclusion of marginalized voices in watershed planning. The study that emerged in the Nechako watershed was a result of obtaining a research job on a collaborative project between York University and the University of Northern British Columbia. The larger research project focused on supporting the development of the Nechako Watershed Roundtable (NWR), as well as the development of the Nechako watershed portal (see Chapter 2 for more information). The research for this study of youth engagement in watershed planning took place between September 2015 and December 2016.

Research began with a review of the grey literature published on the Nechako watershed, and by participating in several community-based events in Prince George, B.C., which focused on the Nechako watershed. Through field observations and conversations with members of the NWR and greater research team, the topic of youth participation in watershed management decisions emerged as an issue of community concern, and a research gap in the larger project. The research question and applied objective of the project was defined: *How can youth meaningfully participate in the watershed planning process through the development of the Nechako Watershed Roundtable and Nechako Watershed Portal?*

Interviews were chosen as the appropriate method to continue the inquiry, and interview guides for youth and adult study participants were prepared. Interview questions were semi-structured, and interviews were conducted in both individual and group formats. The final stage of analysis consisted of coding the data for emergent themes to formulate recommendations for taking action with regards to youth involvement in the Nechako, and to contribute new ideas to the discussion of youth participation in the academic literature.

## Research Paradigm

### Personal Aspirations

My experience in academic research is rooted in the objective ontologies and positivist epistemologies inherent to quantitative methodology and the natural sciences (Macintosh & Gorman, 2015). However, after many years of reading and contributing to studies which assumed all knowledge was inherently objective and could be measured using hypothetical-deductive methods, I began to consider the factors that prevented the policy recommendations arising from these studies for environmental management from being successful. Mainly, I began to think about the role of the general public in environmental management and governance. I wished to gain a more in-depth understanding of why certain individuals were motivated to act as environmental stewards and to understand the public's perception of the relationships between participation, ecosystem health, and human wellbeing. Though I still firmly believe that quantitatively derived knowledge has an essential role to play in environmental decision making and management, I also believe that in-depth and context-specific understandings of human perceptions, experiences and behaviours are equally as important. These lines of inquiry are typically qualitative and look to inductively and holistically understand human experience in context-specific situations (Patton, 2015).

In this study, my research position can be described as a blend of constructivist-qualitative, critical-postmodern, and pragmatic paradigms (Anderson, 2013). The foundations of these research paradigms that I consider to be important include understandings from insider perspectives, investigations of power relationships, and interventions and critical analysis including action and participatory research (Anderson, 2013). In my opinion, these foundations are critical to a holistic examination of the relationships between the social and ecological systems which comprise watershed planning and governance. A methodology referred to as 'Ecosystem Approaches to Health' or the 'Ecohealth Approach' encompasses many of these ontological and epistemological foundations (Bunch & Waltner-Toews, 2015; Bunch, 2016;

Charron, 2011). The principles of the ecohealth approach had a strong influence on the methodological design of this study.

## Methodology and Conceptual Framework

This study was informed by 'Ecosystem Approaches to Health' or the 'Ecohealth Approach' (Charron, 2011), as this methodology was well-suited to the holistic approach required to understand the complex interactions between the human and ecological components of youth participation in watershed planning. The Ecohealth Approach also aligns well with the student researcher's personal aspirations discussed earlier in this chapter.

### *The Ecohealth Approach*

The field of 'ecohealth' represents a series of approaches to research, practice, and policy that actively connect ecological and social determinants of health, and recognize the links between health, community, environment and economy and the overlaps between health and sustainability (Parkes, 2009). The ecohealth approach can be carried out in many ways. One of the most important aspects of the approach is that it be adaptable, and catered towards local needs and knowledge users. The approach is primarily founded on systems thinking (a holistic approach), transdisciplinarity (integrating varied perspectives) and participation (ensuring a formal platform for stakeholder participation). These founding principles are supported by theories in sustainability (e.g., resilience theory), equity (e.g., decolonizing, critical or feminist theories) and action-oriented research (Charron, 2011; Earl, Carden, & Smutylo, 2001).

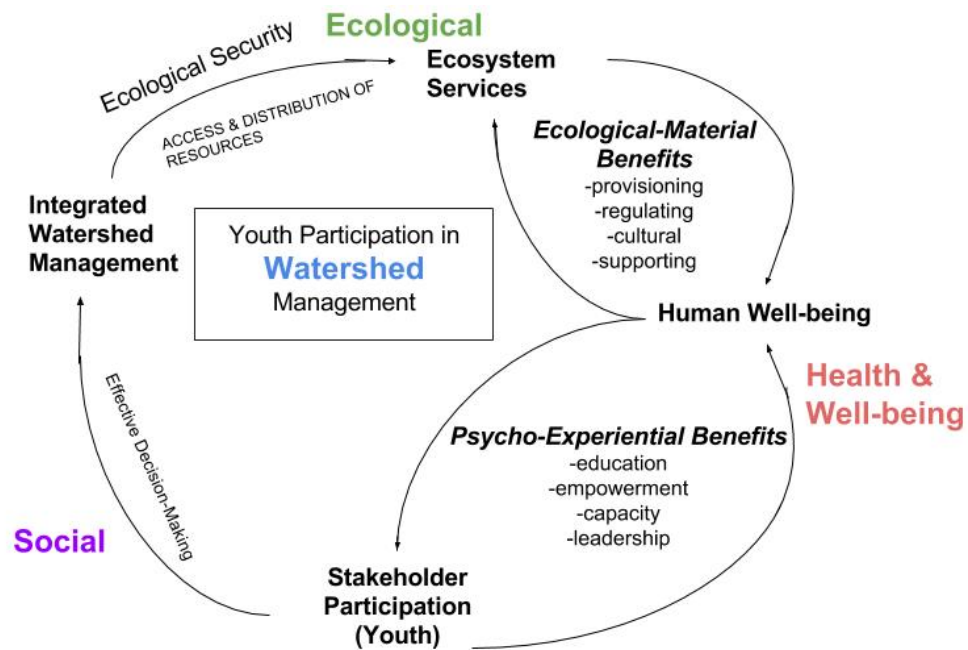
Thus far, studies published in the field of ecohealth tend to address the intersectoral issues between environment and society with a particular focus on issues of biophysical health and ecosystems, however, ecosystem approaches "represent a holistic way of understanding a situation, and a focus on complex socio-ecological dynamics that also recognize the interconnections with culture, identity and well-being" (Parkes, 2009, p.4). The goal of framing the study within an ecohealth approach was to situate the main relationships in the study within a socio-ecological framework and to recognize their significance within the bigger picture.



This framing illustrates and investigates the relationships between youth participation, integrated watershed management, human wellbeing, and the health and resilience of ecosystems (i.e., ecosystem services).

### Conceptual Framework

Figure 9 depicts a conceptual framework for the study which situates the main research question pertaining to the participation of youth in watershed planning in the greater socio-ecological context. This map was derived from the author's understanding and interpretation of the theoretical links within the social-ecological system, and is supported by the literature review presented in Chapter 3. Overall, Figure 9 depicts how increased ecological security resulting from participatory ecosystems-based governance can result in increased physiological well-being, thereby increasing freedom and choice to participate and benefit in a multitude of



**Figure 9.** The conceptual framework of the social-ecological system relevant to the study purpose and research question. This framework provides a basis for the thought process and research inquiry, and its individual components/relationships are supported by the literature review in Chapter 3. The approach is consistent with the integration of the ecohealth and IWRM frameworks as suggested by Bunch et al. (2011). The diagram depicts the significance of youth engagement in participatory planning in the bigger picture, including its relationships to human well-being and ecological security through ecosystem services.

ways from local decision-making processes. The author acknowledges that this diagram is only one interpretation of the socio-ecological environment, and that it is simplified to include only the major factors relevant to this study.

## The Study Design and Data Collection

Qualitative inquiry is most often comprised of fieldwork observations, participant observations and/or in-depth interviews (Patton, 2015). Fieldwork observations in this study were completed at a series of meetings held by the Nechako Watershed Roundtable and other research groups based in the Nechako watershed early in the fall of 2015. These field observations were followed by a series of in-depth interviews.

The study was initially open-ended and inductive, and resulted in the definition of the research problem pertaining to youth participation in the Nechako watershed. The research inquiry unfolded to require an in-depth, holistic, and contextually-sensitive understanding of the *meaning* of participation to youth and their allies in watershed planning and management in the Nechako. The goal was to document a range of responses examining questions such as *how* youth felt they could meaningfully take part, the *meaning* of participation, and youth perspectives on the *relationships between participation and well-being*.

To help derive an understanding of these meanings, it was necessary to document and interpret a diversity and variation of perceptions and understandings. This approach adheres to a qualitative research methodology, and took a naturalistic approach to inductively and holistically understand experiences and perceptions of youth and their allies in relation to participatory watershed planning (Patton, 2015). A “naturalistic” approach was appropriate because the study’s purpose was to generate practical and detailed knowledge (Given, 2008). The project was based on the assumption that different ways of knowing are inherently culture-bound and perspectival, and an effort was made to incorporate participatory values such as antiracism, anticlassism, and antisexism (Lather, 1988).

## Field Observations

This case study was inductive and emergent in its design, and began with an initial phase of open-ended fieldwork in which the researcher was open to discovering a research question or problem defined by the ‘community of interest’. The community of interest is the community of residents, professionals, academics and practitioners who attended community meetings focusing on stewardship, research and management in the Nechako during the fall of 2015.

Detailed field observations and notes were taken throughout the course of the fieldwork between September and December of 2015. In particular, field observations and notes were completed at meetings with individuals from various communities in the Nechako watershed, a community meeting presenting current research on the Nechako, a youth event focusing on sustainability with the Lieutenant Governor of BC, the launch event and first business meeting of the Nechako Watershed Roundtable, a workshop introducing interested researchers and community members to the Nechako Watershed Portal, an event called “Blue Drinks” connecting young professionals interested in water issues which took place at UNBC, and in two classrooms at Nechako Valley Secondary School.

Field observations and notes were used as part of the iterative and reflexive research process to define the research problem, reflect on and guide the inquiry, create preliminary notes about interview data, recruit future research participants, and to modify interview questions based on observations of interest or significance when appropriate/necessary.

## Interviews

Interviews were chosen as the means best able to record the personal thoughts and feelings of participants when compared to alternative methods such as questionnaires or surveys. Semi-structured interviews were chosen as an appropriate method of data collection due to the importance of understanding the meaning (i.e., perceptions, feelings and experiences) of participation in watershed planning for study participants (Patton, 2015). Interview guides

(Appendix B-1) were completed for semi-structured interviews which allowed the interviewer to engage in a natural conversational style, and explore emerging topics of interest to the interviewee (Patton, 2015). The interview style was “pragmatic”, with straightforward questions focused on real-world issues aimed at getting straight-forward answers that could yield practical and useful insights for the problem-solving, action-oriented inquiry (Patton, 2015).

Children and young people are often identified as vulnerable in the research community, and consequently, their voices are often omitted in order to protect their rights (Ey, 2016). Interviews, however, are becoming a more acceptable and commonplace method to involve young people and children in research, as young people are increasingly recognized as having the capacity to participate in research if all ethical considerations are properly attended to (Ey, 2016). Since the study was designed to be participatory and action-oriented, interviews were also seen as a means of giving a voice to research participants, and particularly those of children, youth or young adults participating in the study. The interviews conducted in this study with the youngest people (ages 13-14) were completed as a group, and interviews conducted with older youth and adults were completed individually. The audio of all interviews was recorded digitally to later transcribe all interviews. Individual interviews were completed over the telephone and the group interview was completed in a classroom setting (in person). Interview guides for both the group interview and individual interview can be found in Appendix B-1, and were prepared to ensure the same basic lines of inquiry were used in each interview setting (Patton, 2015).

### *Individual Interviews*

A goal of 10-12 individual interviews with youth and adults was set at the beginning of the research process. This number was chosen in part because it was recommended by the student’s supervisor as appropriate for the project at hand and the time and resource constraints inherent to a master’s level research project. The strategy of saturation or redundancy sampling (interviewing that continues until no new information is obtained; (Baker

& Edwards, 2012; Patton, 2015)) was also kept in mind, and employed to the best of the researcher's ability. Patton (2015) notes that when conducting qualitative analysis, it is acceptable and even sometimes preferable to examine a small sample in depth as opposed to a wide, shallow sample. Baker and Edwards (2012) also stress the importance of building a convincing analytical narrative based on "richness, complexity and detail" rather than on statistical logic.

### Sampling Strategy

A combination of a snowball technique and a purposeful random sample was used to recruit participants for individual interviews (Bryman, Bell, & Teevan, 2012; Patton, 2015). A small number of key informants were initially identified at community events through newly established connections and networks, and these individuals were asked to recommend additional participants for the interviews. An effort was made to interview individuals from a range of geographic locations, and with a range of occupations to capture any place-specific or stakeholder-specific commentary. The purposeful random sampling was conducted by hanging posters throughout UNBC to alert interested students of the opportunity to participate in the study.

### Data Collection

Individual interviewees were given information letters and consent forms prior to participating (Appendix B-2). The following individuals were interviewed: youth in the public (university students and other community members), adults who work with youth in environmental education, regional government representatives, adults and youth working in the not-for-profit sector on issues related to watershed health, as well as academics with a research interest in youth engagement. A total of ten individuals were interviewed in-depth. The interviews lasted between 20 minutes and 60 minutes depending on the availability of the participant, the amount of information they wanted to share, and the natural flow of the conversation. All the individual interviews were conducted on the telephone or Skype and

followed the interview guide for individual adults (please see Appendix B-1). The interviews which were conducted on the phone were recorded using an app called “Automatic Call Recorder” which generated an audio file which was converted to MP3 format to be compatible with the transcription software. One interview was conducted on Skype and was recorded using the cell phone app called “Voice Recorder” which is standard to the Android operating system on the LG G3 phone which was used.

### *The Group Interview*

A letter of consent was obtained from the principal of the school which welcomed the research activities for any interested teachers or students (Appendix B-3). One teacher was particularly interested in having her students involved in the study, and a group interview was planned for this classroom of students who were in grade 8. The “Enviro-Vikes”, members of the school environmental club, were also invited to participate in the interview. The Enviro-Vikes were also all in grade 8 except one individual who was in grade 12. Approximately 30 students participated in the group interview.

Students were given information letters and consent forms to take home prior to the interview (Appendix B-2), and a presentation was made to introduce them to the study and explain their rights regarding participation. Due to unforeseen time constraints to conduct the group interview, the format was changed from "semi-structured" to what Patton (2015) refers to as an "interactive group interview and dialogue" where questions were "standardized and open-ended". A standardized, open-ended interview is characterized by questions that are predetermined, but the data collected are still open-ended because respondents supply their own words, thoughts, and insights. The group interview was interactive because it was conducted in a matrix style (see below) and facilitated dialogue between students as they asked one another questions as co-inquirers (Patton, 2015).

## Data Collection

The group interview was conducted in a matrix style by dividing the class into groups of 4 students. Each student was given a question to interview each of the other 3 participants in their group, and each group answered a total of four questions (see Appendix B-4 for a sample question sheet). Each of the groups had the same four questions to answer. After the groups had finished their interview matrix, the individuals from each group who had asked the same question got together in a group to discuss the answers they'd obtained from their peers (e.g., each person who had asked question #1 from each of the groups got together to form a new group). They then worked on summarizing these answers and one student with parental consent to have their voice recorded stood up to present the summary orally to the class. These oral presentations were recorded using a digital audio recording machine so that they could later be transcribed for analysis. The interview matrix sheets with written responses were also collected to review while conducting data analysis.

## Access, ethics, and informed consent

This project was part of a larger project entitled, "The Nechako Watershed Portal: A web-based, geospatial tool to foster information exchange and guide land and water decision making in the Nechako River Basin". Research Ethics Board (REB) approval for the larger project was obtained in April of 2015 from UNBC and in August of 2015 from York University. An amendment to the application for the larger project was submitted during the fall of 2015 and approval to conduct this subproject was obtained on December 1, 2015 from York University and December 2, 2015 from UNBC (Appendix B-5).

The REB approval for the group interview required a letter of consent from Nechako Valley Secondary School. The letter of consent was provided by the school's principal and provided access to NVSS to talk to any interested students and teachers (Appendix B-3). All interview participants (both individual and group interviewees) received an information package and consent form to return if they agreed to participate in the study (Appendix B-2).

## Data Transcription

Interviews were transcribed using a free, web-based software called “Transcribe” and available at <https://transcribe.wreally.com/>. The interviews were usually transcribed within a few hours, but in a few extreme cases, transcription was left over the summer months while I was working full-time and away from my studies. Copies of the transcriptions were emailed to interviewees for “participant checking”. Participants were given ample time and opportunity to respond with any additions, subtractions or modifications they wished to make.

The transcription of the group interview from NVSS was emailed to the person who volunteered as a coordinator for the teachers and students during the fieldwork period. This volunteer reviewed the transcript with the group of students and did not request any changes.

## Data Analysis

### Overview of Data Analysis

The analysis of interview transcripts focused on an inductive approach to understanding youth participation in watershed governance and stewardship in the Nechako watershed. The inductive approach looked at the data for undiscovered patterns and emergent understandings (Patton, 2015). The researcher acknowledges, however, that one can never enter the field with a blank slate, and was aware that the study was quasi-deductive in nature at times. The researcher entered the study with some knowledge and initial curiosities as a result of the academic literature and listening to community members speak about the lack of youth participation. Thus, some of the interview questions were “constructivist” and geared towards exploring whether some of the general theories in the literature held true for youth in the Nechako. The analysis which followed was influenced by this disciplinary knowledge which provided “sensitizing concepts” (e.g., barriers and benefits of youth participation) for beginning to code and develop more refined and precise concepts (Charmaz & Belgrave, 2012, p. 355). Thus, the coding process was an example of “modified analytic induction”, which acknowledged



previous influences, but focused on staying open to discovering concepts and elucidating new ideas in the interview data (Patton, 2015).

In general, an emphasis was placed on illuminating substantive significance, and the use of quantitative descriptions of the data was avoided due to the sample size and the importance of an in-depth examination of the meaning of spoken and written content. As Patton (2015) asserts, this strategy is not meant to be "anti-numbers", but "pro-meaningfulness" (p. 1220).

### Thematic Coding

Coding is the first step in the analysis which “moves the researcher from description toward conceptualizing that description” (Charmaz & Belgrave, 2012, p. 355), by highlighting aspects of the data that reflect the researcher’s interests and perspectives as well as information in the data. Interview data were coded thematically using open and focused coding methods (Bryman et al., 2012; Charmaz & Belgrave, 2012).

The initial readings of the data in the open phase of the coding process were conducted to identify lower-level themes that were: 1) directly related to the research question; 2) common amongst the interview data; 3) surprising or that appeared to be outliers; 4) concepts or themes that the interviewee explicitly stated were important; and/or 5) concepts or themes that related to those found in the academic literature reviewed in Chapter 3 (Lofgren, 2013). The second phase of coding (focused coding) analyzed the data in more depth by recognizing patterns and triangulating the data to discern the most frequent codes as well as the codes that appeared to be most revealing, to define the major or higher-level themes (Bryman et al., 2012).

### Template Analysis

Coding themes were organized hierarchically in a template, with lower level (subsidiary) themes representing distinct instances or manifestations of the concepts identified as higher-level (major) themes (King & Horrocks, 2010). During the coding process, it was decided to organize the data into three groups: 1) youth under 18; 2) youth over 18; and 3) adults. The

analysis was completed by developing a template for each of the groups displaying the interview data. An iterative process was used to construct each template, which grew and evolved over the course of the analysis. The goal was to construct three templates that would each represent all the data within their respective group. The initial template was formed by analyzing a couple of interviews, and during the analysis of successive interviews, if new themes were identified that did not fit the template, a theme was either added or revised, or the hierarchy of the themes was re-organized until the template was found to sufficiently represent all the data collected for the group (King and Horrocks, 2010). The data within these templates will be presented in Chapter 5 (Results) and represents the new knowledge generated from the research study (Löfgren, 2013).

# Chapter 5: Results

## Overview

This chapter presents the results of the interviews about youth engagement in watershed planning in the Nechako watershed. The interview data were analyzed separately in three groups: 1) interview data from individual youth over age 18; 2) interview data from the group interview with youth under age 18; and 3) interview data from individual interviews with adults. The analysis focused on coding for action-based themes (such as barriers to participation and strategies for success), as well as context-focused themes (such as youth values, motivations and awareness). This approach aimed to provide a holistic and comprehensive examination of the data to derive a set of recommendations that could realistically tackle the challenge of engaging youth in participatory watershed planning. A template analysis was used to facilitate the analysis of the data within each of the three groups (see Chapter 4).

## Youth Interviews (Individual)

Individual interviews were conducted with 7 youth who were older than 18 years of age, and included community members in the Nechako watershed, undergraduate students at the University of Northern British Columbia (UNBC), and young academics (Master's and PhD students; ages 29-30) specializing in water governance. A template analysis was completed to represent the themes identified in the data (Table 3).

The major themes identified for youth (18+) were: 1) place-based values; 2) passions and motivations; 3) barriers to youth participation; 4) youth awareness and concerns; 5) experiences and skills; 6) benefits to youth participation; 7) strategies for inclusion; and 8) the Nechako Watershed Portal (Table 3). In the following presentation of the interview results, quotations will be used as illustrative examples, and will be cited using a two-letter code representing whether the interviewee was an undergraduate student at UNBC (YU), a youth from the Nechako region not attending UNBC (YC), or a young academic specializing in water governance (YA).

*Place-based values.* When asked to describe what was important about the Nechako watershed, the three most common discussions that followed included those that fit into categories of community, recreational, and spiritual or emotional connections to place (Table 3). Relationships to the environment that described its significance as provisioning (e.g., a vital source of food or water) were seldom mentioned. Reflections on connections to community and the people of the region were often mentioned before discussing any connections to the physical landscape:

*...Yeah, a strong sense of community, in the sense that people are really friendly, and approachable, and um, a sense of identity with this place, I don't know, it means something to live here, it kind of stands for something. (YU)*

Others reflected on the importance of living in a “close-knit” community, and the importance of general community service as opposed to focusing on environmental stewardship. Other interviewees did equate the landscape with a connection to community or cultural history: “Burns Lake is my home and I just love the landscape... just growing up being a Cheslatta person too creates so much home and sense of place, and sense of displacement I guess, just with our history...” (YC).

Recreational aspects of the region that were mentioned by youth included opportunities to go canoeing, hiking, mountain climbing, swimming, boating, hunting, fishing, and exploring or going on adventures:

*I think what I value most is the close-knit community, but if we're just talking about the land in general, I would say, just about how generally clean it is, and how free I feel, there's just so many things that I can do in the area, I can go canoeing down the river, I can go hiking, I can climb a mountain in my backyard, I mean, I feel that it's something that you wouldn't get in a lot of places. (YU)*

Interviewees' descriptions of recreational values often overlapped with spiritual or emotional values. However, youths' descriptions of both emotional and spiritual connections to the Nechako were most often focused on physical aspects of the landscape, which included aspects

that some interviewees attributed very strongly to their cultural background. Most of the emotions and spiritual connections that were described were very positive in nature, and related to feelings of happiness such as those associated with feelings of “freedom” in the open spaces and “remoteness” of the Nechako. Deeper feelings of rootedness in the landscape were also expressed, as illustrated in the following quote, which describes one young woman’s relationship to the river:

*I learned that the water is that sort of cleansing, spiritually cleansing, and emotionally cleansing place, so I still use that and I still feel it whenever I am with the water...when I get there, it’s one of the things when I’m there, I always have to go down and touch it, and feel it, and kind of cleanse myself with it in my own way. (YC)*

Other important emotional and spiritual connections to the Nechako included the role of women in caring for the health of the water, the positive and healing energy of the river, as well as feelings of connection to river as the “life-blood” of the earth: “...water you know, the blood that runs through our veins is the same blood that runs through Mother Earth, it’s all water-based, it’s all the same” (YC). While most descriptions of emotional and spiritual connection to the Nechako were positive, one interviewee described negative feelings associated with living in a polluted or degraded environment:

*...I drive into Prince George, and it’s just all steam from the river, but like mixed with the pollution, it immediately affects my... not necessarily my health or well-being directly, but it’s like wow, I just kind of drove into an environment that has crappy air, and it’s a real downer. (YA)*

Despite all the feelings expressed by the interviewees describing their connections to the Nechako environment and its people, the watershed was described as a direct source of sustenance by only one interviewee. This interviewee, however, was the only youth interviewed who grew up on the banks of the river. She described the river as “the reason we were there” and that it was “...integral to our lifestyle, you know, for drinking water, cooking, bathing,

everything was done in that river...my connection with that place is very strong” (YC). Overall, most of the interviewees expressed some connection to nature, but overall, valued the area for its sense local community and for its recreational opportunities. Some of the interviewees expressed strong emotional and spiritual ties to the watershed, and especially those who grew up in the Nechako.

*Passions and Motivations.* While all interviewees agreed that youth participation is important, one interviewee expressed her feelings about not only the importance of youth participation, but of the responsibility of youth:

*...I think that if you are interested at all, or if you like being outdoors, or you doing anything like that, that it's sort of a responsibility...people lived in B.C. for 12,000 years before us, settlers showed up, and I think we have a, not only a responsibility, but that, it is only respectful...if we want to continue to call this, like these lands and these waters, ours, or equally ours, I think we have a responsibility to make sure that we are stewards, and act accordingly. (YA)*

Other youth expressed strong motivations rooted in the importance of their role for the future of the Nechako watershed: “...because it’s our future...this is where we live, this is where we play, this is where we work...and the Nechako watershed is a big part of that” (YC).

The place-based values which connected youth physically, emotionally, and spiritually to nature and the Nechako watershed were often expressed as part of a story or a memory from childhood. Interviewees often described these childhood experiences as directly linked to their passions and motivations for participating in watershed stewardship. One interview participant described memories of spending time at the family cottage, while another spoke of developing a love of gardening as a child:

*I know it’s such a simple answer, but probably gardening. That’s where I started and that’s what I really love to do. Where I grew up was kind of on a bigger plot of land, and we had a fairly huge garden, and that’s what I did every summer and every spring. I would spend all day out there. It really motivated me to get involved in environmental stuff when I got to school and there were actually things to get involved in. (YU)*

One of the young academics who was interviewed described playing and adventuring in urban waterways, and travelling with family and learning about the communities and ecology of British Columbia. An undergraduate student from UNBC reminisced about growing up beside the ocean and the obvious connections between water and life growing up on Vancouver Island, while another interviewee told stories about growing up on the banks of the Nechako River. One student described her memory of summer camp:

*... at the end of each day, we would sit around the fire or whatever and just talk about what it means to you... what do you feel when you're in the forest...just that week in the forest, it just stands out so clearly in my mind. I remember we had to keep this little journal while we were there and then a week or so after, about what you learned while you were there, and when you were home, how you were making connections... (YU)*

The interviewee quoted above commented immediately after about the importance of these types of childhood experiences in developing a connection to nature that motivates a sense of responsibility as you grow up. She felt very strongly that one cannot "be told to care, it has to come from the inside" (YU). She also stressed her opinion about the importance of giving children these experiences at the earliest opportunity: "Getting youth involved as young as possible will give them more experience and foundation to actually do something about what they care about later" (YU). Though not all the childhood experiences described by the interviewees were necessarily linked to the Nechako watershed, they all involved developing a connection to nature at a very young age and led to the participants' interests and motivations to get involved in community and environmental initiatives as they grew up.

**Table 3.** Major and sub-themes resulting from initial and focused coding phases of data analysis for individual interviews conducted with youth over 18 years of age. Please see Appendix C-1 for full table including all 4 levels of sub-themes for more detail.

Major Themes	Sub-Themes
Place-based values	Connections to community Recreational values Spiritual and emotional values Nature as provisioning
Passions and motivations	Youth involvement is a responsibility not a choice Passion must come from the inside Childhood memories and experiences
Youth awareness	Regional industries Local and regional environmental issues Socio-ecological complexities of watersheds
Experiences and skills	Natural resource background School trips School clubs NGOs and grassroots organizations Professional associations Technical and political engagement skills
Barriers to participation	Societal norms Education system Lack of awareness of regional issues Lack of resources and access to info Differences and conflict between values and ideas Youth voice not valued Power dynamics Remote and isolated communities Inter-generational trauma in First Nations communities
Benefits to participation	Engaging, empowering, fun Helps to develop respect for nature Provides a foundation to enable change-making Helps young people learn to think critically Supports social interaction Builds communication skills Builds self-confidence and improves self-worth Helps adults better consider future generations Builds connection to landscape and culture Vital for intergenerational knowledge transfer Educates about social and political processes Increases understanding of diverse perspectives Helps youth take responsibility for future
Strategies for success	Engage youth meaningfully (see Table 4) Realize the importance of finances Engage youth in groups Consider the appropriate role for adults Increase youth awareness and knowledge Focus on the positives and celebrate the water
Nechako Watershed Portal	Current opportunities exist through established user-groups Database-like function not particularly appealing to youth Knowing data has a last home is a benefit youth like



*Youth awareness.* All the youth (18+) who participated in this study expressed concern for the health of the Nechako watershed. The interviewees had varying levels of awareness and knowledge of local issues which mostly depended on whether they grew up in the area, and in the case of the students who participated from UNBC, their field of study. The youth who were interviewed were concerned about the impacts and sustainability of regional-based natural resource industries such as commercial fisheries, oil and gas development including fracking and pipelines, forestry and logging practices, and hydroelectric dams (Table 3). The specific issues that were brought forward during the interview process included concerns for the impacts of logging practices on water quality:

*There's a pretty face past of logging going on...they've logged all the areas on flat ground, and they're starting to move towards more sloped areas, and that really affects erosion, which has its effects on stream quality, cause you have sediment running off into the stream, so that's potentially an issue. (YU)*

Other concerns included changes to salmon runs and fish migrations, as well as changes in flow patterns of the Nechako River: "I've witnessed so many things over the years and growing up, the changes in the flow of the river, the change in the salmon runs...it's devastating to look at that and see it happening..." (YC). Youth were also aware of the impacts of the pulp mill near the intersection of the Fraser and Nechako Rivers: "...I know like the Nechako, before it meets the Fraser, the baselines for clean water in BC, like it's really really pristine and then it crosses in front of the pulp mill and meets the Fraser, and then it changes" (YU). Youth also expressed awareness and concern with respect to the mountain pine beetle, the integrity of the Kenney Dam, as well as changes to the hydrology of the watershed and sustainable management of community forests. Youth also highlighted concerns for point source pollution to the air and water from industry including pulp mills, decreases in drinking water quality, the need to protect old-growth forest, and illegal dumping in the watershed:

*...where I live directly there's a lot of illegal dumping cause obviously, that leaks into the ground, and then down into the creeks and stuff...so there's a spot right by my house, right by the power lines, where people dump so much*

*garbage, and it's literally on a hill that goes straight down to the Chilako River. (YA)*

The same student expressed severe concern about the effects of the Kenney Dam and the resultant flow levels in the Nechako River:

*...I'm living in a vastly altered watershed, and what I see come down the Nechako River, which is about 10 kilometres from house...it's only running at maybe, depending on what day it is, running at less than 50% of its natural flow, since the other 50% has been diverted to the Pacific Ocean... (YA)*

Her concerns about the dam extended to the provincial government's attitude towards the health of the Nechako watershed, and the well-being of its citizens, and especially, for the Cheslatta Carrier Nation.

*Barriers to youth participation.* There were eight major themes amongst the seven interviews with individual youth regarding barriers to youth participation. These themes included 1) societal norms; 2) the education system; 3) a lack of awareness of environmental issues; 4) a lack of resources and access to information; 5) a feeling that the youth voice is not valued; 6) fear associated with power; 7) remote and isolated communities; and 8) inter-generational trauma in First Nations communities (Table 3).

Societal norms were described as the root cause of two major barriers cited by youth which included a lack of time to participate, and a lack of connection to nature: "...you kind of feel like well there's nothing you can do because who has the time, that's number one, that's a big barrier is time, to start writing the letters and rallying the people..." (YC). An undergraduate student at UNBC also described her feelings with respect to youth engagement and time: "...I think the problem with targeting university students is that we're constantly busy and there's constantly things going on that we're told we need to care about, and at the end of the day, maybe we really do care, but we just don't have time" (YU).

A lack of connection to the watershed was also cited to be a result of societal norms: "I think a lot of youth in this area take the rivers for granted, aren't connected to them, cause that's the way society is, the emphasis is on technology and social interactions and things like

that...” (YC). Another interviewee suggested that the connection between nature and human health should be taught since children grow up in society looking to the outdoors as simply a place to play and recreate.

A lack of connection to nature was also described as being a result of living in a region dominated by natural resource industries. One interviewee felt that growing up in an area where one’s livelihood depends on resource extraction, conditions people’s attitudes towards nature: “I think it [resource extraction] does have a negative effect on the communities too, and the way that people think about nature...I think they value economics over nature...it makes nature less of an issue for them, and less so than it is for a lot of people” (YU). Another student made the point that even if people living in natural resource-based communities are aware of the environmental impacts, “...if you’re from the north, and you’re from a resource extraction background, feeling like you have to go with it, because that’s the way it is...” (YU).

A lack of connection to nature was also described as being related to another major barrier cited by youth: a lack environmental awareness (Table 3). Several of the interviewees said they knew many people living in Prince George who didn’t even know the Nechako River was dammed, let alone the story that went along with it: “I think just spreading awareness about it, because I don’t think there’s a whole lot of people who even know this exists” (YU). One student explained her thoughts regarding a lack of awareness by describing that environmental problems in the Nechako are not visible to the naked eye. She explained that human nature is not to go looking for what’s wrong: “People aren’t going to wonder, ‘what’s wrong in the world, I’m going to do some research!’, even though that’s how we read our news, it’s not how we operate in our daily lives...” (YA). Another student described the importance of awareness to environmental stewardship: “...if you don’t know, you won’t care, and if you don’t care, you won’t do anything about it” (YU).

A lack of awareness was also described to be compounded by generational differences in behaviours regarding access to information, as well as a general lack of resources:

*...Part of it [access to info] is probably that it feels it's not there, but we don't have time to look for it, and because our generation is so used to everything being, in terms of information, not just being available, but actually being presented to us...and shoved in our face, so seeking out that info, is, I don't know....and then also, knowing what level of government is responsible for what, in terms of protecting the environment, that kind of thing, is not always known. (YU)*

The confusion around resource jurisdiction was also expressed by another interview participant:

*The jurisdiction over the rivers right? That's a really difficult thing to navigate and understand, who is responsible for the water and who has rights to those waters...I'm just thinking that on average, youth aren't aware of those things, and don't really think of them. When it comes down to something, like say they witness something, they don't know where to go, and what to do about it. (YC)*

A lack of resources was also brought up in another context which was a general lack of funding for youth initiatives. This discussion was initiated by one of the young academics specializing in water governance who had experience organizing and coordinating youth engagement. She noted that youth do not usually have their own funding to attend youth events such as regional forums, so additional funding is required to assist with transportation, especially in rural areas like the Nechako. The same interviewee also mentioned that due to a lack of funding, really great youth initiatives can turn into “one-offs” when the organization is living funding cycle to funding cycle, resulting in a lack of follow-up activities in some cases:

*...it's great, we had a one-day, and maybe some of those students, children or youth have gone afterwards and actually...maybe there has been something, but there's been no follow-up because we don't have the funds to do follow-up, so then what, so this is the financial bit that comes back into play. (YA)*

This interviewee stressed the importance of having adequate funding, and specifically funding a full or part-time youth coordinator for the watershed. She emphasized the need for people to understand that meaningful youth engagement requires time and energy to be successful and to be beneficial to youth.

Finally, a lack of resources was also brought up in terms of those available to young people in remote communities in the Nechako watershed. As youth living in smaller

communities grow up and need to move out of the family home, a lack of affordable local housing and jobs often results in some youth travelling to the major city centres. An associated barrier is a lack of information regarding local opportunities for youth in the watershed:

*...we're such a rural community, there's not a lot of info that's put out there for them to see what is available, like a lot of them think that you can only log in this town or work in an office, or you can only get a part-time job...they don't want to leave Burns Lake right, they don't want to go away and move away, which a lot of them have to because we don't have any places to live in Burns Lake, there's nothing to rent or anything like that and a lot of people can't afford to buy... (YC)*

The same interviewee described how difficult it is to attend, for example, courses in nearby towns, or to travel to Prince George due to a lack of public transportation. The community also faces the physical barrier of requiring a ferry to get to and from the main highway:

*...the greyhound bus only runs once a day, and that's at 2:30 in the morning, so people that live in our community on south side, it's hard because the last ferry runs at 11 o'clock at night, so if you're going to go to town on an 11 o'clock ferry, and your bus doesn't leave until 2:30, and it's the middle of winter, what are you going to do for that 3 hours? (YC)*

Since many people in the community do not have driver's licenses, this isolation and lack of transport is a serious barrier to participating in initiatives outside of the community. She also mentioned the impacts of the flooding and residential schools to the Cheslatta, and the resultant inter-generational trauma that has resulted in many youth lacking the capacity to attend school regularly or gain employment.

The education system was brought up by a couple of the interviewees as another barrier in relation to access to information and resources. One student explained his frustrations with a system that encourages people to specialize without gaining an understanding of the bigger picture. He described that usually one must choose between the arts or the sciences (especially in undergraduate programs):

*I've definitely learned a lot about these issues in management from a technical and biological perspective and that's definitely some information for feeling like, feeling like you can talk somewhat about what's going on, and being somewhat knowledgeable....and then my roommate is in environmental studies, so he's coming at it more from the policy side, and between the two of us, we know a lot, but usually when you're in school you kind of get...not pigeon holed, but you're either in science or arts, and there's not really a mix, so you either have the knowledge of the, what's physically going on, or the knowledge of how the system works, but often not both...I definitely wish I knew more about that side of things, like public engagement. (YU)*

The education system also came up in terms of class-based versus experiential learning. The case was made that younger kids need more outdoor learning opportunities, both to connect to nature, and to provide alternative learning styles for kids that might not be stimulated in a classroom environment.

Another major barrier that was mentioned by almost all of the youth interviewed was the dismissal of, or disinterest in, the youth voice in society (Table 3). The youth interviewed reported feeling marginalized, under-valued, and not heard or understood: "...I guess the sense of not being listened to, and being on the outside and looking in, in terms of politics, that leaders don't really value or seek-out our opinions" (YU). Youth frequently cited feeling that young people were often included in governance processes as a "token voice": "...let's say you have a youth position or something on a board, it's almost like it's a token thing, 'Oh! We should get a youth to represent on the board!', and then they're not really treated on the same level..." (YA). While youth, in general, were cited by interviewees as being marginalized, one interviewee reported that this issue is even worse for youth who are also minorities such as those who are women or those who are Indigenous. The same interviewee noted that youth are not considered "stakeholders" in the traditional sense like industry, farmers, governments, etc., "so you have to look at that broader question of what is a youth, and how are they a stakeholder" (YA). This under-valuation of the youth voice was also reflected in a comment by the same interviewee regarding the fact that youth initiatives often lose out when they're in competition with other issues regarded as being higher in priority, such as climate change.

The same interviewee told a story about someone wanting to present her Master's research findings to a community, but not wanting the young researcher to be the one to present the findings. She reported that the woman said: "Oh no! I don't want you there because you're too young, you won't be valued by our community if you're the one sharing the information because they'll look at you as a young girl!" (YA). Similarly, this same youth had experienced situations where adults were keen to include youth until they "disturbed the waters", meaning that the youth voice was beginning to challenge the *status quo*. The interviewee had experienced funding withdrawn when the youth component began to actually influence decision-making processes within city council.

The sentiments expressed by the youth who were interviewed for this study were often described in relation to an additional barrier referred to as "power dynamics" in Table 3. Interviewees described why they felt under-valued, and a common explanation was that they feared not having the necessary specialized knowledge or skills to participate, feared being regarded as inadequate or stupid, or just generally felt intimidated as an individual youth entering an adult-oriented situation: "I think that when people go in there they're afraid that they're going to feel that they can't contribute, or that they're not as well versed as others in the topic. They don't want to feel inferior or stupid" (YU). Some of the interviewees also mentioned the water governance scene as being dominated by "old white men", or described it as an "old men's club": "...how many times am I sitting around tables and it's all old men, typically old white men, who don't value your white female perspective, who don't value your young white perspective..." (YA), which poses some challenge not only for youth, but for participatory processes in general. A fear of retaliation from figures of authority such as the government or the police was also expressed in terms of speaking out on issues of watershed health.

*Youth experience and skills.* While describing their thoughts on youth participation in water governance, the youth interviewed shared a multitude of examples of initiatives related to natural resources, community development, and environmental justice that they were

involved with at the time, or had been involved with in the past (Table 3). These experiences included school trips, and involvement with school clubs (e.g., the Outdoors Club), NGOs (e.g., Fraser Basin Council) and grassroots organizations (e.g., BC Lake Keepers Society), as well as student associations (e.g., International Forestry Student Association). Some youth also had direct exposure to the natural resource industry, such as participating in Environmental Assessment referrals, sitting in on inter-governmental negotiations, and being employed in collaborative wildlife management positions. A young woman who had on-going opportunities to participate in the negotiations between the Cheslatta, the Province of BC, and Rio Tinto Alcan remarked on her growth during the experience. She explained that she was a “smaller voice” at the table, but that “the chief, council and senior staff are really giving me a chance to voice my opinion as a youth of the Cheslatta” (YC). One interviewee who had worked at a sawmill just like her father, “I was a ‘clean-up’, and since I’m pretty small, I would actually shut down small machinery and crawl inside to clean it!” (YU).

The only organization outside of school clubs that was mentioned that was local to the Nechako watershed was the Nechako Environment and Stewardship Society (NEWSS), which had involved students in the Enviro-Vikes club at Nechako Valley Secondary School (NVSS) in Vanderhoof, B.C. One of the young academic interviewees mentioned the Fraser Basin Council (FBC) which is technically active in the Nechako, however, her experience as a youth with FBC was further south and outside of the Nechako watershed.

The Canadian Water Network was mentioned as great opportunity to be exposed to what other water-minded people across the country are doing, and for general networking. The same interviewee mentioned that she had tried to organize a water-oriented gathering at UNBC, but that the interest from the student body had been low. When asked why she thought the initiative had not been popular she replied, “I’m not sure why they’re not popular, I think people don’t care enough to make the time? What is sitting around talking about water going to achieve?” (YA).



While describing past experiences as youth in various community, professional and environmental organizations, some of the youth highlighted skills that they had acquired. One undergraduate student mentioned that his involvement with the Ontario Nature Youth Council had given him experience lobbying the provincial government with regards to biodiversity and habitat protection, as well as creating new protected areas. Another undergraduate student mentioned that she had started a Twitter page for the International Forestry Student Association at UNBC. She said that she had noticed her activity on social media had created a sense of community within the school amongst like-minded individuals in various clubs. The student who had been active with the Enviro-Vikes and NEWSS in Vanderhoof mentioned that she had gained a considerable amount of experience gathering stream quality data and compiling statistics:

*I've participated through school groups, I guess mostly high school at this point. We did quite a few site visits to projects being done in the watershed and some of them are pretty interesting. I did quite a bit of work gathering statistics about water flow and stuff, just to present to other people. (YU)*

This same student also had the opportunity to participate in a follow-up activity to this data gathering experience, by using the statistics from the stream monitoring to present a delegation to the local town council to pass a by-law for the human right to a healthy environment.

*Benefits of youth participation.* When asked to comment on the benefits of youth participation in watershed planning, interviewees felt that overall, participating is an empowering experience (Table 3). Youth felt that being meaningfully included in watershed stewardship and governance would help youth to develop respect: "I think it really grows your respect for later in life, especially since so many jobs, especially here, are related to industry, it makes us think more about what we're doing" (YU). Others felt that meaningful participation was directly linked to developing respect for nature and the local environment, while some felt that participation gives young people the foundation to make change as they grow older,

provides opportunities early on to think critically about environmental issues, and develop self-confidence: “Seeing the bigger picture can really help a person feel more self-confident, and better about themselves too” (YU). The young woman who described her experiences sitting at the negotiation table with Rio Tinto Alcan and the Province of BC also said she “gained confidence”, which felt good. She started out as an observer in the meetings and gained responsibility over time: “I gained confidence and then I sort of put myself out there one day, and they thought ‘well maybe she does have something that she can bring to the table,’ so since then I’ve gained a lot more responsibility...” (YC).

Another important theme that came up in discussions of the benefits of youth participation was its significance in terms of inter-generational governance (Table 3). One interviewee mentioned its importance for passing the knowledge of the past to the people of the future:

*...just being present is going to help people think about that aspect, of future generations, and how that knowledge is passed down, that’s one of the important things, is that knowledge transfer...having younger generations there for that continuity of knowledge, and continuum of the process and understanding the past...it’s important for young people to be involved because it helps with, just awareness, and that idea of time, right, being aware of where it’s at now, and seeing it in the future, that’s something a lot of people miss, they don’t have that connection, they don’t have that understanding, because they don’t know any other things to compare it to... (YC)*

The same interviewee emphasized the importance of the presence of youth for helping adults consider the effects of their decisions on youth and future generations: “I think one of those things is to really help them realize that their participation at that time is going to...even just being present, is going to help people think about that aspect, of future generations...” (YC).

Others interviewees saw value in intergenerational work increasing opportunities for community learning: “There’s of course, extreme value to working with different age groups,

because of the knowledge and the perspectives that come out of each one of them...everyone will probably learn something” (YA).

Finally, one interviewee expressed the benefit to First Nations youth engaging in initiatives on the land such as assisting with Environmental Assessments and field work associated with caribou conservation: “...the youth are understanding more, that this is where we came from, when we were taken away from our land, and this is a way for us to get back to the land...” (YC). Many of these benefits discussed by interviewees were associated with the strategies that were suggested to better include youth in watershed activities in the Nechako.

*Strategies for success.* During discussions with interviewees about their motivations, interests, background, and opinions regarding youth participation in watershed planning, many suggestions were made as to how to meaningfully engage youth (Table 3; Table 4). Youth expressed very directly their thoughts regarding what *meaningful* engagement means (Table 4). Most of the interviewees mentioned words like "respect", "trust", "care", "equal" and "consideration", as illustrated by the thoughts of this undergraduate student from UNBC: "I definitely feel like meaningful means that there is trust and care on both sides, and care as in 'I care about this issue and I want to know your opinion about it'" (YU). The majority of youth also mentioned that meaningful meant that if they took the time to contribute their knowledge or opinion, that it would be respected as much as the next person's (Table 4). Most of the interviewees also described meaningful engagement to include some action resulting from the inclusion of youth such as this young woman from the community:

*I think for the most part, I would like to expect to see some results... some actions, because there is always talk about what we might do or should do or could do, and I don't really see much in the way of action happening. (YC)*

One interviewee also emphasized the importance of adults or other people working to organize youth initiatives in understanding the immense diversity of youth voices. Because youth span in age anywhere between 16 and 30 years of age, "youth" represents many different people living

in different situations at various life stages: "...youth are not a unified voice...we are very diverse...there's a huge diversity of what issues, what life choices, all of that, that matter for youth" (YA). This suggests that electing one youth representative to a committee is likely inadequate to represent the youth voice unless that voice is representative of a greater body of youth.

**Table 4.** *Youth share their thoughts on meaningful engagement.*

- Develop mutual trust, care and respect between participants of all ages
- Treat youth as equals
- Respect for and inclusion of a diversity of youth voices
- Respect and value the opinions of youth
- Ask youth directly about how they would like to participate
- Realize that meaningful engagement is hard work and takes time
- Make sure youth are not being included as a "token voice"
- Communicate clear plans and objectives
- Consider students' schedules and other time commitments
- Be sure to reach out to youth in more rural areas of the watershed
- Design youth initiatives to include active, hands-on learning experiences

Youth who had experience participating in community initiatives and decision-making processes emphasized the importance of planning and the financial component of youth participation. Suggestions were made including coordinating event planning and spending with other groups to save money, and to link existing budgets to those accessible through the Nechako Watershed Roundtable.

Interviewees also stressed the importance of youth participation occurring in groups of other like-minded youth. A youth from the Cheslatta Carrier Nation suggested getting youth together from several nations for watershed initiatives. Another aspect that was discussed in terms of youth groups was the importance of defining a clear role for adults. One individual gave an example of a group she had participated in that had a facilitator who enabled the group to take their own direction: "It was almost completely student-driven...we had a supervisor who just sort of helped us to go wherever we wanted to go" (YU).

Youth frequently mentioned the need to increase youth awareness and knowledge through engagement activities (Table 3). The importance of getting the story of the Nechako out to youth and the general public was stressed, and especially to tell the story linking the development of the Kenney Dam with the injustices to First Nations. A suggestion was made to use social media to tap into and connect existing groups and the general social and environmental justice community at UNBC. Suggestions were also made to combine outdoor and hands-on activities with educational experiences to learn about the watershed. Specific activities that were mentioned as being particularly interesting included: 1) site visits guided by elders; 2) documentary screenings; 3) lunch gatherings at UNBC with guest speakers; 4) creating a documentary about the Nechako; and 5) a photography exhibit featuring the photos of the Cheslatta Carrier Nation. A suggestion was also made to focus more on generating positive energy by celebrating the rivers and the waters to attract and build connections instead of always focusing on problems:

*I think trying to find positive ways for people to engage, like celebratory ways, are a good avenue to use...I think that's one piece of the puzzle that is missing, is not just looking at how people currently use and understand and how they feel it, but to create opportunities to build those connections. (YC)*

An example that was given of a celebratory activity was the canoe race on the Nechako that was recently re-instated. It was suggested that these types of activities might also serve to alleviate some of the fears of the river that had been embedded in the local population.

Suggestions related to increasing awareness were also made in terms of engaging remote communities more effectively. Suggestions were made to hold well-planned information sessions (perhaps without UNBC to start), in which community members could be given plenty of notice and some incentive to participate. A suggestion was made to get the Cheslatta together with some of the other nations in the area to initiate youth engagement in the watershed.

*Youth engagement with the Nechako Watershed Portal.* Depending on the course of the conversation, some youth were also asked about their thoughts regarding the online, geospatially referenced watershed portal that was being built at the time of the study (Table 3). Some youth were not able to comment due to a lack of familiarity with such a system. One individual said that a database or data management system might be hard to engage with: “I think it’s interesting, but I feel like it’s being turned into a...well it is a database, but it’s kind of something that is hard to engage in...” (YU). As an alternative, this interviewee suggested creating opportunities for youth to engage remotely. She thought it might be good to have a live online forum for discussion:

*I don’t know, it would almost be cool if there was like a certain time, on a forum or Facebook page or whatever, when there was a discussion hour, or couple of hours, when people logged on when there was actually a virtual discussion happening, or just like a big question, like the ‘question of the day’ when people can say what they think or something like that, where I could actually say what I wanted instead of just reading facts... (YU)*

One positive reaction to the Nechako watershed portal was that it could help youth efforts have more of an impact: “It gives it more of a purpose, it’s going to have a lasting home” (YU). One of the young academics who was interviewed was very familiar with the Nechako watershed portal development and stressed that its usefulness for youth, at its current stage of development, would probably be through established user-groups of the system, as opposed to individual use for something like citizen science:

*The thing is, is that the portal is user-group friendly...it’s for a business or a company or a community to use...it’s just not a citizen science tool...it is in the sense that say the Enviro-Vikes are collecting stream keeper data and then they’re uploading it into the portal, but they’re doing it as a group... (YA)*

At the time of the interview, these user-groups included NEWSS and the Cheslatta Carrier Nation.

## Youth Interviews (Group)

An interactive group interview was conducted in a matrix style with approximately 30 individuals in grade 8 (except one student who was in grade 12) at Nechako Valley Secondary School (NVSS; see Chapter 4). The students were very quiet during the introductory discussion, but once they started to talk in small groups and interview one another they became much more talkative. It was obvious from the responses that a previous class trip to the Nechako White Sturgeon Recovery Initiative (NWSRI) had had quite an impact, as they seemed to care very much for the sturgeon and the Nechako River.

The transcript from the group's responses was coded using initial (open) and focused coding methods and the major themes that emerged were similar those that emerged from the individual youth interviews (Table 5). Most participants expressed the feeling that youth participation is very important, while some students said they didn't think it was important, or that there was no point in taking part. There was a strong overall sense from the students that they did not trust adults to listen to their suggestions or follow through on their word. Several suggestions were made by the students about how young people might get involved. The interview data were coded for the major themes: 1) youth place-based values; 2) local awareness; 3) strategies/ideas; 4) benefits to participation; and 5) barriers to participation (Table 5).

*Youth place-based values.* When asked about what they value most about the Nechako watershed, or the environment in their community, students most frequently stated that they value the clean water that comes from their taps for a variety of purposes including drinking, bathing, fishing, and cooking. The students also mentioned the importance of water as habitat, and especially the importance of surface water for fish, and particularly sturgeon. The importance of the river as a symbol of Vanderhoof and the local community was voiced by one student. Students also said they value the local rivers for their beauty, and for their

accessibility for recreational purposes such as boating, biking, and bushwhacking. The importance of the water cycle was also mentioned for its role in supporting all life.

*Local awareness.* When asked what challenges or problems the students were aware of in their local streams and forests, and what could be improved or worked upon, students most frequently mentioned their concern for sturgeon, dumping and littering, the effects of the Kenney Dam on fluctuating water flows in the river, and issues associated with deforestation and the pine beetle epidemic. Students were very aware of the life history of the sturgeon, and showed an understanding of the status of the species as critically imperiled, including the low count of recruits and the significance of the age of sexual maturation in female sturgeon.

Concerns for dumping and littering were frequently cited:

*...all the garbage in the water, but not just small garbage, but big garbage too, like I know my brother almost split his foot open on a washing machine in the river, that's not really supposed to be in the river. Or when you go floating down the river they tell you not to get off the float because there are cars in the river, so there's also big garbage too...*

Students reported large amount of dumping in nearby streams and forests, and said the reason it happens is because people are too lazy and don't care enough about the environment. Floods and fluctuating water flows because of the Kenney Dam were also mentioned as a local issue of concern. One student mentioned that at certain points "you can just walk across it", and at other times there is severe flooding. Finally, the students mentioned the impacts of deforestation in their community which had led to increased flooding because the roots of the trees were no longer taking up as much water. They also understood the connection between the pine beetle epidemic and increased deforestation in their community.

*Benefits to youth participation.* When asked if they thought it was important for elementary and secondary students to be involved in efforts to improve the health of the watershed (and why, or why not), students most frequently answered that they thought it was important. When asked to explain why, students reported that they thought youth had a good



chance of being able to make a difference, that youth are the future, and that they had been educated differently than older generations:

*Our generation of children have a different education than the older citizens in our area, and not everyone's opinions are used in conversations, especially the younger ones. We have a different education so we know different things.*

Interviewees also mentioned that they thought if they had opportunities to participate, that they could teach their own parents about taking care of the watershed. Youth also said it was important to participate because it builds awareness overall (Table 5).

*Barriers to youth participation.* Some youth expressed that it was not important for youth to participate or that it was inconsequential because nothing would change. When asked to explain, one individual said that the river and the watershed were “none of her business and didn’t really concern her”, while others said “because we’re just kids”. A sub-theme was youth distrust of adults to involve youth in a genuine way (referred to as “tokenism” in Table 5): “...kids should be listened to and heard, instead of just saying, ‘yeah we will listen to you’ and then not doing anything about it and ignoring them”. Interviewees also mentioned that adults often say things they don’t really mean, and gave an example about littering: “...your parents tell you not to litter, but they are the ones throwing their pop cans”.

*Strategies.* When asked about some of the ways we might be able to work together as a community to address watershed problems, the strategies mentioned by youth reflected their values and awareness of local issues (Table 5). Ideas such as community clean-ups as well as increasing the number of waste disposal bins were suggested as ways to combat littering and garbage dumping. The students also suggested preparing for flooding by piling up sandbags along the banks of the river, as well as the more long-term solution of trying to get more water out of the Kenney reservoir to normalize flows, and tree planting on stream banks. In addition, interviewees mentioned enforcing regulations on over-fishing more effectively, using less chemical inputs in agriculture, and increasing the use of active transportation in town to cut

down on pollution. Finally, the students mentioned that school field trips and projects could be used to accomplish these strategies (Table 5).

**Table 5.** Major and sub-themes resulting from initial and focused coding phases of data analysis for a group interview conducted with youth under 18 years of age. For more detail please see Appendix C-2.

<b>Themes</b>	<b>Sub-Themes</b>
Youth Values	<ul style="list-style-type: none"> <li>-Water as provisioning</li> <li>-Water as habitat</li> <li>-Water as connection to community/home</li> <li>-Water as recreational</li> <li>-Watershed as recreational and aesthetically beautiful</li> </ul>
Local Awareness	<ul style="list-style-type: none"> <li>-Sturgeon going extinct</li> <li>-Dumping/littering into streams and forests</li> <li>-Flooding</li> <li>-Deforestation + Pine beetle epidemic</li> </ul>
Benefits to participation	<ul style="list-style-type: none"> <li>-Students can have positive impact</li> <li>-Youth think differently than adults</li> <li>-Prepares youth for the future</li> <li>-Youth can teach their parents</li> <li>-Youth have a different education</li> <li>-Increases awareness</li> </ul>
Barriers to participation	<ul style="list-style-type: none"> <li>-Participating is useless, nothing will change</li> <li>-Kids are just kids, they can't have an impact</li> <li>-It doesn't affect us personally or concern us</li> <li>-Tokenism and distrust of adults</li> </ul>
Strategies	<ul style="list-style-type: none"> <li>-Stop littering in the community</li> <li>-Initiate a community clean-up</li> <li>-Use school trips to do riverside cleanups and tree planting</li> <li>-Enforce restrictions on over-fishing</li> <li>-Put more garbage bins out in town</li> <li>-Use less chemical inputs + fertilizers in agriculture</li> <li>-Use school projects to get things done in the community</li> <li>-Plant more trees</li> <li>-Set-up flood prevention infrastructure</li> <li>-Get more water into the river</li> <li>-Increase active transportation in Vanderhoof to cut pollution</li> </ul>

### Adult Interviews (Individual)

Three adults with an interest in supporting youth participation in planning and stewardship initiatives in the Nechako watershed were interviewed to discuss their perspectives on youth participation, the opportunities available, as well as any challenges or barriers to involving youth. The adults who were interviewed included one individual from the general public who has been deeply involved with various watershed-based non-governmental organizations over

her lifetime (referred to as “GP”), an individual employed in regional government (“RG”), and an individual employed in natural resource management (“NR”).

The major themes that surfaced from initial and focused coding were: 1) opportunities for youth participation; 2) general adult perspectives on youth participation; 3) obstacles to involving youth; 4) strategies for involving youth; 5) general organizational needs; and 6) general comments on public participation (Table 6).

*Opportunities for youth participation.* Overall, the adults who were interviewed ranged in their opinion about the number of opportunities (from hardly any, to many) for youth engagement in watershed planning related activities in the Nechako. Each of the interviewees was aware of the newly established opportunity for a youth representative on the Nechako Watershed Roundtable (NWR) core committee. They were also aware of the excellent work and opportunities available to the students at Nechako Valley Secondary School (NVSS) with the Nechako Environment and Watershed Stewardship Society (NEWSS) conducting field work related to stream restoration, as well as opportunities to learn and volunteer at the Nechako White Sturgeon Recovery Initiative (NWSRI). The individual from regional government explained that the NWR is not a decision-making authority, per say, but a group of individuals and organizations facilitating the gathering and organization of information and scientific data from throughout the watershed. She explained that the NWR would be a go-to source for decision-making authorities requiring information to make informed decisions. This information can be used to think about the opportunities for a youth representative within the NWR. This interviewee was not aware of any watershed-related opportunities for youth beyond those with NEWSS, NVSS, and the NWSRI, but mentioned the 4H club as an excellent example of an organization that develops youth skills and interests in rural areas of BC (Table 6).

The individual working in natural resource management described opportunities for youth in fisheries management throughout Carrier-Sekani territory:

*We have youth hired, so we've got several projects going right now. One of them is some training that we're doing, it's sort of like learning on the job, learning through a consulting company that we're working with, to learn how to do water quality sampling and monitoring, at a bunch of different small streams throughout the Carrier-Sekani Tribal Council territory...they also work on our other projects with sturgeon, there's spawn monitoring in the spring where we look for eggs and for larvae, and then there's juvenile monitoring in the fall, and they've also helped with salmon enumerations throughout the whole area.*  
(NR)

An individual from the general public who has been an active member of various non-government organizations was able to say with confidence that youth had not been included in previous community-led governance organizations including the Nechako Watershed Council (NWC) and Nechako Watershed Alliance (NWA). Beyond the engagement in Vanderhoof with NVSS, NEWSS and NWSRI and the NWR in Prince George, this interviewee also mentioned the BC Nature Young Naturalists Club (now NatureKids BC for ages 5-12), as an example of positive youth engagement in BC.

**Table 6.** Major and subsidiary themes resulting from open and focused coding phases of interview data from individual interviews with adults from the Nechako watershed with an interest in youth participation in watershed planning. Please see Appendix C-3 for full template.

Major themes	Sub-themes
Opportunities for youth participation	<ul style="list-style-type: none"> <li>-Nechako Valley Secondary School (NVSS)</li> <li>-Nechako Environment and Stewardship Society (NEWSS)</li> <li>-Nechako White Sturgeon Recovery Initiative (NWSRI)</li> <li>-Seat on NWR core committee</li> <li>-Jobs/Temp positions with CSTC fisheries management</li> <li>-4H Club</li> <li>-Young Naturalists (BC Nature)</li> <li>-Youth were <u>not</u> included in NWA or NWC</li> </ul>
Barriers youth face	<ul style="list-style-type: none"> <li>-Lacking interest, passion, initiative</li> <li>-Busy school schedules</li> <li>-Logistical difficulties including transportation</li> </ul>
Benefits to including youth	<ul style="list-style-type: none"> <li>-Fresh perspectives</li> <li>-Reminds adults of the importance of the next generation</li> <li>-Youth build skills/interests</li> </ul>
Obstacles to including youth	<ul style="list-style-type: none"> <li>-Youth require a lot of support/guidance on the job</li> <li>-Youth schedules conflict with adult schedules</li> <li>-Difficulty connecting with interested youth</li> </ul>
Strategies for involving youth	<ul style="list-style-type: none"> <li>-Working in groups with experienced people</li> <li>-Helping with \$/transportation</li> <li>-Engagement with local schools</li> </ul>

*Barriers youth face.* Adult perspectives on youths' barriers to participating in watershed initiatives included: 1) youth may lack the necessary interest, passion or initiative; 2) youth have busy school schedules; and 3) there are logistical difficulties such as youth lacking basic means of transportation to travel across large distances within a primarily rural watershed (Table 6).

*Benefits to including youth.* Adult perceptions of the benefits to including youth in watershed planning related initiatives included gaining fresh perspectives within groups of adults who are entrenched or somewhat jaded (Table 6). For example one of the interviewees commented:

*...they're naïve in a good way. They're open to all sorts of possibilities without the experience to sort of close doors ahead of time...even if [their] ideas may not be realistic, there are some that will be, and people who are my age or older, sort of the usual suspects that would come out to a public meeting of sorts, or a volunteer organization, we've already got a set of histories that say 'oh well that won't work'...so I think it's really critical, to just look at things with fresh eyes. (RG)*

Another interviewee commented that though youth were not included in previous community-led governance organizations (i.e., the Nechako Watershed Council and the Nechako Watershed Alliance), it would have been great if they had been since, "the youth perspective is really important ...sometimes people who have been slogging along for so many years, they're too close to it, and then you get a new perspective and that can be really helpful" (GP). An individual interviewed from regional government emphasized the importance of including youth even as part of a preliminary process of helping adults to realize the importance of the youth voice (Table 6):

*I think it's still necessary to have them there, and to keep trying as that older generation, I mean, we have to start listening better and taking their opinions more seriously, if we don't have youth there, we'll never get to that point. (RG)*

*Barriers to including youth.* The barriers mentioned by adults to involving youth included: 1) youth require a lot of support, training and guidance on the job; 2) schedules conflict with those of working adults; and 3) it's difficult to connect with interested youth. In reference to some of the opportunities provided for youth in the past, one interviewee mentioned that sometimes:

*...they haven't had enough guidance to feel secure in what the job is meant to entail...the data they give isn't always exactly what we had hoped for...they need some more support if they're going to hire youth, just until they know what it is exactly that's expected of them. (NR)*

The same individual commented on the obstacles related to scheduling and making the right connections:

*...I mean their schedules, it depends on how old the youth are, if they're still in high school or even if they're in school period, and they've got their schedules, versus people like me who work 9-5 kind of thing, so there's that, you can get around that, but it's making the connections to the youth that's the tricky part, and how to find those interested people. (NR)*

The interviewee from regional government also mentioned the barrier of working with students' schedules.

*Strategies for involving youth.* Three main strategies were suggested by adults to involve youth in the Nechako: 1) forming mentorships such as placing youth with experienced workers in a job situation; 2) helping youth with logistical challenges such as funding and transportation issues; and 3) involving school children in watershed stewardship activities (Table 6). The importance of mentorships was stressed by the interviewee who reported on the involvement of youth working in fisheries management: "Yeah, it's good to have them working with other people, I guess for anyone that is new, but it seems especially important with young workers..." (NR). Involving school children in stewardship activities was also suggested: "...maybe to work with a farmer and do some planting on the bank, or you know, if I can get the school involved,

you know the Grade 6/7s kind of level, if they start to become aware that this river is something we all swim in, it's kind of a big part of our lives, but in a very casual way" (RG). These strategies touch on awareness building, personal development as well as fundamental logistical issues such as transportation in a rural area.

The template analysis that was developed for each of the three groups of interview participants (youth under 18, youth over 18, and adults) were used to facilitate a discussion (Chapter 6) of the key themes in relation to the academic literature, and to derive a set of recommendations to be used as a guide for the next steps to meaningful youth engagement in the Nechako watershed.

# Chapter 6: Discussion and Conclusions

## Overview

The interviews conducted in this study began to assemble a picture of the values, experiences, and interests of youth, as well as their perceptions of the barriers and benefits to participating in watershed planning. The template analyses presented in Chapter 5 were used to think critically about the diversity of perspectives, thoughts and ideas that emerged throughout the study period. While the interview data from each of the individual groups provided an abundance of information to start thinking about how to engage youth meaningfully in the Nechako, a comparison of the data obtained from the youth and the adults provided some additional food for thought. Comparing the perspectives of adults and youth highlighted some areas where cultivating communication and mutual understanding might serve to improve the quality of engagement activities for youth. Of particular importance is making sure that youth organizers are aware of the spectrum of obstacles that hinder youth involvement in watershed planning. The following discussion will focus on this important aspect of youth engagement, and is supplemented by references to the academic literature where appropriate. The discussion is accompanied by 9 recommendations that will assist in developing a strategy to meaningfully engage youth in the Nechako watershed.

## Discussion and Recommendations

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*Recommendation #1 – Promote inclusivity by seeking to understand the diversity of youth in the Nechako and the barriers they face to participating in watershed planning and stewardship initiatives.*

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The interviews conducted with youth of all ages revealed a variety of perspectives on the involvement of youth in watershed planning. Though there were definite trends which surfaced as major themes, there was also an incredible amount of diversity, expressed by the great



number of sub-themes listed in Tables 1 and 2 and Appendix C. This diversity emphasizes the importance of conceptualizing the youth voice as a multitude of voices that cannot be represented by a single individual. This perspective is supported by a recent report by the Fraser Basin Council (2016) on meaningful and authentic youth engagement in BC. If we are to be truly inclusive in our attempts to engage youth as stakeholders, we must be aware of the diversity youth and the range of barriers to participation that they face.

Most of the youth (of all ages) discussed barriers related to “tokenism” during the interviews. The younger youth who were interviewed at Nechako Valley Secondary School (NVSS) said kids should be included, but expressed a lack of faith in adults to listen to their opinions, citing instances where adults had said they would listen and include their ideas, but had not followed through. This frustration of a lack of adult responsiveness is documented in a literature review by Frank (2006) as having been observed by Baldassari, Lehman & Wolfe (1987), Salvadori (1997), and Schwab (1997). A lack of responsiveness from adults could lead to youth losing interest or experiencing a “loss of hope” over time.

Other youth in the classroom at NVSS expressed that they were “just kids” and that there was no point in trying to participate. This self-recognition of marginalization is documented in the literature by Kalnins, Hart & Ballantyne (2002) and reflects the societal barriers to youth participation categorized by Frank (2006) as developmental, vulnerable and legal barriers (see Chapter 3 for details). The older youth who were interviewed in the community and at UNBC expressed similar sentiments. They expressed that the involvement of young voices was usually more of a public relations strategy rather than an act of true inclusion based on “respect”, “trust”, “care” and “consideration” (see Table 4, Chapter 5).

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*Recommendation #2 - Treat youth equally in terms of respect. They will not necessarily be equal in terms of their knowledge or experience, but their presence serves an important purpose. Among many important roles, youth bear the responsibility of transferring knowledge from our elders to future generations. Think about and define what it means to consider youth as stakeholders.*

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Another major barrier discussed by the older youth who were interviewed was a feeling of fear or intimidation in relation to getting engaged in watershed activities. Youth expressed perceptions of watershed planning as esoteric and its decision-makers being predominantly white and male. Youth expressed fears about entering into these adult-oriented settings where they might feel socially isolated, and unable to contribute equally to the conversation. As the young students at NVSS pointed out, however, young people are being educated in new ways, and have something to offer adults in terms of alternative problem solving strategies. Overall, youth demonstrated knowledge and awareness of many local and regional environmental issues, and an array of experiences in organizations suggesting that youth are indeed knowledgeable and should be considered as valuable resources in their communities (also supported by Frank, 2006). In addition to contributions of knowledge, there are many other ways in which youth can be meaningfully involved as stakeholders. In some instances, the appropriate role for a young person might be to simply observe. An example of this is illustrated by the youth interviewee who described feeling empowered during the process of participating in negotiations between her community, Rio Tinto Alcan, and the Province of BC. She started as an observer who felt shy, and realized over time that the thoughts that were passing through her own mind were similar to the comments made by her supervisors. This led to an increase in her confidence, and eventually, a gain in responsibility.

Another meaningful and incredibly important role for youth stakeholders was discussed by a young woman from the community. She highlighted the responsibility of youth to ensure the transfer and preservation of knowledge from one generation to the next. She emphasized

the importance of sharing knowledge and stories about the land between elders and young people to develop a sense of both time and place. The physical role of youth as receivers and carriers of knowledge is a powerful means of retaining knowledge and wisdom, and documenting environmental change. The responsibility to ensure that inter-generational knowledge transfer occurs imparts a great purpose to the presence of youth. A discussion by Kahn (2002) further supports this notion with his idea of “generational amnesia”. Kahn writes that the present generation is unable to recognize the severity of degradation in our environment due to new generations calibrating their idea of “normal” in degraded landscapes (Kahn, 2002). This idea is also known as “shifting baseline syndrome” (Papworth, Rist, & Milner-Gulland, 2009). All of the adults who participated in this study agreed that youth serve a valuable purpose in “just being present”. It may be helpful to consider some of the experiences shared by youth in this study to envision why engaging youth as stakeholders is particularly important.

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*Recommendation #3 – Provide opportunities for youth in watershed governance that are comprehensive in scope and action-oriented to help young people fill the gaps in their education or other knowledge bases and build confidence.*

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Another major barrier discussed by the older youth who were interviewed was a lack of understanding of the larger picture in terms of governance processes, as well as a lack of access to the necessary resources to take action. Some of the youth said their education had resulted in either a science-based or policy-based understanding of the world, and others expressed frustration with trying to understand concepts such as jurisdiction over water. These responses from youth contribute to one of the knowledge gaps highlighted in Chapter 3 regarding the kinds of education and training that are required for meaningfully engaging children and youth (UNICEF, 2014).

Youth of all ages displayed a strong interest in activities that go beyond developing their own skill set, as the majority of youth interviewed wanted to make a real difference in their communities. One of the youth interviewees who had participated in the Enviro-Vikes program at NVSS had taken part in a project which involved data collection, data analysis and a presentation of her findings to town council. Interestingly, this interviewee was one of the only study participants who felt confident that opportunities for meaningful youth engagement are available, and that adults value the opinions of youth. The partnership between NVSS, the Nechako Environment and Watershed Stewardship Society (NEWSS) and the Nechako White Sturgeon Recovery Initiative (NWSRI) is an excellent example of youth engagement that is educational, comprehensive, and connected to real governance processes. Facilitating comprehensive activities such as these to help youth fill some of the gaps in their understanding of the larger picture, will greatly improve the confidence of youth to participate, and empower them to make a difference. Knowles-Yanez (2005) supports this finding as they reported that youth involvement usually focuses on a narrow aspect of the larger process (e.g., scholars study youths' views, educators teach about planning process, and process organizers engage youth in community development). Knowles-Yanez (2005) calls for more integration of these practices with one another as well as with the activities of local government (Frank, 2006).

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*Recommendation #4 – Hire a youth coordinator to lead the development of a strategy for youth engagement in the Nechako to increase awareness, build social networks, and create momentum within the youth population. Link this position with the core committee of the NWR, and investigate opportunities to work with the Fraser Basin Council to capitalize on synergies.*

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Apart from the opportunities mentioned by youth and adult interviewees which included those in Vanderhoof through NVSS/Enviro-Vikes, NWSRI, NEWSS and the work-related opportunities in Carrier-Sekani and Cheslatta-Carrier traditional territories, interviewees were not aware of any other opportunities for youth engagement in stewardship and governance in

the watershed. While students in Vanderhoof and some First Nations youth have excellent opportunities in their own communities, there is an obvious need for a youth-focused organizational body to provide support for these existing opportunities, as well as to coordinate and lead stakeholder engagement throughout the rest of the watershed. Since the purpose of the NWR is to coordinate watershed governance activities, it makes sense to connect a newly established youth organization to the seat that has been made available on the core committee of the NWR for a youth. One youth seat is insufficient to meaningfully engage youth in the Nechako, however, there may be an excellent opportunity to link a Nechako-based youth organization to the Fraser Basin Council to take advantage of the available resources, funding, and support networks. As pointed out by one of the most experienced youth interviewees, meaningful youth engagement requires hard work, dedication, and adequate funding. It is recommended that a youth coordinator be hired to do the initial legwork of travelling and reaching out to youth throughout the watershed to build awareness and connections, and to generate enthusiasm and momentum. A youth coordinator could start to figure out how to tackle important issues such as accessibility to youth engagement activities for people living outside of city centres who lack access to public transportation, and the possibility of facilitating youth gatherings at the sub-watershed level to tap into local issues of concern and maximize the potential benefits for youth living in more remote areas.

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*Recommendation #5 – Increase awareness and connection to the history and socio-ecological conditions of the watershed with celebratory and educational public outreach activities such as gallery showings, documentary screenings, or outdoor adventure-based learning experiences.*

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Youths' feeling of a lack of understanding of the larger picture in terms of governance process was often discussed in tandem with expressions of disconnect or awareness of regional issues in the watershed. The general impression of the older youth was that the majority of

students at UNBC are not aware of the history of the Nechako River, the effects of the Kenney Dam or the current socio-ecological challenges in the watershed. A significant effort should be made to tell the story of the Nechako to help connect youth to the region, and to enhance youths' sense of place in the watershed. Hausmann, Slotow, Burns, & Minin (2015) discuss the potential of the often under-valued ecosystem service of "sense of place", to enhance biodiversity conservation and human well-being. The most popular activities that were suggested by the older youth who were interviewed to begin to build a better sense of place were documentary film screenings, photography exhibits, and art shows. Other popular suggestions were outdoor adventure-based education trips, and site visits guided by elders.

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*Recommendation #6 – Continue to support students' interests at NVSS in local environmental issues. Consider mentorship between older students and younger students to ensure a sense of continuity and to create momentum within the community to value youth as local stakeholders.*

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The younger youth at NVSS who were interviewed showed a strong sense of connection to place which may be a result of growing up in Vanderhoof beside the river, the strong presence of the natural resource industry, as well as the associations NVSS and the Enviro-Vikes share with NEWSS and NWSRI. Among the other issues listed in Table 2 in Chapter 5, the students demonstrated knowledge of the sturgeon and its relation to other on-going issues in the watershed. This suggests that the field trips to NWSRI that NVSS students have participated in do help to develop stronger connections between youth, environment and society. The students at NVSS showed the most concern for locally-based issues in Vanderhoof and its immediate surroundings, such as dumping in their local streams and forests, local flooding, local clear-cutting, and taking care of the sturgeon. The students were keen to use field trips as opportunities to engage further in activities such as community cleanups and stream bank restoration.

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*Recommendation #7 – Through public engagement activities, promote a holistic understanding of the values of watersheds to human well-being.*

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Some of the interview questions sought to gain an understanding of what matters to youth in the context of the watershed. It was important to gain an understanding of participant values since values are usually connected to interests, and act as a source of motivation in our daily activities. Overall, youth expressed connections to place that represented the watershed as fundamental to survival, a place to recreate, and representative of an array of spiritual and emotional connections to nature. In the group of older youth, only one interviewee mentioned the watershed as an important source of drinking water and food, and this interviewee happens to be the only person who grew up depending directly on the Nechako River. If most people thought about it for a moment, they would likely agree that their health and well-being depends directly on the health of their environment, but the results of these discussions may suggest that many individuals in our society (even the environmentally-minded ones who volunteered for this study), take the natural processes referred to as regulating, supporting and provisioning by the Millennium Ecosystem Assessment (MA), somewhat for granted. The interview data from this study suggest that many of the interviewees' values fit into the category of ecosystem services identified as "cultural" (MA, 2003). The MA defines cultural ecosystem services as those related to aesthetic, spiritual, educational and recreational values of nature. These results also suggest that youth could benefit from sharing stories with one another about their own values and attachments to the Nechako watershed, to bond over shared identity, and simultaneously broaden one another's perspectives of the value of watersheds to human well-being.

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*Recommendation #8 - Help to provide experiences for young children in the watershed to connect with "wild nature" as well as other hands-on, nature-based activities.*

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Interestingly, most of the individual youth interviewed brought up a story from their childhood which helped to form their initial connection to nature. Whether it was growing up on the banks of the Nechako, spending summers at a cottage in northern Ontario, gardening with family, adventuring in urban waterways, or going to a children's camp that focused on environmental stewardship, these early childhood experiences were reported by interviewees to have been formative in developing the motivation and passion to participate in watershed governance and stewardship activities. This phenomenon is well supported by studies published in the academic literature (e.g., Wells & Lekies, 2006; Nisbet, Zelenski, & Murphy, 2009; Chawla, 2007; and Horwitz, 1996). Wells and Lekies (2006) found that childhood participation in "wild nature" (as opposed to "domesticated nature") was positively related to adult environmental attitudes and behaviours. This research and the experiences of the youth interviewed in this study provide an important point of consideration for youth engagement. As suggested by one of the interviewees, it is important to engage youth as young as possible in nature-based educational activities that can help children growing up in a society that is relatively disconnected from nature to develop fundamental understandings of the relationships between the environment, health, and society. A suggestion was made by one of the interviewees to run a summer camp where older youth could mentor younger children and youth through adventure-based learning.

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*Recommendation #9 – Focus youth engagement on in-person, interactive, and community-building activities. The use of web-based platforms may not be particularly beneficial in the early stages of youth engagement in the Nechako.*

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One of the important questions that was discussed during the interviews with adults and older youth, as well as an informal discussion with some of the Enviro-Vikes at NVSS, was the potential for the newly developing Nechako Watershed Portal to assist in a strategy for youth engagement in the Nechako. It was difficult for interview participants to envision the



potential for its use due to the preliminary stage of its development, as well as the fact that youth have not yet come together to identify issues of concern or a vision for participation.

The older youth who participated in this study expressed very strong feelings of connection with the communities and people of northern BC, but at the same time, they expressed that part of the issue with engaging in watershed planning is that it feels like a socially-isolating experience, since the meetings and other initiatives are usually adult-oriented and intimidating to join. Youth expressed a strong desire to work with other youth in groups, and connect socially over shared values and issues of mutual concern. The initial stages of youth engagement in the Nechako should probably focus on interactive and community-building exercises. This approach is supported by Rydin and Pennington (2011) who argue that a crucial precursor to participatory planning is generating the necessary social capital to provide incentive for participation. If and when there is some momentum with youth participation in the watershed, potential avenues for youth engagement with the portal may become clear.

## Conclusion

This study responds to a direct need identified by members of the NWR, as well as a greater knowledge gap in the academic literature identified by Hood et al. (2011) and Zurba and Trimble (2014). Youth have broad interests and diverse perspectives, and are keen to increase their knowledge, skills, awareness, and impact on regional watershed issues for the betterment of their communities. In the field of land use planning and resource management, a stakeholder is usually defined as someone who has something to gain or lose from the outcomes of a planning process or project (Overseas Development Institute, 2009). In western society, we tend to consider private stakeholders, government stakeholders and civil society stakeholders. Why should youth be considered an important stakeholder within civil society? Youth will experience the effects of the decisions that are made today for the next century, and thus, youth have a

fundamental interest in the strategies and steps we take as a society towards sustainable development, including watershed governance and planning.

It is important for our society to realize that youth should not have to earn their place at the bargaining table by being an excellent student or taking the initiative to join a council. These characteristics may result in youth participation, but they should not be considered prerequisites. The majority of youth face barriers to participation that are physical, societal and personal. If we seek only to include youth who are the “champions” of our communities, we will not be employing a truly participative approach to governance. Understanding and tackling the range of barriers facing youth will allow a greater diversity of young people to be present so that youth engagement activities can foster the principles of inclusivity, fairness, and equitability. The results of this study are supported by those of Zurba and Trimble (2014) who concluded that a greater understanding of the complexity of the barriers youth face is required for meaningful engagement (see Chapter 3).

When we become aware of barriers such as a fear of inadequacy, the intimidation associated with being a marginalized voice, and geographic isolation, we can reach out and engage with youth to understand their interests, build awareness, and create a vision for youth to play a meaningful role in the future of watershed planning. The importance of this approach cannot be understated, as those who are disadvantaged in society, including those in poverty, and those who are politically weak or geographically vulnerable, suffer the most from the inequitable distribution of resources and human-induced environmental change (Marmot, 2007).

According to the youth and adults who participated in this study, meaningful engagement is empowering, develops respect for people and places, builds self-confidence and awareness, helps youth build skills and interests, reminds adults about future generations, gives decision-makers fresh perspectives and new ideas, helps youth become familiar with political processes, and ensures the transfer of knowledge between generations. These benefits

are in line with the most significant elements of personal, relational and collective well-being for youth discussed by Evans and Prilleltensky (2007).

There are many ways in which these benefits also contribute to the overall well-being of society and the ecological integrity of natural systems. First and foremost, youth benefit directly from personal development and empowerment within society, but secondly, youth participation also contributes to more effective resource management when all stakeholders are present to define local problems and find relevant, viable, and long-term solutions (Bonnell and Koontz, 2007). When resource management is successful because of participatory governance, ecosystem services become more plentiful and more equitably distributed. Building governance processes on the principles of trust, care, respect and equality will help to enable the generation that has the most profound interest in sustaining the health of our watersheds to be included meaningfully. If we are successful, the result will be a healthier environment for all.

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# Appendices

## Appendix A: Supplementary Background Materials

### Appendix A-1- Overview of Natural Resource Sectors

#### Agriculture

Agriculture is concentrated in the plateau areas of the watershed west of Prince George and is predominantly comprised of cattle production and cereal crops (Benke and Cushing, 2005). Presently, the Nechako Valley is the second largest contiguous agricultural belt in the province and is considered a future economic driver for the region. The Vanderhoof area has been farmed by settlers since the early 20th century, and by the early 1930s, there were scattered subsistence homesteads throughout the Nechako Valley. These early farmers helped to create the present-day Agricultural Land Reserve (ALR) that was initiated by the provincial government (Agricultural Land Commission) in the early 1970s. Many of the sources of pollution in the watershed that come from agriculture are a result of the policies of the early 20th century which required landowners to cultivate 80% of the arable land in a 20-year period to receive land title. This often resulted in widespread clearing up to and through streams and wetlands (Nechako Environment and Watershed Stewardship Society, 2016b).

#### Forestry and the Mountain Pine Beetle

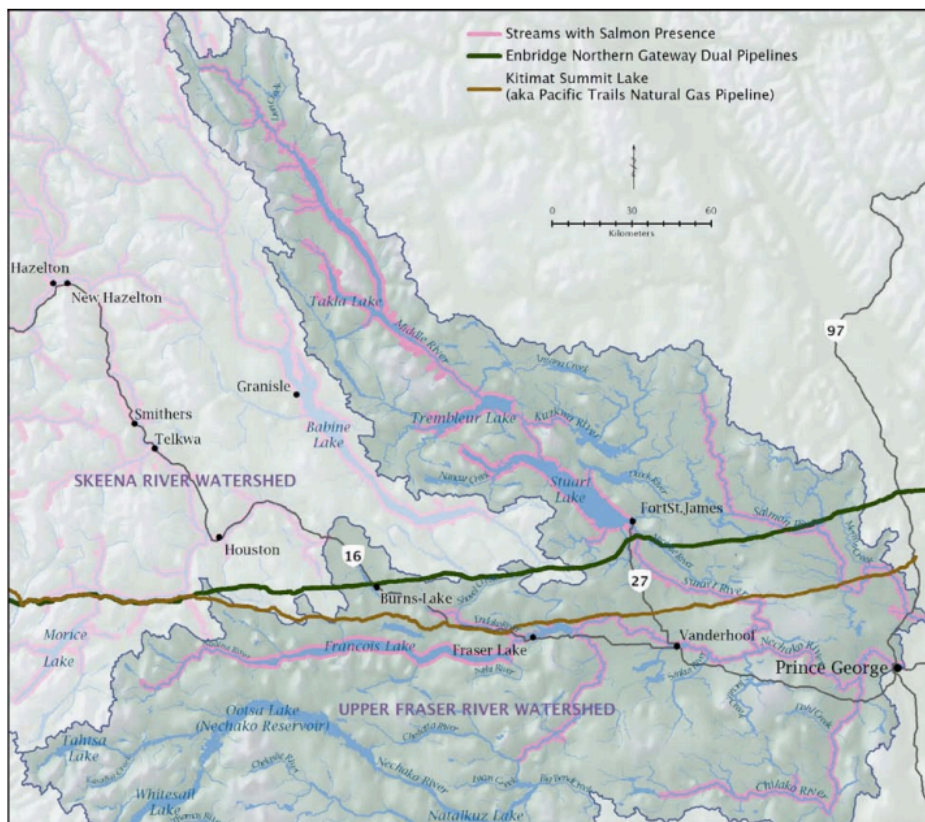
The Mountain Pine Beetle (MPB) has had a large impact on the forest industry of BC and resulted in significant increases in the Annual Allowable Cut (AAC) around the Prince George area for many years. Up to three-quarters of the mature pine in the Nechako watershed are expected to die from the MPB epidemic (Picketts et al. 2014). Information from Natural Resources Canada displaying the displacement of the MPB throughout western Canada shows the entirety of the Nechako Watershed as affected by the MPB between 2002-2007 (Natural Resources Canada, 2016). The great swaths of dead and dying trees have greatly altered the hydrology of the region, as areas that were previously forested with live trees are no longer able to take up water (CSTC, 2007). The resulting increased size and frequency of clear cuts are having significant impacts on moose, beaver and other fur-bearing animals. The Carrier-Sekani Tribal Council (CSTC) has described the MPB epidemic as a "catastrophic situation for economic, environmental, and cultural stability of Carrier and Sekani people" (CSTC, 2007, p.12). Between 2006-2013, impact from fine sediment to water quality from forestry were monitored at 381 sites in the Nechako watershed. It was found that a little more than one-half of the sites were classified as low or very low impact; one-third as moderate impact; and just over one-tenth as experiencing high impact from forestry-related operations. In addition, the Nechako watershed was hit by the largest forest fires in the province of B.C. in both 2010 and 2014 (Fraser Basin Council, 2015).

#### Oil and Gas

Minimal oil and gas development has occurred in the Nechako (Picketts et al., 2014), however, the oil and gas industry is currently increasing exploration activities (CSTC, 2007). The MPB epidemic has made it easier to identify oil and gas deposits due to the increased ease of using remote sensing technologies (CSTC, 2011). Figure 10 depicts current and proposed natural gas pipelines in CSTC territory (CSTC, 2014). Figure 11 depicts salmon habitat in the Nechako watershed alongside two proposed pipelines: the Northern Gateway Pipeline, as well as the Pacific Trails Natural Gas Pipeline (Levy, 2009).

## Mining

In 1965, the Endako Mine, the largest producer of molybdenum in Canada began its operation near Fraser Lake, BC (CSTC, 2011). The Endako Mine operated until 1982 and since this time, the mining industry in the Nechako watershed region has been increasing in intensity and is expected to replace forestry as the area's dominant industry in the future (Picketts et al., 2014). Other mining operations in the Nechako watershed include the now decommissioned Huckleberry mine, which was an open-pit copper mine that operated near Houston, BC, and the Pinche mercury mine which operated until 1975 just outside of Fort St. James.



**Figure 10.** Proposed pipelines in relation to key salmon bearing streams in the Nechako watershed. From "Pipelines and Salmon in Northern British Columbia", by D.A. Levy, 2009.





## Appendix A-2- Provincial Legislation Related to Watershed Planning

### Water Act, 1909

- Most of this act is now repealed (and replaced with the *Water Sustainability Act*), but Part 3 (Water Users' Communities) is now the *Water Users' Communities Act*, which governs the creation and management of water users' communities (Walton, Crossman, & Chernawsky, 2016)

### Water Protection Act, 1994

- Affirms BC's ownership of surface and groundwater and clearly defines limits for bulk water removal and prohibits large-scale diversions between the nine major watersheds in BC (Government of BC, 2016e)

### Riparian Areas Protection Act, 2016

- Previously the *Fish Protection Act*
- Calls on local governments to ensure protection of riparian habitat by ensuring the completion of science-based assessments of proposed residential, commercial and industrial development activities
- The purpose of the Act is to protect the features, functions and conditions that are vital for maintaining stream health and productivity (Government of BC, 2016d)

### Forest and Range Practices Act, 2004

- Replaced the *Forest Practices Codes of British Columbia Act*
- Includes some policies regarding community watersheds, watersheds with significant fisheries habitat and lakeshore management zones
- Provides mechanisms to translate strategic land use planning into legally enforceable objectives, however, these processes are complex and rarely completed and do not apply to all water users (only forest and range licensees)
- Increases pressure through non-legal mechanisms for forest and range licensees to maintain "social license" (Forest Practices Board, 2008).

### Oil and Gas Activities Act, 2008

- Similar principles and policies regarding water and watershed management to the *Forest and Range Practices Act* for oil and gas licensees (Brandes and O'Riordan, 2014)

### Drinking Water Protection Act, 2002

- Replaced the former Safe Drinking Water Regulations
- Sets out requirements for drinking water operators and suppliers to ensure the provision of safe drinking water to their customers
- Assigns duties to the Provincial Health Officer to ensure safe and potable drinking water (Government of BC, 2016a)
- Permits the development of Drinking Water Protection Plans, however, as of 2014 no plans had been initiated (Brandes and O'Riordan, 2014)

### Living Water Smart 2008 Strategy

- A provincial plan that represents British Columbia's vision for sustainable water stewardship
- The Ministry of Environment is responsible for coordinating the strategy and reporting on progress
- Involves 11 other ministries and a range of stakeholders
- Implemented through the *Water Sustainability Act* (Government of BC, 2016b).

### Water Sustainability Act (WSA), 2016

- Modernization of the *Water Act*

- Purpose is to protect water flows for ecosystem health and fish and to improve the requirements for groundwater users and licensing, well construction and maintenance, dam safety, and compliance
- Requires for the first time that groundwater users (non-domestic users) obtain a license, pay fees and annual water rentals akin to surface water users (Government of BC, 2016f)

## Appendix A-3- Collaborative Governance and Planning Initiatives in the Nechako

### Research & Coordinating Bodies

Several organizations function as research and coordinating bodies for watershed governance in the Nechako including the Fraser Basin Council, the Nechako Environment Enhancement Fund, the Integrated Watershed Research Group, the Nechako Environment and Stewardship Society, and the Nechako White Sturgeon Recovery Initiative.

#### *The Fraser Basin Council*

The Fraser Basin Council (FBC) is a charitable, non-profit organization whose mandate is to bring people together to advance sustainability in the Fraser Basin and across British Columbia. The FBC has been working since 1997 on three main areas including climate change and air quality, healthy watersheds and water resources, and finally, sustainability, resilient regions, and communities. The FBC staff and directors work mainly in the role of educators and facilitators to help people, government and businesses solve problems and take advantage of opportunities related to improving the health of the Fraser Basin. The FBC is currently serving as secretariat in the development of the Nechako Watershed Roundtable (Fraser Basin Council, 2016b).

Prior to the establishment of the roundtable, the FBC helped to coordinate and put together a Nechako Watershed Health Report and online community atlas tool to provide a snapshot in time of the state of the watershed's ecosystems. A recommendation that came out of this project was to complete a watershed strategy which would specify objectives and responsibilities for participants. The watershed strategy was completed and presented to the public in the fall of 2016. This work coincides well with the development the Nechako Watershed Roundtable, and will assist the roundtable in facilitating collaborative work in the watershed. The next step the FBC will be working towards is the development of a Nechako Watershed Plan which will put the specific objectives outlined in the strategy into action.

#### *The Nechako Environment Enhancement Fund*

Formed as a by-product of the 1997 agreement between the Government of British Columbia and Alcan which addressed outstanding legal matters from the provincial governments, the Nechako Environment Enhancement Fund (NEEF) committed \$50 million to enhance the environment of the Nechako watershed. In 2001, NEEF made a legally binding decision that a cold-water release facility would be built at the Kenney Dam to restore the health of the Nechako River pending additional research. Further studies revealed that a cold-water release at the dam would not generate the number of benefits previously thought. After the feasibility studies were conducted, the NEEF Management Committee consulted with the public to gather more information on how to allocate the fund. NEEF also committed in their original agreement to consult the Nechako Watershed Council in all decision-making. In 2012, they decided to allocate the NEEF fund based on ten decisions, which committed funding for a cold-water release facility, Cheslatta watershed restoration, a white sturgeon conservation

program, tributary watershed restoration and stewardship, integrated watershed research, and a legacy fund (Nechako Environment Enhancement Fund, 2016).

#### *The Integrated Watershed Research Group*

The Integrated Watershed Research Group (IWRG) at the University of Northern British Columbia (UNBC) is undertaking a four-year research project to respond to the primary concerns expressed in a report by the Nechako Environmental Enhancement Fund (NEEF). The research project can be described as focusing on three major themes: 1) Climate Change and Hydrometeorology; 2) Sediment Sources and Dynamics; and 3) Tools for Integration in Watershed Management and Governance (Integrated Watershed Research Group, 2016a). The third theme describes the research context for this project as the Nechako Watershed Portal is one of the main tools being developed for integration by the IWRG.

The Nechako Water Portal is a “web-based, geospatial tool to inform land and water decision-making in the Nechako River Basin”. The researchers hope the portal will form a single access point for information pertinent to the social and ecological issues of the Nechako River Basin to facilitate the sharing and discussion of information. The goal is to engage various community and interest groups in watershed management and governance.

Two of the communities of interest who are currently engaged are the Nechako Environment and Stewardship Society (NEWSS) and the Cheslatta Carrier Nation. NEWSS is hoping to be able to profile the data they are collecting on an ongoing basis on stream and riparian restoration, while also engaging students at the local schools to collect scientific data for the portal. The Cheslatta are looking to transfer physically stored archival information into the public domain and at the time of writing, were engaged in preliminary discussions regarding using the portal to do so (Integrated Watershed Research Group, 2016b). It is in these sorts of community contexts that this Major Paper will be able to assist in making recommendations for involving youth such as those from School District 91 or the Cheslatta Carrier Nation in participating in watershed management and governance activities including potential avenues of engagement through the Nechako Watershed Portal.

#### *The Nechako White Sturgeon Recovery Initiative*

The Nechako White Sturgeon Recovery Initiative (NWSRI) evolved after a study by the Government of B.C. was completed between 1994-1999 on the state of the health of sturgeon in the Nechako River Basin. The study found that the sturgeon were in a critical state of decline and as a result, the Government of BC initiated a recovery plan for white sturgeon in 2000. The NWSRI operates as two committees: a technical working group composed mainly of scientists that focus on figuring out why the sturgeon are declining, and a community working group functioning as a public advocate and focused on education and outreach. The recovery planning process is meant to ensure technical soundness, meaningful participation of the public, and cooperation among the provincial and federal governments, First Nations, industry and other stakeholders (Boudreau, 2005). The NWSRI field station engages many school groups each year to stimulate interest in young residents of the Nechako River Basin (Nechako White Sturgeon Recovery Initiative, 2016).

#### *The Nechako Environment and Stewardship Society*

The Nechako Environment and Stewardship Society (NEWSS) is a non-governmental environmental organization based out of Vanderhoof, B.C., that operates within the entirety of the Nechako watershed. NEWSS expanded to work outside of Vanderhoof after the great success of restoration project at Murray Creek. NEWSS' vision is to act in an advisory capacity, to be a vehicle for delivering incentives and investments for watershed restoration, and as a trust that inspires people, landowners, and industry to demonstrate high-quality land and water stewardship. The goal is to improve water quality in the hopes of creating resilient



stream ecosystems and enhanced capacity in the region to understand and manage water security in the face of climate change and into the future. NEWSS' projects work to improve damaged ecosystems by restoring riparian function in the floodplain of streams.

NEWSS has partnerships and working relationships with the University of Northern British Columbia, the University of British Columbia, and Simon Fraser University. NEWSS is also highly engaged with elementary and high schools in the region, the White Sturgeon Recovery Initiative, and various farms and ranches. NEWSS is currently in discussion with School District 91 (Nechako Lakes) about developing the curriculum to include various aspects of NEWSS' projects and mission (Nechako Environment and Watershed Stewardship Society, 2016a).

## Collaborative and Community-based Planning Initiatives

### *The Carrier-Sekani Tribal Council*

The Carrier-Sekani nations are currently in Stage 4 (Agreement in Principle) of a six-stage treaty negotiation process with the Government of British Columbia. Separate from the provincial Land and Resource Management Planning (LRMP) process, the CSTC nations have embarked on a variety of their own land use planning processes over the years. Due to internal and external instability in governance, however, some projects have not been completed or are currently on hold. As of 2016, the CSTC nations are focusing on a Regional Land Use Plan based on a regional vision (CSTC, 2007).

### *Nechako Watershed Council*

In 1996, the Fraser Basin Council (then the Fraser Basin Management Board) started a collaborative watershed initiative in the Nechako, which by 1998 had formed into the Nechako Watershed Council. Its mandate was: "to enhance the long-term health and viability of the Nechako Watershed with consideration for all interests, and to provide a forum to address water management and related issues in the watershed and to work towards cooperative resolution of these issues" (Boudreau, 2005, p.1). The NWC was comprised of 25 different groups including those from industry, communities, businesses, First Nations, non-governmental organizations and government representatives. As of 2005, the participating groups were: Carrier-Sekani Tribal Council; Cheslatta Carrier Nation; City of Prince George; District of Vanderhoof; Fisheries and Oceans Canada; Fraser Basin Council; Fraser-Fort George Regional District; Integrated Watershed Research Group, University of Northern BC; Ministry of Environment; Ministry of Forests, Lands and Natural Resource Operations; Nechako Environment and Water Stewardship Society; Northern Health; Regional District of Bulkley-Nechako; and Saik'uz First Nation (Sheedy, 2005).

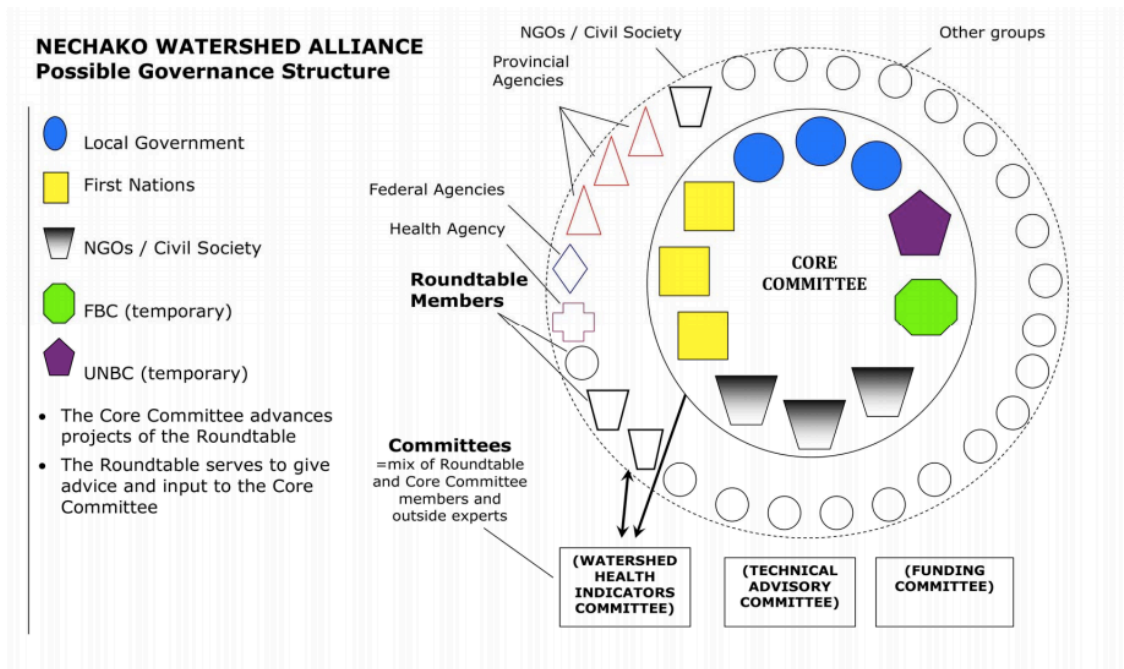
In the 1997 legal agreement between Alcan and the Government of BC, an agreement was made to consult the NWC on options available for the downstream enhancement of the Nechako River Basin. To this end, the NWC focused its efforts on a proposal for a cold-water release facility at the Kenney Dam (Boudreau, 2005).

### *The Nechako Watershed Alliance and Roundtable*

The Nechako Watershed Roundtable (NWR) began as the Nechako Watershed Alliance (NWA) in 2012, when a dialogue began between various organizations working to improve watershed health in the Nechako shared a desire to exchange information and knowledge, and explore common interests (Matthews et al., 2015). In 2015, the NWA decided to form a

roundtable and include government representatives, community groups, academic institutions and research groups, as well as the public.

The NWR is a collaborative initiative established in 2015 to improve the health of the Nechako watershed for future generations. The roundtable is led by a core committee made up of key representatives from participating organizations/sectors, and decision-making is based on a model of consensus (Figure 12). The core committee is made up of 10-12 members: 3 from local government; 3 from First Nations; and 4 from non-governmental organizations (NGOs) and civil society. The four members from NGOs/civil society may include youth representatives (age 16-29), elders (First Nation or non-First Nation), or community members "at large" (those not affiliated with a particular organization; Nechako Watershed Roundtable, 2015). The participants as of late 2015 include B.C. First Nations, the Government of B.C., local governments and other agencies including: Carrier-Sekani Tribal Council; Cheslatta Carrier Nation; City of Prince George; District of Vanderhoof; Fisheries and Oceans Canada; Fraser Basin Council; Fraser-Fort George Regional District; Integrated Watershed Research Group, University of Northern BC; Ministry of Environment; Ministry of Forests, Lands and Natural Resource Operations; Nechako Environment and Water Stewardship Society; Northern Health; Regional District of Bulkley-Nechako; and Saik'uz First Nation (Fraser Basin Council, 2016).



**Figure 12.** Schematic of governance structure for the Nechako Watershed Roundtable (at the time this diagram was made the organization was still referred to as the Nechako Watershed Alliance). From, "Nechako Watershed Roundtable Draft Terms of Reference", by Nechako Watershed Roundtable.

## Appendix B: Supplementary Research Methods Materials

### Appendix B-1: Interview Guides

#### Draft INDIVIDUAL Youth Interview Guide (Adult)

**Project Name:** *The Nechako Watershed Portal: A web-based, geospatial tool to foster information exchange and guide land and water decision-making in the Nechako River Basin.*

---

The following guide represents the questions and topic areas to be covered in the interviews. The protocol allows for a semi-structured, open-ended process. As such, additional follow-up questions may be added as a result of the direction of the interview. The guide is designed to be used in a responsive way in discussion with key informants. The proposed line of questioning is open to topics or themes raised by the participants in the process of the interview.

---

#### Background

- 1) What regions of the Nechako Watershed have you lived in?
- 2) Have you ever participated in any watershed related stewardship activities or other watershed initiatives?
- 3) How do you understand the connections between watershed health, society and human well-being?
- 4) Do you think that youth are excluded from watershed governance conversations or other decision-making processes?

#### Purposes

- 5) What issues do you feel most passionate about in the watershed?
- 6) Do you have any specific project ideas?
- 7) Why do you think that youth participation in the Nechako Watershed Roundtable is important or is not important?

#### Recommendations

- 8) Do you have any ideas about how youth at UNBC could play a role in the Nechako Watershed Roundtable?
- 9) What kinds of connections (if any) do you envision between the NWR, the Portal, and Youth in the Nechako?

## Draft GROUP Youth Interview Guide

**Project Name:** *The Nechako Watershed Portal: A web-based, geospatial tool to foster information exchange and guide land and water decision-making in the Nechako River Basin.*

---

The following guide represents the questions and topic areas to be covered in the group interview with the students at NVSS. The protocol allows for a semi-structured, open-ended process with follow-up/probing questions as required (see possible examples in italics). As such, additional follow-up questions may be added as a result of the direction of the interview. The guide is designed to be used in a responsive way in discussion with key informants. The proposed line of questioning is open to topics or themes raised by the participants in the process of the interview.

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***Before the Group Interview begins, the researcher will start with an intro presentation about herself and how she came to be conducting a study on youth participation in watershed governance. The presentation will be in a storytelling format, with the intent of providing some context to the activity and to engage/excite the students about participating in the study.***

### **Introduction/Background**

1. What do you learn about watersheds at school in your Environment and Life Science classes?  
*What do you enjoy about these classes or activities?*  
*What are some of your favourite topics?*

### **Learning about the Students' Experiences in the Watershed**

2. What kinds of issues do you care about in the watershed? What problems do you see? Do you see anything positive happening?
3. How many people here have been out to the Murray Creek or Stoney Creek field sites?  
*What was it like?*  
*What did you do?*  
*Does anyone have a favourite memory?*
4. How long have you been involved in these projects?
5. What kind of data or information have you been collecting on these projects?  
*How is data collected?*  
*Do you know if this data has been collected before or if it will be collected again later?*
6. What kinds of tools do you use during field work?

### **Learning about students' thoughts/opinions on stewardship etc.**

7. Do you think it's important as elementary and secondary students to be involved in these sorts of watershed projects? Why or why not?  
*Why do these projects matter?*  
*Locally?*  
*In the bigger picture?*
8. Other people working in stewardship and watershed conservation would love to see more youth involved, would you?  
*If so, how?*
9. Would you like to share your experiences on these projects with a larger group of representatives from across the Nechako Watershed? What do you think about having some representatives from the Enviro-

Vikes join the Nechako Watershed Roundtable? What would be some of the challenges associated with this sort of arrangement? What would be the benefits?

**Thoughts on the development of a potential mobile app for students' field work**

*The students may suggest something similar to a citizen science mobile app, depending on responses, the researcher will have a few powerpoint slides prepared to present some examples of other citizen science apps*

10. What do you think of some of these examples for mobile apps for logging field observations? Is there any interest in creating one of these mobile apps specifically for the Nechako and the projects the school is working on?

11. What kinds of features would be useful to have in the app?

12. Do you think this would be a good way for students in Vanderhoof to contribute and utilize the Nechako Watershed Portal and connect with the initiatives of the Nechako Watershed Roundtable?

**Concluding Thoughts**

13. Is there anything else you'd like to add?

## Appendix B-2: Information Letters & Consent Forms

*Information Letter and Consent form for Youth under 18 years of age*

(information package not included here)



December 7, 2015

**Dear Parents/Guardians and Students:**

I am a graduate student in Environmental Planning at York University, and have spent the fall semester as a visiting research student at the University of Northern British Columbia. I am working with Dr. Margot Parkes on the development of the Nechako Watershed Portal. The portal is a web-based tool which will be used to consolidate and share information about the Nechako to foster improved decision making associated with resource management and human well-being in the watershed. As part of this larger project with Dr. Parkes, I am working on a sub-project of the study, which is focusing on the involvement of youth. Enclosed you will find an information package and consent form with regards to an upcoming opportunity for students to participate in this research study.

The overall purpose of the study I am conducting is to gather information in order to generate recommendations for increasing the level of youth participation in watershed conservation, stewardship and decision-making in the Nechako. Students at NVSS and the Enviro-Vikes have been recognized as leaders in watershed stewardship, and have been identified as potential participants to help generate the necessary knowledge to complete the study. This project is a direct response to input from participants of the first meeting of the Nechako Watershed Roundtable, which took place in Prince George on October 21st and 22nd, 2015.

I am planning to conduct an informal discussion (group interview) with the Enviro-Vikes. The purpose of the interview is to learn more about the projects that the students are working on, and about their interests in connecting their work to projects at UNBC, including the Nechako Watershed Portal. Participation in the group interview is entirely voluntary, and will be approximately 90 minutes in duration.

There are no risks associated with participating in this study. We are, however, required to provide detailed information letters and consent forms to any potential research participants, and parental or guardian consent for participants under 18 years of age. I am hoping that you can take the time to read through the enclosed information package, and return the signed consent to the school at your earliest convenience.

If you have any questions, please do not hesitate to contact me on my cell phone at (905) 376-3208 or by email at [bale@unbc.ca](mailto:bale@unbc.ca).

Thank you very much, and I am looking forward to this exciting opportunity to work with students at NVSS!

Sincerely,

A handwritten signature in black ink that reads 'Sarah Bale'.

Sarah Bale  
Visiting Student at UNBC  
Masters of Environmental Planning Candidate, York University

**XII. PARTICIPANT CONSENT AND PARENT/GUARDIAN SIGNATURE**

Ultimately, the participation of the student in this study is entirely up to you as a parent/guardian. We hope that you will have the opportunity to discuss this with your child. If the student chooses to take part, they may choose to withdraw at any time without giving a reason and without any negative impact.

**CONSENT**

We (the parent/guardian and student) have read over the information presented in the information letter:

YES NO

We (the parent/guardian and student) have had the opportunity to ask questions about being involved in this project and to receive additional details:

YES NO

We (the parent/guardian and student) understand that in agreeing to participate in this project, that the student may withdraw at any time up until the report completion, with no consequences of any kind:

YES NO

The parent/guardian and student agrees that the student can be recorded (audio):

YES NO

The parent/guardian and student agrees that the data gathered in this study can be used in future (similar) projects and be shared with the community via the Nechako Watershed Portal:

YES NO

Signature of Parent or Guardian: \_\_\_\_\_

Name of Student Participant (Printed): \_\_\_\_\_

Date: \_\_\_\_\_

*Information Letter and Consent form for youth and adults over 18 years of age*  
(information package not included here)



December 7, 2015

**Dear potential research participants:**

You have been invited to participate in this study as a key informant for youth engagement in watershed governance. The Information Package and Consent Forms enclosed provide a thorough description of the purpose of the study, and what participating in an interview would involve, should you consent to participating. Please note that your involvement is entirely voluntary and that you may withdraw from the study at any time without penalty, and have all the information you contributed removed and securely destroyed.

If you wish to participate in the study, please contact me at [bale@unbc.ca](mailto:bale@unbc.ca), and return the signed consent form (you may keep the information package for your own records).

If you have any questions regarding the study or participating in the study, please do not hesitate to contact me on my cell phone at (905) 376-3208 or by email at [bale@unbc.ca](mailto:bale@unbc.ca).

Thank you very much and I look forward to speaking with you,

Sincerely,

*Sarah Bale*

Sarah Bale  
Visiting Research Student, UNBC  
Masters of Environmental Studies (Planning) Candidate, York University





**XII. PARTICIPANT CONSENT AND SIGNATURE**

Taking part in this study is entirely up to you. You have the right to refuse to participate in this study. If you decide to take part, you may choose to withdraw from the study at any time without giving a reason and without any negative impact on you.

**CONSENT**

I have read or been described the information presented in the information letter about the project:

YES NO

I have had the opportunity to ask questions about my involvement in this project and to receive additional details I requested.

YES NO

I understand that if I agree to participate in this project, I may withdraw from the project at any time up until the report completion, with no consequences of any kind.

YES NO

I agree to be recorded (audio).

YES NO

I agree that the findings arising from my contributions to this study can be used in future (similar) projects and be uploaded to the Nechako Watershed Portal for the benefit of the community.

YES NO

Signature: \_\_\_\_\_

Name of Participant (Printed): \_\_\_\_\_

Date: \_\_\_\_\_

## Appendix B-3: Consent Letter for Research with Minors



### NECHAKO VALLEY SECONDARY SCHOOL

2608 Bute Avenue, P.O. Box 950, Vanderhoof, BC V0J 3A0

Telephone: 250-567-2291 Fax: 250-567-2123

<http://nvss.bcschoolweb.ca>

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November 23, 2015

Dr. Margot Parkes  
Faculty of Health Sciences  
University of Northern British Columbia  
3333 University Way  
Prince George, BC  
V2N 4Z9

Dear Dr. Margot Parkes:

Please find this letter as Nechako Valley Secondary School's formal response to your request to have Sarah Bale, a student researcher from the University of Northern British Columbia, hold a group interview with students associated with the Enviro-Vikes Environmental Club. My understanding is that Sarah Bale is conducting research for a project that will contribute to your study: *The Nechako Watershed Portal: A web-based, geospatial tool to foster information exchange and guide land and water decision-making in the Nechako River Basin*. Sarah is coming to investigate opportunities for youth to connect with the Nechako Watershed Portal, and more generally in watershed governance in the region.

We believe this will be a great partnering opportunity for the students, and look forward to our students engaging with conversations about health, environment, and community in their local area. The activities that Sarah has described for the group interview process will be of minimal risk, as the students will be engaged with a slideshow presentation and interactive discussion using flip-charts and white boards to express and record the students' ideas. These activities are very similar to the students' everyday experiences at NVSS.

I would like to give my consent to Sarah Bale and her field assistant Kate Hewitt as part of your research team at UNBC, to come to NVSS to conduct these research activities. Understanding that the students will need to obtain parental consent to participate, we look forward to planning the details of your visit during the week of November 30, 2015. We look forward to working with you and for our students to have an opportunity to engage with graduate students on issues of local importance.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ken Young', written over a light blue horizontal line.

Ken Young

## Appendix B-4: Sample Interview Matrix

### **INTERVIEW MATRIX**

Q 1. What do you value most about the Nechako watershed, or the environment in your community?

1<sup>ST</sup> INTERVIEW:

2<sup>ND</sup> INTERVIEW:

3<sup>RD</sup> INTERVIEW:

Appendix B-5: Research Ethics Board (REB) Certificates

*REB Amendment Approval (UNBC)*

# UNIVERSITY OF NORTHERN BRITISH COLUMBIA

## RESEARCH ETHICS BOARD

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### MEMORANDUM

**To:** Margot Parkes, Scott Emmons

**From:** Michael Murphy, Chair  
Research Ethics Board

**Date:** November 30, 2015

**Re:** **E2015.0204.010.00(a)**  
**The Nechako Watershed Portal: A web-based, geospatial tool to foster information exchange and guide land and water decision-making in the Nechako River Basin**

---

Thank you for submitting the above-noted proposal to the Research Ethics Board (REB). Your proposal has been approved, subject to submitting a copy of the Provost Approval to the REB.

We are pleased to issue approval for the above named study for a period of 12 months from the date of this letter. Continuation beyond that date will require further review and renewal of REB approval. Any changes or amendments to the protocol or consent form must be approved by the REB.

Good luck with your research.

Sincerely,



Dr. Michael Murphy  
Chair, Research Ethics Board



## AMENDMENT

<b>Certificate #:</b>	<b>e2015 - 229</b>
<b>Amendment Approved:</b>	<b>12/01/15</b>
<b>Approval Period:</b>	<b>08/13/15-08/13/16</b>

OFFICE OF  
RESEARCH  
ETHICS (ORE)  
5<sup>th</sup> Floor,  
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4700 Keele St.  
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Fax: 416 650-8197  
[www.research.yorku.ca](http://www.research.yorku.ca)

### Memo

To: Professor Martin Bunch, Faculty of Environmental Studies, [bunchmi@yorku.ca](mailto:bunchmi@yorku.ca)  
From: Alison M. Collins-Mrakas, Sr. Manager and Policy Advisor, Research Ethics  
(on behalf of Denise Henriques, Chair, Human Participants Review Committee)  
Date: **Tuesday, December 01, 2015**  
Re: Ethics Approval

The Nechako Watershed Portal: A web-based, geospatial tool to foster information exchange and guide land and water decision-making in the Nechako River Basin.

With respect to your research project entitled, "The Nechako Watershed Portal: A web-based, geospatial tool to foster information exchange and guide land and water decision-making in the Nechako River Basin.", the committee notes that, as there are no substantive changes to either the methodology employed or the risks to participants in the research project or any other aspect of the project, an amendment of approval re the above project is granted.

Should you have any questions, please feel free to contact me at: 416-736-5914 or via email at: [acollins@yorku.ca](mailto:acollins@yorku.ca).

Yours sincerely,

Alison M. Collins-Mrakas M.Sc., LLM  
Sr. Manager and Policy Advisor,  
Office of Research Ethics

## Appendix C: Supplementary Materials (Results)

### Appendix C-1: Full Template (Individual Youth Interviews)

**Table 7.** *Template analysis for interview data from individual interviews with youth 18+.*

#### **1. Place-based values connected to well-being**

##### *1.1. Connections to community*

- 1.1.1. Importance of “close-knit” community
- 1.1.2. Sense of identity with community of northern BC
- 1.1.3. Importance of general community service (as opposed to strictly environmental work)
- 1.1.4. Feeling connected to the people of northern BC
- 1.1.5. Feeling connected one’s culture and history

##### *1.2. Nature as recreational*

- 1.2.1. Canoeing
- 1.2.2. Hiking
- 1.2.3. Mountain Climbing
- 1.2.4. Swimming
- 1.2.5. Boating
- 1.2.6. Hunting
- 1.2.7. Fishing
- 1.2.8. Exploring/Adventuring

##### *1.3. Nature as spiritual/cultural/emotional connections*

- 1.3.1. Experiencing and living in degraded or polluted environments affects emotions negatively
- 1.3.2. The river as spiritually cleansing
- 1.3.3. Feeling of freedom
- 1.3.4. Women’s responsibility for taking care of water
- 1.3.5. Feeling of connection to the land and to the river (as a “life-blood”)
- 1.3.6. Valuing open spaces and remoteness
- 1.3.7. The landscape as representative of one’s culture and history

##### *1.4. Nature as provisioning*

- 1.4.1. The river as a water source
- 1.4.2. The river as a source of food (fish)
- 1.4.3. The river as a place to bathe

#### **2. Passions/Motivations**

##### *2.1. Youth engagement is a responsibility not a choice*

##### *2.2. Passion to participate has to come from the inside*

##### *2.3. Childhood memories/experiences connecting youth to nature*

- 2.3.1.1. Travelling with father to BC Heritage sites as a child
- 2.3.1.2. Connecting with urban waterways as a child
- 2.3.1.3. Spending summers at a family cottage
- 2.3.1.4. Love of gardening as a child
- 2.3.1.5. Attending a kids camp “Earth Keepers” that focused on the environment and conservation
- 2.3.1.6. Living by the ocean growing up and on Vancouver Island with lots of waterfalls
- 2.3.1.7. Living on the river growing up/remembering swimming, bathing, eating, drinking from the river

#### **3. Awareness and Concerns of Youth**

##### *3.1. Awareness and issues of concern regarding regional industry*

- 3.1.1. Fisheries
- 3.1.2. Oil/Gas
  - 3.1.2.1. Fracking
  - 3.1.2.2. Pipelines
- 3.1.3. Forestry
- 3.1.4. Hydro-power dams

##### *3.2. Awareness and concern regarding local/regional environmental issues*

- 3.2.1. Risks associated with the integrity of the Kenney Dam

- 3.2.2. Need to improve management of Cheslatta community forest
- 3.2.3. Changes in salmon runs
- 3.2.4. Proposals for oil and gas pipelines projects
- 3.2.5. Changes to fish migrations
- 3.2.6. Rapid land clearing due to pine beetle epidemic
- 3.2.7. Changes in flow patterns in the Nechako and overall hydrology in the watershed from the pine beetle and dams
- 3.2.8. Point source pollution from pulp mills
- 3.2.9. Drinking water quality
- 3.2.10. Changes to air quality from mills
- 3.2.11. Protecting the ancient wet-belt
- 3.2.12. Illegal dumping near the Chilako River
- 3.2.13. The greatly altered state of the Nechako watershed
- 3.2.14. The provincial government is not taking responsibility for the wellbeing of the watershed's residents
- 3.3. *Understanding the socio-ecological complexity of watershed issues*
  - 3.3.1. Understanding that general community engagement is important and not just environmental stewardship
  - 3.3.2. Understanding the connections between industry practices, riparian health, and water quality
  - 3.3.3. Understanding the tensions between the economic backbone of the region and environmental protection
  - 3.3.4. Understanding the need for sustainable forestry management to sustain economic backbone
  - 3.3.5. Understanding connections between the makeup of the ground/soils & natural resource development
- 4. **Youth Experience and Skills**
  - 4.1. *Youth Experiences*
    - 4.1.1. Family and/or interviewee work in natural resource industry
    - 4.1.2. Opportunities for Engagement
      - 4.1.2.1. Schools
        - 4.1.2.1.1. Highschools
          - 4.1.2.1.1.1. Enviro-Vikes Club at NVSS
        - 4.1.2.1.2. University
          - 4.1.2.1.2.1. UNBC
            - 4.1.2.1.2.1.1. Fish and Wildlife
            - 4.1.2.1.2.1.2. Forestry
            - 4.1.2.1.2.1.3. Environmental Science
            - 4.1.2.1.2.1.4. Outdoors
            - 4.1.2.1.2.1.5. Students for a Green University
            - 4.1.2.1.2.1.6. Field trips in environmental engineering classes
      - 4.1.2.2. NGOs and Grassroots
        - 4.1.2.2.1. Ontario Nature Youth Council
        - 4.1.2.2.2. Fraser Basin Youth Council
        - 4.1.2.2.3. POLIS
        - 4.1.2.2.4. BC Lake Stewardship Society
        - 4.1.2.2.5. Lake Keepers
        - 4.1.2.2.6. Together Shuswap
        - 4.1.2.2.7. Nechako Watershed Roundtable
        - 4.1.2.2.8. NEWSS
        - 4.1.2.2.9. Northern Wet-belt Council
      - 4.1.2.3. Professional Associations
        - 4.1.2.3.1. Canadian Water Network
        - 4.1.2.3.2. International Forestry Students Association (IFSA)
      - 4.1.2.4. Employment Opportunities
        - 4.1.2.4.1. EA Referrals and Cooperative Wildlife Management on Cheslatta territory
        - 4.1.2.4.2. Negotiation table (Cheslatta Carrier Nation and Rio Tinto Alcan/Province of BC)
  - 4.2. *Youth Skills/Knowledge*
    - 4.2.1. Lobbying provincial government with regards to protection of biodiversity and habitat conservation
    - 4.2.2. Negotiation processes

- 4.2.3. Field methods in wildlife management
- 4.2.4. Field methods in Environmental Assessment processes
- 4.2.5. Water flow and quality data gathering
- 4.2.6. Presenting delegations to council
- 4.2.7. Building social network groups (e.g., starting a Twitter feed for a new club)
- 5. Barriers to Youth Participation in Watershed Stewardship or Planning Initiatives**
  - 5.1. Societal norms*
    - 5.1.1. Resource extraction industries condition people's attitudes to "nature as a resource"
      - 5.1.1.1. People's jobs depend on industry/feeling like you "have to go with it"
    - 5.1.2. Society values technology and social connections
    - 5.1.3. Society lacks spiritual connection to nature
    - 5.1.4. Lack of time/too many unrelated commitments
    - 5.1.5. Stress of commitments
    - 5.1.6. Generation of current youth not brought up in a society where community service is the norm
  - 5.2. Education System*
    - 5.2.1. Education system is not holistic- either science or arts focused
    - 5.2.2. Teachers do not have time to incorporate extra, place-based teaching modules
  - 5.3. Lack of awareness of local and regional issues*
    - 5.3.1. People don't go looking for what's wrong, need to be taught
    - 5.3.2. People have trouble caring about something that doesn't affect them directly
    - 5.3.3. People can't see a lot of the environmental problems that we have...or they are at least not obvious
  - 5.4. Lack of resources and access to information*
    - 5.4.1. Lack of data (or access to data), especially in vast region like Nechako
    - 5.4.2. Lack of resources to stay in home communities (affordable housing, etc.)
    - 5.4.3. Lack of transportation options
    - 5.4.4. Lack of access to information about opportunities for youth
    - 5.4.5. Lack of funding
      - 5.4.5.1. Many initiatives end up being "one-offs" without follow-up
    - 5.4.6. Difficulty understanding jurisdictional issues
    - 5.4.7. Generational differences in behaviours associated with accessing information
    - 5.4.8. Difficulty knowing where to find pertinent or relevant information needed
  - 5.5. Youth Voice Not Valued*
    - 5.5.1. Youth are not identified as a "stakeholder" in a traditional sense
    - 5.5.2. Young women and young minority youth experience greater marginalization
    - 5.5.3. Youth may be listened to, but they are not often heard or understood
    - 5.5.4. Adults do not often seek out youth opinions
    - 5.5.5. Youth participation is not considered a priority in comparison to issues such as climate change
    - 5.5.6. Youth initiatives compete for funding with initiatives of higher priority
    - 5.5.7. Youth often included as a token voice, often less welcome if disturb the status quo
    - 5.5.8. Youth voices are not considered legitimate, not taken seriously by the general population
    - 5.5.9. Opportunities to participate are "all talk" and "no action"
  - 5.6. Power dynamics*
    - 5.6.1. The majority of actors in watershed governance are old white men
    - 5.6.2. Fear of retaliation from governmental authorities for activism
    - 5.6.3. Feeling "young" and socially isolated within a group of adults
    - 5.6.4. Fear of a lack of knowledge or expertise
      - 5.6.4.1. Intimidation by adults or large groups
      - 5.6.4.2. Perception that academic, professional or specialized knowledge is required
      - 5.6.4.3. If someone is young and new to participating it might be intimidating
  - 5.7. Remote and isolated communities*
    - 5.7.1. Lack of public transportation
    - 5.7.2. Lack access to educational institutions etc.
  - 5.8. Inter-generational trauma in First Nations communities*
    - 5.8.1. Lack of capacity
    - 5.8.2. Drug and alcohol problems
- 6. Benefits to Youth Participation**
  - 6.1. Engaging, empowering and fun*
  - 6.2. Develops respect for the nature and the local environment*



- 6.3. *Empower youths with a foundation to make change*
- 6.4. *Helps young kids think critically at an early age*
- 6.5. *Builds communication skills and supports networking*
- 6.6. *Develops self-confidence and improves self-worth*
- 6.7. *Helps adults think about the inclusion of youth and future generations*
- 6.8. *Helps to develop a connection to nature/the land/cultural roots*
- 6.9. *Vital for intergenerational knowledge transfer*
- 6.10. *Helps youth become familiar with political and social processes that affect their lives*
- 6.11. *Develops understandings of diverse perspectives*
- 6.12. *Helps youth take responsibility for the future*

## **7. Strategies for success**

- 7.1. *Engage youth meaningfully*
  - 7.1.1. Develop mutual trust, care, and respect between participants of all ages
  - 7.1.2. Treat youth participants as equals/on the same level
  - 7.1.3. Design youth initiatives to be active, hands-on learning experiences
  - 7.1.4. Reach out to the less-usual, as well as the usual youth suspects
  - 7.1.5. Realize and value the diversity of youth
  - 7.1.6. Foster consideration and respect
  - 7.1.7. Ask for and value the opinions of youth
  - 7.1.8. Ask youth directly about how they would like to participate
  - 7.1.9. Realize that meaningful youth engagement is hard work and takes time and effort
  - 7.1.10. Make sure youth are not being included as a “token voice”
  - 7.1.11. Prospective initiatives need clear plans and objectives
  - 7.1.12. Consider students’ schedules
  - 7.1.13. Reach out to youth in far corners of the Nechako who probably know the watershed best
- 7.2. *Financial Component*
  - 7.2.1. Look for parallel or other potential initiatives to collaborate with to share and reduce costs
    - 7.2.1.1. Link to existing budgets accessible through the NWR, e.g., Regional Government
  - 7.2.2. Fund a paid part-time or full-time position for a youth coordinator to do the legwork
  - 7.2.3. Identify funding sources ASAP to provide on-going opportunities
  - 7.2.4. Assist youth who have to travel with associated costs
- 7.3. *Youth want to work in groups with other youth*
  - 7.3.1. Unite youth based on common passions and values
  - 7.3.2. Consider an annual youth summit or regional forum
  - 7.3.3. Take advantage of existing social networks and clubs
  - 7.3.4. Cheslatta may be interested in getting together with other Nations for youth initiatives
- 7.4. *Adult Role in Youth Participation*
  - 7.4.1. Consider the most appropriate role for an adult supervisor or facilitator
- 7.5. *Increase youth awareness & knowledge*
  - 7.5.1. Tell the story of the Nechako to the region’s residents (especially the history of the Kenney Dam)
  - 7.5.2. Use social media to link into existing clubs and build community awareness and support
  - 7.5.3. Combine education with real-world experience to generate interest
  - 7.5.4. Hold well-planned info meetings with remote communities (some with UNBC, some without)
  - 7.5.5. Build knowledge, awareness and connections to place based on people’s interests
    - 7.5.5.1. Activities that interest youth
      - 7.5.5.1.1. Site visits guided by elders (First Nation or other)
      - 7.5.5.1.2. Documentary Screenings
      - 7.5.5.1.3. “Brown bag lunches” with speakers
      - 7.5.5.1.4. Making a documentary
      - 7.5.5.1.5. Photography Exhibits/Competitions
        - 7.5.5.1.5.1. Focus on the passage of time and related environmental shifts
- 7.6. *Celebrate the river and the watershed*
  - 7.6.1. Canoe races
  - 7.6.2. Alleviate fears associated with river
- 7.7. *Strive to include some inter-generational learning experiences*
  - 7.7.1. Critical to preventing the loss of knowledge of environmental baselines for management
  - 7.7.2. Try to include very young people, the younger the better

- 7.7.3. Intergenerational component not valued strongly by all
- 7.8. *Consider remote opportunities for youth to participate*
  - 7.8.1. Online “live” discussion forums
  - 7.8.2. Build awareness through social media
- 8. **Youth Engagement with the Nechako Watershed Portal**
  - 8.1.1. Opportunities for youth with established portal “user-groups”
    - 8.1.1.1. NEWSS
    - 8.1.1.2. Chelsatta Carrier Nation
  - 8.1.2. Reactions to the portal proposal
    - 8.1.2.1. Needs to be incorporated into the curriculum for youth to engage
    - 8.1.2.2. A “database”-like appearance/function is not particularly engaging for youth
    - 8.1.2.3. Having a “lasting home” for data from school projects is somewhat appealing

## Appendix C-2: Full Template (Group Youth Interview)

*Table 8. Template analysis for interview data from group interview with youth <18.*

- 1. Place-based Values**
  - 1.1. *Water as provisioning*
    - 1.1.1. Drinking
    - 1.1.2. Bathing
    - 1.1.3. Fishing
    - 1.1.4. Cooking
    - 1.1.5. Clean water
  - 1.2. *Water as habitat*
    - 1.2.1. Sturgeon
    - 1.2.2. Fish
    - 1.2.3. Home to all species
  - 1.3. *Water as connection to community/home*
  - 1.4. *Water as recreational*
    - 1.4.1. Boating
    - 1.4.2. Biking trails
    - 1.4.3. Bushwhacking
- 2. Local Awareness**
  - 2.1. *Sturgeon going extinct*
    - 2.1.1. Life history and survival rates
  - 2.2. *Dumping/littering into streams and forests*
    - 2.2.1. Laziness and apathy
  - 2.3. *Flooding and extreme flow levels*
  - 2.4. *Deforestation & Mountain Pine Beetle*
    - 2.4.1. Altered hydrology
- 3. Benefits to Participation**
  - 3.1. *Students have good chance of helping*
  - 3.2. *Youth think differently and can contribute new ideas*
  - 3.3. *Prepares youth for future*
  - 3.4. *Youth can teach their parents*
  - 3.5. *Youth have a difference education*
  - 3.6. *Increases awareness*
- 4. Barriers to participation**
  - 4.1. *Participating is useless, nothing will change*
  - 4.2. *Kids are just kids, they can't have an impact*
  - 4.3. *It doesn't affect us personally*
  - 4.4. *Tokenism*
    - 4.4.1. Adults don't follow through on commitments
    - 4.4.2. Adults tell you to do one thing and do another (e.g., littering)
- 5. Strategies**
  - 5.1. *Stop littering in the community and initiate clean-ups*
    - 5.1.1. School trips can do this
  - 5.2. *Enforce restrictions on over-fishing*
  - 5.3. *Put more garbage bins out in town*
  - 5.4. *Use less chemicals in agriculture*
  - 5.5. *Use community groups and school projects to get things done*
  - 5.6. *Plant more trees*
    - 5.6.1. School trips
  - 5.7. *Plan and set-up flooding infrastructure*
    - 5.7.1. Sandbags
  - 5.8. *Get more water into the river*
  - 5.9. *Increase active transportation in Vanderhoof*

## Appendix C-3: Full Template (Adult Interviews)

**Table 9.** *Template analysis for interview data from individual interviews with adults (youth allies).*

- 1. Opportunities for youth participation**
  - 1.1. *NVSS/Enviro-Vikes*
  - 1.2. *Nechako White Sturgeon Recovery Initiative*
    - 1.2.1. Photographers etc.
  - 1.3. *Seat on NWR core committee*
    - 1.3.1. Help to gather and share info
    - 1.3.2. Connect decision-making bodies to work of NWR?
  - 1.4. *Jobs/Contracts with First Nations fisheries projects*
    - 1.4.1. Water quality sampling
    - 1.4.2. Spawn monitoring
    - 1.4.3. Juvenile monitoring
    - 1.4.4. Salmon enumerations
    - 1.4.5. Catch-monitoring
      - 1.4.5.1. Interviewing people who food fish
  - 1.5. *4H Club*
  - 1.6. *Young Naturalists (BC Nature)*
  - 1.7. *Youth were not included in NWA or NWC*
- 2. Adult Perspectives on youth participation**
  - 2.1. *Barriers that youth face*
    - 2.1.1. Lack of interest/initiative
    - 2.1.2. Schedules
    - 2.1.3. Lack of transportation
  - 2.2. *Benefits of youth participation*
    - 2.2.1. To start process of valuing youth more, to remind adults
    - 2.2.2. Fresh perspectives
      - 2.2.2.1. “Naive in a good way”
    - 2.2.3. Youth build skills/interests
    - 2.2.4. Build awareness
- 3. Obstacles to involving youth**
  - 3.1. *Need a lot of guidance/training/support*
  - 3.2. *Schedules of youth do not fit into 9-5 work day usually*
  - 3.3. *It's very difficult to make connections with interested youth*
  - 3.4. *Attracting youth*
- 4. Strategies for involving youth**
  - 4.1. *Working in groups with experienced people*
    - 4.1.1. Increases competence and employee peace of mind
  - 4.2. *Helping with \$/transportation*
  - 4.3. *Engagement with local school and watershed activities*
    - 4.3.1. E.g., Grade 6/7, planting trees with farmer on stream bank