

INVESTIGATING GOVERNANCE ENABLERS FOR  
WATER SAFETY PLANS  
IN MI'KMAQ AND WOLASTIQJYIK COMMUNITIES

by

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Dalhousie University is located in Mi'kma'ki,  
the ancestral and unceded territory of the Mi'kmaq.  
We are all Treaty people.

## Dedication Page

I dedicate this work to my parents and siblings, who's early teachings shaped me and prepared me for life and love. In our family the Golden Rule applied to every living thing.

I dedicate this work to my husband, who sometimes seems to know me even more than I know myself. Together we face today's challenges with the confidence that our bond always grows stronger.

I dedicate this work to my children. I pray that their future holds space for multiple ways of knowing and that they become ambassadors of Etuaptmunk.

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## Abstract

Despite Canada's privileged economic status, First Nations disproportionately experience drinking water issues. In the past decade, the focus has shifted from technological to governance-based solutions, in recognition of the complex history of settler-colonialism that has perpetuated inequalities. Water safety plans (WSP) are a preventative, risk-based water management approach recommended by the World Health Organization and implemented worldwide in various contexts. This research investigates how WSP governance relates to a First Nations context, including in the Atlantic Canada First Nations Water Authority (AFNWA). The method of inquiry was a jurisdictional scan of New Zealand and Alberta Canada's WSP implementation. The data revealed that success depends on organizational culture change towards prevention. This lesson is directly applicable to the AFNWA, but not all governance "enablers" are appropriate in a First Nations context. The study concludes that place-based solutions are necessary and must be co-developed and consider capacity, self-determination, and de-colonizing methods.

## List of Abbreviations and Terminology Used

### A note on terminology

This research is mainly focused on First Nations, which is one of three constitutionally recognized groups of Indigenous peoples in Canada with distinct histories, languages and spiritual beliefs (First Nations, Métis, and Inuit). The term First Nation is sometimes used to refer to a group of people, as in the example above, or to refer to a place, such as the Woodstock First Nation. The terms Aboriginal and Indian are not used unless directly quoted from referenced material. The term Māori refers to the Indigenous peoples in New Zealand.

### Abbreviations

AFN	Assembly of First Nations
AFNWA	Atlantic First Nations Water Authority
APC	Atlantic Policy Congress of First Nation Chiefs Secretariat
ERB	Ethics Review Board
FNIHB	First Nations and Inuit Health Branch
GUDI	Groundwater Under Direct Influence
HC	Health Canada
ISC	Indigenous Services Canada
MAV	Maximum Accepted Value
MEW	Mi'kmaw Ethics Watch
MTSA	Municipal Type Service Agreements
PHRMP	Public Health Risk Management Plans (the predecessor to WSP in New Zealand)
WSP	Water Safety Plan
DWSP	Drinking Water Safety Plan (Alberta)

## Glossary

- Bottom-up** In governance, bottom-up refers to groups taking individual action to influence policy through behaviour. Considers the perspective of the community or end-user.
- De-colonizing research** aims to design research projects with the specific goal of removing bias and harmful research practices that result from the legacy of the *Indian Act* and instead promote self-determination.
- Etuptmumk** Mi'kmaq word for “two-eyed seeing,” learning to see from one eye with the strengths of Indigenous knowledges and ways of knowing, and from the other eye with the strengths of Western knowledges and ways of knowing, and to using both these eyes together, for the benefit of all. (Bartlett, 2011)
- Kaitiakitanga** Māori word for the exercise of guardianship and protection based on the Māori worldview. Includes the ethic of stewardship (Te Ahukaramū Charles Royal, 2007).
- M's-it No'kmaq** Mi'kmaq word as expressed in (M'sit No'kmaq et al., 2021), ““all my relations” refers to your “overall” family, which is your “natural world” and “every living thing”. Humans are not the superior being, but a small part and parcel of it. M's-it No'kmaq reminds us how we are all related and dependant within all the living world.”
- Nutukulink** Natural laws explain the relationships, responsibilities, and obligations that all forms of life have to one another. They emerged from the land and apply to all forms of creation; they were not created by humans; and are not required to be mandated by Western legal systems to be actualized. As expressed in Netukulink, “man and nature are one,” “everything comes from the land,” and “all that the earth holds is sacred” (M'sit No'kmaq et al., 2021).
- Pākehā** Term used in New Zealand to distinguish the non-Māori population, derived from the Māori word for foreigner.
- Pace-based** Knowledge or information that is localized. In water governance, this includes considering the community context alongside the geographic context (Gerlak et al., 2018).
- Priority 1 determinands** are substances in water whose presence can lead to rapid and major outbreaks of illness. Determinands that fall into this category in New Zealand include pathogenic bacteria, protozoa and viruses.
- Priority 2 determinands** are substances in water of public health significance in a specific supply or distribution zone that are present at concentrations that exceed 50 percent of

the MAV and, for micro-organisms, are present at concentrations that represent an unacceptable risk to health.

Self-determination as defined by the United Nations Declaration on the Rights of Indigenous Peoples and refers to Indigenous people's right to freely determine their political status and freely pursue their economic, social and cultural development

Top-down In governance, top-down refers to applying system-level changes driven by policy and operational directives, consistent with overhead democracy.

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The AFNWA Elders Advisory Lodge have also generously taken the time to guide the research team on our path towards Etuaptmumk, patiently sharing their knowledge. Thank you for trusting us with your stories.

CP and AJ are two water professionals dedicated to helping suppliers understand risk. Thank you for taking the time to explain the finer details of water governance in your jurisdictions.

As a final point I would like to recognize the resilience of Canada's First Nations, Inuit, and Métis people. Any discussion and recommendations made in this research are meant to bring some level of additional knowledge and information to this work, and always intended in support of reconciliation and self-determination. This research was conducted the following the principals of Ownership, Control, Access, and Possession (OCAP™) (*Ownership, Control, Access and Possession (OCAP TM): The Path to First Nations Information Governance*, 2014)

## Chapter 1 Introduction

### 1.1 Problem Definition

Water safety plans have been recommended by the World Health Organization (WHO) as a proactive and preventative risk-based management approach to ensure the provision of safe drinking water since the 3rd edition of their Drinking Water Quality Guidelines in 2004. As of a 2017 WHO survey they have since been implemented in 93 countries (WHO, 2017a, 2017b) of varying size and economic backgrounds. Canada is not among these countries, as it does not regulate the use of water safety plans (WSP) or other comparable risk-based management approaches. Canada's decentralized approach to environmental governance devolves drinking water regulation to the provinces, who generally further delegate water management to the municipal level (Bakker & Cook, 2011; Dunn et al., 2014).

Despite Canada's abundance of fresh water and status as a high-income country, communities in Canada still struggle to reliably access safe drinking water that is trusted by the population. Canada's First Nations is one of these groups that struggle disproportionately with water security when compared to other rural non-Indigenous Canadian populations (Baird et al., 2015; H. Castleden, Crooks, et al., 2015; Hanrahan, 2017; Lam et al., 2017; Morrison et al., 2015).

For First Nations, safe drinking water is one concern among many that lay to bare the broken fiduciary relationship with the federal government of Canada and the legacy of negative effects stemming from settler-colonialism and the *Indian Act 1985* (Battiste, 2016). Current water governance in First Nations falls under federal jurisdiction, while elsewhere in Canada water governance has been devolved to the provincial level. The resulting governance void is one area where First Nations are concentrating their efforts to ensure future generations benefit from safe, clean drinking water. In Atlantic Canada, the Atlantic Policy Congress of First Nations Chiefs Secretariat (APC) has partnered with Dalhousie University since 2009 to cooperate on means to address the regulatory void, which ultimately led to the inception of the Atlantic First Nations Water Authority (AFNWA or water authority) in 2020 through a

framework agreement signed by the Government of Canada (Canada & AFNWA, 2020). The AFNWA represents the first Indigenous owned and operated regional water utility in Canada<sup>1</sup>.

## 1.2 Study purpose and objectives

The purpose of this study is to investigate how the different approaches New Zealand and Canada have taken to implement water safety planning governance can be applied in a Canadian First Nation context. What lessons can we learn from these jurisdictions that would be relevant to support a successful implementation in the AFNWA?

It is important to note that I am approaching this study with curiosity, not to compare jurisdictions or berate past actions or inactions. New Zealand and Canada are similar enough to draw lessons learned and apply them to the AFNWA, but there are too many differences in political structure and the complexities of Indigenous-Crown relations to draw direct comparisons.

## 1.3 Research Context

### 1.3.1 Canadian context – First Nations regulatory void

Given the continued reliance on the organizational governing structures resulting from Canada's history of settler-colonialism and the establishment of the *Indian Act 1985* in 1876, there is a persistent power imbalance between Canada's diverse Indigenous populations and the federal government that approves funding for capital upgrades and operational budgets of water treatment systems on First Nations (Office of the Auditor General of Canada, 2005, 2011, 2021). The political situation at the time of this research is such that both Canada and Indigenous peoples whose ancestors have been on these lands for time immemorial agree more must be done to deconstruct the legacy structures brought about by the *Indian Act 1985*,

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<sup>1</sup> The most current information regarding the AFNWA can be found on the website <https://www.afnwa.ca>. At the time of this report, the following communities had resolved to participate in the AFNWA: Elsipogtog, Kingsclear, Oromocto, Tobique, St. Mary's, Esogenoôpetitj, Abegweit, Lennox Island, Acadia, Eskasoni, Glooscap, Membertou, Millbrook, Paqtnkek, Pictou Landing, Potlotek, Sipekne'katik.

but there is not yet consensus within Indigenous groups, within government, or between the two, of what that should look like (Cornell, 2015; Mascarenhas, 2007). Canada is therefore in a period of transition, with no tangible end in sight as both parties continue to identify what reconstruction will resemble.

In water governance specifically, it has been long recognized that First Nations face a regulatory void that has been a major contributor to the gap in water security, demonstrable by the disproportionate number of long-term Boil Water Advisories in First Nations (Baird et al., 2015; Indigenous Services Canada, 2017; Swain et al., 2006). Since the Walkerton tragedy, the federal government has launched strategies and legislation in hopes of closing that gap, but twenty years later there are still no enforceable regulations for drinking water in First Nations. Some of these strategies include the 2006 Protocol for Safe Drinking Water in First Nations, the 2003-2008 First Nations Water Management Strategy (which includes the 2006-2008 Plan of Action for First Nations Drinking Water), the *Safe Drinking Water for First Nations Act 2013*, and the 2008-2016 First Nations Water and Wastewater Action Plan (Morrison et al., 2015). The Auditor General has produced three reports in the past two decades, all criticizing the effectiveness of these strategies (Office of the Auditor General of Canada, 2005, 2011, 2021). The *Safe Drinking Water for First Nations Act 2013* especially seems to indicate a move toward enforceable legislation that will lead to safe drinking water in First Nations when taken at face value. However, it was developed without an authentic consultative process and failed to gain support from First Nations leadership organizations (Bellegarde, 2017, 2019). It was criticized for being in violation of Treaty Rights<sup>2</sup>, lacking clarity about roles and responsibilities, and especially for concerns around “transferring liability to First Nations with no commitment to funding, training or infrastructure improvement – essentially setting up First Nations to fail” (Atleo, 2011). For this reason a new engagement process led by First Nations began in 2019 and is seeking solutions to repeal and replace the *Safe Drinking Water for First Nations Act 2013* (Bellegarde, 2019; Canada, 2019).

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<sup>2</sup> The *Safe Drinking Water for First Nations Act 2013* (s.3) provides a clause that existing Aboriginal or treaty rights may be superseded by regulation “to the extent necessary to ensure the safety of drinking water on First Nations lands”, and authorizes the Governor-in-Council to confer on third parties the power to regulate (s.5).



There were several factors that contributed to decisions regarding the design of this research. The global pandemic of SARS-COV-2 rendered field work unfeasible due to public health restrictions, leading to the decision to conduct a jurisdictional scan. There was also a conscientious decision to rely on secondary data when seeking Indigenous perspectives. At the time of this research, Sepekne'katik Mi'kmaw fishers were defending their rights to operating a self-regulated lobster fishery in support of a moderate livelihood (Slaughter, 2020), which led to physical altercations with commercial fishers. Later in the same year, hundreds of unmarked graves were uncovered at former residential schools across Canada, which led to an ongoing search of the former Shubenacadie Residential School near Sipekne'katik First Nation (Smith, 2021). Both incidents have triggered intense emotional responses in Mi'kma'ki, as Indigenous and non-Indigenous alike reflect on the cultural genocide and systematic racism that Indigenous peoples have faced since colonization. Out of respect for the fact that academic timelines should not compromise ethical research (H. Castleden et al., 2012; H. Castleden, Sylvestre, et al., 2015; Koster et al., 2012), the decision was made to rely on secondary data rather than other qualitative research tools such as interviews, surveys, or focus groups.

### 1.3.2 New Zealand context – “Standards don't guarantee safe water<sup>3</sup>”

It should be noted that at the time of this research, the New Zealand government was undergoing a significant water legislation reform following a severe waterborne illness outbreak in Havelock North in 2018 (Government Inquiry into Havelock North Drinking Water, 2017a, 2017b; Wiant, 2019). The reform was called the Three Waters Reform (New Zealand, 2021). The Havelock North outbreak raised serious questions about the quality of drinking water in New Zealand, given that the inquiry concluded Havelock North was compliant with the Drinking-water Standards for New Zealand and had an approved water safety plan at the time of the outbreak.

The Three Water Reform resulted in the grouping of drinking water, wastewater, and

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<sup>3</sup> Quoted from a video conversation with a WSP specialist in New Zealand on 2 February 2022

stormwater legislation under one Act. On 1 March 2022, The *Water Services Act 2021* replaced the *Health Act 1956* in terms of drinking water legislation. The reform also included the creation of a drinking water regulator under *Taumata Arowai – the Water Services Regulator Act 2020*. Taumata Arowai is now the direct regulator for drinking water and has oversight responsibilities for wastewater and stormwater. Future changes that are expected include an updated *Drinking-water Standards for New Zealand 2005*, where it is expected that the onus to execute a quality WSP will fall more directly on the supplier, and the consolidation of water services into four multi-regional entities governed by independent boards (New Zealand, 2021).

The decision was made to continue this research based on the previous system under the *Health Act 1956*, which had been in place for 17 years. However, the Three Waters Reform provided interesting context for the jurisdictional scan, as it represents a growing trend in high-income countries of shifting to a regulated, integrated water management strategy. Water professionals in New Zealand suspect that WSPs had evolved into a compliance tool (see Section 5.8.1) which had compromised their quality as a preventative method (Graham, 2017; Water New Zealand, 2017). New Zealand's water reform demonstrates the need for jurisdictions to remain critical and agile enough to adapt their water governance in the face of new information.

#### 1.4 Thesis Overview

This thesis has 7 chapters. This chapter has introduced the historical context of the problem and situated the jurisdictions in current events, including factors that affected the research design. Chapter 2 will outline how scholarly literature has framed the problem. Chapter 3 reflects on the researcher as a research tool, and describes the methods used. Chapter 4 introduces the jurisdictions with a broad overview of geography, water governance, and status-quo for inclusion of Indigenous perspectives. Chapter 5 presents the results of the jurisdictional scan and relates them to Canada's First Nations, and in Chapter 6 the underlying conclusions related to WSP implementation in First Nations is discussed in detail. Chapter 7 concludes the study with recommendations for future work.

## Chapter 2 Key Research Themes

### 2.1 Introduction

The previous chapter introduced some of the historical factors that have influenced Canada's gap in water security between non-Indigenous and Indigenous people. It is recommended that the reader use the concepts introduced in Chapter 1 to conduct further readings on the subject of settler colonialism to truly understand how the historical context has influenced water management for First Nations.

The literature review conducted to inform this research focused mainly on studies exploring the historical and current context of water governance for First Nations, and research on water safety plan implementation focusing on governance enablers. Examples where Indigenous ontologies were adopted were especially sought, in support of enabling Etuaptmumk, capacity building, self-determination, Treaty rights and de-colonizing governance.

### 2.2 Shifting from technological to governance solutions

The most universal definition of water governance in literature uses some variation of “the range of political, organizational, and administrative processes through which communities articulate their interests, their input is absorbed, decisions are made and implemented, and decision makers are held accountable in the development and management of water resources and delivery of water services” (Nowlan et al., 2010). Water governance models vary but generally involve multiple levels of governments, and multiple agencies across the levels of governments (OECD, 2011). The complexity of water governance is intensified in countries such as Canada, where regulation is devolved to lower levels of government in a decentralized administration.

Di Vaio et al. (2021) conducted a broad review of literature around water governance models with a lens to meet the United Nations Sustainable Development Goal #6: clean water and sanitation by 2030 (SDG#6). One finding of their analysis determined that the trend has

shifted from debating technical solutions to meet SDG#6 to a heavier focus on governance and management issues. “Good water governance requires the strengthening of policy, institutional and regulatory frameworks” (Di Vaio et al., 2021) and a strong emphasis on stakeholder engagement, participation, and dialogue. This view is supported by Graham (2003) and Wilson et al. (2021), who write specifically about First Nations requiring more than money to fix the problem (implying a technological solution), and instead requiring collaboration between First Nations, the federal government and the provinces (Graham, 2003) and decolonizing, community-led efforts (Wilson et al., 2021). The OECD further recognizes that generally the technical and institutional solutions impeding water security are well known, which is certainly the case in First Nations. “The real challenge lies in implementing these solutions, tailoring them to local contexts, overcoming obstacles to reform, and bringing together the main actors from different sectors” The OECD (2019), Diver (2017), and H. E. Castleden et al. (2017) go on to point out that during implementation, governments struggle to include Indigenous knowledge into environmental management because of the rigid policy frameworks that create systematic barriers.

Specific to First Nations, tailoring solutions to local contexts is paramount, and widely supported by literature (Barrington et al., 2013; Black & McBean, 2017; Herschan et al., 2020; Patrick, 2011; Perrier et al., 2014; Thompson, 2016; van den Berg et al., 2019), as is the use of Indigenous ontologies and research methods to address water problems affecting First Nations (Arsenault et al., 2018; McGregor et al., 2018; Wilson & Inkster, 2018). However, the predominant belief that Western scientific knowledge is “better” than Traditional Ecological Knowledge (TEK) can lead to efforts to “confirm” TEK with Western science, which can be perceived as insulting and paternalistic (Matsui, 2015; Stefanelli et al., 2017). Instead, Arsenault et al. (2018) have developed recommendations for engaging in Indigenous research by applying decolonizing methodologies.

### 2.3 WSP can help fill regulatory gap

A recent systematic review of 86 studies revealed that most OECD countries have implemented WSPs, but Canada and the USA are both listed as having very limited experience with the method (Baum & Bartram, 2018). Most of the studies included in this literature review focused on relatively rich countries with stable governments, as these are fundamental characteristics of Canada. Therefore most literature approached WSP as a top-down initiative, with focus on the importance of an enabling environment through guidelines, regulations, training, performance indicators, and audits (Baum & Bartram, 2018; Ferrero et al., 2019). These enablers counter some perceived barriers to WSP implementation including the fact that they are often not legally required, and water suppliers perceive them as taking too much time or duplicating already existing management practices (Amjad et al., 2016; Kot et al., 2015; Roeger & Tavares, 2020).

Most researchers talk about the necessity for context specific evidence that WSP are producing improvements (Amjad et al., 2016; Baum & Bartram, 2018; Ferrero et al., 2019; Kanyesigye et al., 2019; String & Lantagne, 2016), and some caution that demonstratable improvements in water quality and health targets take time. It is beneficial to develop a broader range of performance indicators, keeping in mind that institutional, operational, financial and policy changes can have more immediate demonstratable benefits (Amjad et al., 2016; Lockhart et al., 2014; Magtibay, 2017; Mudaliar, 2012; K. Setty et al., 2018; K. E. Setty et al., 2017).

The literature review revealed examples where a bottom-up approach was used, mainly in small supplies in low- and middle-income countries (Herschan et al., 2020). Regardless of a top-down or bottom-up implementation strategy, a common pitfall of the WSP is to focus on the first steps of the WSP (assemble a team, system description, hazard ID and risk assessment, improvement plan), but implementation stalls at the “back end” (monitoring, verification, management and review), such that the WSP becomes a one-time exercise and filed away (‘Auditing and Verification of Food Safety and HACCP’, 1998; Gelting et al., 2012; Gordon et al., 2019; Kanyesigye et al., 2019, 2019; Vieira, 2011; WHO, 2015). Another pitfall is in attempting

an implementation without first considering the human dimension, and in Kot et al. (2015) a tool is proposed to assess community readiness for WSP.

The balance between a top-down and a bottom-up approach is a delicate one. Hasan et al. (2021) argues that a regulator is an important enabler to WSP, and it would be naïve to expect the WSP cycle to continue without regulation. However, the authors (Hasan et al., 2021) caution not to delay WSP implementation until regulation is in place, given the often long timeframes experienced when bureaucratic processes are engaged. As countries develop regulation, Herschan et al. (2020) caution that regulation should be supportive, not strict, as suppliers and other water management stakeholders transition from a culture of compliance to a culture of prevention. Hanrahan (2017) provides a counterargument that tinkering with the regulatory process does not represent real advancement.

Adapting the WSP to the local context is one of the basic principles of water safety plans (Barrington et al., 2013; Perrier et al., 2014; van den Berg et al., 2019; WHO, 2009), and some studies recommend that implementers expand the WSP to include behavioural hazards (Barrington et al., 2013; String & Lantagne, 2016) for water users and their interactions with the water, or gain a better understanding of how risk communication strategies can be modified based on how users respond to drinking water issues (H. Castleden, Crooks, et al., 2015).

Canada's First Nations hold worldviews around water as Spirit, water's importance in ceremony, and the people's responsibility towards conservation and caring for water and the surrounding ecosystem (Anderson, 2010). In Mi'kmaw'ki these principles are grounded in the concepts of M's-it No'kmaq and Netukulink (M'sit No'kmaq et al., 2021; Pictou et al., 2021), and these and other Indigenous ways of knowing must also be appropriately represented in the WSP (Black & McBean, 2017).

Many of the above enablers must be evaluated with a critical eye before transferring directly to a First Nations context, always keeping at the forefront the imperative of respecting Treaty rights, self-determination, capacity-building, and reconciliation. The AFNWA, positioned as the first Indigenous owned and operated regional water utility, bears an impetus for determining new governance practices. In a culturally distinct jurisdiction working towards

decolonization and self-determination, there is an opportunity to develop and implement new and appropriate governance and management tools. However, the application of WSP in the context of the AFNWA is a new paradigm, as will be explored in the following sections and discussed specifically in Section 6.4. Throughout the literature review, two principles stood out as being directly applicable to a WSP implementation in the AFNWA: the importance of a coordinating agency for small systems implementing WSP (Oluwasanya & Carter, 2017), and the crucial role of senior management as advocates of WSP to achieve organizational buy-in (Summerill et al., 2010).

## 2.4 Conclusion

There is a gap in WSP literature where the context of WSP implementation in a First Nation water governance paradigm is not readily available. First Nations water management exists in a sustained regulatory void with insufficient and antiquated funding programs (Office of the Auditor General of Canada, 2021) leading to First Nations being disproportionately affected by water insecurity. In recognition of this, researchers now tend to focus on governance rather than technological solutions. Water safety plans are an example of a preventative, risk-based strategy that can be operationalized in a gap of regulations, or integrate into already existing or future regulations, making them a suitable alternative for First Nations.

Although the literature reveals examples of enabling governance, the lack of studies applying the enablers to First Nations make it difficult to identify which enablers are transferable to the First Nations context without perpetuating colonial inequalities. Adapting the WSP to the local context and expanding it to include culturally relevant principles were the most common enablers that support Indigenous self-determination. The AFNWA will also provide insight into two other enablers that are cited in literature: the importance of a coordinating agency, and the crucial role of senior management to achieve organizational buy-in.

## Chapter 3 Methodology, Research Design and Methods

### 3.1 Introduction

As discussed in Section 1.3, the research design was highly influenced by the socio-political context during the research timeframe. Due to the qualitative nature of this research, the main tool used was the researcher themselves, as explained in Janesick (2011). For this reason, a reflective composition follows with comment on the researcher's philosophy, ontology and epistemology that shaped the research design. The specific methods used to collect, analyse, and triangulate the data is also presented.

### 3.2 Methodology

This research is based in the philosophy that it is possible to implement immediate change, in this case, increased water security in Canada's First Nations, despite the current climate of uncertainty and transition as First Nations and the Government of Canada contemplate what legislative levers to address the systematic racism that is the legacy of the *Indian Act 1876* and to honour the calls to action from the *Truth and Reconciliation Commission of Canada: Calls to Action* (2015)<sup>4</sup>. Water Safety Plans are an example of an initiative that does not require enabling governmental interventions to succeed. The interest the AFNWA has shown in formalizing WSP for their organization has presented an opportunity to reflect on how this can be achieved to simultaneously respect the customs and priorities of the Mi'kmaq and Wolastiqjyik communities it serves, and conscientiously include lessons learned from other jurisdictions. Therefore, this jurisdictional scan aims to study the implementation of a WSP regulatory framework in New Zealand and Alberta, Canada, then relate the lessons learned back to two scenarios: WSP implementation in the context of an Indigenous owned water

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<sup>4</sup> The Truth and Reconciliation Commission of Canada provided an opportunity for survivors and others affected by the legacy of the Indian Residential School system to share their stories and experiences. The final report includes 94 Calls to Action to advance the process of reconciliation. See <https://nctr.ca/> for further details.



authority (such as the AFNWA), or WSP implementation in the context of an independent First Nation.

The methodology was designed to evaluate the research question from a basic, explorative standpoint using mainly deductive research methods. Existing risk management regulatory best practices based on WHO water safety planning formed the theoretical backdrop. Resources and materials were drawn from grey literature readily available on the governmental websites of the jurisdictions studied. When possible, experts knowledgeable about each jurisdiction were consulted to provide ground-truthing for the documentation.

### 3.3 Positionality

I grew up in Montreal, which is unceded Indigenous territory known as Tiohtià:ke. Historically, it a gathering place for many First Nations, but the Kanien'kehá:ka Nation is recognized as the custodians of the lands and waters surrounding Tiohtià:ke. My mother and father taught me the importance of respect and kindness towards all people, but also towards the land, the animals, and the water. Because of this, I identify strongly with the concepts of M'sit No'kmaq and Netukulink (M'sit No'kmaq et al., 2021) as much as my limited experience with Indigenous worldviews allows me.

I approach this research with a lifetime of programming, including educational experiences informed by biased history that dominates the Canadian narrative and colonial worldview. I am aware of this cultural context that has influenced me, and I am also aware that the dominant worldview does not necessarily equate to the best worldview. As a woman engineer with decades working in a male-dominated field, I understand what it is to think differently, act differently, and wish things could be different. Through my research I have allowed myself to become awakened to the systematic racism aimed at Canada's First Nations People, Inuit, and Métis that I have taken part in unconsciously and benefited from. My hope is to position myself as an ally, using my acquired professional skills to support Indigenous self-determination and reconciliation.

In my previous career I worked in an organization that regularly and intentionally took calculated risks, which has lent me a positive outlook on how successful risk-management can be when implemented conscientiously. My time as a federal public servant is both an advantage and a disadvantage for me in this research. An advantage because I have an insider's understanding of the organizational culture of the Canadian Federal Government. However, this means that I approach this research through a lens of loyalty towards Canada, which prevents me from truly internalizing the Indigenous perspective, and has resulted in decidedly Western methods and analysis.

I approach this research with an ontology based in bounded relativism as defined by Moon & Blackman (2014), accepting that water security in First Nations has a complex historical context that must be taken out of hiding and understood from its various perspectives. From an epistemological standpoint, subjectivism best describes my understanding that each actor in water governance interprets risk management approaches in different ways, and this epistemology compliments my understanding of how Etuaptmumk respects the Western scientific ways of knowing and Indigenous ways of knowing, without putting them in competition with each other or forcing an integration of the two. However, I am decidedly pragmatic in my use of methods, open to adjusting philosophical positions depending on the context of the study.

I recognize that I was raised in the dominant colonial society and that my research intersects with Indigenous cultures, with theoretical assumptions beyond my comprehension. I have spent time reflecting on this and on the personal biases that my privileged upbringing has enabled. I have concluded that my indignation over the miseducation that non-Indigenous people have received about the reality of settler-colonialism lends depth to my research, constantly challenging me to evaluate and overcome biased thinking as it crops up.

## 3.4 Methods

### 3.4.1 Jurisdiction selection

The selection of jurisdictions to review was intentional. Owing to the diversity in water governance globally, it was considered beneficial to include a Canadian jurisdiction. In Canada, the provinces of Alberta and Ontario<sup>5</sup> have rigorous and documented risk-management approaches to water quality, and Alberta was selected as their implementation was largely informed by the WHO process which forms the theoretical backdrop for this research.

As the goal has always been to draw conclusions for use of WSP in First Nations, jurisdictions with a history of settler-colonialism were sought, making New Zealand, Australia, and United States the most obvious international choices. The United States does not currently employ WSP, eliminating that country as a possibility. New Zealand and Australia are similar enough that it would not be necessary to study both jurisdictions to attain saturation. New Zealand was attractive as a jurisdiction to contrast against a Canadian jurisdiction because it was an early adopter of water safety plans based on the WHO method (compared to Australia who adopted the Hazard Analysis and Critical Control Point method from the food industry before WHO's WSP recommendations), and an initial web-based search of governmental websites revealed a strong presence of Māori culture when compared to Canada and Australia, making it the most logical choice for drawing conclusions around Indigenous perspectives.

Water Safety plans can be implemented in a wide range of economic and socio-geopolitical situations. Although it would have been an advantage to study a jurisdiction that has implemented water safety plans through truly grassroots initiatives (without government support), these jurisdictions are either not comparable to First Nations due to their status in the developing world, or they are not documented to an extent required for a complete jurisdictional scan without the possibility of field work (this research design was conducted in the context of the SARS-COV-2 global pandemic and field work was not considered an option).

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<sup>5</sup> Ontario's process is detailed in the Drinking Water Quality Management Standard (Ministry of the Environment, Conservation and Parks, 2017). Although it is not based on the WHO guidelines for water safety plans, it overlaps heavily with the WSP process.

Both New Zealand and Canada are members of the Organization for Economic Co-operation and Development (OECD), which is an international organization that focuses on shaping “policies that foster prosperity, equality, opportunity and well-being for all” (*About the OECD*, n.d.). Within the constraints of OECD, New Zealand and Alberta have different enough qualities that an acceptable range of information was obtained through the jurisdictional scan. Table 1 outlines some of the main differences between New Zealand and Alberta’s WSP implementation that supported the choice of these two jurisdictions.

*Table 1: Differences between New Zealand and Alberta WSP implementation that supported this research*

<b>New Zealand</b>	<b>Alberta</b>
Early adopter	Recent adopter
Water governance centred around WSP	WSP added into already existing water governance
Unitarian government based on Westminster parliamentary system	Federal government based on the Westminster parliamentary system
Indigenous worldviews integrated into water legislation	Indigenous worldviews separate from provincial legislation

### 3.4.2 Data collection

This study centred around a jurisdictional scan of legislated Acts, regulations, and associated grey literature collected mainly from governmental websites, such as the Ministry of Health in the case of New Zealand and the Ministry of Environment and Parks for Alberta. A complete list of documents is detailed in Appendix 1 starting with Acts and working down through the different documentation toward WSP-specific documents and guides. Standards of inclusion consisted of:

1. Is it a type of communication produced by (or on behalf of) an official government?
2. Does it pertain to drinking water, wastewater, or community involvement in water infrastructure decisions?
3. Does it mention Water Safety Plans or other risk-based water management programs; and/or

4. Does it clarify ways to communicate and consult with citizens about drinking water and wastewater?

Documentation describing First Nations perspectives was obtained mainly from Indigenous-led organizational websites. A review of scholarly literature situated this study in previous water governance initiatives, then Indigenous-led responses were sought both at the National level (resolutions passed by the Assembly of First Nations<sup>6</sup>) and at the local level through documentation produced by the APC and the AFNWA. This method was adopted for two reasons. First, although it is recognized that each First Nation across Canada has their own distinct customs and traditions, each of the 10 regions is represented at the national level by a Regional Chief as well as Elders, Women and Youth councils, situating the AFN as an established central organization for First Nations dialogue on important matters. Second, as this research was intended to support the APCs initiatives which resulted in the AFNWA being incorporated under the *Canada Not-for-Profit Corporations Act 2009* in 2018, a more local perspective was sought, allowing for a collaborative, participatory approach where possible.

### 3.4.3 Data Analysis

Data analysis was conducted in two phases to facilitate the coding of text and delivering inductive themes from the deductive thematic analysis process:

#### *Phase 1: Broad reading, categorization (inductive and deductive)*

Documents satisfying the criteria in Section 3.4.2 were imported into NVivoPro v12. During reading, the “back-end” (monitoring, verification, management, and review) of water safety planning was used as a theoretical backdrop, and specific attention was given to sections pertaining to the following categories, which resulted in the deductive coding categories: approvals, communication, performance indicators, verification, and appeals. During reading it

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<sup>6</sup> “The role of the National Chief and the AFN is to advocate on behalf of First Nations as directed by Chiefs-in-Assembly. This includes facilitation and coordination of national and regional discussions and dialogue, advocacy efforts and campaigns, legal and policy analysis, communicating with governments, including facilitating relationship building between First Nations and the Crown as well as public and private sectors and general public.” <https://www.afn.ca/about-afn/>

became apparent that broader themes contributed to the regulatory framework of water safety plans, which resulted in the inductive coding categories: consultation, capacity building, integrated water management, strategic planning, and compliance/regulator. Refer to Table 2 for a full description of each avenue of inquiry.

Table 2: Inclusion criteria for selection of jurisdictional scan documents

	Themes	Inclusion criteria
<b>Deductive</b>	<i>Approvals of WSP</i>	Is there an organization that reviews the water safety plan and provides feedback to the water utility?
	<i>Communication</i>	How does the jurisdiction communicate water quality and/or water safety planning information to the general public, both in normal operation and in emergency operations?
	<i>Performance indicators</i>	Are there any specific metrics that the water utility uses to prove the success or shortcomings of the water safety plan?
	<i>Verification of WSP</i>	Are there any regulations that mandate a specific schedule for audits and/or verifications, and is there an avenue for enforcement of these regulations?
	<i>Appeals</i>	If a water utility is unsatisfied with an aspect of water safety planning governance, is there an appeals process?
<b>Inductive</b>	<i>Consultation</i>	It is widely accepted that Canada struggles with meaningful consultation with First Nations on water governance issues (Section 1.3.1). Are there any lessons to be learned in our chosen jurisdictions?
	<i>Capacity building</i>	Most scholarly articles discussing water governance for First Nations touch on the topic of closing the human resource capacity gap. How have our chosen jurisdictions addressed this issue?
	<i>Strategic planning and Supporting governance</i>	Taking a deeper look into the strategies and programs that have enabled the evolution of water safety planning in our jurisdictions, such as: Integrated water management Watershed-level governance Drinking water regulator

### *Phase 2: Re-review for emerging themes (inductive)*

The jurisdictions were related across the themes in Table 2, and sub-themes emerged based on the jurisdictional scan and supported by a literature review. The results are presented in a series of Tables in Chapter 5. Scholarly articles were consulted, and a concerted effort was made to review literature published by Indigenous authors or by recognized Indigenous organizations, such as the Assembly of First Nations, to ensure applicability of emerging themes to the Canadian First Nations context. Finally, recommendations were formed for the applicability of the themes towards use in the context of an Indigenous owned and operated water authority such as the AFNWA, and in First Nations communities who wish to pursue water safety planning independently.

#### 3.4.4 Triangulation

In qualitative research, triangulation serves to infuse a level of creditability to the results by reducing the systematic bias of the researcher, who is considered a research tool (Moon et al., 2016). In this study, Theory Triangulation was employed as described in Patton (1999). This was achieved by evaluating the data from a theoretical framework that best reflects the overarching goals of a regulatory framework for drinking water in First Nations. The chosen theoretical framework was the *2006 Expert Panel on Safe Drinking Water for First Nations* (Expert Panel) (Swain et al., 2006). The following paragraphs describe the process that led to this decision.

When drawing conclusions and making recommendations in this research, care was taken to consider the complex jurisdictional context that drinking water and wastewater systems must operate in in First Nations, as well as the different lived experience of First Nations compared to the researchers, including political, social, and familial structures, and the cultural and spiritual significance of water to First Nations. It was also important to consider that although the First Nations in Atlantic Canada are related through their shared heritage, and historically through the Wabanaki Confederacy, they remain independent Nations. Blanket

solutions are not appropriate, especially if this research is to be extrapolated to other First Nations in Canada. Throughout this project the research team remained in monthly communication with the AFNWA executive and/or the Elders Advisory Lodge to provide updates and gain perspective and understanding of the local context. This contact also benefited the researchers' application of Etuaptmumk in helping us learn how to communicate to achieve a Two-eyed seeing outcome.

To verify that the conclusions and recommendations are truly applicable, we referred back to the regulatory framework recommendations from the Expert Panel. This was identified as an appropriate triangulation reference as it was central in Atlantic Canada's response in the Impact Analyses which analyzed the impacts of adapting provincial water regulations to First Nations context (Graham et al., 2009). They were also a guiding philosophy in the creation of the AFNWA, and they represent a solid consultative process that was conducted on a national scale and included perspectives from Indigenous peoples across Canada. A summary of the recommendations and how they were applied in this research is provided in Table 3.

*Table 3: Regulatory recommendations from the Expert Panel on Safe Drinking Water for First Nations and how they relate to this research*

<b>From Swain et al. (2006), to be effective, the framework must:</b>	<b>How it was applied in this research:</b>
<i>Help to achieve the most efficient funding arrangements;</i>	<i>Out of scope of this research, although one output of the WSP is an improvement plan which has a function in funding prioritization</i>
<i>Be binding on all of the parties involved in the First Nations water sector, including the federal government;</i>	Approvals, appeals, compliance/regulator
<i>Be based on best practices from within Canada and other jurisdictions for setting standards and requirements;</i>	Performance indicators, verification
<i>Provide for appeals against orders and decisions, and investigation of complaints;</i>	Appeals
<i>Encourage the sharing of information and success stories within the sector to build capacity, and with the broader community, both on and off reserve, to build trust</i>	Communication, capacity building, consultation, performance indicators



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*Use information, inspection and enforcement sensibly, as tools to improve performance rather than to penalize those lacking the capacity to perform.*

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Capacity building, consultation, strategic planning, compliance/regulator

### 3.5 Conclusion

Without field work, the important process of building a trusting and reciprocal relationship within the communities was not available, rendering Indigenous methodologies inaccessible at the time of research. In the previous sections, I reflected on methodology and positionality, both based on a colonial upbringing, and the resulting methods used. Applicability to First Nations was corroborated using established and reputable secondary data.

## Chapter 4 Jurisdiction Overviews

### 4.1 Introduction

The following section provides a geographic, demographic and water governance overview of each of the jurisdictions. Additionally, to situate the readers in the context of water governance for First Nations in Canada, a third section is included where the governance paradigm under the AFNWA is compared to the status quo for the majority of First Nations across Canada.

### 4.2 Overview of New Zealand

New Zealand is a country situated in the South Pacific Ocean made up of two main islands (and several smaller islands). Combined, the North and South islands occupy approximately 720,000 km<sup>2</sup>. The total population served by small, medium, or large<sup>7</sup> drinking water suppliers in New Zealand is 4,077,000, with an added 840,000 people self-supplying or being served by very small neighbourhood supplies (Ministry of Health, 2020). Drinking water sources are evenly divided between groundwater and surface water, and 99.7 per cent of New Zealanders received drinking water that met all monitoring requirements in the *Drinking Water Standards for New Zealand* (Standards NZ) in 2018-2019 (Ministry of Health, 2020). New Zealand was an early adopter of water safety plans, adopting the Public Health Risk Management Plans (PHRMP) into the Standards NZ in 2005 and formally in legislation in 2007 (Ministry of Health, 2018b).

Clean water is a matter of national identity for New Zealanders (*Resources Management Act 1991 s.6*), both Indigenous (Māori) and settlers (Pākehā). During a 1989 re-structuring of their local government system, the local jurisdictional boundary lines were roughly divided by

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<sup>7</sup> Health Act 1956 s.69G defines drinking water suppliers based on population served:

Large: more than 10,000 people

Medium: 5001-10,000 people

Minor: 501-5000 people

Small: 101-500 people

water catchment areas (Skarsbrook & Pearson, 2008; Taylor & Smith, 1997), demonstrating an early understanding of the need for holistic and integrated planning along ecosystem boundaries (Barham, 2001).

Like Canada, New Zealand shares a history of settler-colonialism and follows the Westminster democratic parliamentary system of government. However, where Canada is a federation with water governance devolved to the provincial level, New Zealand is unitarian, which has benefited water governance by allowing for a more uniform application of law across the country. This has resulted in a near country-wide use of WSP: a full 98.9 percent of New Zealand's population served by a water supplier implementing a water safety plan in 2019 (Ministry of Health, 2020).

A full discussion of Māori-Crown relationship is beyond the scope of this study, but there were noticeable elements of Māori culture that were apparent through casual observation while browsing governmental websites, suggesting efforts to acknowledge and include New Zealand's first stewards. In 1987, te reo Māori (the Māori language) was made an official language of New Zealand (Higgins & Keane, 2013). This is obvious at first glance on any governmental website. Furthermore, while reading the grey literature for the purpose of the jurisdictional scan, the use of several principles commonly attributed to Indigenous ways of knowing are enshrined in the Western legal documents. For example, the *Resources Management Act 1991* (RMA) makes specific mention of the Treaty of Waitangi, kaitiakitanga (the ethic of stewardship) and the protection of land or waterways of cultural and spiritual significance. Even more telling is an upcoming reform to the RMA, which will change the wording from "take into account" to "give effect to" the Treaty of Waitangi (*Overview of the Resource Management Reforms*, 2022), essentially enshrining in central legislation the requirement to honour the Treaty in matters of resource management, including decisions around water. It is important to note that the inclusion of Māori perspectives in legislation demonstrates an encouraging improvement which has been ongoing since the 1870s, but adoption of inclusive approaches are still difficult at the local level (Morgan, 2006).

### 4.3 Overview of Alberta

Alberta is one of ten provinces and two territories in the parliamentary democracy of Canada. Compared to New Zealand, it covers a similar geographic area (661,848 km<sup>2</sup>) and population (4 million range). For drinking water purposes, roughly 97 percent of treatment plants draw from surface water. Drinking water safety plans (DWSP) were officially introduced to Alberta in 2011 (Perrier et al., 2014) as a provincial initiative.

Canada is known to be one of the most de-centralized drinking water regulatory frameworks in the world (Bakker & Cook, 2011), with regulation and management of drinking water devolved to the provinces, and in many cases, further to municipalities. Canada's current water management philosophy is based on the multi-barrier approach (CCME, 2004). Canada's federal government (similar to New Zealand's central government) recommends this approach in federal guidelines, but they are not enforceable. Most provinces, including Alberta, have produced enforceable regulations based on the multi-barrier approach.

First Nations in Alberta do not fall under provincial jurisdiction, therefore provincial regulations do not apply in First Nations. They are instead under federal jurisdiction. Consequently, any discussion in the following sections about Alberta's application of drinking water safety plans refers only to provincial municipalities and Métis settlements.

### 4.4 Overview of AFNWA

Atlantic Canada is situated on the eastern coast of Canada in Mi'kma'ki, the traditional unceded territory of the Mi'kmaq and Wolastiqiyik. Atlantic Canada comprises of the four provinces of Prince Edward Island, New Brunswick, Nova Scotia, and Newfoundland and Labrador, cumulatively occupying a total of 500,591 km<sup>2</sup>. There are 48 First Nations communities across the territory, and 17 in total (four Wolastiqiyik, 13 Mi'kmaq)<sup>8</sup> have expressed intent to participate in the AFNWA once federal funding has been secured, with room for expansion if necessary. Most drinking water systems draw from ground water,

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<sup>8</sup> This number is accurate as of 10 February 2022, and represents the number of communities undergoing an asset management plan (see <https://www.afnwa.ca/> for most updated statistics).

however not all sources have a known Groundwater Under Direct Influence (GUDI) status, meaning it is not known if microbial pathogens are travelling from the surface to the well. There is a wide variety of treatment processes, with some greensand filtration, UV disinfection, membrane nanofiltration, and almost all communities chlorinating their water prior to distribution. There are also some communities that have entered into Municipal Type Service Agreements (MTSA) with neighbouring non-Indigenous communities, whose contracts and negotiations will become the responsibility of the AFNWA. Most systems serve populations in the 500-5000 range, although there are at least five communities in the under 500 range.

The AFNWA is a First Nations owned non-profit organization. By assuming liability for the water infrastructure in the participating communities, they will be responsible for ensuring the delivery of safe and clean drinking water and wastewater. This will be achieved in a manner that emphasizes First Nations traditional knowledge and culture while applying Western science-based best practices. The utility is expected to be fully operational by mid-2022, at which point all operations, maintenance, and capital upgrades of the community assets will be the AFNWA's responsibility. For any communities that are currently receiving water through MTSA, the AFNWA will become responsible for the existing contract and future negotiations.

At the time of this research, the Board of Directors was established, the interim CEO and COO were hired as well as the senior management team, and regular hiring is still underway. A third-party engineering firm has been contracted to produce an Asset Management Plan, which will inform a 10-year Capital Plan, allowing the utility to benefit from a long-term funding arrangement with the federal government. This is unique in Canada's First Nations, who otherwise receive funding on an annual basis from ISC based on an outdated funding formula (Office of the Auditor General of Canada, 2021).

To provide context for readers unfamiliar with water governance in Canada's First Nations, and to highlight why the AFNWA is a shift from current practices, Table 4 compares the status quo with how various elements of management will be addressed for the communities that are affiliated with the AFNWA.

Table 4: Comparing current water governance for First Nations with the expected differences once the AFNWA is fully operational

<b>Management Element</b>	<b>Status quo</b>	<b>Communities affiliated with the AFNWA</b>
<b>Geographic/political distribution of water infrastructure responsibilities</b>	Each First Nation (Chief and Council) is responsible for water infrastructure directly to the federal government	Full service de-centralized (hub and spoke): participating communities are arranged in a network grouped by similar geographic location, with one community per region named as the regional “hub” of operations, and supported by a main office ( See Figure 1)
<b>Responsible and liable for water infrastructure</b>	Chief and Council	<p>AFNWA. The Board of Directors is composed of up to 15 members. There are 12 Directors selected from First Nations communities, and up to three technical experts</p> <p>For First Nations receiving water from a neighbouring municipality through a Municipal Type Service Agreement (MTSA), the AFNWA will become signatories to their MTSA's and be responsible for capital upgrades</p>
<b>Funding</b>	Up until December 2020, the federal government provided funding annually based on an outdated formula for 80% of projected costs, which has been insufficient for realistic operation and maintenance costs (Murphy et al., 2015; Office of the Auditor General of Canada, 2021). Chief and Council were responsible for the remaining 20%	An asset management plan is currently underway to inform a 10-year budget
<b>Risk-based management</b>	At the discretion of Chief and Council, but generally, no. This is	Yes, AFNWA is working on developing a localized version of water safety plans and sanitary

	in the absence of enforceable regulation	safety plans which they are calling Nujo'tme'k Samqwan. This fits into a larger enterprise risk management framework that is under development
<b>Engineering and management philosophy</b>	Follows the conventional Western approach of compartmentalizing the different elements of water management into individual silos	System-based, holistic, integrative (ex. Nujo'tme'k Samqwan integrates source water protection, drinking water and wastewater, Etuaptmumk celebrates the spiritual and ceremonial aspects of water alongside science-based management)
<b>Responsible for compliance sampling and monitoring</b>	Chief and Council (with ISC- First Nations and Inuit Health Branch (FNIHB))	AFNWA
<b>Operator certification</b>	Chief and Council (not required through enforceable regulation)	AFNWA
<b>Communication</b>	Chief and Council	AFNWA
<b>Community involvement and feedback from water users</b>	No feedback mechanisms through enforceable regulations, although water operators do develop local strategies	The Elder's Advisory Lodge has been established and is providing strategic direction for community involvement and inclusion of Indigenous ways of knowing;  The AFNWA intends to actively seek involvement of youth and explore ways to engage with the communities;
<b>Capacity-building</b>	ISC - FNIHB provided education to Community Based Water Monitors through the Atlantic Policy Congress of First Nations Chiefs Secretariate  Education and mentorship to water operators through the Circuit Rider Training Program	AFNWA is now responsible for the education of the Community Based Water Monitors;  The AFNWA will prioritize certification and have all operators on an individualized training plan;  Operator workshops are currently held two times per

<b>Water operator salary and benefits</b>	Salary averages 30 percent below provincial median wage, often on-call 24/7, difficult to retain operators (Office of the Auditor General of Canada, 2021)	<p>year for education and information sharing;</p> <p>Hiring for AFNWA positions prioritizes Indigenous applicants</p> <p>The Draft Compensation Policy is available online at <a href="https://www.afnwa.ca/">https://www.afnwa.ca/</a>, based on the following principals:</p> <p>Fair and equitable salary treatment;</p> <p>Leave policy for vacation and other circumstances;</p> <p>40 hour workweek, with provisions for overtime and compressed week</p>
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Figure 1: Representation of the Hub and Spoke service delivery model adopted by the AFNWA. Image a result of graphical note taking during outreach working groups designed to solicit feedback from First Nation Chiefs, Elders and system operators regarding the corporate structuring of the AFNWA. Photo source: (Halifax Water, 2017)



#### 4.5 Conclusion

The AFNWA represents a significant shift from the status quo of water governance in First Nations in Canada. New Zealand and Alberta are comparable in size and demographic and they both mandate WSP through legislation. Despite their shared history of settler-colonialism and Westminster parliamentary systems, they have evolved different systems of government (unitarian vs. federalist) and contemporary Indigenous-Crown relationships that provide sufficient basis to draw lessons for the implementation of water safety plans in the AFNWA.

## Chapter 5 Results

### 5.1 Introduction

This section is divided into eight main sections based on the following themes that emerged from the jurisdictional scan: approvals, communication plan, performance indicators, verification, appeals, inclusion of Indigenous in decision-making, and strategic initiatives. Each section is further divided into three sub-sections: a summary of the grey literature for New Zealand, a summary of the grey literature for Alberta, then a synthesis of lessons that can be applied to the AFNWA and to other First Nations interested in implementing WSP outside of the AFNWA.

### 5.2 Approvals of WSP

*Is there an organization that reviews the water safety plan and provides feedback to the water utility?*

#### 5.2.1 New Zealand

Approvals of WSP in New Zealand are managed by Drinking Water Assessors, who are appointed under the authority of the Director-General of the Ministry of Health (authorized by the *Health Act 1956*) and possess qualifications and experience in the field of public health and/or drinking water supplier, as well as specific mentoring and training courses in the field of drinking water assessments<sup>9</sup>. Large, medium and minor water suppliers in New Zealand are required under the *Health Act 1956 (s69Z)* to submit a WSP for approval within 12 months of establishment of the utility, and the Drinking Water Assessors are mandated to provide a response, either approval or otherwise, within 20 days of receipt. These concepts will be explored in more detail in Section 5.4.1.3 for small and neighbourhood suppliers, and in Section 5.5.1 for Drinking Water Assessors.

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<sup>9</sup> See [Water New Zealand \(waternz.org.nz\)](http://www.waternz.org.nz) for full details on Drinking Water Assessor qualifications.

In support of water suppliers meeting the requirements for WSP approval, suppliers can refer to the *New Zealand Drinking-water Safety Plan Framework* (Ministry of Health, 2018b) as well as the *Guides* (Ministry of Health, 2014). The use of these documents is optional, there is no one required format for WSP approval. Once approved, the WSP is valid for five years unless otherwise indicated.

### 5.2.2 Alberta

The *Potable Water Regulation AR277/2003 (s.3)* requires the use of a drinking water safety plan by referring to the requirement that all waterworks systems must be designed, operated and maintained to achieve the applicable code of practice, which in this case is the *Codes of Practice for a Waterworks System* (Alberta Environment and Water, 2012a, 2012b). The *Potable Water Regulation (s.4)* also requires the waterworks system to be designed to meet the minimum standard in the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems (Standard)* (Alberta Environment and Parks, 2021; Alberta Environment and Sustainable Resource Development, 2012). Both documents require the completion of drinking water safety plans. Alberta Environment and Parks also has a fillable Excel template available online<sup>10</sup> with common risks to consider for DWSP.

The Codes require the registration holder of a water utility to complete a DWSP by December 31, 2013 but does not name an approval authority. The specific wording reads as follows: “The registration holder shall maintain, and update the drinking water safety plan”. The Standards provide the additional detail that “The drinking water safety plan shall be available to AEP [Alberta Environment and Parks] upon request”. After contacting a water professional in Alberta, it was clarified that the system owner refers to the person responsible for the operation of the waterworks system, which can mean the mayor, council, water co-op, or any other number of leadership roles (generally non-technical). Furthermore, it was clarified that the requirement for a DWAP is also stated through each water systems' operating approval and

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<sup>10</sup><https://environment.alberta.ca/apps/regulatteddwq/DWSP.aspx>

registration<sup>11</sup>. Drinking Water Operations Specialists are available to review specific issues or questions on DWSPs.

*Table 5: Lessons on Approvals applicable to First Nations*

<b>New Zealand</b>	<b>Alberta</b>	<b>AFNWA</b>	<b>Other First Nations</b>
<b>WSP mandated by regulations</b>			
<b>Yes</b> <i>National through the Health Act 1956</i>	<b>Yes</b> <i>Provincial through the Environmental Protection and Enhancement Act (Potable Water Regulation AR277/2003)</i>	<b>Not recommended</b> <i>If implementation of WSP in First Nations becomes a top-down mandate there is a risk of reinforcing the negative status-quo. WSP in First Nations should be implemented using de-colonizing methodologies, encouraging capacity building, two-eyed seeing, and mutually respectful relationships. However, once a water governance decision is jointly made (as it has been with the AFNWA, where WSP were adopted as a bottom-up approach), it should satisfy Expert Panel recommendation #2: “be binding on all of the parties involved in the First Nations water sector, including the federal government”</i>	
<b>Third party WSP approvals</b>			
<b>Yes</b> <i>Drinking Water Advisors</i>	<b>No</b>	<b>Recommended</b> <i>The AFNWA has identified personnel within the organization responsible for implementing the engineering risk processes, but at the moment no third party has been identified for WSP approvals, although possibilities are being discussed as it is an industry best practice</i>	<i>Must be a place-based solution, and satisfy Expert Panel recommendation #3: “be based on best practices from within Canada and other jurisdictions...”</i>

### 5.3 Communication

*How does the jurisdiction communicate water quality and/or water safety planning information to the general public, both in normal operations and in emergency operations?*

<sup>11</sup> Operating approvals and registration for drinking water suppliers can be viewed at <https://avw.alberta.ca/ApprovalViewer.aspx>

### 5.3.1 New Zealand

One of the planned milestones behind New Zealand's strategy of water governance from 1993-1995 aimed to "achieve informed community discussion and decision-making on public health safety issues on drinking-water by the end of 1997", in order to provide water users with "sufficient knowledge and awareness of public health issues for the public to enable their effective participation in decision-making about public health issues relating to community drinking-water supplies" (Ministry of Health, 2017). The end goal was to educate New Zealanders on matters pertaining to their water supply and raise awareness of everyone's duty to prevent contamination of the drinking-water supplies.

From Chapter 2 of the *Guidelines for Drinking Water Quality Management for New Zealand* (Ministry of Health, 2017):

"The nature of the material reported, and the language used, need to be appropriate for the recipients of the report. Thought should also be given to the way in which recipients may perceive risk and how this may need to influence the wording of the report. Perceptions of risk can vary widely depending on such things as the assumptions, concepts and needs of the stakeholders."

To this end, the public have access to several reporting initiatives keeping them apprised of water quality issues, which serves to encourage an informed public who takes water issues seriously and holds suppliers accountable.

#### 5.3.1.1 Annual reports and DWO (*Drinking Water Online, previously WINZ*)

For all registered water suppliers save neighbourhood suppliers, water quality data is entered into Drinking Water Online<sup>12</sup> by suppliers before 1 July each year. The Ministry of Health consolidates the data entered to produce the *Annual Report on Drinking-Water Quality*<sup>13</sup>

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<sup>12</sup> DWO (formally WINZ, Water Information New Zealand) is a centralized electronic database accessed by all suppliers to keep track of samples, investigations, report results, sampling schedule and any other pertinent information.

<sup>13</sup> <https://www.drinkingwater.org.nz/external/documentsall.asp>

(Annual Report), usually published by April of the following year. As water safety plans are mandated by the *Health Act 1958 s.69Z*, the supplier's completion or not of WSP are reported in the Annual Report. See Table 6 for the full list of requirements derived from the *Health Act 1958* and reported in the Annual Report.

Table 6: Duties of water suppliers mandated by the *Health Act 1956*

Section	Requirement
69S	Adequate provision of water
69U	Source protection
69Y	Monitoring frequency in accordance with the Standards
69Z	Water safety plan (approved and implemented)
69ZD	Adequate records
69ZE	Investigation of complaints

The Annual Reports are available electronically on the Ministry of Health website, a free printed copy available to the public at the head office of the Ministry of Health, or printed copies that can be purchased by the public at a reasonable price. An interactive map is also available online<sup>14</sup> that allows the user to brows each Local District and find all data (plus more) that is found in Annual Report.

For the water safety plan to be approved, it must contain a communication plan, including which agencies to contact in the case of a high-risk event. Emergency reporting is usually developed on a system of “incident levels”, where the agency contacted increases in a hierarchy directly proportionate to the escalation of risk. At a minimum, the emergency communication plan outlined in the WSP must satisfy the *Health Act 1956*.

### 5.3.2 Alberta

The *Alberta Potable Water Regulation* requires malfunction reports to be reported immediately to the Director and to the appropriate Regional Health Authority. Further details

<sup>14</sup> <https://www.drinkingwater.org.nz/supplies/Suppliescompliance.asp>

are provided in the *Alberta Codes of Practice* (the Codes) (Alberta Environment and Water, 2012b, 2012a), specifying method, timeframe (within 7 days after discovery of a contravention), and the minimum information required in the contravention report. Corrective actions are detailed in the *Communication and Action Protocol for Failed Bacteriological Results in Drinking Water for Waterworks Systems Authorized under the Environmental Protection and Enhancement Act* (Barraclough et al., 2009)

The Codes further detail monthly and annual reporting requirements, as well as record keeping requirements. The monthly reports are consolidated on a publicly accessible website where information on sampling, boil water advisories, and inspections can be accessed<sup>15</sup>. Paper copies can be obtained upon request.

Each registered water supplier is registered following the *Approvals and Registration Procedure Regulation* under the *Environmental Protection and Enhancement Act 2000*. Suppliers are issued an Operating Approval and Registration certificate, which can be viewed online<sup>16</sup> by the general public. WSP are specifically mentioned in the operating approval and registration certificate as a compliance requirement for registration. Every five years, the registered water suppliers undergo an assessment by an independent third-party contractor.

*Table 7: Lessons on Communication applicable to First Nations*

<b>New Zealand</b>	<b>Alberta</b>	<b>AFNWA</b>	<b>Other First Nations</b>
Central list of water suppliers			
<b>Yes</b> <i>Registry of suppliers</i>	<b>Yes</b> <i>Operating approval and registration</i>	<b>Recommended</b> <i>Each participating community will pass a Band Council Resolution and accompanying agreements to formalize the transition of liability for drinking water and wastewater facilities to the AFNWA once fully</i>	<i>Highly dependent on the circumstances surrounding the implementation of the WSP. However, this does satisfy Expert Panel recommendation #3: "Be based on best practices... for</i>

<sup>15</sup> <http://environment.alberta.ca/apps/regulatteddwg/Listing.aspx>

<sup>16</sup> <https://aww.alberta.ca/ApprovalViewer.aspx>

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*operational. Final registry will be held by AFNWA and ISC*

*setting standards and requirements”*

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**Grading of water suppliers**

<b>No</b> <i>Not mandatory</i>	<b>Yes</b> <i>Every 5 years by a third-party contractor<sup>17</sup></i>	<b>Not recommended</b> <i>Too much potential to violate Expert Panel recommendation #6: “use information, inspection and enforcement sensibly, as tools to improve performance rather than to penalize those lacking the capacity to perform”</i>
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**Informed public, educate the public on their responsibilities as water users**

<b>Yes</b>	<b>Yes</b>	<b>Recommended</b> <i>Educational endeavors must be developed in de-colonizing ways, with emphasis placed on involving the youth, Elders, and women, and delivery methods that are culturally appropriate. Satisfies Expert Panel recommendation #5: “encourage the sharing of information and success stories...”</i>
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**Annual reporting**

<b>Yes</b>	<b>Yes</b>	<b>Recommended, satisfies Expert Panel recommendation #5: “Encourage the sharing of information and success stories within the sector to build capacity, and with the broader community, both on and off reserve, to build trust.” Must include the individual communities for decisions on reporting format and audience. The most robust strategy is one that incorporates OCAP, two-eyed seeing, opportunities to involve youth, Elders, ceremony, and recognize the work of water operators.</b>
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#### 5.4 Performance Indicators

*Are there any specific metrics that the water utility uses to prove the success or shortcomings of the water safety plan?*

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<sup>17</sup> This requirement has been removed in the 2021 revision of the Standards, however, this analysis occurred prior to the change



#### 5.4.1 New Zealand

The most common performance indicator worldwide for drinking water quality is to determine if the water met the jurisdiction's water quality standards through compliance testing at an accredited laboratory, and New Zealand mandates this compliance testing through the *Health Act 1956* and provides the limits in its *Drinking Water Standards for New Zealand* (Standards NZ) (Ministry of Health, 2018a), which are largely based off of the WHO guidelines (WHO, 2017b). The sampling and testing program is detailed in the Standards NZ, and the Maximum Allowable Limits (MAL) statistically provide a 95 percent confidence level that no parameter is exceeded for more than 5 percent of the time (Ministry of Health, 2018a). In 1995, the Standards NZ adopted a Bayesian statistical approach, which considers historical data to refine frequency of testing requirements and acceptable transgression rates. This has been one factor that was adopted in support of small and community suppliers, who were notably struggling to meet Standard NZ-mandated testing frequencies due to their smaller scale, both in terms of human resources and economy of scale. Please refer to Section 5.4.1.3 for further details on how small systems are managed differently.

##### 5.4.1.1 Guides

The Guides are WSP-specific tools that were developed to support water suppliers as they prepare their water safety plans for approval. There are 38 guides in total under the general categories of abstraction, pre-treatment and treatment processes, distribution systems, monitoring, staff training and construction materials. For the full list of guides please refer to Appendix 1. Each guide provides detailed instructions on carrying out the risk assessment of one specific hazard generally associated with the water system. The Guides all follow an identical format, and each Guide contains a chapter entitled Water Safety Plan Performance Assessment. A general description of the information provided in each of the WSP Performance Assessment chapters is provided in Table 8.

Table 8: WSP performance assessment descriptions

<b>WSP Performance Assessment</b>	<b>Description from WSP Guides</b>
<b><i>What to measure or observe</i></b>	Indicates concrete parameters to observe and track. May be a detrimand already measured through compliance monitoring sampling, (ex. Total coliforms), but may also be related to operational monitoring (ex. system pressure), an inspection (ex. sanitary inspection), or a review of records (ex. record of complaints, review of logbooks);
<b><i>How often</i></b>	Frequency the parameter should be observed, usually broken down depending on the size of the population served by the water supplier.
<b><i>What to do with the results</i></b>	In general, the same four paragraphs are repeated in every guide, with some guide-specific additions. Each guide mentions the legislative requirement to record results and suggests the WINZ* database (expanded in Section **), the need to review the data periodically, the recommendation to review procedures related to that hazard following incidents or non-compliance, and the recommendation to evaluate the monitoring results and determine if the water safety plan requires modification
<b><i>Responsibility</i></b>	Clearly indicates who is responsible for the verification process

#### 5.4.1.2 Customer Complaints

In New Zealand, the resource of water is considered free, but Local Governments may charge rates to cover infrastructure costs. The requirement to investigate customer complaints and take remedial action is required by the *Health Act 1956 (s.69ZE)* and the supplier's adherence to this law is reported in the *Annual Report on Drinking Water Quality*. The supplier must also include a clear plan for addressing customer complaints in the WSP, which is verified by the Drinking Water Assessors for compliance with the *Health Act 1956* prior to approval.

#### 5.4.1.3 A note specific to small water supplies

In the case of small and community suppliers (under 500 people served), the *Drinking Water Standards for New Zealand (Standards NZ)* (Ministry of Health, 2018a) makes concessions for monitoring systems serving such small populations, recognizing that neighbourhood suppliers lack the economy of scale afforded to larger utilities to meet the sampling frequency set out in the Standards NZ. It is also recognized that with smaller populations comes smaller public health risk, since the number of people potentially exposed

to a pathogen is significantly less than in larger suppliers. Small and neighbourhood suppliers are therefore given the option to comply fully with the quality and monitoring criteria set out in the Standards NZ (s.4,5,7-9), or to develop a localized compliance monitoring schedule documented through an approved water safety plan. The abbreviated sampling plan is based on the assumption in the Guidelines that 12 non-transgressions indicates no transgressions at least 95% of the time (Ministry of Health, 2017), versus the 38 samples per year that would be required if the Standards NZ are followed (as in the case of larger suppliers).

Whether the small supplier follows the Standards NZ or a modified risk-based sampling strategy, the WSP is approved through the government appointed and accredited Drinking Water Assessors, following the same approvals process as the larger water suppliers.

#### 5.4.2 Alberta

The Government of Alberta published a DWSP Template (accompanied by a Guidance Framework) and a Generic Risk Control Measures document (*Drinking Water Safety Plan - Generic Risk Control Measures, 2016; Template - Drinking Water Safety Plan, 2011; Government of Alberta, n.d.*). Both documents discuss in detail certain common risks associated with the treatment and distribution of drinking water, with recommended controls (mitigations, interventions).

The Guidance Framework does include a section 3.1: Validating the Control Measures, where utility management is encouraged to review water sampling data and continuous on-line monitoring parameters for any evidence of poor performance, possible “near misses” or unusual occurrences. It also names three main processes of verification:

1. Compliance monitoring;
2. Internal and external auditing of operational activities; and
3. Assessing customer satisfaction.

Much freedom is accorded to the utility management in deciding how and when the DWSP is reviewed. This allows the DWSP to be truly adapted to the local context, however, it does

also mean that the quality of the DWSP is entirely dependent on the motivation and internal leadership of the utility.

Alberta recognizes the shortcomings in its drinking water safety plan program and has made the following recommendations in its *Water for Life Implementation Review 2016 to 2019* (2021):

“Recommendation 2. Improved Water for Life Reviews: That the AWC [Alberta Water Council] improve future Water for Life assessments by using performance indicators where applicable and feasible, and which may be adjusted from time to time, implementing a schedule of reporting and periodically producing more comprehensive reviews of individual Water for Life elements.

Recommendation 4. Drinking Water Safety Plan Audits: That the GoA improve the drinking water safety plan program for publicly regulated systems by adding a mandatory review and/or auditing function to the current process by 2024.”

Table 9: Lessons on Performance Indicators applicable to First Nations

New Zealand	Alberta	AFNWA	Other First Nations
<b>WSP informs compliance sampling requirements</b>			
<b>Yes</b> -parameters based on risk assessment -sampling frequency proportional to historical data, size of population, and public health risk	<b>No</b>	<b>Recommended</b> Because the systems involved with the AFNWA are considered small systems, using risk analysis and historical data to inform sampling requirements can reduce time and cost for sampling without introducing undue risk. Satisfies recommendation #3 from Expert Panel: “Be based on best practices... for setting standards and requirements”	<i>Before diverting from current practices, it is important to ensure the regulatory enablers for WSP are in place (approvals, audits, human resource and technical capacity etc.), otherwise there is a risk of violating Expert Panel recommendation #6 “use information, inspection and enforcement sensibly, as tools to improve performance rather than to penalize those lacking the capacity to perform”</i>
<b>Regulations formalizing the water supplier’s response to complaints</b>			

<b>Yes</b> <i>Mandated through Health Act</i>	<b>No</b>	<b>Recommended</b> <i>With the creation of the AFNWA there is an infusion of capacity to manage feedback from community members. Meets Expert Panel recommendation #4: “provide for ... investigation of complaints”</i>	<i>Before a formalized feedback framework is created, care must be taken to ensure sufficient capacity is present to manage responses and engagement, otherwise there is a risk of violating recommendation #6 (penalizing those lacking the capacity to perform)</i>
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## 5.5 Verification

*Are there any regulations that mandate a specific schedule for audits and/or verifications, and is there an avenue for enforcement of these regulations?*

### 5.5.1 New Zealand

Following the first set of data obtained from the introduction of grading in 1993, it was noted that grading results were uneven, and this was attributed to the level of competence of the health protection officers that were employed by the District Health Boards to assess the performance of the drinking water supplies in their districts (Ministry of Health, 2017). In response, Drinking Water Assessment Units were created for each District Health Board, and a training program was established including a diploma-level qualification in drinking water assessment, accreditation to ISO/IEC 17020 specifications (inspection and assessment), and training in the legal aspects of their roles. This was the origin of Drinking Water Assessors. Section 69ZL of *The Health Act 1956* outlines the functions of drinking water assessors. Table 10 provides a summary in simplified language:

*Table 10: Duties of Drinking Water Assessors mandated by the Health Act 1956*

<b>Function</b>	<b>Description</b>
<b>Compliance</b>	Assess a supplier’s compliance with the <i>Health Act 1956</i> (Table 6)

<b>Compliance</b>	Assess a supplier's compliance with the <i>Drinking Water Standards of New Zealand</i> : 1. Achieve the water quality standards over 95 percent of the time; 2. Monitor in accordance with compliance criteria; 3. In the event of a transgression, take immediate action to protect public health and to prevent reoccurrence (Ministry of Health, 2018a)
<b>Audit</b>	Ensure suppliers are keeping the appropriate records for the prescribed duration
<b>Approval</b>	Authorize the persons tasked with treatment, sampling, and monitoring
<b>Assessment</b>	Assess the competence of the persons tasked with treatment, sampling, and monitoring
<b>Communication</b>	Communicate to the appropriate authorities when suppliers are non-compliant
<b>Approval</b>	Approve water safety plans
<b>Assessment</b>	Assess and certify a supplier's implementation of their water safety plan
<b>Assessment</b>	Verify the adequacy of water safety plans
<b>Compliance</b>	Verify that complaints received by suppliers are recorded and responded to appropriately

### 5.5.2 Alberta

In Alberta, drinking water suppliers gain their right to supply drinking water through their operating approval and registration, which is regulated under the *Environmental Protection and Enhancement Act 2000*. For an approval to be granted, the supplier must meet all requirements in the *Codes of Practice*, including the completion of a DWSP. Unannounced compliance inspections are conducted by Environmental Protection Officers at a frequency based on several factors (mainly centred around the potential to cause an adverse effect). Although compliance inspections verify the completion of a DWSP, they are not meant to review or provide feedback on the quality of the DWSP.

\*Risk assessment from independent contractor every five years

Table 11: Lessons about Verifications applicable to First Nations

New Zealand	Alberta	AFNWA	Other First Nations
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## Regulations mandating WSP audit

<b>Yes</b>	<b>No</b>	<b>Recommended</b>	<i>How verifications are</i>
<i>IAW Health Act 1956, WSP are reviewed and renewed every five years by the DWA</i>		<i>The AFNWA has the opportunity to build an internal auditing schedule into its regular operations from the beginning</i>	<i>carried out is highly dependent on the WSP implementation strategy. Expert Panel recommendation #6 must be honored: “Use information, inspection and enforcement sensibly, as tools to improve performance rather than to penalize those lacking the capacity to perform”</i>

## 5.6 Appeals

*If a water utility is unsatisfied with an aspect of water safety planning governance, is there an appeals process?*

### 5.6.1 New Zealand

A water supplier with grounds to appeal a finding of a Drinking Water Assessor in relation to compliance can seek recourse by writing to the technical manager of the Drinking Water Assessor’s unit (Ministry of Health, 2018a). If still dissatisfied, the *Health Act 1956* contains further appeal provisions by requesting a review by the Director-General of Health. The request for review of a decision made by a Drinking Water Assessor (in relation to compliance or refusal to approve a water safety plan) must be made within two months after the date the decision is made known. It should be noted that in general, persons exercising official functions (such as Drinking Water Assessors) are protected from civil or criminal liability, unless an act or omission was done in bad faith or without reasonable care.

The *Local Government Act 2002 (s.48R-S)* also provides a framework for disputes about allocation of decision-making or proposed bylaws. As the local government holds responsibility

for drinking and wastewater infrastructure funding and long-term planning, this is another avenue of appeal if said decisions or bylaws cause changes to the risks identified in the WSP.

### 5.6.2 Alberta

No formal appeals process specific to DWSPs exists. However, the *Water Act 2000* does provide for an Environmental Appeals Board to which objections under the *Water Act 2000* can be submitted. This mainly applies to appeals pertaining to construction or upgrades to the system. The *Water Act 2000* also outlines a dispute resolution and mediation process (s93-94).

*Table 12: Lessons about Appeals applicable to First Nations*

<b>New Zealand</b>	<b>Alberta</b>	<b>AFNWA</b>	<b>Other First Nations</b>
<b>Appeals process for decisions pertaining to WSP</b>			
<b>Yes</b>	<b>No</b>	<b>Recommended</b> <i>Should satisfy Expert Panel recommendation #4: “provide for appeals against orders and decisions...”</i>	

### 5.7 Improving water quality for Indigenous and small systems

*It is widely accepted that Canada struggles with meaningful consultation with First Nations on water governance issues (see Section 1.3.1). Are there any lessons to be learned in our chosen jurisdictions?*

*Most scholarly articles discussing water governance for First Nations touch on the topic of closing the human resource capacity gap. How have our chosen jurisdictions addressed this issue?*



## 5.7.1 New Zealand

### 5.7.1.1 Including communities in infrastructure planning

The *Local Government Act 2002* (s.125) outlines the obligations of the Local Governments to provide water and sanitary services, and how the long-term and short-term planning of water services is carried out is further detailed in the Act. It also provides the framework for consultation based on the New Zealand government's recognition of their responsibilities imparted to them by the Treaty of Waitangi (s.4), mandating local governments to consult the Māori "if any of the options identified under paragraph (a) [regarding decision-making] involves a significant decision in relation to land or a body of water, take into account the relationship of Māori and their culture and traditions with their ancestral land, water, sites, waahi tapu, valued flora and fauna, and other taonga" (s.77).

The *Local Government Act 2002* also provides details on the process of community planning, both short- and long-term. In s.101B, the local authority must prepare a 30-year plan for the management of water supply and wastewater treatment and disposal. The plan includes identifying infrastructure issues, responding to growth or decline in demand, maintaining public health and environmental outcomes, and generally addressing future risks with options available and a timeline for decision milestones. Although WSP are not specifically mentioned in the Act, in a perfect world, the 30-year plan along with the 10 year long-term plan (s.93), the 3 year drinking water services assessment (s.125) and the annual plan (s.95) work synchronously with the WSP improvement plan. Although the potential for this synchronicity exists, discussions with a water professional in New Zealand revealed that it is not the norm. A description of each of the required documents is provided in Table 13.

Table 13: Summary of planning requirements (related to drinking water) mandated by the Local Government Act 2002

Section	Outlook	Short description
<b>s.101B</b>	30 years	<i>Infrastructure strategy</i> : identify significant infrastructure issues and principal options for managing those issues
<b>s.93</b>	10 years	<i>Long-term plan</i> : describe the activities of the local authority and the community outcomes. Developed by following a consultative process.

		Must also report on the Local Authority’s plan to increase capacity among its Māori community members
<b>s.125</b>	3 years	<i>Drinking water services assessment</i> : each community undergoes an assessment of the state of drinking water services, including access, system and public health risks, future demands, and wastewater discharges
<b>s.95</b>	1 year	<i>Annual plan</i> : proposed annual budget and funding impact statement. Developed following a consultative process

The *Local Government Act 2002* uses the word “must” in s.81 where it requires the local authority to “establish and maintain processes to provide opportunities for Māori to contribute to the decision-making processes of the local authority” and “consider ways in which it may foster the development of Māori capacity to contribute to the decision-making processes of the local authority” (emphasis added by author). Although the effectiveness of contemporary Crown/ Māori relations are still a topic of debate (Hayward, 2012), the inclusion of the shift in power balance from consultation (as a stakeholder) to decision-making power (as a rights-holder) in legally binding documents is noted. Further cementing the inclusion of Māori interests at the decision-making level, s.33 stipulates that at least one seat on the Local Government Commission must be reserved for a person who has knowledge of tikanga Māori (Māori customs and practice). In the long-term plan produced by the Local Government, there must be a strategy for the development of Māori capacity to contribute to decision-making processes, and updates provided.

More generally, the literature provides other examples of how building capacity is encouraged within the water supplier, especially focused on small and neighbourhood suppliers, so that ultimately everyone benefits with safer water. From Chapter 2:2.2.4 of the Guidelines (Ministry of Health, 2017):

“It is preferable that water suppliers prepare their own WSPs, because during the process, they will become more aware of each step involved in running the supply, identify the critical points, and will therefore consider the risks, monitoring, improvements and training needs associated with each step. If it is considered necessary to use consultants, the water supplier must be closely involved in the preparation of the

WSP. It is recommended that the WSP makes frequent reference to all relevant operations manuals.”

### 5.7.2 Alberta

Due to the federal jurisdiction of First Nation reserve land and the primacy of the Indian Act, there are no legal requirements to include Alberta’s First Nations in water infrastructure planning outside the Duty to Consult. Consultation is required when a provincial decision has the potential to adversely impact the continued exercise of a Treaty right (Government of Alberta, 2013).

*Table 14: Lessons on including Indigenous worldviews that can be applied to First Nations*

<b>New Zealand</b>	<b>Alberta</b>	<b>AFNWA</b>	<b>Other First Nations</b>
<b>Formal representation of indigenous peoples in decision-making about water</b>			
<b>Yes</b> <i>Local Government Act 2002</i>	<b>No</b> <i>First Nations in Canada are not under provincial jurisdiction</i>	<b>Yes</b> <i>The AFNWA is led by a Board of Directors with up to 15 members. Three are technical experts, the remainder are chosen from First Nations leadership. The AFNWA is incorporated as a not-for-profit, all participating communities are considered equal members. The AFNWA is further guided by an Elder’s Advisory Lodge made up of five Elders from the participating communities</i>	<b>Recommended</b> <i>For WSP to be successful in a First Nations context, the communities must be empowered to make decisions regarding their water. Furthermore, there must be a shift in power relationships, moving away from treating First Nations as stakeholders, to treating First Nations as rights-holders. By shifting this power relationship, decisions made collaboratively must “be binding on all of the parties involved in the First Nations water sector, including the federal government”</i>
<b>Inclusion of Indigenous worldviews in water governance</b>			

<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>Recommended</b>
<i>Resource Management Act 1991 (also undergoing a major reform with added emphasis on Indigenous worldviews)</i>		<i>By creating an Indigenous owned and operated water authority, the goal is to govern water using Etuaptmunk, giving effect to both Western science and Indigenous ways of knowing</i>	<i>There must be a shift in power relationships, moving away from treating First Nations as stakeholders, to treating First Nations as rights-holders. By shifting this power relationship, decisions made collaboratively must “be binding on all of the parties involved in the First Nations water sector, including the federal government” as recommended by the Expert Panel</i>

## 5.8 Strategic planning

*Taking a deeper look into the strategies and programs that have enabled the evolution of water safety planning in our jurisdictions, such as: Integrated water management*

*Watershed-level governance*

*Drinking water regulator*

### 5.8.1 New Zealand

It is important to recall that New Zealand is currently undergoing a significant reform to water management at the national level. In parallel, the Three Waters Reform shifted New Zealand into an integrated water management philosophy (three waters representing drinking water, wastewater and storm water), a water regulator known as Taumata Arowai was created, and the *Water Services Act 2021* came to Royal Assent in October 2021, replacing the *Health Act 1956* as the principal water legislation. Although a full analysis of the changes is out of the scope of this project, New Zealand’s shift to integrated water management and a dedicated regulator is reported as a trend in wealthy countries (Ferguson et al., 2013; OECD, 2015). It is also largely motivated by a severe outbreak of campylobacteriosis in Havelock North in 2016. At

the time of the contamination, Havelock North had an approved WSP and was compliant with the Standards, but the inquiry following the incident revealed that there were “longstanding problems that have put the safety of the country’s water supplies at risk” (Graham, 2020), which prompted the major review of water management.

New Zealand was one of the first countries to implement watershed-level planning by adopting it into legislation through the *Resources Management Act 1991* (Pyle et al., 2001). *The Resources Management Act 1991* is also in a process of reform, as discussed in Section 4.2.

### 5.8.2 Alberta

Alberta’s *Water for Life* strategy (Government of Alberta, 2003, 2008) remains the main document that sets the provinces strategic goals for water management. The strategy was launched in 2003 and renewed in 2008, and its progress is measured at approximately three-year intervals by a standing committee of the Alberta Water Council. The latest *Water for Life Implementation Review 2016 to 2019 (2021)* recommends a One-water approach (for Alberta, this includes drinking water, waste water, storm water, and water reuse). The first milestone is to provide advice to the Government of Alberta by 2024, which indicates that an actual implementation is years away. However, Alberta has recognized that this is a future direction they wish to explore.

Watershed Planning and Advisory Councils<sup>18</sup> were one of the medium-term goals from the original Water for Life strategy that was successfully implemented. They are independent, non-profit organizations that work with all levels of government and the public to seek stakeholder consensus on watershed level resource management. There are 11 in total, representing the major river basins in the province.

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<sup>18</sup> Further information is available online at <https://www.alberta.ca/watershed-planning-and-advisory-councils.aspx>

Table 15: Lessons learned about Strategic Planning applicable to First Nations

<b>New Zealand</b>	<b>Alberta</b>	<b>AFNWA</b>	<b>Other First Nations</b>
<b>Integrated water management</b>			
<b>Yes</b> <i>Three Waters Reform</i>	<b>No</b> <i>Beginning to explore a One-water approach</i>	<b>Recommended</b> <i>The AFNWA is currently developing Nujo'tme'k Samqwan which integrates drinking water and wastewater</i>	<b>Recommended</b> <i>Integrating water management aligns with Indigenous ways of knowing. Satisfies Expert Panel recommendation #3: "be based on best practices from within Canada and other jurisdictions..."</i>
<b>Recognition of the advantages of watershed-level water governance</b>			
<b>Yes</b> <i>Local Government boundaries roughly established around sub-catchments</i>	<b>Yes</b> <i>Watershed Planning and Advisory Councils</i>	<i>New initiatives in this area should focus on honouring traditional water and land rights, and respecting Treaty rights where applicable. Satisfies Expert Panel recommendation #3: "be based on best practices from within Canada and other jurisdictions..."</i>	
<b>Drinking Water Regulator</b>			
<b>Yes</b> <i>Taumata Arowai since November 2021</i>	<b>Yes</b> <i>Alberta Environment and Parks</i>	<b>Recommended</b> <i>The AFNWA has the human-resource capacity to address the current regulatory void and is working with ISC to determine how to approach the question of a regulator for their drinking water systems</i>	<i>Must be a place-based solution, and satisfy Expert Panel recommendation #2: "be based on best practices from within Canada and other jurisdictions..."</i>

## 5.9 Conclusion

Using the WHO water safety plan framework as a theoretical backdrop throughout the jurisdictional scan, eight main themes emerged as enablers to WSP implementation in the jurisdictions. However, success of an initiative in one jurisdiction does not necessarily translate to success in other jurisdictions, and one perceived strength of the WSP is its adaptability to

local context. In this section the main legislation supporting each initiative was outlined for New Zealand and Alberta, and its applicability to the AFNWA and other First Nations was assessed. Recommendations for the use of initiatives in a First Nations context were grounded by recommendations from the Expert Panel (Swain et al., 2006).

## Chapter 6 Discussion

### 6.1 Introduction

In the previous section, a basic understanding of how water safety plan governance initiatives influenced implementation in New Zealand and Alberta was provided, and lessons that are applicable in a Canadian First Nations context based solely on the governance and management frameworks were identified. In this section, the discussion will be centred on broader conclusions that were drawn from the literature review and the second phase of the jurisdictional scan, and supported by the Expert Panel recommendations.

The AFNWA is the first Indigenous owned and operated regional water utility in Canada and there is no precedent of any kind. The AFNWA's early adoption of WSP favours a successful WSP implementation, as the risk management culture will be present from the beginning. The uniqueness of the AFNWA also means that recommendations around WSP implementation and governance in literature are not directly transferable to the First Nations context and must be reviewed with a critical eye and in dialogue with communities. Finally, the decision to implement water safety plans and how they are governed is highly dependant on the local context and the capacity within the community. Thus, First Nations implementing independently from the AFNWA should look toward place-based solutions.

### 6.2 WSP works best if it comes with intentional culture change

Water safety plans are recognized for their ability to exist alongside regulations, without needing regulations to be operationalized (Hanrahan, 2017; Hasan et al., 2021; Herschan et al., 2020). The literature review revealed that for water safety plans to be truly successful in this regard, they must be implemented with intention, and be accompanied by a culture change.

Those involved in the operation, management, and funding of water systems must be educated and supported to shift from compliance monitoring and corrective action to risk-informed monitoring and preventative action. Both Canada and New Zealand transformed their



water cultures in the early 2000s, supported by a global interest in water security as 2005-2015 was named the International Decade for Action “Water for Life” (Resolution Adopted by the General Assembly on 23 December 2003, International Decade for Action, ‘Water for Life’, 2005-2015, 2004). In the New Zealand jurisdiction, we see examples of breaking down old ways and rebuilding with a new vision. Water safety plans were the new vision and they were woven into all aspects of New Zealand’s water management framework, implementing them in lockstep with the WHO recommendations. Canada’s current water culture also emerged in the early 2000s following the Walkerton outbreak and subsequent inquiry, which influenced the adoption of the multi-barrier approach shortly thereafter. This approach recognizes the importance of risk management and the use of barriers along the entire water system from source to tap to reduce risk. However, it still holds at its core an emphasis on compliance monitoring and corrective action instead of aligning operational monitoring and practices to system-specific risks.

On observing the documentation of Alberta’s implementation of water safety plans, and speaking with water professionals in the jurisdiction, my observation is that the culture shift to prevention did not occur even as WSP became obligatory in Alberta. At the moment, WSP remain a top-down mandate that water suppliers fulfill for compliance reasons.

Interestingly, in New Zealand, where the water governance framework was rebuilt with WSP as a central tenant, one could argue that WSP have evolved into a compliance tool in that jurisdiction as well. The waterborne illness incident in Havelock North in 2016 revealed that a water treatment system can be compliant with the water quality standards and be in possession of an approved water safety plan and still experience a major outbreak. Water professionals in New Zealand have recognized the attitude of complacency with WSP for both utilities and regulators, which has motivated the government to design a new water regulator and implement key changes in roles and responsibilities spanning WSP approvals. One major change is that water suppliers are now to be held accountable for the quality of their WSP.

The AFNWA is in the unique situation that it is an organization with no prior “organizational culture”. The groundwork for WSP was laid in the years leading up to the

creation of the AFNWA, as workshops with First Nations Elders and leadership were conducted to determine the service delivery model and the basic ethos of the organization. Akin to the New Zealand model of implementation, the WSP can be woven into the organizational culture. With the example of New Zealand's recent water reforms, the AFNWA can begin their WSP journey with the knowledge that fundamental to the WSP's success is the culture of prevention coupled with a continual renewal of the risk process, following incidents, upgrades, or new knowledge.

### 6.3 This is uncharted territory for First Nations' water governance

The next lesson that can be drawn from the jurisdictional scan and literature review is that the AFNWA is in uncharted territory and should not rely solely on current WSP scholarly literature to base their assumptions. There are no known examples in literature of a new organization building its regulatory framework with a commitment to water safety plans. The vast majority of WSP implementations in developed countries share similarities with Alberta's implementation, where the motivation is present to adopt water safety plans, and the most appropriate method (for any number of reasons) is to adapt the WSP principals to the already existing organizational culture (Herschman et al., 2020; Viljoen, 2010). However, Herschman et al. (2020) further cautions that adapting WSP into already existing organizational culture may perpetuate already existing prejudices, which is a valid warning when considering the First Nations context.

Many of the articles pertaining to WSP governance point to "enablers" that support implementation, for example, Vieira (2011) advocates for actions at a national level. In the New Zealand jurisdiction, the enablers were evident and functional, supporting a nation-wide adoption of WSP. However, this is an example where the literature is not directly transferrable to the AFNWA in the short term, given the regulatory void that currently characterizes drinking water governance for First Nations. The long-term goal is to repeal and replace the *Safe Drinking Water for First Nations Act 2013* with legislation that has been co-developed by and

with First Nation leadership, but during the period of transition, the flexibility of water safety plans affords an immediate alternative.

In the case of the AFNWA, it will be through internal motivation that this enabling atmosphere will be fostered. The grouping of 17 distinct First Nations into an Indigenous owned water authority, guided by Western best practices and an Elder's Advisory Lodge is re-writing the narrative on water management for First Nations. The examples in literature must be evaluated with a critical eye before blindly applying regulatory enablers to the First Nations context. The basic principles of self-determination and honouring treaty rights<sup>19</sup> must be the centre of any regulatory framework, followed by meeting the recommendations from the *Expert Panel on Safe Drinking Water for First Nations* or other rigorous processes where the communities in question have the opportunity to express their priorities (such as the workshops conducted to determine the service delivery model of the AFNWA) (Halifax Water, 2017).

#### 6.4 The use of WSP must be a place-based solution

The AFNWA aims to address systemic issues in water governance for the member First Nations, and the WSP is one tool among others that the water authority will apply to achieve this goal. The use of WSP in the participating communities is facilitated by the AFNWA acting as a coordinating agency (Oluwasanya & Carter, 2017), and support at the Board of Directors and senior management level (Summerill et al., 2010). With these two factors influencing the AFNWAs implementation, the water authority is better suited to look to other jurisdiction, such as New Zealand and Alberta, for lessons learned.

In the case of other First Nations interested in using water safety plans outside of the water authority, the lessons learned in this jurisdictional scan are less transferable. The most common comment in the Tables in Chapter 5 remains, "must be a place-based solution". The

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<sup>19</sup> On the East Coast, Treaty Rights derive from the Peace and Friendship Treaties and do not involve First Nations surrendering rights to traditional lands and resources <https://www.rcaanc-cirnac.gc.ca/eng/1100100028589/1539608999656>

strength of the WSP implementation in the AFNWA begins with its conception as a bottom-up solution and the organization's commitment to Indigenous ontologies, and it is supported by addressing capacity issues. Based on the literature, a top-down mandate for water safety plans in all First Nations would be ineffective (Graham, 2003; Swain et al., 2006; Wilson et al., 2021), rendering it an exercise in compliance. Both New Zealand and Alberta have struggled with this problem.

The themes centred around transparent communication, respecting and including Indigenous worldviews, and providing an avenue for appeals, however, were directly applicable to all First Nations. These themes are aligned with the consistent message from Indigenous peoples over the years, including the recommendations for a regulatory framework from the Expert Panel (Swain et al., 2006).

## 6.5 Conclusion

Although both Canada and New Zealand undertook major reforms to their water governance in the early 2000s, both jurisdictions have struggled with truly adapting to a culture of prevention rather than compliance monitoring. In terms of risk culture, the AFNWA has the distinct advantage of committing to water safety plans early, enabling risk-informed monitoring and preventative action to be woven into the ethos of the organization. The AFNWA should continue to question “enablers” in literature and confirm that they align with the de-colonizing approach of the water authority. For other First Nations interested in implementing water safety plans, this research identified lessons for transparent communication, including Indigenous worldviews, and providing avenues for appeals. However, the remainder of the themes explored are best applied using a place-based solution, therefore direct recommendations were not offered.

## Chapter 7 Conclusion

### 7.1 Limitations and future work

The most blatant limitation in this study is the lack of Indigenous voice in research design, which is discussed in Section 1.3. Throughout the duration of this research, open and reciprocal communication was established with the AFNWA on a monthly basis to provide updates and solicit feedback, which was beneficial and helped to establish context. This evolved into regular meetings with the Elder's Advisory Lodge. However, academic timelines emerged as a second limitation to designing a participative research design. The research team is committed to spending time building a relationship with the Elders and communities and our goal is to work collaboratively in the future. The aim is to ensure future research topics and methods will be developed co-operatively, and to expand the research team's outreach to include Indigenous youth.

Another important factor that was absent in this research was the consideration of financial dimensions of water management and governance. Funding, financial subsidies, capital upgrades, levies, etc. are all beyond the scope of this work but have an important impact on effective water governance. As the AFNWA represents a new governance paradigm where drinking water and wastewater assets are transferred to the water authority, including capital and operational budgets, there is room for future studies specifically focusing on the interaction between the water safety plan, the capitol upgrades plan, and long-term funding. Reduction of operational costs and more efficient capital costs are particularly cited in literature as potential performance indicators for the effectiveness of water safety plans.

The Three Waters Reform in New Zealand occurred in the last quarter of this research, which limited the researchers from including new legislation in the scope of this work. New Zealand is still in a period of transition, and not all changes have been developed or adopted at this time. However, while discussing WSPs with water professionals in New Zealand, it became clear that there is a relationship between WSP and the motivations for the reform, as well as

interesting proposed changes to how WSP are governed. Once New Zealand has completed its transition, future work could concentrate on the role of WSP in the Three Waters Reform.

## 7.2 Conclusion

The jurisdictional scan revealed transparent communication, respect for Indigenous worldviews (operationalized through *Etuaptmumk*), and ensuring an equal relationship by making space for an appeals process were themes that are applicable to all First Nations interested in implementing a preventative water management strategy such as the WHO recommended water safety plan. The AFNWA has emerged as a coordinating agency for affiliated communities in Atlantic Canada and the added capacity this affords them results in a broader transferability of lessons learned from the jurisdictional scan, especially given their early commitment to WSP. However, it is important that First Nations implementing WSP, including AFNWA member-communities, remain critical of the enablers to implementation that are described in the literature. Most studies focus on top-down implementations and do not adopt a de-colonizing approach.

The AFNWA derives its authority from the Indigenous-majority Board of Directors, which is culturally guided by the Elders Advisory Lodge. This represents a new paradigm in drinking water management for one group of Canada's First Nations and a step forward for self-determination and *Etuaptmumk*. By adopting a culture of stewardship and prevention, capacity-building and self-determination, this innovative approach of a First Nations owned and operated water authority may become recognized as an effective mechanism to transform the status-quo in water management for First Nations.

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