

A National Water Vision for Canada – Exploring the Obstacles and Opportunities

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Abstract

Canada has one of the largest freshwater supplies in the world, yet it does not have a national level vision or strategy for water. Water-related challenges in Canada, driven by climate change, urbanization, population growth and water pollution, pose a serious threat to Canada's sustainable development. The absence of a national water vision in Canada has led to fragmented, unsustainable and inadequate, water management across Canada.

To better understand the obstacles and opportunities of a national water vision for Canada, this study applied a qualitative approach by interviewing water policy experts from across Canada. The findings of this study are intended to highlight the need for a national water vision and provide recommendation to support the development of a national water vision in Canada.

Keywords: Water; Water Vision; Water Law; Policy; Canada

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Chapter 1. Introduction

Canada has 7% of the world's total renewable freshwater supply and is often considered one of the most developed and progressive countries in the world (Statistics Canada, 2018). However, Canada lacks something that many developed nations have. Canada does not have an effective comprehensive national level vision, strategy or policy for water. Canada has the fourth largest supply of renewable freshwater in the world, yet it does not have a national level vision to hold provinces, territories, local governments or the private sector accountable to manage water sustainably. Nations across the world including New Zealand, South Africa, Korea and Lebanon have developed national level approaches to manage water more sustainably. From drought in South Africa to water degradation in Korea, these countries have created national level guidance to tackle their country's most difficult water challenges.

Historically, Canada has attempted and failed on several occasions to implement national level water strategies and policies. In 1953, the Canada Water Conservation Assistance Act was enacted, which was superseded by the Canada Water Act in 1970 and finally in 1987 the Federal Water Policy was created. All three attempts to create a shared and national level vision for water failed due to a lack of clarity, support and funding. Since the 1990s there has been very little progress made in national level water policy in Canada. Instead, provinces and territories have taken it upon themselves to create water legislation to protect and conserve their water resources. This provincial and territorial level approach has produced several new and innovative ways to manage water, however, it has also created an extremely fragmented approach to water management across the country.

With little national direction for water management since the 1990s, there have been serious water challenges throughout Canada. This includes no federally enforceable standards for the safety and environmental/economic sustainability of drinking water, wastewater, stormwater and ground water extraction. Furthermore, the absence of a national water vision has led to fragmented, unsustainable and inadequate, water management across Canada, resulting in disproportionately disadvantaged Indigenous people, an increasing water infrastructure deficit, and failure to offer clear support for the declaration of water as a human right.

As Canada continues to be polarized by resource development issues such as pipelines and fracking of natural gas, it is important to protect a resource that is vital to life. This research will outline historic national water policy in Canada, demonstrate the need for a national water vision in Canada and highlight the opportunities and obstacles to create a national water vision for Canada. This paper intends to foster new ideas, which will lead to actionable strategies, and the steps necessary to create a national water vision for Canada.

The following four statements are the research objectives I used to shape and guide my research:

1. To understand what the main water challenges and issues are in Canada today.
2. To understand if creating a shared national water vision would help address some of the issues facing water in Canada.
3. To seek out expert opinions to see if water experts believe Canada should have a shared national vision for water.
4. To develop ideas of how to create a national water vision and the principles within it.

In order to address my research objectives, I have provided a thorough literature review, which details the history of national water policy in Canada, water management in the 21st century and considerations for a national water vision. Next, I discuss the methodology used to conduct this research. The research style I chose for this research involved structured interviews and a qualitative analysis of the interview responses. After the methods, I describe the results of the interviews and findings. Next, I discuss and interpret the results as they relate to a national water vision in Canada. Last, I present my recommendations and concluding thoughts.

Chapter 2. Literature Review

2.1. Historic Overview of Water Management in Canada

2.1.1. Water and the Canadian Constitution

Since Canada's establishment in 1867, water resources have received little attention in national policy formulation. This can be observed in the very foundation of Canada's natural resource laws. The British North America Act of 1867, now the Constitution Act, 1867, allocates different rights and responsibilities to provinces, territories and the federal government in regard to natural resources (Quinn, 1985). For example, the British North American Act allocates jurisdiction over navigation and fisheries to the federal government and the right to manage most natural resources within their boundaries to provinces (Brandes & Curran, 2017). Even though the British North America Act establishes jurisdiction over water resources, water is not explicitly mentioned in the Act (Quinn, 1985). This trend of overlooking water resources in federal law and policy formulation continued from 1867 to 1945 (Quinn, 1985). During these decades, water was not the focal point of federal policy development, but rather a resource attached to other policy issues. Departments such as the Department of Agriculture and the Department of Public Works were created, where the function of these departments involved and affected water resources, yet specific federal water policies were not created.

A key piece of legislation between 1867 and 1945 was the creation of the Indian Act, 1876. Following the Constitution Act of 1867, the Indian Act attempted to assimilate a vast population of Indigenous people into settler society (Hanson, n.d.). The Indian Act defined who was considered an "Indian" and restricted Indigenous peoples' freedoms in regard to cultural practices, land, resources, education and governance (Hanson, n.d.-a). The federal government's jurisdiction over "Indians and Lands reserved for Indians" and the constitutional allocation of natural resource rights, greatly impacted Indigenous peoples' ability to manage natural resources, i.e. water (Hanson, n.d.-b). Both the Constitution Act of 1867 and the Indian Act of 1876 expanded the crown's jurisdiction over non-treaty First Nations. Because of this, First Nations have had to prove their rights to natural resources in court.

From 1945 to 1965 the federal government began placing more attention on natural resource development and postwar development (Quinn, 1985). This time period marked the beginning of the modern environmental movement in Canada and a growing concern for water resources (Parlour & Schatzow, 1978). The federal government responded by funding water-related projects and supporting the development of water-related commissions and boards (Quinn, 1985). This time period can be considered one of the first attempts to focus regional efforts in accordance with a broader national water policy agenda (Quinn, 1985). Notable steps towards national water management can be seen in the development of the Canada Water Conservation Assistance Act in 1953 and the Guidelines for Canadian Drinking Water Quality in 1968 (Environment and Natural Resources, 2013; Health Canada, 2018).

The Water Conservation Assistance Act was the first explicit federal legislation for water resource management, while the Canadian Drinking Water Guidelines were the first federal level drinking water standards (Health Canada 2018), although they were structured as guidelines rather than legally binding standards. The Water Conservation Assistance Act primarily provided for federal funding to provinces and territories for water storage projects. It also provided for funding for several flood management projects across Canada (Booth & Quinn, 2017; Shrubsole, 2013). However, this act was met with some criticism. Provincial governments complained the federal government was only providing funding and not participating in the planning process; there was little public participation; the funding structure of the act did not allow major water projects to be granted funding; and diverse water uses were not considered (Booth & Quinn, 1995; Health Canada, 2018).

2.1.2. Formulation of the Canada Water Act

In 1970, the federal government continued to push a broader national water policy agenda by establishing the Canada Water Act (Quinn, 1985). The Canada Water Act was created to promote collaboration between federal, provincial and territorial governments on water related issues (Canada Water Act, 1985). This new act encouraged novel ideas relating to water research, planning, conservation and water utilization (Canada Water Act, 1985). The Canada Water Act was divided into 4 parts. The first part established intergovernmental relationships between provincial and federal governments. This part also outlined the Minister's ability to gather data and conduct

research on water resources and the ability to create and apply water management plans for water resources of “significant national interest” (Benedickson, 2017: Booth & Quinn, 1995;). The second part focused on cleaning Canada’s waterways and introduced the idea of polluter fees. This part also detailed the federal government’s ability to act unilaterally to protect waters, including shared waters in cases where interprovincial efforts have failed (Benedickson, 2017). However, this part of the act was never implemented due to objections from provincial governments (Booth & Quinn, 1995). The third part also focused on cleaning Canada’s waterways, more specifically focusing on phosphate contamination. This part of the Canada Water Act was largely successful and eventually became a part of the Environmental Protection Act (Booth & Quinn, 1995). The last part promoted the development of water-related committees, advisory boards and programs (Booth & Quinn, 1995).

Shortly after the development of the Canada Water Act, Environment Canada was established in 1971 (ECCC, 2017). The establishment of Environment Canada was a positive step for water management because it created an institutional space for water in the federal government. Environment Canada also played a critical role in the operation of the Canada Water Act as it became the administrative body for the Canada Water Act. In 1975 the federal government created the Canada Water Act Fund; the budget for this fund was \$17.9 million and all projects were to be managed by Environment Canada (Booth & Quinn, 1995). The Canada Water Act Fund was used to finance many successful water projects. Some notable projects include the 1974 Montreal Regional Flood Control project to mitigate flood damage and build dikes in the Montreal region; as well as the 1978 Prairie Province Water Board to promote equitable practices on shared waterways between Alberta, Saskatchewan and Manitoba (Booth & Quinn, 1995).

During the 1970s, Canada was not only promoting collaborative water management within its own borders it was also promoting transboundary water management with the United States. Back in 1909 Canada and the United States agreed to the Boundary Waters Treaty, a bilateral agreement to equitably manage water resources between the two countries (Johns, 2017). The signing of the Boundary Waters Treaty also established the International Joint Commission. The International Joint Commission is composed of six members, three appointed by each country (Johns, 2017). The function of the commission is to provide unbiased recommendations to

prevent and solve water management issues between the two countries over shared waters (Johns, 2017). One of the highlights of the International Joint Commission is the Great Lakes Water Quality Agreement of 1972, this agreement was financed and thrived under the Canada Water Act. The Great Lakes Water Quality Agreement received some of the largest funding from the Canada Water Fund, this money was used to set up monitoring and facilitate research along the Great Lakes (Booth & Quinn, 1995). The Great Lakes Water Quality Agreement was revised in 2016 and continues to work to reduce pollution in the Great Lakes.

2.1.3. Decline of the Canada Water Act

During the early part of the 1980s the Canada Water Act began to lose traction. Even though the Act was innovative for its time and helped to address the public's concern for water quality, the Act was extremely reactive and did not live up to its full potential. Specifically, the Canada Water Act struggled to fulfil its main purpose of broadening water resource management to the watershed and national level (Benedickson, 2017). In 1981 the federal government conducted a review of the Canada Water Act (Booth & Quinn, 1995). This review determined that "negotiating, joint planning and reviewing recommendations" of water-related projects under the Canada Water Act was lengthy and rigid in its ability to adapt to new needs (Booth & Quinn, 1995). The federal government also concluded that provincial governments had the ability to continue future water basin projects on their own (Booth & Quinn, 1995).

In the early 1980s funding for the Canada Water Act also began to diminish. One of the largest funding sources for municipal wastewater treatment, through the Canada Mortgage and Housing Cooperation, was cut by the federal government (Booth & Quinn, 1995). A few years later the Department of Regional Economic Expansion, another major funding source for the Canada Water Act, was reduced significantly (Booth & Quinn, 1995). Also during this time, there was mounting concern from the scientific community about water-related issues that extend past traditional geographical lines. Issues such as climate change, acid rain, droughts, contamination, water diversions and related environmental risks were going to impact water resources (Booth & Quinn, 1995). Meanwhile, Environment Canada was pushing to use the authority of the Canada Water Act to research and study these issues, yet no funding was allocated to the Canada Water Act to undertake such actions (Booth & Quinn, 1995).

In 1982 the Parliament of the United Kingdom enacted the Canada Act, 1982, granting Canadians the right to amend the Canadian Constitution outside of British rule (Azzi, 2016). This revolutionary act not only transformed the Canadian Constitution, it also more clearly defined natural resource laws. Under the Canadian Constitution Act, 1867 and the Constitution Act, 1982, federal and provincial jurisdiction over natural resources arises from two categories of authority. The first type of authority is known as a proprietary right, which can be defined as the ownership of natural resources (Mitchell, 2017). Proprietary rights over most of the natural resources within a province are held by the provincial government. Thus, each provincial government owns most of the water within its boundaries (Mitchell, 2017). The second type of authority is legislative authority; put simply this means the power to create, enact and amend laws (Mitchell, 2017). This kind of authority is divided between federal, provincial and territorial governments depending on the resource. Under the Canadian Constitution Act, the areas of the federal government's legislative authority that can be used for water management include: interprovincial and international trade; navigation and shipping; taxation; fisheries; "Indians and lands reserved for the Indians"; interprovincial and federal works and undertakings; and the Boundary Waters Treaty (Brandes & Curran, 2017). On the other hand, provincial and territorial governments have legislative authority over managing, conserving and exploring most natural resources within provincial boundaries (Natural Resource Canada, 2017). From a water resource perspective this means provincial and territorial governments have the right to enact and amend laws dealing with water standards, management and provisioning (Brandes & Curran, 2017). This means that provincial and territorial governments have the jurisdiction to create provincial and territorial water legislation, which all municipalities within the province or territory must abide by.

The Canada Act was also monumental because it brought into force the Canadian Charter of Rights and Freedoms (Mitchell, 2017). The Act also formally recognized and affirmed "aboriginal and treaty rights of the aboriginal peoples of Canada" (Constitution Act, 1982, s. 35; Mitchell, 2017). This meant that the federal government could not overlook Indigenous rights and must recognize the practices, culture and traditions of Indigenous people. The changes introduced by the Canada Act rightfully made it the duty of provincial and federal governments to integrate Indigenous people into natural resource co-management institutions and practices (Bakker & Cook,

2017). This acknowledgement of Indigenous rights has led to more Indigenous people being involved in water-related projects and more inclusive decision-making on traditional land and water resources (Mitchell, 2017). This recognition of Indigenous people's rights is significant as Indigenous people have been and continue to be disproportionately affected by water resource issues (Castleden et al., 2017).

2.1.4. Formulation of the Federal Water Policy

After the underwhelming success of the Canada Water Act, national water policy reached a peak in the late 1980s. In 1984 the federal government launched a Federal Water Inquiry (Pearse et al., 1985). The Inquiry was led by three non-government officials, its purpose was to conduct research, public outreach and consultation with different levels of government to examine how water was being utilized and protected (Benedickson, 2017; Booth & Quinn, 1985). The Federal Water Inquiry led to the establishment of the Federal Water Policy in 1987. The Federal Water Policy defined two main goals; to protect and enhance the quality of water resources and to promote the wise and efficient management and use of water resources (Federal Water Policy, 1987). The Federal Water Policy also outlined five strategies and 25 policy recommendations (Federal Water Policy, 1987). The five strategies include water pricing, science leadership, integrated planning, legislation and public awareness (Federal Water Policy, 1987). Using these five strategies as the backdrop, the federal government promoted innovative ideas including, co-operative water projects, the advancement of water expertise and technology, the true value of water, public education, conservation and proactive legislation (Benedick, 2017; Federal Water Policy, 1987; Mitchell, 2017).

Unfortunately, the peak of national water policy did not last long. In 1989 a senior member of Environment Canada decided against modernizing the Canada Water Act, even though it was recommended by the Departments of Environment and Justice (Booth & Quinn, 1995). By the early 1990s the Federal Water Policy had lost momentum and most of the strategies and policy recommendations have never been implemented (Bakker & Cook, 2001; Bruce & Mitchell, 1995). Beginning in 1993, funding and resources for national water policy also began to collapse due to major changes in Environment Canada's water programs (Bruce & Mitchell, 1995). First, the Inland Water Directorate was terminated, and its staff was reassigned. Next, the Interdepartmental

Committee on Water was dissolved. Then, the Canada Water Act Fund was reduced to \$5 million dollars in 1995 and projected to be reduced further to \$500,000 in 1997 (Bruce & Mitchell, 1995). Last, the Canadian Council of Ministers of the Environment eliminated its Water Advisory Committee.

During the 1990s there was a significant shift in the federal government's interest. In the mid 1990s the federal government was focused on reducing Canada's large budget deficit (Martell & Palmer, 2011). This meant cuts to program budgets and reduced spending (Martell & Palmer, 2011). The federal government was more concerned about the "big picture"; focusing on ecosystems rather than their components (Booth & Quinn, 1995). Environmental initiatives such as the Green Plan, Canada Environment Act and harmonization were being pushed by Environment Canada (Bakker & Cook, 2017; Natural Resources Canada, 1990; Booth & Quinn, 1995). Fragmentation of water related programs, boards and committees became so bad that the "Where's Water?" review was launched by Environment Canada (Booth & Quinn, 1995; Bruce & Mitchell, 1995). The "Where's Water?" review was conducted to ensure critical water responsibilities and duties were still being fulfilled (Booth & Quinn, 1995; Bruce & Mitchell, 1995).

2.2. Canadian Water Focus in the 21st Century

2.2.1. A Shifting Focus on Water

During the early 2000s, water exports became a major concern in Canada. In 1998, Ontario began issuing licenses to export water from Lake Superior (Saunders, 2014). These licenses were quickly revoked; however, it created national concern that such licenses were easily obtainable (Saunders, 2014). The federal government decided to take action to address water export concerns by amending pre-existing legislation in the Boundary Waters Treaty. However, the legislation did not address the entirety of the issue but rather introduced a limited prohibition with several exceptions (Saunders, 2014). Moving into the federal election of 2006 and 2008 the federal government offered the idea of a new national water policy and new legislation on bulk water exports (Saunders, 2014). These water-related policies were criticized by the opposing federal liberal government as an attempt to increase environmental credibility, in order to mask significant changes the federal government was making to other environmental policy

(Saunders, 2014). A new national water policy was never developed, however, and in 2010 the federal government failed to implement new legislation on bulk water exports (Saunders, 2014).

More recently, the federal government has been pressured to address other contemporary issues surrounding water resources. During the 2000s and into the 2010s, drinking water became a centerpiece of public concern. Significant drinking water failures in Walkerton Ontario, North Battleford Saskatchewan, and Kashechewan, Ontario prompted provinces to establish enforceable drinking water standards. In 2005 the Senate Standing Committee on Energy, Environment and Natural Resources reported that Canada water management was “shocking” and “unacceptable” (Bakker& Cook, 2011). These comments came specifically in response to the large number of Indigenous communities living under boil water advisories and the lack of groundwater mapping and monitoring across Canada (Bakker & Cook, 2011). The federal government and provincial governments have also received public pressure with concerns about climate change, growing population and extreme weather events.

In a recent turn of events, in December of 2019, the federal government mandated the development of the Canadian Water Agency (DuBois & McCandless, 2020). At this time, the implementation, role and design of the Canadian Water Agency remain unclear. It is likely the details of the Canadian Water Agency will continue to remain unclear for some time as the federal government’s focus has shifted towards the impacts of a global pandemic. However, the foundation of the Canadian Water Agency is to bring together water leaders to find innovative solutions to overcome some of Canada’s most difficult management challenges and to improve freshwater stewardship in Canada (DuBois & McCandless, 2020). The development of the Canadian Water Agency provides a new and exciting platform for federal participation in freshwater management.

2.2.2. Provincial Focus on Water Resources

During the past few years, there has been a shift towards provincially led initiatives on water management. Provinces and territories have asserted their legislative authority to establish water-related policy, including ground water extraction rates,

drinking water standards and sustainable action plans. All 10 provinces and the three territories have developed their own water resource policies:

British Columbia established the Water Sustainability Act in 2016 (Water Sustainability Act, 2016). The Water Sustainability Act has become the central law to manage water resources in British Columbia (Water Sustainability Act, 2016). In addition to continuing and amending the province's licensing scheme for surface water, the Water Sustainability Act states that anyone who diverts ground water, that is not for domestic use, must obtain a license and pay for water (Horbulyk, 2017). The first three years of the act will be used as a time to move approximately 20,000 non-licensed water users into the new licensing framework (Ministry of Forests, Lands, Natural Resource Operations and Rural Development, 2019).

Alberta established the Water Act in 2000 and it recently received revisions in 2017 (Water Act, 2017). Alberta's Water Act identifies household water use as a top priority. It also recognizes the importance of water use for agricultural practices and it protects traditional agricultural water use (Water Act, 2017). The Water Act also provides for the distribution of water licenses for ground and surface water use, however, a significant part of the province does not accept new license applications (Horbulyk, 2017).

The Water Security Agency Act in **Saskatchewan** was established in 2005 and was revised in 2017. The Water Security Agency Act's mandate highlights the importance of efficient and economical use of water resources while promoting conservation (Water Security Agency Act, 2005). The act also eliminated the historic hierarchal water use system and established the right for the province to revoke licenses issued after 1984 (Horbulyk, 2017).

The **Manitoba** Water Rights Act has gone through several revisions over its lifetime, but its most recent revision came in 2018. The Water Rights Act allows domestic water use up to 25,000 liters a day, without a license (Water Right Act, 2018). The act also ranks the priority of water users as follows, domestic, municipal, agricultural, industrial, irrigation and other water uses (Horbulyk, 2017).

Ontario developed the Water Resources Act in 1990 and it was most recently revised in 2018 (Water Resources Act, 2018). The Water Resources Act focuses on

ground and surface water, as well as sewage disposal (Water Resources Act, 2018). The act also provides for the issue of permits for water use over 50,000 liters of water a day, however, users and uses in place before 1962 generally do not require a licence (Horbulyk, 2017; Water Resources Act, 2018).

Quebec established the Environment Quality Act in 1981 and it is currently undergoing some major modernizations. The Environment Quality Act is the principal act to manage water resources in Quebec. The act requires licensing for surface and groundwater extraction beyond 75,000 liters per day (Horbulyk, 2017). This includes licenses for bottling water, food production and inter-basin transfers (Horbulyk, 2017).

New Brunswick's main water laws are in the Clean Environment Act. The Clean Environment Act was established in 1973 and covers a wide range of environmental concerns (Clean Environment Act, 1982). Under the Clean Environment Act, surface and groundwater extraction require a license for use over 50,000 liters per day (Horbulyk, 2017). Domestic wells not connected to a municipal system do not require a license (Horbulyk, 2017).

The Environment Act of 1995 in **Nova Scotia** is the main act to manage water resources. The Environment Act also encompasses a broad range of other environmental concerns. The act allows surface and groundwater extraction up to 23,000 liters per day without a license and it gives priority to existing licensees over new applications (Horbulyk, 2017).

Prince Edward Island established the Environmental Protection Act in 1988 and it was revised in 2017 (Environmental Protection Act, 2017). The Environmental Protection Act is the main act to regulate water use in Prince Edward Island. Under the Environment Protection Act licenses are required for water use over 45,000 liters per day (Horbulyk, 2017). In the case where environmental health is threatened, the Minister has authority to revoke and deny licenses for water use.

The Water Resources Act was established in 2002 in **Newfoundland and Labrador**. The Water Resources Management Division is responsible for enforcing the regulations in this act (Water Resources Act, 2002). Under the Water Resources Act extractions of surface water, groundwater and water from icebergs all require a license. This act also ranks the priority of water users as follows, domestic, municipal,

agricultural, commercial, institutional/industrial and thermal power generation (Horbulyk, 2017).

The **Yukon Waters Act** was established for the Yukon by the federal government in 1992, and then repealed and replaced by the Yukon territorial government's own Waters Act in 2002-2004 (Waters Act, 2003). The Waters Act founded the Yukon Water Board (Waters Act, 2003). Under the Waters Act domestic users are exempt from water licenses, and most other waters users are exempt from licenses for up to 300,000 liters per day. However, oil and gas water users require a permit for over 100,000 liters per day (Horbulyk, 2017).

The federal government also established a Waters Act for the **Northwest Territories** in 1992 and it was repealed and replaced by territorial legislation in 2014 (Waters Act, 2014). The Northwest Territories also set up a water board known as the Inuvialuit Water Board (Waters Act, 2014). Similar to the Yukon's Waters Act domestic users are exempt from water licenses and surface and groundwater extraction require a license up to 100,000 liters per day (Horbulyk, 2017).

Lastly, **Nunavut** established the Nunavut Water and Nunavut Surface Rights Tribunal in 2002 (Nunavut Water and Nunavut Surface Rights Tribunal, 2017). This tribunal also founded the Nunavut Water Board (Nunavut Water and Nunavut Surface Rights Tribunal, 2017). Under the tribunal domestic users are not subject to licensing (Horbulyk, 2017). Surface and groundwater extraction require a license for up to 50,000 liters per day, but priority goes to "Inuit-owned land" over licensed users (Horbulyk, 2017).

2.2.3. Gaps in Canada's Contemporary Water Management Approaches

Since Canada's establishment in 1867 there have been varying attempts to create national water policy and national water management standards. Most of these attempts have either failed or produced insufficient action. Funds and resources such as the Canada Water Act, Canada Water Act Fund, Federal Water Policy, and Environment Canada have all suffered through highs and lows in support and funding from the federal government. The Canada Water Act and the Federal Water Policy were the largest attempts by the federal government to push a broader national vision for water.

However, these efforts quickly lost traction due to historic natural resource laws, political will, funding, fragmentation and lack of resources.

The idea of a national water vision is not new. The Canada Water Act of 1970 and the Federal Water Policy of 1987 were both attempts to create an overarching vision for water management in Canada. In 2008, the Canadian Water Research Association commissioned a report to outline the benefits of a national water vision (Loe, 2008). In 2009, the Canadian Council of Ministers of the Environment endorsed a small-scale national vision for water (CCME, 2014). This vision included five goals pertaining to climate change, conservation, and ecosystem protection (CCME, 2014). In 2011, the Forum for Leadership on Water (FLOW) toured 16 Canadian cities to share knowledge and discuss the development of a national water vision (Baltutis & Sandford, 2012).

This situation leads one to pose several questions to better understand the underlying gaps in our understanding, as a first step to finding solutions to Canada's water management challenges:

- What jurisdictional level has the greatest potential to effectively respond to Canada's water challenges? What can be perceived or measured as Canada's strengths and weaknesses to address these challenges?
- Considering that there has been significant progress in water management approaches across the world in the past two decades, can Canada learn from other developed countries in formulation of its national water vision? Can the development framework offered through the Sustainable Development Goals (SDGs) (Sustainable Development Goals, 2015) serve to "modernize" Canada's water management approaches?
- Considering some recent successes in engagement of indigenous peoples in formulation of transboundary water sharing agreements, can we identify the ingredients for such successes and foster their broader replication through a national water vision?
- Considering the somewhat chequered history of water management in Canada, can we identify the players and stakeholders at the national level that have been most effective in engaging the public on water challenges? How can their success be replicated?

2.3. Considerations for Canada's Water Vision

2.3.1. Consequences of a Policy Vacuum

National water policy in Canada has struggled to gain traction since the development of the Canada Water Act in 1970 and the subsequent Federal Water Policy in 1987. With little national level guidance, provinces and territories are left to establish and enforce standards for issues such as drinking water, wastewater and groundwater extraction. The absence of a shared national water vision has had adverse effects across Canada including, fragmented management, insufficient monitoring and in some cases duplicated data, not meeting global sustainable development goals, not declaring water as a human right and transboundary water issues. This project explores the effectiveness of national water vision in addressing these adverse impacts, while investigating the process for developing such a vision.

The lack of a national water vision in Canada has indirectly enabled decentralized and fragmented water policy and management (Bakker & Cook, 2011). Without a shared national vision, the federal government has become disengaged and fragmented in dealing with water issues. Within the federal government there are over 20 departments and agencies responsible for freshwater management (ECCC, 2017a). For example, Health Canada is responsible for water quality standards, Global Affairs Canada is responsible for international engagement and Environment and Climate Change Canada is responsible for ecosystem water quality (ECCC, 2017a). Canada's failure to establish a shared national vision has promoted fractured efforts in water management, making it challenging to integrate policies and consolidate information. A national water vision could help alleviate some of this fragmentation by creating a unifying vision that established sustainable and resilient guidelines and standards to encourage better water management.

In the absence of a shared national water vision, Canada has never established federally enforceable drinking water standards for the nation. Canada is the only country in the Organization for Economic Co-operation and Development (OECD) that does not have legally enforceable national drinking water standards (Bakker & Cook, 2011). A survey of OECD countries such as Germany, The Netherlands and the United States shows that a national level vision for water is crucial to successful water governance

(Adeel, 2016). Not only do these OECD nations take a national level approach to water management, they also manage water more effectively than the current fragmented approach in Canada (Adeel, 2016).

Only four out of the 10 provinces adhere to the national drinking water guidelines and less than half of the provinces and territories have created drinking water standards that require “advanced” treatment (Bakker & Cook, 2011). On top of that there is no department in the federal government dedicated strictly to water management, unlike other resources such as fisheries and forestry, making it difficult to enact and enforce new policies.

Canada has also struggled to practice comprehensive water management because water resources are insufficiently monitored and mapped. With no national water vision in place there have been no federal guidelines or standards created for monitoring and mapping water resources. Therefore, monitoring is often duplicated, inadequate or it is not shared effectively (Bakker & cook, 2011). Often, water resource data is not shared because there is no national water resource database in Canada. Over 10 million people in Canada rely on groundwater for drinking water, yet groundwater reserves are poorly mapped across Canada (Bakker & Cook, 2011). This makes it difficult for water managers to calculate for water use and ecosystem health when there is inadequate information or understanding of the resource. If Canada created a national water vision it could develop monitoring standards, encourage monitoring by providing funding and establish a national water resource database.

2.3.2. Intersection of Water and Human Rights

One of Canada’s biggest issues, from the perspectives of service provisioning and human rights, is the large number of boil water advisories across Canada. As of September 2018, there were over 1,100 boil water advisories in Canada (National Water Advisory Map, 2018). Nearly all of these boil water advisories occur in Indigenous and rural communities. Prime Minister Justin Trudeau has vowed to eliminate all boil water advisories by March 2021. Starting in 2016 the federal government committed \$1.8 billion over a five-year period to improve and establish adequate drinking water and wastewater treatment facilities for First Nations communities (The Office of the Parliamentary Budget Officer 2017). However, the Office of the Parliamentary Budget

Officer has reported that the \$1.8 billion budget will only cover 70% of the actual investment needed (The Office of the Parliamentary Budget Officer, 2017).

Without a national water vision or enforceable national drinking water standards, it is difficult for Indigenous communities to engage with various government levels about water issues or to receive the attention they deserve. Developing a national water vision would create a platform to not only work with Indigenous communities to solve water related issues, it would provide a platform for implementing the Truth and Reconciliation Commission's (TRC) recommendations. The Truth and Reconciliation Commission ran from 2008-2015. The TRC was a commission derived from the Indian Residential Schools Settlement (Truth and Reconciliation Commission of Canada, 2015), reached in response to the damage, loss and abuse endured by Indigenous communities and children forced to attend residential schools. The recommendations of the TRC highlight the importance of establishing new relationships in order to foster mutual respect. Heather Castleden et al. (20-17) compellingly define the shift that must occur to integrate Western knowledge and Indigenous Traditional knowledge. They state that Western knowledge must work "by and with rather than in and on Indigenous communities" (Castleden et. al., 2017). If this approach was interwoven throughout a national water vision it could facilitate opportunities for Truth and Reconciliation, and improved access to clean water.

In 2010 the United Nations General Assembly adopted a resolution declaring water as a human right: "the human right to safe drinking water and sanitation is derived from the right to an adequate standard of living and inextricably related to the right to the highest attainable standard of physical and mental health, as well as the right to life and human dignity" (UNGA, 2010-a). The declaration was signed by 122 member states (UNGA, 2010-a). However, Canada abstained from signing this declaration, along with other countries including the United States and United Kingdom (UNGA, 2010-b). This lack of support ostensibly stemmed from concerns that such a declaration would: (a) impinge on Canada's engagement in the North American Free Trade Agreement (NAFTA) and limit any future bulk exports of water to other countries if water was declared a human right (Mitchell, 2017); (b) open the door to many other aspects that may be proposed as human rights (Mitchell, 2017); (c) somehow impinge on Canada's national sovereignty and how resource extraction is conducted (Mitchell, 2017); and, (d) lead to requiring an immediate response to the boil water advisories across Canada

(Mitchell, 2017). The absence of Canada from this UN declaration also aligns with the position that water is not a formal human right under the Canadian Constitution.

2.3.3. Water and the Global Development Agenda

The United Nations 2030 Agenda for Sustainable Development included the creation of 17 Sustainable Development Goals (SDGs) through a UN General Assembly resolution in 2015 (Sustainable Development Goals, 2015). The main focus of these goals is to reduce inequality while encouraging prosperity and protecting the environment. Within the 17 SDGs there are 169 targets with 230 indicators (Sustainable Development Goals, 2010). These indicators are not legally binding, but all member states are expected to participate and take all possible actions to reach the SDGs by 2030. The unique feature of the SDG framework is that it is universally applicable to all countries, unlike its predecessor – the Millennium Development Goals. Such a universal focus should help to ensure that developed countries, including Canada, must also orient their development planning towards the SDG implementation and regularly report back to the UN General Assembly.

The 17 SDGs cover a wide variety of development challenges, ranging from climate action to quality education; 14 of the SDGs are directly connected to water security (Sanford, 2016). This broad-ranging nature of water security demands that Canada must include water security as part of its plans to achieve sustainable development by 2030. Canada has the opportunity to use the SDG framework to improve water policy and assess and prioritize water conservation in multiple sectors. This recognition could help Canada both establish a national water vision and meet SDGs and potentially become a global leader in water management and SDGs.

2.3.4. Transboundary Water Sharing

The lack of a strong national water vision puts Canada at a disadvantage in negotiating management of shared, transboundary water resources with the United States (US). The US is an important partner in trade, and Canada shares twelve major water basins with the United States (IJC, 2018). In order to protect and conserve Canada's water resources and plan for a more sustainable future, it is critical to assess how the US manages its resources and evaluate how Canada could play a role in their

future resource needs. The development of a national water vision would allow the government to set standards for trade and address the potential trade challenges that lie ahead.

2.3.5. Climate Change and Population Growth

Climate change and population growth will exacerbate water management challenges in Canada (Schindler, 2000). Canada's population is expected to grow to 63.5 million people by 2063, (Statistics Canada, 2014) putting added pressure on water resources across the country. Canada should prepare for increased rainfall, triggering floods in some regions, and decreased rainfall, promoting drought in other regions (Chen et. al, 2011). The increase in population together with climate change will significantly impact Canada's water resources unless substantial changes are made to water policy and management approaches. Population growth undoubtedly increases water consumption, but population growth also puts pressure on aging water infrastructure, depletes natural resources and intensifies agricultural production; causing an increase in water pollutants. In the face of climate change and population growth, it is vital for Canada to create a national water vision to protect its water resources in order to provide for current and future generations.

Chapter 3. Methodology

Chapter 3 outlines the approach taken to complete my research. Section 3.1 describes my qualitative research approach. Section 3.2 outlines the interview structure, including interview questions and participant selection. Section 3.3 describes the methods used to collect and analyze the data. Section 3.4 explains the limitations of qualitative research, specifically the limitations related to my research.

3.1. Qualitative Approach

3.1.1. Research description

In order to meet the objectives of this research, I adopted a qualitative approach. The qualitative approach I chose involved writing a literature review and augmenting this literature review by interviewing experts. As a student with limited practical experience working with water law and policy, I used the interviews to expand my knowledge base and better understand the views of respected water experts. Adopting a qualitative approach allowed me to speak with water experts to better understand the intricacies of water law and policy and provide insight into water management across Canada. Taking a qualitative approach allowed me to explore the multifaceted issues related to water management and the interactions between the social, economic and environmental dimensions of water

3.1.2. Definition of an Expert

The definition of an expert varies depending on the field of research. I used the following definition to establish who would be considered an expert for my research. An expert is a person who has specific insights and knowledge because of their professional position and expertise (Flick, 2014). I did not use any other more specific qualifications to define who would be considered an expert because the number of available experts was limited. I did not define expertise by years of experience because I wanted to interview experts with a wide range of experience in the water sector. Additionally, I did not define expert using specific job descriptions as I wanted to

interview experts spanning academia, government, non-government agencies and the private sector.

3.2. Interview Methods

3.2.1. Structured interviews

In order to augment my literature review, I chose to conduct structured interviews. Conducting structured interviews enabled me to keep the conversation on topic and provided clear answers to inform my over-arching research question. Before conducting the interviews, I defined 11 questions to ask each expert (Appendix A). The experts were not given the questions before the interview, they were only given an introduction to my research and the topics that would be discussed. The interviews took from 15-45 minutes. At the end of the 11 questions I provided time for the expert to add any additional comments or questions. All of the interviews were conducted over the phone and recorded, then later transcribed by me.

3.2.2. Participant Selection

The participant selection was based on connections my supervisor has with water experts across Canada. His list of contacts has been developed over years of working across Canada in the water sector. My supervisor provided me with a list of 15 Canadian water policy experts, which I expanded to 27 experts using google and LinkedIn searches. The experts ranged in age, gender and geographic location and included experts from academia, the private sector and non-government (Table 1). I emailed all 27 experts with an outline of my research and expressed my interest in interviewing them. Many of the experts responded to my request; however, several of the interviews fell through due to scheduling conflicts and a lack of response to my emails.

Table 1: Expert Breakdown

	Academic	Non-Government	Private Sector
Number of experts	5	4	1

Before I began conducting the interviews my academic supervisor and I established an expectation of 10-15 interviews. Out of the 27 requests, 10 experts

agreed to participate in an interview. I was unable to interview more than 10 experts due to time and resource constraints.

3.3. Data collection and Analysis

The qualitative data collected for my research included 10 one-on-one interviews. The interviews were conducted from July 2018 – January 2019. Each of the interviews was conducted over the phone and recorded on a digital recorder. The interviews were then transcribed and edited by me. Once I transcribed each interview, I quality checked the transcriptions by re-listening to each interview and comparing it to the transcription.

3.3.1. Thematic Analysis and Coding

Once the interviews were transcribed, I uploaded the transcripts to NVivo qualitative data analysis software. All of the data analysis for my research was completed in NVivo using a thematic coding approach. I began coding the interviews by creating a “node” for each interview question. Next, I went through the interviews and analyzed each answer to every interview question. When I read through each answer, I would highlight excerpts from the answer and assign it to a node under the corresponding interview question node. The nodes represented key themes and ideas that were pulled from the experts’ answers. Once I completed coding each interview, I went through the interviews a second time to review the coding. Reviewing the coding helped me ensure the excerpts were coded to the correct node and there was no overlap between the nodes. This coding process took 3 weeks.

3.3.2. Additional Analysis

In addition to coding the interviews, I examined external information to support the answers given by the experts and expand my knowledge base. This additional analysis included reviewing historic national water policy in Canada, current provincial water policies, global best practices and literature related to sociology and politics. This additional analysis was conducted subsequent to my literature review, which allowed me to augment my literature review and support the information I found during my literature review.

3.4. Additional Related Work

November 9, 2018, I attended and presented and the Canadian Science Policy Conference (CSPC) in Ottawa. In conjunction with a professor from Ryerson University, my supervisor and I organized a Symposium at the CSPC titled “Brainstorming for Canada’s National Water Vision”. The symposium was structured as a panel discussion comprised of water experts from across Canada. The panel discussion was split into two different panels. The first panel served as the foundational panel, focusing their discussion on current national water policies, water management challenges, respecting Indigenous rights and rethinking water management in Canada. A list of takeaways and recommendations was derived from the discussions at the symposium. These discussions also played a role in my research and developing my recommendations. The list of takeaways and recommendations can be found in Appendix B.

3.5. Limitations

As with all research styles and research projects, there are limitations to my research. I recognize the qualitative data collected for this research is subjective and based on expert opinions and experiences. Listed below are some of the limitations of qualitative research and specific limitations of my research.

- Due to the qualitative, conversational style of the interviews, questions were not phrased the exact same to every participant
- I was the only person who interviewed, transcribed and analyzed the data
- Data saturation is subjective
- This research was targeted to a select group of people
- The definition of what constitutes an expert is subjective
- Participants were selected from my supervisor’s contact list, they did not necessarily encompass a broad range of experts
- Only 10 experts participated in the interviews, 10 was the minimum number set by myself and my supervisor
- Interviews occurred over a long period of time due to scheduling issues and a demanding school schedule

- I was unable to interview a wide variety of experts due to time and resource constraints (e.g. government policy workers, Indigenous experts, government scientists etc.)

A wider variety of experts likely would have provided a broader understanding of water resources in Canada and the opportunities and obstacles to creating a national water vision for Canada.

I think the lack of variety and the small number of interviewed experts was one of the largest limitations of my research. Specifically, I was unable to interview any Indigenous experts, which I believe did not allow me to explore all dimensions of a national water vision for Canada. I cannot speak for Indigenous people, but I believe valuable additional perspectives could have resulted from conversations with Indigenous experts. Additional perspectives such as the importance of co-management, self-governance and the role of Indigenous Ecological Knowledge. These additional perspectives would have allowed me to better understand the impact of a national water vision on Indigenous people and helped shape my recommendations to ensure Indigenous perspectives and Truth and Reconciliation were the foundation of a national water vision. In addition to Indigenous experts, I did not engage with elected officials, provincial and federal leaders and scientists. These experts could have also provided valuable contributions to my research.

Chapter 4. Results

In this chapter I present the results from the expert interviews I conducted. The results are organized into five categories: Water Quantity in Canada; Water Conservation and Sustainability; Fragmentation in Water Policy; Creating a National Water Vision for Canada; Stumbling Blocks and Concerns.

4.1. Water Quantity in Canada

In the literature review I found the perception of water quantity in Canada to be a significant stumbling block to creating effective water policy. Therefore, the first two questions I asked each expert pertained to their perception and the public's perception of water quantity in Canada.

4.1.1. How do you perceive water resources in Canada?

The first question I asked each expert pertained to their perception of water quantity in Canada. Five of the experts indicated that Canada is a water rich country. The large percentage of global freshwater residing in Canada and the great lakes were mentioned as reasons to perceive Canada to be a water rich country. One expert explained, "On a population basis we have massive amounts compared to almost anybody else because we have such a small population." Another expert echoed that sentiment by explaining that Canada is water rich, especially when compared to most countries across the world. The only expert to consider the question on a temporal scale stated, "at this point in time [Canada] is a water rich country. Going forward under the changing climate [Canada] will become a water poor country."

The other five experts indicated that Canada is neither water rich nor water poor. Four out of these five experts suggested that location plays a key role in how water quantity is perceived. Two experts highlighted that the majority of the Canadian population lives in the southern reaches of the country and the majority of water is not necessarily located where most people live in Canada. One expert explained that a person living in southern Alberta may have a very different perception than someone living in the Niagara region and that reflects different realities for each individual.

4.1.2. How do Canadians perceive water resources in Canada?

The second question I asked each expert pertained to the public's perception of water quantity in Canada. This question was answered unanimously by the experts. Ten of the experts said that Canadians perceive Canada to be a water rich country. Two of the experts stated that this perception of water wealth is a result of the majority of Canadians having easy and free access to water. One expert highlighted that there is a disconnect between Canadians and their water source, creating a misconception that Canada has plenty of water and that there is little or no need to worry about the resource.

Three experts also argued that Canadians likely don't think about their water supply at all. One expert stated, "I question how much people in Canada even think about this stuff. I think that's probably the result of inherently or actually feeling like [Canada] is water rich." While another expert stated, "I think that the grand public just sees it as, we've got a lot of water, there is really nothing to worry about, nothing to think about." These thoughts were also echoed by another expert who detailed Canadian's actions towards water are unthought, "As much as people would like to think that everybody thinks water is important, it's just not the case. Regardless of how highly people rate water on a scale of things they think are important. When you look at actual behavior, most of it is unthought."

4.2. Water Conservation and Sustainability

To better understand the current state of water management across the country I asked the experts questions regarding water management, sustainability and conservation.

4.2.1. Are current water management practices sustainable?

When asked if current water management practices in Canada are sustainable, all but one expert expressed concern that current water management practices are not sustainable. Four of these experts cited fragmentation as a leading cause of unsustainable water management across Canada. One expert explained, "The problem is water governance is split between federal and provincial governments and to some

extent local governments and of course the emerging role of indigenous governments. So, you have a highly fragmented government model for Canada and water.” Another expert expressed different concerns regarding fragmentation by stating, “What we are doing right now is quite fragmented and water in some way gets lost as you move up to the higher levels of policy.”

Two experts expressed their concern that unsustainable practices have persisted in Canada because creating change in the current political system can be difficult. One expert explained:

“We’ve designed governance arrangements that layer on top of existing governance arrangements and in a lot of places we’ve kind of locked ourselves in around the decisions we made decades or a century ago about how, for example, to share access to water. Entire economies and communities and societies have built up. So, it becomes very politically difficult to make fundamental changes.”

Another expert echoed these challenges by highlighting the downfalls of a short-term political cycle:

“I think political cycles and the way that the system is right now really doesn’t encourage that long term thinking, it’s very much about, ensuring election or re-election and depending on the will of the party there may or may not be a focus on sustainability at all. So, I don’t think what’s happening in Canada right now bodes well for water sustainability in the long term.”

Three experts highlighted that a lack of imminent concern creates unsustainable water management. One expert explained a lack of concern can be seen in Canada’s tendency to be reactive in its approach to water management. Another expert expressed that as long as there is easy access to water, sustainability will not be a concern of Canadians. Experts also cited the absence of a national vision for water, no federal ministry dedicated to water and a lack of education as additional causes of unsustainable water management in Canada.

The only expert that did not explicitly express that water management in Canada is unsustainable, stated that the answer to whether or not water is managed sustainably depends on where you live. The expert gave an example of areas in southern Alberta experiencing water shortages due to high rates of development and urbanization, while areas in northern Alberta experience no water shortages. The expert highlighted that as

urbanization intensifies the need to practice sustainable water management practices will only increase.

4.2.2. Do current laws and practices promote conservation in Canada?

To better understand the laws and practices affecting water conservation in Canada, I asked each expert if they believe current water laws and practices promote conservation in Canada. All but one of the experts agreed that water policies and practices do not promote conservation. The experts cited a lack of appropriate pricing for water as the main reason water is not conserved in Canada. Five experts highlighted that the majority of Canadians do not have metered water supply and therefore there is no motivation to conserve water. One expert expressed, “there is simply an attitude that water is a free good. It’s not something that needs to be used sparingly such as oil and gas for example, which has a price to it, so wasting [water] does not seem to be a problem morally.” One expert raised the concern that even when Canadians are metered, they usually do not pay the appropriate price: “[Canadians] don’t realize how it takes a lot of energy and resources to collect water, to treat it, to distribute it and by and large people are not paying the real cost of that water.”

Experts also cited several additional reasons for a lack of water conservation in Canada. These reasons included a disconnect between Canadians and their water source; Canada being one of the most wasteful countries in the world; and the absence of imminent concern. The only expert who did not agree with the other experts about whether water laws and practices promote conservation, highlighted that it depends where you live if policies and practices promote water conservation. This particular expert was from Ontario and said that she was accustomed to houses being metered to promote water conservation. When she learned that parts of Ontario and the majority of Canada are not metered, she found it “very surprising” and “ridiculous.”

4.3. Fragmentation

A key theme that emerged repeatedly in my literature review was the impact of fragmentation on water management. Fragmentation of water policy emerged as key downfall of historic national water policy in Canada. To understand how this problem of

fragmentation came to be and how Canada can mitigate fragmentation, I asked the experts the following questions.

4.3.1. Does the constitutional framing of natural resource rights affect the way water is managed Canada?

All of the experts expressed that the constitutional framing of natural resource rights (i.e. water rights) has impacted the way water is managed. The constitutional framing of natural resource rights has resulted in fragmentation. One expert succinctly explained that fragmentation arises from the constitutional allocation of natural resource rights, “When you assign rights and responsibilities to provinces to manage water resources, that results, to some extent, in fragmentation around how water is managed across the country.” Other experts detailed how the allocation of water rights to provinces and territories has created varying approaches to water management. Two experts expressed their concern that the constitutional framing on water rights has allowed different levels of governments to pass the buck on water responsibilities. One expert voiced this concern by stating, “Is it an ideal system? No, and when things fall apart is when you face challenges, suddenly it becomes nobody’s business. The federal government kicks the ball to the provinces, the provinces kicks the ball to municipalities.”

One expert expressed his concern regarding the many facets of fragmentation in Canadian water management. Fragmentation does not just occur between provinces and territories but within provinces and territories. He also highlighted the barriers fragmentation creates:

“The splitting up of responsibilities and just political boundaries have a huge impact on how decisions are made and even within the government on the way that responsibilities are spread across many different departments, without central coordination. It’s challenging, it’s not just the federal and provincial government, even within the federal government water is spread out across so many different departments, in so many different ways, that trying to get a holistic picture of things and to try to influence things in a more holistic basis, is challenging.”

Another expert agreed that the constitutional framing of natural resource rights has impacted the way water is managed but provided insight into past success within the Canada Water Act, 1968.

“The Canada Water Act gave the federal government a stewardship over water. There was still a recognition of constitutional powers of the provinces, but the Canada Water Act of 1968 allowed the federal government to step in and work collaborative with the provinces on major water planning and allocation analysis. But that paramountcy of federal role has simply withered over the years, in my opinion and it needs to be resurrected at some stage.”

Even though each expert expressed that the constitutional framing of natural resource rights has affected the way water is managed, two experts discussed that there isn't necessarily a better constitutional approach. One expert explained:

“We've created this quirky federation [in Canada]. Some people think the answer is to play around with [constitutional rights] and I think that is generally a waste of time because no matter what system you settle on it's always going to be problematic. The problem is the disconnect of water from the other major sectors of decision making. It has nothing to do with the constitution or how we've organized water, it's how we've organized society. So, frankly any system can be made to work if people just make the effort to make it work. So, I am a lot less fussed about how the feds and provinces have organized stuff, it's just mechanics, those are all solvable problems.”

Another expert highlighted that it is not only Canada grappling with these issues, most of the world struggles to find effective water governance structures.

“The whole world has inappropriate water authority structures because until the end point of the last century we were living in a planet with 2 billion people. You know 2 billion people found that they could get along on traditional amounts of water fairly well. When you jump that up, even just the jump up that has been in Canada, and then you make everyone wealthier and having more appetite for everything that takes water to create.”

4.3.2. How do we mitigate the challenges of fragmentation associated with the constitutional framing of natural resource rights?

All of the water experts agreed that the constitutional framing of natural resource rights has affected the way water is managed and three experts expressed that it has created a fragmented approach to water management. The question now is, how does Canada mitigate this fragmentation? Each expert provided their thoughts on how to combat fragmentation. The experts' ideas ranged from easily implementable strategies to difficult national-level shifts. Some of the most frequently repeated ideas included collaborative processes, a unified vision and a new approach to water management.

Four of the experts cited collaboration as a tool to minimize fragmentation and foster better water management. One expert explained:

“I see the need for greater collaborative process on lots of things. And I think water is definitely one of those categories where you think national roundtable, you think that sort of approach, that it is needed to be brought more to the forefront and something that is worked on collaboratively between levels of government. To understand the issues and the responsibilities, where the responsibility lies and how to manage them.”

A different expert recognized the importance of collaboration not only between municipal, provincial, territorial and federal government but also the inclusion of First Nation government. The expert stated, “Aboriginal rights need to have bigger roles and respect and then integrating aboriginal water management and those practices are certainly important.” Another expert took collaboration to a new level, including the private sector and other industries that may not typically be considered when thinking about water management:

“There is a whole bunch of things we could do but sometimes they don’t only involve the provincial and federal government. For example, the flooding issue, probably to get to a sustainable solution there, we would probably have to involve the insurance industry, to a large extent. So, sometimes it’s not just provincial and federal its other sectors of the economy as well.”

In response to this specific question four experts expressed that Canada should have a unifying vision or a brand-new approach to water management to mitigate the impacts of fragmentation. Two experts cited a unified vision as a key factor to reduce fragmentation. One of these experts stated that a unified vision is necessary but admitted he doesn’t know how Canada can get there, “I don’t know how to get there, but a unifying vision and a holistic approach has got to be a part of the path.” The other of these experts supported the idea of a national strategy and also detailed several components that would need to be included in the strategy.

“Going forward a new water management strategy should include sustainability of water, conservation of water but also source protection, the watershed, efficiency of treatment and also precautionary management, not precautionary concern, but all of these things should be part of it. Efficiency, sustainability, respect for aboriginal rights, those I think would be the key in going forward.”

Two experts provided examples of more profound change that could be made in the way Canada manages water. The first approach involves completely changing the configuration of Canada, and this expert suggested that in the future, in the face of climate change, that could be a real possibility:

“We definitely have to focus at a watershed level, rather than across political lines. I don’t know where it was, in the 80s or something, I think New Zealand went bankrupt and they redefined their provinces based on watersheds. Obviously, it would be a big change, but the more things can move towards aligned with watershed approach the better.”

The second approach involves the water sector taking control of its own fate and creating a new appreciation and understating of water throughout all sectors.

“Water as a sector, needs to find ways to clarify how water is material to other people. If I want the energy policy community to recognize how water outcomes matter for them, I need to understand what the energy people are after so I can see that connection to water. So, I think we have done a remarkably bad job at that as a sector. But I think we are going to continue doing and being and getting the outcomes we have now if we keep doing what we are doing. So, for me the key is how do we get a better understanding of how water is material for other priorities and other objectives.”

Even though revamping the way Canada manages water, either using a unified approach or completely reworking the way Canada manages water, will be a difficult task it is clear the experts see room for improvement and innovation to reduce fragmentation.

One expert provided an interesting perspective on fragmentation that none of the other experts touched on. The expert agreed the allocation of natural resource rights in Canada has created fragmentation in the way water is managed. However, the expert highlighted that the allocation of rights to provinces and territories allows them to manage water and create laws that make sense for their context. The expert explained:

“I know that these allocations need to be made and you know, the idea that natural resources should be managed at the lowest level makes sense, that subsidiarity principle is one that makes good sense. It is important to be sensitive or accommodate to local context and what works in one place might not work in another and understanding that every water shed is different.”

Even though almost every expert criticized the fragmentation that has risen from the constitutional framing of natural resource rights, one expert indicated that the allocation

of natural resources rights does have some positive impact on the way provinces and territories manage their natural resources.

4.4. Creating a National Water Vision for Canada

As a graduate student with minimal experience working in the water sector, I wanted to know what experts thought of the creation of a national water vision for Canada. Because the experts have held leadership roles in the water sector, they hold knowledge on what hasn't worked in the past and what currently works. They also have the expertise to make predictions about what could work in the future. The experts provided a variety of thoughts and positions on the creation a national water vision.

4.4.1. Do you think Canada should have a shared national vision for water?

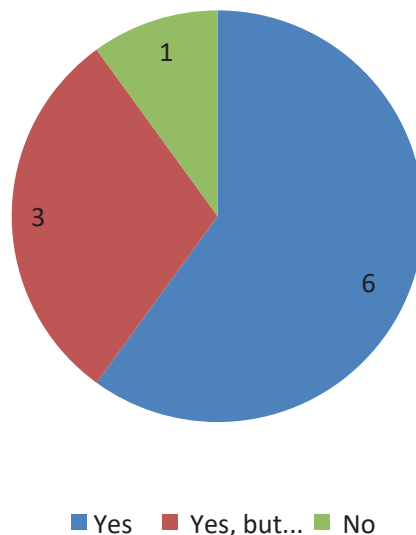
This question is the very foundation of this research. It is the first question I posed to myself when I began my research and it is the question I was most interested in asking the experts. Six of the experts stated that Canada should have a national vision, three of the experts stated Canada should have a national water vision but had serious reservations about the vision and its content, while one expert expressed there is no need for a national water vision in Canada (Figure 1).

Of the six experts who supported a national water vision, one stated "As a country you are always better off at any level to have a shared and agreed vision" and another said "I think without a vision of where you want to go, people can't effectively align their decisions with a direction." But all six of these experts also expressed concern regarding how difficult it would be to develop and implement a vision. One expert expressed his concern that provinces across Canada have very different needs and challenges when it comes to water, "[A vision] will be difficult to craft because there are different issues across the country from the Maritimes through Quebec and Ontario, certainly the prairies and BC so it will be not an easy task to do." Another expert admitted a nation water vision will come with challenges but remained hopeful about the continued momentum for a national water vision across the country.

"There have been calls for that for a really long time. I think it's not something that would surprise anyone. You know a lot of researchers in

Canada are thinking about this. A lot of people elsewhere in the world have been thinking about this and implementing it and I think there are some really interesting ideas in other places that we can draw from as Canadians... I think change of this kind can be challenging, it's obviously been challenging to get enough force behind this idea of a water vision or water strategy and so hopefully we continue to make some progress on that. But I think that there has been a ton of really good arguments for it and it's kind of a no brainer in a way."

Figure 1: Should Canada Have a Shared National Vision for Water?



Other experts were not as confident that Canada should have a national water vision. Three of the experts had serious reservations about the development and implementation of a national water vision. The first of these experts voiced his thoughts that Canada should have a national water vision but he doesn't think Canada needs a new vision, "I don't think there is any need for a new federal water policy, the one that is there is pretty good it just needs to be implemented and supported by the federal government." The second of these experts proposed the idea of a national statement for water rather than a vision. This expert discussed that a vision would be too prescriptive, whereas, a statement would allow governments to work within their local context. This expert stated:

"[A shared vision] would be nice, but it would be at the level of we should all be good. It's difficult to imagine, but not impossible. I think it would be useful to have a statement of water, but I don't think that it's going to happen. It's not perceived to be a problem in Canada, the general perception is that, if anything, there is an oversupply, a wealth of water and so therefore, a government does not come along and open

up a bunch of potentially conflict causing areas if there is not a problem to be solved.”

The third expert expressed support for a coherent vision but in the end he voiced his opinion that collaboration is extremely difficult, and that he sees no benefit in provinces, territories and the federal government trying to collaborate when there are no clear benefits to all parties involved. This expert provided an example of when collaboration would have clearly benefited all parties involved:

“In 1964, when all the provinces and Health Canada could’ve slapped their foreheads together and said jeepers creepers, we are all individually making these drinking water quality standards, so we are all individually doing the same thing.”

All three of these experts expressed reservations about the development of a national water vision. However, all three of these experts still feel that Canada would benefit from a shared water vision.

Last, there was one expert that did not agree with the other experts about a national water vision. This expert voiced his opinion that a national water vision would have to be so broad it would be useless:

“Water touches on everything, if you tried to get a water policy, if you treat water as an issue and try to get a water policy, it would be, if you ever got there, which is doubtful, it would be so general it would be useless.”

4.4.2. If you were to create a national water vision what principles would you include?

This was a fairly open-ended question, many of the experts provided several answers while others only provided one or two answers. Some of the experts provided specific policies while others provided broad principles. The following is a list of the principles that were mentioned in the interviews. The list is ordered from most frequently mentioned to least frequently mentioned.

- Collaboration
- Improved science, monitoring and enforcement
- Recognition of First Nations rights

- Resiliency
- Respect for ecological functions
- Sustainability
- Water conservation
- Water pricing
- Performance metrics
- Adaptation to climate change
- Affordability

Six out of the 10 experts cited collaboration as a key principle that should be included in a national water vision. The types of collaboration mentioned included collaboration between the private sector and the government, between provincial/territorial governments and the federal government and inter-provincial/territorial collaboration. The second most mentioned principle was the idea of improved science, monitoring and enforcement. One expert stated, “There needs to be a lot better monitoring and coordination of monitoring in terms of where we are and there needs to be a lot better enforcement and management.” Another expert agreed with the need for improved monitoring especially in the face of climate change. The expert stated, “[We need to] make sure the science and monitoring systems are compatible with monitoring change so that as the climate and hydrology changes we can adapt our activities to that witnessed change.” The third most mentioned principle was First Nations rights. Experts who cited the importance of recognizing First Nations rights emphasized the importance of equity and inclusion of First Nations communities in decision making.

4.4.3. What are the first steps to creating a national water vision?

This was another open-ended question in which experts provided a wide variety of answers. Listed below are the answers from most frequently mentioned to least.

- Collaboration
- Leadership from Federal government
- Interdisciplinary dialogue

- Public engagement
- Tackle individual issues
- Think tank
- Understand scientific literature
- Use old Federal Water Policy as framework
- Use best practices from other countries

Again, collaboration emerged as a key theme. Interestingly, collaboration was followed by leadership from the federal government. The top answers identify two somewhat conflicting ideas in that there needs to be collaboration, which denotes a more grassroots approach to management, but there also needs to federal leadership and oversight, which denotes more of a top-down approach to management. One expert expressed the need for the federal government to take action but also recognized there are other outside factors at play. This expert stated:

“At some stage, I think the federal government has to reach out and I’m not sure the timing is absolutely right, right now. There are a lot of stresses and strains in federal and provincial relations around climate, carbon taxes and that tends to throw off a well-meaning approach to water management.”

Surprisingly, very few experts were able to give specific tangible steps to begin a national water vision. Most of the responses were vague and broad and few of the experts’ responses aligned with one another.

4.5. Concerns and Stumbling Blocks

The next two questions are crucial to understand how to develop and implement a national water vision in Canada. Understanding the biggest concerns for water in Canada can help inform the principles and standards to be included in national level vision. In addition, recognizing the stumbling blocks to creating a national level vision will help determine the feasibility of a national water vision and highlight areas for planning and mitigation.

4.5.1. What are your three biggest concerns for water resources?

Living in British Columbia for the majority of my life, I have a narrow understanding of the threats and concerns impacting water across the country. In order to gain a better understanding of these issues, I asked each expert what they believe are the 3 biggest concerns for water resources. Listed below are the experts' answers from most frequently mentioned to least.

- Water quality
- Climate change
- First Nations rights
- Water quantity
- Lack of water planning
- Infrastructure
- Fragmentation
- Undervaluing water
- Development

Seven out of the 10 experts stated water quality as one of the three biggest concerns for water in Canada. The experts cited several different concerns affecting water quality, including, mercury, agricultural runoff, toxic chemicals, endocrine disruptors and poor drinking water quality in Indigenous and northern communities. Additionally, 7 out of 10 experts stated climate change as one of the three biggest concerns for water in Canada. Experts expressed their concern over climate change and its impact on the hydrological cycle. One expert stated, "The biggest threat by far, is what I call global environmental change. The combination of climatic change related to hydrologic change and the increasing loss of biodiversity and resilience of watersheds to accommodate or adapt to that change." Another expert highlighted the potential impacts of climate change and the need to change governance arrangements to mitigate the impacts of climate change:

"I'd say increasing climatic variability, we built a system on the assumption that the past will be a reasonably good predictor of the future and it's worked very well for us but that all goes out the window

with climate change. So, I think that is a significant challenge that we have to get our heads around because most of the governance arrangements that were using are grounded in the assumption of stationarity, that we can look at the past and know the future.”

4.5.2. What are the biggest stumbling blocks to creating a national water vision?

Nine of the 10 experts stated that Canada should have a national water vision, but all of the experts indicated there are numerous challenges to creating a national water vision. These range from major systematic changes to minor issues. Listed below are the experts’ answers from most frequently mentioned to least.

- Fragmentation
- No political will or leadership
- Lack of awareness/urgency/care
- Getting people to collaborate
- Costs money
- Difficult to know who to engage
- Political cycles
- Change takes time
- Emotions are involved
- Recognition of First Nations water issues
- Lack of data
- A vision would not be useful

There was a wide variety of answers to this question, ranging from no political will or leadership to a lack of data. One expert highlighted the difference between minor challenges and systemic challenges:

“There are things that can be done somewhat in an easy way, if the willingness is there and the resources are there such as protection of water supply, improving the efficiency, improving the sustainability etc. but when it comes to sharing the responsibilities between different governments and territories then that gets very complex.”

Chapter 5. Discussion

National level guidance for water management in Canada is not a new idea. The literature highlights several historic attempts to create and implement national strategies, acts and policies to establish a centralized and shared approach for water. These efforts suggest there is an appetite and a need for a national water vision in Canada.

Additionally, the experts' responses indicate that Canada should be working toward a progressive and proactive solution in the face of climate change, population growth and ecosystem degradation. The literature and almost every interviewed expert supports the creation of a national water vision in Canada. However, several of the experts and some of the literature highlight major concerns and considerations that need to be addressed in order to create a vision that works for Canada. In this section three key themes that emerged from the literature will be discussed and compared with the results of the interviews. These three themes are: fragmentation in water management, the need for a national vision and the concerns and stumbling blocks to creating a national level vision.

5.1. Fragmentation

Repeatedly in the literature and interviews the problem of fragmentation was raised as a key issue in Canadian water management. After completing the interviews, it became clear to me that fragmentation in Canadian water management can be defined in several different ways. Fragmentation can be defined as the different approaches to water management between provinces. For example, Ontario has different laws related to water than the Northwest Territories, which influences the way water is monitored, data are collected and the types of conservation efforts that are implemented in each province and territory. Fragmentation can also mean the dispersal of water management within government structures, such as multiple ministries being responsible for managing water. Last, fragmentation can also mean the division of water rights between levels of government (local, provincial, federal and First Nations). All of these types of fragmentation persist in Canada and have created an inconsistent and inefficient approach to water management (Bakker & Cook, 2011).

The interviews and literature review both indicate that fragmentation in Canadian water management can largely be attributed to the constitutional framing of natural

resource rights. The majority of experts expressed that the allocation of natural resource rights has created a fragmented approach to water management in Canada. This idea that the constitution has had a negative impact on the way water is managed, is echoed in the literature (Bakker & Cook, 2011; Booth & Quinn, 1995; Bruce & Mitchell, 1995). It is easy to see that the constitutional framing of natural resource rights has created fragmentation. However, for many reasons, including the impracticality of amending the constitution, it is unreasonable to discuss amending the constitution to minimize fragmentation in water management. Therefore, Canada needs to work within its constitutional framing of natural resource rights to find innovative and collaborative solutions.

In the interviews, experts expressed several ideas and strategies to minimize fragmentation. One strategy that was mentioned frequently was the concept of collaboration. Experts highlighted the importance of collaboration, not only to reduce fragmentation but in the development of a national water vision. The experts' responses indicated there is insufficient collaboration in the water sector in Canada. One expert stressed that collaboration on water issues may not be as easy as it seems, due to inter-provincial/territorial quarrels over other natural resources or even unrelated political issues. Another expert expressed the idea that collaboration can be difficult because it is not always clear who should be included in the discussion or too many people get included. However, it is clear that collaboration needs to be employed in the development of a national water vision and the concept of collaboration needs to be a key guiding principle of a national water vision for Canada.

Another strategy, shared by the experts, was the implementation of new approaches to reduce fragmentation. Three experts discussed different approaches to create more efficient laws and management practices. One expert hypothetically discussed aligning provincial and territorial boundaries to better reflect watershed boundaries to enable more practical laws and efficient management. Another expert emphasized the importance of understanding how the general public sees and understands water. This expert said that if Canadians step outside of their political boxes and think about how water impacts their health and well-being, that Canadians can come together to create solutions that are based on people's desire to be happy and healthy rather than politics. Similarly, the last expert highlighted the importance of understanding how water is important to other sectors. This expert discussed the need

to understand how water materializes in the energy sector, transportation sector, education sector, etc. The expert expressed that once it is understood how water is material for other priorities and objectives that laws and regulations can be made to ensure buy-in from all sectors. These three approaches indicate there is a need for innovation, engagement and collaboration in the Canadian water sector. The development of a water vision for Canada would be an excellent opportunity to discuss and implement new ways of managing water.

5.2. The Need for a National Vision

During the expert interviews, nine out of 10 experts stated that Canada should have a national water vision. When you consider the wide range of experience, expertise and location of the experts, this high level of agreement is notable. This suggests that there is not only the desire to have a national water vision but there is a true need for a national water vision in Canada. The extensive list of literature pertaining to this subject and the expert panel from the CSPC indicate there are many other experts, outside of my interviews, who strongly believe Canada needs national level guidance for water. The interviews, panel discussion and literature revealed a long list of reasons why Canada needs a national water vision, these reasons will be discussed further in this section.

The most fundamental reason Canada needs a national water vision is to mitigate fragmentation caused by the constitutional framing of natural resource rights. The constitutional framing of natural resource rights has enabled provinces and territories to create water laws, regulations and management practices that do not align with one another, creating inconsistent and inefficient approaches to water management (Bakker & Cook, 2011). The interview results indicate that fragmentation is one of the biggest concerns for water resources in Canada and was the most frequently identified stumbling block to creating a national water vision. These concerns expressed by the experts underscore the need to mitigate fragmentation in Canadian water management. One way to mitigate fragmentation is to create a unifying vision that understands and meets the needs of each province and territory. At its very core, a national water vision is intended to bring together experts, share new ideas, create innovative solutions and inspire new ways of thinking. A national water vision for Canada should include best practices, guidelines and recommendations, which would reduce fragmentation and

increase efficiency across the country. A national water vision should also establish standards for contemporary issues such as groundwater extraction, surface water contaminants, and bulk water exports.

Another reason Canada needs a national water vision is to bring water to the forefront of Canadian natural resources. Issues surrounding other natural resources such as oil, lumber and natural gas are at the forefront of national conversations and debates, while water, which is integral to the production of other natural resources, is rarely the topic of national conversations. The creation and implementation of a national water vision would help put water in the national spotlight and create dialogue regarding the integral role water plays in the livelihoods of Canadians. Bringing water to the forefront of national conversation might also bring water to the forefront of public opinion in Canada. Two of the interviewed experts expressed their concern that the average Canadian rarely thinks about water let alone makes extra effort to conserve water. The creation of a national water vision could provide opportunities to engage, ask questions and educate the public about where their water comes from and the role they play in the protection of their water source.

The need for a national water vision intersects all sectors. For example, in the public sector, provincial and territorial governments fail to fully implement water laws and regulations due to a lack of resources and understanding of the resource (Lui, 2016; Westcott, 2018). The private sector's innovation is potentially stifled due to varying water laws and regulations across the country, which necessitate repetitive and duplicated approval processes for new technologies. Companies continue to pollute, contaminate and overexploit water resources which impacts Canadians' access to clean drinking water and Canada's freshwater ecosystems (Egan, 2015; King, 2018; Williams, 2019). Current laws and practices have allowed these issues, and other water related issues, to develop and persist across the country. These types of problems should be addressed in a national water vision. Guidelines, standards and best practices should be built-in into a national vision to provide guidance and help provinces and territories solve their water challenges. However, it isn't as simple as creating guidelines, standards and best practices, a national water vision should also include funding opportunities, leadership, peer support and training opportunities. A national vision should create a centralized system for water quality and quantity to promote credible, comparable and sharable data and information (Water Quality Task Group, 2006). A

national water vision also needs to be multifaceted yet flexible to ensure the needs of each province and territory are met, as well as the private sector and other forms of government (De Loe, 2009)

Last, Canada needs a unified and shared vision to inspire change and a new way of managing water, as Canadian water management practices are reactive and complacent (Sanford, 2012). Few provinces or territories have forward thinking or innovative water laws and regulations. These outdated and sometimes unsustainable water laws and regulations can result in permanent damage to watersheds and can be difficult to reverse once put in place. Therefore, a national water vision should be implemented as soon as possible to provide national level guidance on contemporary water issues and provide a platform for new sustainable water practices. For example, a national water vision can include guidance on virtual water trade, green infrastructure, greywater systems and improved irrigation that align with the UN's SDGs. Guidance on these topics would potentially encourage provinces and territories to implement water laws, regulations and policies that better reflect contemporary knowledge and practices. The development of a national water vision could also provide a platform for collaboration between not only provinces and territories but the private sector, other forms of government and non-profits. Collaboration was a key theme in the expert interviews and an obvious area for improvement in the water sector. A national water vision could bring together a wide variety of experts to share data, information and best practices to create real change in the way water is managed.

5.3. Concerns and Stumbling Blocks to Creating a National Vision

The creation, enforcement and lasting implementation of a national water vision comes with many stumbling blocks. These stumbling blocks range from the political will of governments to the public's perception of water resources. Creating any kind of vision or strategy at the national level can be difficult, as it seeks to satisfy the needs of an entire country. Previous policy-formulation efforts like the Canada Water Act and the Federal Water Policy highlight some of these challenges. Conversely, these efforts can also serve as the foundation of a new visioning process.

One of Canada's greatest stumbling blocks to creating a national water vision is its federalist approach to governing water resources. This approach makes it difficult for the federal government to participate in water management and to know when it is appropriate to intervene in water management issues (Saunders, 2014). Due to the allocation of natural resource rights under the Canadian Constitution, provinces and territories are sensitive to the intrusion of the federal government (Mitchell, 2017).

Another stumbling block to creating a national water vision is the major discrepancies in each province's and territory's approach to water management. Since provinces and territories have historically been left to establish their own water management practices, it has produced varying approaches. For example, most cities in Ontario use water metering as a tool to assess fees for water services and promote conservation, while only a few cities in British Columbia use water metering. This kind of fragmentation makes it difficult to define a unified vision because provinces and territories have the right to establish and enforce their own water management strategies, such as drinking water standards, provisioning and groundwater extraction. Another internal stumbling block to creating a national water vision is that water does not have its own "sector" or ministry in the federal government. Without a dedicated institutional home in the federal government it may be difficult to build capacity, gain funding, maintain resources and enforce policies for a national water vision.

Extraneous factors also create major stumbling blocks for a national water vision. Political will is a key factor that could affect the development of a national water policy, or any policy for that matter. If elected government officials do not see the benefit or the public support for a new policy or project, they will not advocate for it. The government's support or lack thereof can also affect funding for research and projects, pushing certain agendas over others. The short political cycle of governments can also cause a shift in what projects and policies are supported.

Another major challenge facing the development of a national water vision is how Canadians use and view water resources. On average, Canadians consume 329 liters per capita per day (Brooks, et al., 2011). This is the second highest rate in the world, after the United States at 383 liters per capita per day (Brooks, et al., 2011). This high rate of consumption suggests that Canadians are not concerned about the depletion of water resources. According to the Canadian Water Attitudes Study, 80% of Canadians

believe Canada has enough freshwater to meet long term needs (RBC, 2017). This perceived abundance of water tends to wrongfully minimize and mask the shortcomings of Canadian water management.

The Canadian Water Attitudes study also found that only 6% of Canadians say they put extra effort into saving water and only 50% of Canadians say they have an adequate understanding of the impact of climate change on water availability and quality (RBC, 2017). Additionally, 45% of Canadians believe water is Canada's most important natural resource and 50% believe water is an important part of Canada's national identity (RBC, 2017). These findings clearly indicate Canadians value water as one of the nation's most important natural resources, and that water plays a central role in Canada's national identity. However, they also highlight Canadian's nonchalant attitude towards current and future water challenges. The disconnect between the thoughts and actions of Canadians illustrate the need for education and creation of a national dialogue around water.

More than 30 years after the creation of the Federal Water Policy, Canada is still struggling with water management challenges. The creation of a national water vision would provide an opportunity to address these water-related issues and manage water resources more sustainably.

5.3.1. Public Perception

One of the key stumbling blocks, mentioned by almost every expert in this research, was the concern that the public and elected officials do not see water as a pertinent issue. This means water is left out of key political discussions and is pushed to the back, or out, of Canadian's minds. For many people in Canada, water does not create imminent concern or cause for action. The average Canadian and elected officials appear to be content with status quo and maintaining unsustainable practices. Two of the experts I interviewed indicated this is likely because water has little direct impact on an individual until they experience a major crisis, such as a flood or a drinking water advisory. Several experts and the literature characterize Canada as a reactive nation when it comes to not only water management, but management of other natural resources. Another expert attributed this lack of concern to Canadians becoming more and more detached from their watersheds and not understanding the significant role they

play in water stewardship. Either way, this false sense of security has allowed Canadians to become complacent. The sit back and wait approach, currently employed by Canada, is not a progressive or sustainable approach to water management.

Another hurdle that contributes to Canadian's false sense of water security is the perception that Canada has an abundance of water. The results from the expert interviews show that 100% of the experts expressed that the public perceives Canada to be a water rich country. These results are echoed in the Water Attitudes Survey conducted by RBC. The RBC survey found 80% of Canadians believe Canada has enough freshwater to meet long term needs (RBC, 2017). These results highlight the perception of water abundance in Canada and the perceived sustainability of current practices. When the majority of Canadians believe there is enough water to meet long-term needs, they will use the resource as if there is more than enough to go around. This mentality leads to the overuse and abuse of water in Canada.

The way the public perceives water resources in Canada is a large hurdle; not only in the creation of a national water vision but also to ensure water is a valued resource in Canada. In order to ensure water is valued and to create a national water vision that is effective, is important to understand how the public perceives, understands and interacts with water. When we understand how the public engages with water we can create policies that encourage or discourage certain behaviors. Ultimately, it does not matter what experts or the scientific community think, if the general public does not understand or appreciate water, progress will be difficult.

There are several approaches to combat the misperceptions of water in Canada and almost all of them involve education and outreach. Education and outreach are opportunities to provide the public with real data and scientific facts to help them understand the laws and regulations that govern water and how and why decisions are made. The government needs to promote sustainable water management practices, water conservation and a comprehensive understanding of the resource based on scientific data. This can be achieved in a variety of different ways such as, offering watershed tours, social media pages, media campaigns, surveys/interviews with the public and experts, and providing educational opportunities on a variety of topics such as groundwater extraction, the impact of climate change on water, watershed management, fisheries management and citizen science projects. Providing the public with knowledge

and information will hopefully foster a better understanding of the resource and promote more sustainable practices.

The United States has made significant strides towards unified and national level water management, including the Clean Water Act and Water Resources Planning Act (Adeel, 2016). These acts have yet to be fully implemented but much of the advancement in the United States can be attributed to the public's growing concern for conservation and the environment (Adeel, 2016). Across all sectors, the United States has made progress towards governance structures that support transparency, accountability and public participation in government decision making (Adeel, 2016). This shift towards public inclusion helps to ensure that policies will reflect the needs of the public and also engages and educates the public in a new way. The inclusion and education of the public is a key step in the development of a successful national water vision.

5.3.2. A vision won't make a difference

A stumbling block that was raised by two experts in my research, but not in the literature, was the concern that a national water vision would have little impact on the way water is managed. The experts presented several legitimate arguments as to why a national water vision may not have the profound impact it is intended to have.

Two experts expressed their concern that a national level vision would have to be extremely high-level due to the large scope of issues related to water and the vast difference in water issues across the country. These two experts were also concerned that creating a high-level vision would be relatively useless because the vision would have to be so broad and general to accommodate the needs of each province and territory that no meaningful change could be made. Furthermore, one of the two experts discussed the possibility of a national water vision being a single statement that essentially states all provinces and territories should manage water well. These two experts presented a provoking argument, but a national water vision does not have to be high-level and broad, and it also does not have to address every water issue in every province and territory. The purpose of a national water vision is to establish standards and principles to encourage more sustainable water management. Therefore, a national water vision will not be broad or high-level, instead it will provide specific standards and

principles to allow provinces and territories to work within their means and circumstances.

Other experts expressed different concerns related to the effectiveness of a national water vision. One expert stated their concern about the enforcement of a national water vision. This expert said that under the current constitutional framing, a national water vision would not be enforceable and therefore no province or territory would be obliged to follow a water vision. Another issue echoed by three of the experts was the concern that provinces and territories already struggle to get along on issues related to other natural resources. Therefore, creating a national water vision would either create more division between provinces and territories or the vision would not have the support of all provinces and territories and result in no meaningful change.

These were all valid concerns raised by the experts, especially considering the failed previous attempts at national level strategies and policies for water in Canada. However, these concerns should not be used as an excuse to allow fragmented and ineffective laws and regulations to persist across Canada. There are solutions and approaches that can be used to combat these concerns. One of the main strategies to ensure there is buy-in from all provinces and territories is to use a collaborative approach in creating and writing the vision. In the interviews collaboration emerged as a key theme. A collaborative approach would ensure affected entities have a say in the way a national water vision is developed and what it includes. Yes, it is difficult to ensure all voices are heard but if the vision is crafted carefully and meaningfully it can include the concerns of everyone.

In response to the concerns regarding enforceability, a national water vision for Canada does not have to be enforceable. Instead, a national water vision can bring together innovative solutions and new ways of thinking to encourage better water management. To gain support from provinces and territories, a national water vision should be centred on ensuring access to adequate and clean water for all Canadians now and into future. Additionally, it would be futile to create a vision that is not implementable across the country. This is why a national water vision needs to be carefully crafted to set out standards, guidelines and best practices that are implementable and achievable across the country. Eventually, these standards and best

practices will become the new norm and provinces and territories will use these standards and best practices in the development of future water laws and policies.

The absence of a national water vision and the lack of cooperation and coordination on water related issues highlight the underlying need for innovation and change in the way Canada approaches water management. Some experts may feel that a national water vision will have no impact on the way water is managed. However, several countries across the world have successfully implemented national policies and national governance structures that have created a more cohesive and improved approach to water management. For example, in 1988 Brazil's constitution instituted a two-tier governance structure to align with a watershed level approach (Adeel, 2016). This governance structure allowed for the future development of a national level policy and national water management system, which helped Brazil make fundamental changes in the way water is managed. If other countries around the world have implemented effective national level policies and innovative governance structures, Canada should be able to shift towards a unified approach to water and successfully implement an effective national water vision.

5.3.3. Politics, time and money

Politics, time and money were identified by interviewed experts as critical factors to consider in developing a national water vision. When asked what are the biggest stumbling blocks to creating a national water vision, 17% of the responses referenced politics, time or money. These pressures can play a large role in the success or failure of a national water vision. In order to ensure the effective implementation of a national water vision, these three factors will have to be considered at length. Five experts provided insightful responses regarding the potential impact of politics, time and money on the development of a national water vision in Canada, these ideas will be discussed further in this section.

It is undeniable that politics play a large role in the way natural resources are managed in Canada. Therefore, politics can greatly impact the success of a national water vision. Each political party in Canada has different perspectives and beliefs on how resources should be managed and what regulatory tools should be used to manage those resources. Depending on who is in power at the provincial or territorial level and

at the federal level, a national water vision may not be feasible due to a variety of reasons. In the interviews experts gave some examples such as, a provincial government not being open to working with a particular federal government or the federal government simply lacking the appetite for something like a national water vision. In addition to these complicated intergovernmental issues there are other deep-rooted issues related to politics and natural resource management. One expert expressed concern about these deep-rooted issues:

“I think the current way that we do things is just extremely challenging and I hesitate to say that we need a totally different way of governing because democracy is not negotiable, but things can swing so far one way or another depending on who’s in power. It’s not consistent with thinking about sustainability or resilience or any of these concepts that we think are going to get us into the future in a relatively healthy, happy way.”

This quote highlights the divergence between Canadian political practices and sustainability. Potential large swings in political ideologies can greatly impact the way Canada manages natural resources. This means, in order for a national water vision to be developed and consistently implemented into the future, Canada needs a government that puts continual focus on the sustainability of natural resources.

Not only can the politics of natural resource management impact the development and implementation of a national water vision but political cycles can also play a role. In an interview one expert stated, “The challenge is, that a lot of these [water] issues don’t work on the four-year, five-year time scale. And so, trying to drive change in political systems that have a different time frame is a real challenge.” This expert highlighted a major stumbling block to managing water; water doesn’t follow political cycles. Prime Ministers, Premiers, Ministers, Mayors and Council change frequently, making it difficult to implement forward thinking and long-term goals. Creating and implementing laws, policies or visions can be difficult due to short term political cycles, but this isn’t an issue that is specific to water. Political cycles affect the way almost all resources are managed such as housing, transportation and education. Therefore, a national water vision needs to be nimble and adaptable and please the needs of all Canadians to ensure it is implemented now and into the future. Additionally, it is important to strike when the political iron is hot. For example, an election year may be a good time to develop a national water vision for a political party that wants to use it as part of their election platform.

Another factor that may impede the development and success of a national water vision is time. One expert voiced their concern for the slow pace at which government moves, “My concern [is] that by the time we act under normal government circumstances it’s going to be too late and a lot of people are going to start to get affected.” This quote highlights again the lack of imminent concern related to water and the potential impact of water related issues to Canadians if governments do not take a proactive approach. Not only does government take time but change itself takes time. People and institutions become creatures of habit, making change daunting and difficult. Creating a national water vision will not be easy and it will take time and require new ways of thinking but a national water vision for Canada can help shift toward sustainable practices and make Canada a leader in sustainable water management.

The development and implementation of a national water vision would also require significant financial commitments. Provinces and territories are unlikely to buy-in to the idea of a national water vision if it comes with a significant price tag. One funding approach that could mitigate the financial pressure on provinces and territories and be used as a leverage to ensure the implementation of a national water vision, is the approach taken by the federal government under the Canada Health Act. Similar to natural resource rights, under the Canada Health Act, provincial and territorial governments are allocated most of the responsibility for delivering health and other social services (Health Canada, 2019). On the other hand, the federal government sets and administers national policies for the health care system and provides funding support to provinces and territories (Health Canada, 2019). In order to receive federal funding, provinces and territories must meet the federally established criteria and conditions for health care and provide reasonable access to medically necessary hospital and doctor services (Health Canada, 2019). A similar approach could be taken by the federal government to implement a national water vision. The federal government could leverage funding for water projects and infrastructure to ensure provinces and territories are meeting the standards set out in a national water vision. This would ensure the federal government does not overstep its jurisdiction, but it would also provide incentive for provinces and territories to implement a national water vision. This approach would also alleviate some of the financial burden on provinces and territories to implement a national water vision. However, this approach would put all of the

financial pressure on the federal government. Further research can be done to determine what innovative funding approach would be best for Canada.

An example of two countries that have been able to overcome issues associated with politics, time and money, are Brazil and the United States. Both Brazil and the US have developed national level legislation to create a unified approach to water management (Adeel, 2016). Brazil and the US are similar to Canada, in that they are democratic and federated countries that also have a comparable land mass (Adeel, 2016). However, unlike Canada, Brazil and the US have found ways to work within their political settings to develop national level water policy. Brazil and the US face similar challenges to Canada in that they have to work within political timelines, are federated countries with considerable autonomy at the state level and they have a large land mass and population to consider. Canada should look to Brazil and the US to see what approaches they took to mitigate the impacts of politics, time and money on the development and implementation of national level water policy.

5.3.4. If it was easy, it would have been done already

When asked “what do you think are the first steps to creating a national water vision for Canada?”, one of the interviewed experts gave the following response:

“It makes me feel frustrated, because I have been working in this field for basically my whole life and I wish the situation was better and I wish I could tell you honestly, what I think would work and start to do it but I don’t know. I mean I think you do need strong leadership, you need a commitment, I hate to say this, but you maybe even need a crisis, that doesn’t result in death but results in making society more aware. We have so many other priorities as a nation in Canada that I fear that water and a national vision for water is not at the top of the list, it’s nowhere even near the top of the list.”

This response stood out to me the most from all of the interviews. It was discouraging to hear, but it provided context for how hard it is to create change and start a national vision, policy or strategy from the ground up. This expert provided some needed grounding and helped shape the recommendations of this research, because if experts, who have worked their entire lives in this field, are frustrated and don’t have the answers then it is going to take a lot of careful consideration and work to provide meaningful recommendations and contribute to the national conversation. Developing a national water vision will have challenges; however, Canada can learn from other countries and

find inspiration from other countries that have successfully implemented national frameworks that encourage better water management.

Chapter 6. Recommendations

As has been detailed repeatedly in this paper, creating a national water vision will not be easy. It will take time, money, commitment, persistence and systematic change. The literature and the expert interviews highlighted several steps that can be taken to help Canada develop a national water vision. One potential path forward for a national water vision would be for a champion or group of champions to take on this initiative and advance the idea of a national water vision for Canada. It was evident from the interviews there are several experts across Canada who can fill this champion role such as water policy experts in academia or NGOs. Once a champion or group of champions support the idea of a national water vision the following steps can be taken to develop and implement a national water vision for Canada.

6.1. Steps to create a national water vision

1. Establish a group of individuals who are interested and support the idea of a national water vision for Canada. This group could potentially be derived from other water organization, agencies, groups or from the recently mandated Canadian Water Agency. This group of individuals would be the champions of the vision, they would promote the vision, get others interested in the vision, host preliminary events, speak with the federal government and generally get the ball rolling.
2. Gain support from federal leadership, while engaging provincial leadership. If there is no support or political will from federal leaders, it is unlikely the vision will be a success. The above-mentioned group should seek input and support from Members of Parliament and Federal Ministers. Communicating with federal leaders will help determine if the federal government has an appetite for a national water vision and hopefully gain support to develop the vision.
3. Create a large network of water leaders in local, provincial, territorial and federal governments, First Nations, academia, non-profits, and the private sector. A national water vision will not only need support from the federal government it will need support from a wide range of stakeholders. The above-mentioned group should seek support from a wide range of stakeholders to ensure all facets of water are represented and interested in supporting a national water vision for Canada. This large network of stakeholders can also be used to show federal leaders that a wide range of stakeholders support the creation of a national water vision.

4. Engage the public, not only in the development of a national water vision but in general ideas and principles of sustainable water management, water conversation and water stewardship. If the public does not support or see the needs for a national water vision for Canada it will not be successful. Public outreach can include education in elementary schools, television and social media campaigns, interviews and focus groups. Public outreach has the potential to foster a sense of ownership and participation in the sustainable management of water resources in Canada.
5. Put pressure on the federal government to take a leadership role. As two experts expressed in their interviews, the federal government should take a leadership role in the development of a national water vision. Even though this may start out as a grass-roots initiative, the federal government should take a leadership role due to the national nature of the vision. The Canadian Water Agency is a potential group to put pressure on to lead a national water vision.
6. Find potential funding sources. Creating a vision will take time and money, finding innovative funding opportunities will help cover costs of meetings, conferences, outreach, events and other expenses.
7. Host conferences, forums, symposia, think tanks and interviews. Hosting events such as a conferences and symposia are the first step to spark interest and thoughtful conversations about water management in Canada. These events can also provide a platform to grow support and spread the idea of a national water vision for Canada. Interviews can be conducted with experts to gain insight into Canadian water management and interviews can be conducted with the public to better understand how Canadians use and manage water. Think tanks can be used later in the development of a national water vision, bringing together experts to determine the contents of a national water vision.
8. Use social media to broadcast educational information, news, outreach opportunities and events. Social media will provide a new way of communicating, especially with the younger generation. Social media campaigns can be used to grow the support network for a national water vision and also engage people in water related issues.
9. Use the Federal Water Policy as a framework for a new national water vision. Utilize the twenty-five policy recommendations set out in the Federal Water Policy as the foundation of a national water vision. The policies will need to be modernized and revised; however, the essential components of the Federal Water Policy would be a useful starting point for a national water vision.
10. Research international best practices. Canada can learn from other nations such as Brazil, Germany and the Netherlands. Nations across the world have successfully implemented national water visions, innovative governance structures and sustainable water

management practices. Canada can look to these nations and learn not only from their successes but their failures. International best practices should be incorporated into a national water vision to ensure Canada is at the forefront of sustainable water management.

11. Employ the skills of an expert or experts in collaborative approaches. Hiring expert(s) will ensure the voices of many people are heard while also ensuring consultation and collaboration with people who are vested in the vision and can provide meaningful contributions. The assistance of an expert or experts in collaborative approaches should be utilized throughout the entire process, including determining what stakeholders will be at the table, creating expectations for the vision and facilitating the writing of the vision.
12. Once the vision is complete, send it to the larger network established in step 3 and other steps. Ask for feedback and input from this network of people to ensure the perspectives and interests of many stakeholders are recognized and incorporated. Use the feedback from the network to edit and improve the vision.
13. Once the final draft of the vision is complete, the federal government should mandate the national adoption of the vision. Adopting the vision will give the vision the recognition it needs to ensure its implementation.

Based on the literature and expert interviews, the following is a list of the principles, standards and ideas that should be included in a national water vision for Canada. From this research it is clear a national vision for Canada should not only be a set of guidelines and standards, it should also be a platform to foster innovation, set the benchmark for national level collaboration and educate Canadians. This is why the following list includes not only guidelines and standards but principles and practices that should be embedded in a national water vision. This list is not an exhaustive list but rather a list of the key themes that were identified in this research.

6.2. Components of a National Water Vision

General Principles:

1. Declare water as a human right. The declaration of water as a human right would join Canada with the 145 countries that have already declared water as a human right (UNGA, 2010-b). Declaring water as a human right would also provide First Nations communities and any others experiencing inadequate access to drinking water, a legal framework to exercise their rights (Human Rights Watch, 2019).

2. Focus on Truth and Reconciliation. The Federal government has made commitments through the United Nations Declaration on the Rights of Indigenous People (UNDRIP) to focus on reconciliation by building nation-to-nation relationships and recognizing the importance of free, informed and prior consent. A national water vision is an excellent platform to foster relationships with Indigenous communities and incorporate Indigenous perspectives into a national vision (Brandes et al., 2020).
3. Align the vision with all SDGs, specifically SDGs 6, 13 and 14. SDGs 6, 13 and 14 are directly connected to water, however, 14 of the 17 SDGs can be linked to water. Using the SDGs as a framework and implementing the targets of the SDGs will help ensure Canada is a leader in sustainability and water management (Schuster-Wallace et al., 2019).
4. Shift towards sustainable and resilient management practices. In the face of climate change, urbanization and a growing population, Canada needs to be at the cutting edge of sustainable water management. Employing sustainable and resilient practices will safeguard one of Canada most precious resources now and into the future (Schuster-Wallace et al., 2019).

National Policies:

1. Create a water pricing system. Water pricing has been shown to encourage water conservation and increase public awareness about water issues (Olmstead & Stavins, 2009). Look to nations such as South Africa and China that have implemented successful water pricing systems. For example, South Africa has developed a water pricing system with four key principles; social equity, financial sustainability, economic efficiency and ecological sustainability (Schreiner, 2015). Under South Africa's water pricing system all significant water resource uses face water use charges (Schreiner, 2015). However, water used for subsistent uses (stock watering, food production) do not incur charges (Schreiner, 2015). Canada can research South Africa's approach and other countries' approaches to water pricing and implement similar a system.
2. Create legally binding national drinking water standards. Canada is one of two OECD nations that does not have national legally binding standards for drinking water (Dunn, et al., 2014). Creating legally binding drinking water standards would also give Frist Nations a legal framework to exercise their rights to clean drinking water (Human Rights Watch, 2019).
3. Develop non-binding standards for pollutants, groundwater extraction, flooding, greywater reuse and other water issues. These standards would have to be non-binding, as the federal government does not have jurisdiction over such water management issues. However, similar to the Species at Risk Act, a provision should be included in

these standards that states, if a province does not properly protect its water resources than the federal government can step in to do so (Species at Risk Act, 2002).

4. Support innovative and sustainable infrastructure, such as green infrastructure. A national water vision should encourage innovative and sustainable infrastructure to reduce Canada's water infrastructure debt and promote innovative solutions to water challenges (Denchak, 2019).
5. Support transboundary water agreements. A national water vision should support the shift towards watershed level management. The standards and principles of Canada's national water vision should be used as a framework to develop transboundary and watershed level agreements. Implementing watershed level management often leads to more collaborative and sustainable approaches to water management (Menon, 2007).

Operational Actions:

1. Develop a task force/working group to support the vision. The task force would be responsible for continually researching and improving the vision to reflect best practices. The task force would also be a resource for provinces, territories, local governments and non-governmental organizations to help implement sustainable water management practices. The task force would also continue to host events, look for funding opportunities, create social media campaigns and provide educational opportunities. Overall, the task force would help advance the national water vision and ensure its implementation now and into the future.
2. Develop a centralized data hub. The data hub would include data for water quantity and quality. This would provide a centralized national level source for water information. This data hub would provide local, provincial, territorial and first nations governments with access to reliable water data. This data hub should also have a public facing component, where the public can quickly access reliable information.
3. Create national level data collection and monitoring standards. These standards would pertain to the data collected for the centralized data hub mentioned above. These standards would ensure that the data collected is accurate and reliable.
4. Mobilize financial resources to support all of the above. Implementing all of the above-mentioned tasks, principles and policies will take considerable time and money. A crucial step to realizing a national water vision's full potential will be to secure funding to implement many, if not all, of the ideas mentioned in these recommendations.

The purpose of a national water vision for Canada is not to rewrite the constitution or to impose federal regulations and laws on provinces and territories. The main purpose of a national water vision for Canada is to improve water management and shift toward more sustainable and resilient practices. A national water vision can provide the tools to improve water management by including progressive principles, paving the way for new ways of thinking and establishing both non-binding guidelines and legally binding standards. All of these components of a national water vision can help guide provinces and territories to a more sustainable future.

6.3. Considerations for Future Research

To address some of the limitations of this research and to further expand on the topic of a national water vision for Canada, I offer some ideas and considerations for future research. Future research should include an expansion on the amount and type of experts that are interviewed. It would be crucial to interact with a wider variety of experts, specifically Indigenous experts, as this was a significant gap in my research. Half of the experts interviewed for this research were in academia; therefore, it would be important to focus on the perspectives of Indigenous experts, elected officials, provincial and federal leaders, scientists and the private sector. Additionally, it would be key to interview more experts to ensure data saturation and include a wider variety of perspectives.

A number of topics were beyond of the scope of this research, creating opportunities for future research. First, there needs to take a deeper look into the feasibility and implementation of some of my recommendations, including water pricing, legally binding vs non-legally binding standards and the creation of a centralized data hub. These topics all require extensive research to understand how these practices can be implemented in Canada. Researching and learning from other nations that have implemented similar practices can help determine what approaches would be best for Canada. Also, there needs to be a review of innovative financing options to design a funding structure that works in the Canadian context. Again, learning from other nations would be necessary, but Canada can also look inwards to find innovative funding models. For example, the federal government's health care funding structure under the Canada Health Act.

In addition to these future research considerations, a detailed implementation plan for a national water vision needs to be developed. Once it has been determined what principles and policies will be included in a national water vision and who will be responsible for a national water vision, a detailed implementation plan needs to be established. Canada can look to other, similar nations that have implemented successful national water strategies such as New Zealand and South Africa. Learning from other countries and developing an implementation plan will help ensure the intentions and goals of a national water vision for Canada are met.

Chapter 7. Conclusion

Currently, Canada has no effective national level vision, strategy or policy for water. The absence of a national water vision in Canada has led to fragmented, unsustainable and inadequate water management across Canada. This research demonstrates there is not only the need for a national water vision for Canada but there is a clear desire, from respected experts, to have a national water vision for Canada. A national water vision would benefit Canada greatly by establishing principles, standards and innovative ideas to help combat and mitigate some of Canada's most challenging water issues.

The purpose of this research was to explore the opportunities and obstacles for a national water vision for Canada. Some of the key obstacles that were identified are fragmentation in water management; lack of imminent concern; poor public understanding of the resource; and the politics, time and money it takes to develop and implement a national water vision. On the other hand, several interesting opportunities emerged from this research, including opportunities for collaboration, supporting the SDGs, avenues for Truth and Reconciliation, declaring water as a human right and the overall improvement of water management across Canada.

The principles, policies and actions described in Chapter 6 outline the steps that should be taken to develop a national water vision that works for Canada. Principles such as collaboration and sustainable development need to be interwoven throughout a national water vision. Policies such as water pricing and national level standards will encourage water conservation. National level action such as creating a water task force and mobilizing financial resources will help Canada realize the full potential of a national water vision. Even though there are hurdles and stumbling blocks to creating a national water vision for Canada, it is time for Canada to be a leader in water management. This research shows there are numerous experts across the country that support and are interested in the development of a national water vision for Canada. These experts need to take leadership roles and put pressure on the federal government to support a national water vision. Looking into the future, it is critical for Canadians to elect officials that stand for natural resource conservation and sustainability and are open to new ways of managing natural resources. It is also critical that the water sector finds exciting and

interesting ways to engage not only the public, but other sectors to ensure water is a protected and valued resource.

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Appendix A.

Interview Questions

Introduction:

- Introduce ourselves
- Review consent form
- Rundown of interview structure
- Questions

Questions:

1. Do you perceive Canada to be a water rich country or a water poor country?
2. How do you think the public perceives Canada, as a water rich country or water poor country?
3. Are current water management practices in Canada sustainable in the face of climate change, population growth etc.?
4. Do current water laws and practices in Canada promote conservation?
5. What are the 3 biggest threats to water resources in Canada?
6. Has the constitutional framing of resource rights affected the water in managed in Canada?
7. How can we minimize the impacts of the constitutional framing of water rights?
8. Do you think Canada should have a shared and common national water vision?
9. If you were to create a national water vision for Canada what principles would you include in it?
10. What do you think are the first steps to creating a national water vision for Canada?
11. What do you think are the biggest stumbling blocks to creating a national water vision for Canada?

Conclusion:

- Is there anything else you would like to discuss that we did not cover in the questions?
- Thank the participant

Appendix B.

Brainstorming for Canada's National Water Vision: Pacific Water Research Centre and Ryerson Urban Water

Panel 1:

Larry Swatuk, Director, Master of Development Practice (MDP), and Associate Professor, School of Environment, Enterprise and Development at the University of Waterloo; Merrell-Ann Phare, Executive Director, Centre for Indigenous Environmental Resources; [Irving Leblanc](#), Director, Housing, Infrastructure & Emergency Services, Assembly of First Nations; Elizabeth Hendriks, Vice President, Fresh Water Program, WWF Canada; Jeff Hall, Professor in the School of Civil Engineering, Queens University

Moderator: Banu Örmeci, Professor and Jarislowsky Chair in Water and Global Health, and Canada Research Professor, Carleton University

TAKEAWAYS AND RECOMMENDATIONS:

Background and motivation

- Canada has a rapidly-worsening water crisis. The only response is a national response.
- Canada does not necessarily have water where it is needed.
- Water is like climate change in that we're not all impacted equally.
- There is momentum to create a National Water Vision for Canada. These talks are part of the continuum of conversations on developing that vision.
- Federally, Canada currently has the [Canada Water Act](#) of 1970 and the [Federal Water Policy](#) of 1987.
- Canada does not have federally-enforced drinking water standards.
- 20 federal departments are responsible for freshwater.
- There is a lack of water monitoring: no federal agency is dedicated to water, no standards exist for monitoring, and there is no national database for freshwater data.
- Canada has not declared access to water a human right.
- 14 of the 17 United Nations Sustainable Development Goals can be directly connected to water.
- Canada's most important natural resource, according to Canadians, is fresh water. ([RBC Canadian Water Attitudes Study](#))
- 2018 marks the beginning of the [International Water Decade Alliance](#): Water for Sustainable Development (2018-2028). The Alliance is open to new members.

A Canadian water vision

- The national vision must take into consideration:
 - The intersection of water and human rights
 - How to share water across borders
 - The drivers of water insecurity (climate change, population growth, etc.)

- Focus on drinking water. It is a low-hanging fruit.
- Particularly with citizen science and monitoring, expertise is needed to help guide what the data mean and where the monitoring should go in the future.
- The vision needs to be followed by a strategy that includes data: track processes, make stakeholders accountable, and share resources.
- Canada needs a culture of courage: fail quickly and fail fast.

Canadian legislation and the Canada Water Act

- We try to protect the things we care about most by creating a law, and putting money where the law is. We legislate when we care.
- We need a law that will give the water issue teeth.
- A foundation exists already – the Canada Water Act. However, it is deficient and needs updating.
- We have no capacity for national drought and flooding forecasting, etc.
- The Canada Water Act should be more than an enabling act. It needs to require mandatory actions and enforcement in certain circumstances from governments across the country:
 - Designate significant waters for protection and restoration.
 - Set and enforce minimum standards to address or prevent cumulative effects on river basin health.
 - Mandate integrated river basin planning and management.
- An updated Canada Water Act should be developed in partnership with Indigenous Nations so as to ensure that UNDRIP, TRC Calls to Action, and nation-to-nation relations are respected.

Indigenous peoples and water in Canada

- Drinking water advisories are a major problem in indigenous communities.
- Look at water infrastructure in indigenous communities.
- Governance solution: Indigenous governments have their own water laws, and they are creating their own rights.
- Indigenous government water policies need to be integrated into other Canadian policies.
- A Canadian water vision should use a “made in Canada” approach. Indigenous cultures should be full partners.
- Bring the First Nations holistic views on water to discussions about a water vision.
- From a First Nations perspective, technology is allowing for quick and on-place water quality data.
- Many indigenous communities are lacking water security, and have insufficient waste water treatment.
- Treaties with colonials did not include giving up water.
- Indigenous perspective: Water is the creator’s gift, and a living being that needs to be respected and protected.
- The Truth and Reconciliation Report’s calls to action include a UN declaration on the rights of indigenous peoples, with water rights embedded.
- For First Nations, the very starting point is to respect their rights. Top-down solutions do not work. Often at these talks, it is “privilege talking to privilege.” There is a disconnect from impacted people.

Canada's water resources

- In 2017, World Wildlife Fund (WWF) Canada released the [Canada Watershed Reports](#).
- Not understanding our water resources is a major challenge for Canada.
- Of Canada's 167 sub-watersheds, 110 lack data for watershed health.
- WWF's [Living Planet Report](#) found an 83% decline in fresh water species globally in the last 40 years. And by 2030, WWF forecasts a further decline by 40%.
- Over 10 million Canadians get their water from groundwater, yet Canadian groundwater has not been fully mapped.

Canadian groundwater

- In many cases new developments regulate wells a certain distance from a septic system, but that is not the case for older communities, where septic systems and wells may be interacting.
- There is a wide variety of types of wells.
- Testing standards for groundwater vary by province. Water quality can vary day-to-day.
- Wells can run dry in severe drought conditions, yet forecasting is lacking.
- Canada should have a national approach to monitoring groundwater and wells.
- People need to understand where their water comes from.

Panel 2: Nancy Goucher, Knowledge Mobilization Specialist, Global Water Futures, Water Institute, University of Waterloo; Francis Scarpaleggia, Member of the Canadian Parliament for Lac-Saint-Louis; Julia Baird, Assistant Professor, Environmental Sustainability Research Centre at Brock University; Ogimaa Kwe (Chief) Linda Debassige, M'Chigeeng First Nation; Lisa A Prime, Principal Consultant, PRIME Strategy & Planning, Ryerson Urban Water Advisory Board Member.

Moderator: Zafar Adeel, Professor, Resource and Environmental Management at Simon Fraser University; Executive Director, Pacific Water Research Centre

TAKEAWAYS AND RECOMMENDATIONS:

A Canadian water vision

- A paradigm shift is necessary – water views within Canadian culture need to change.
- Canada needs to be more proactive in our decisions around water, particularly related to chemical use.
- Water is a complex issue: there are many jurisdictions and stakeholders.
- Canada needs a national water strategy built on the watershed approach. However, watersheds are not a sexy political handle.
- We need a narrative – support by Canadians is a prerequisite to make change happen.
- We need to understand what data are required, based on what will be done with the data.
- Policies need flexibility, and to include the use of metrics.
- Continue the dialogue – get the right people to the table, initiated by government.
- If climate change is a shark, then its teeth are water. Climate change is about water.
- A Canadian water vision needs:

- 1) To win the hearts and minds of Canadians. Water is a human problem first. Use storytelling.
- 2) Collaboration: We need to have First Nations at the table and water people need to talk to people outside the water community.
- 3) Targets and timelines: Make use of current momentum, review results of implemented change, improve water protection, share stories of success and monitor water using quantitative measurements.
- 4) Global positioning: A vision for Canada must take into account that we are part of a global community. We are responsible for protecting 20% of the world's fresh water.

Canada on the international stage

- Water, and water security in particular, can be a new source of international leadership for Canada.
- If we focus on the United Nations' Sustainable Development Goal 6, we can share our expertise in many water areas.
- We are a water nation; water is part of our Canadian identity, yet we are not present on the international stage.
- If we take an international leadership role, then we can get all Canadian stakeholders, including industry, to work on this problem, which would also support a domestic water policy.

Water as a social-ecological challenge

- We should look at water from a resilience perspective: how we might formulate a vision, including how we engage Canadians in the process?
- It is about social-ecological systems: complex interactions between our society and our environment.
- This perspective entails persisting, adapting, and transforming (shifting and finding new ways).
- The key principles that underlie the social-ecological perspective are to:
 - Broaden participation (not just about politicians having this discussion)
 - Learn and adapt
 - Acknowledge that it is a complex system
 - Collaborate across scales (including data sharing across groups and institutions)
- Draw on climate change barriers to action – use those successes to support a water methodology.

Indigenous perspectives

- A generation ago people could drink water from Lake Huron. Now the water must be treated. Young people only know of treated water – they have never been able to drink from the lake.
- We need to invest funds that will support keeping water healthy.
- A caution: if we talk about protecting water or the technical-economic ideas surrounding water challenges, we sometimes miss the cultural-spiritual part. Keep the two parts in mind.