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## Addressing Water Security Through First Nations-Municipal Cooperation

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# **Addressing Water Security Through First Nations-Municipal Cooperation**

Subject keywords: Multi-barrier Approach, Water Governance, First Nation-Municipal Cooperation, Safe Drinking Water, Water Security

Geographical keywords: Canada, Ontario, First Nations communities

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## **Abstract**

To what extent can municipalities support a multi-barrier approach (MBA) to improving First Nations water security in Ontario? Through a systematic content analysis of legislation, standards, guidelines, and reports, capacities of First Nations and municipalities to implement the MBA are identified in relation to the approach's three barriers: source water protection, water treatment systems, and water distribution systems. The results of this paper show that municipalities are equipped with the capacities to support a First Nations' MBA, and are particularly well equipped in their managerial, technical, and political capacities to support efforts of source water protection. Water treatment and distribution, on the other hand, are much more heavily governed by higher-order government control and so local actors do not have much to offer in the way of support for these barriers. The paper ends with a discussion of potential opportunities for cooperation between municipalities and First Nations in Ontario in using the MBA to address First Nation water security.

Subject keywords: Multi-Barrier Approach, Water Governance, First Nations-Municipal Cooperation, Safe Drinking Water, Water Security

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## **Chapter 1: Introduction**

Canada is fortunate in its abundant access to water, from the Great Lakes to the Atlantic and Pacific oceans, and all the rivers and streams in between. Water has shaped our history, our economy, but most importantly, it has played a huge role in the quality of life Canadians have been able to pursue over time (Longboat 2013, 6); (Galway 2016, 1). Enjoying access to water for drinking, bathing or food preparation, free of disease-causing organisms, with minimal taste and odour is a luxury many indulge in (“From Source to Tap: Guidance on the Multi-Barrier Approach to Safe Drinking Water”, 2004);(Safe Drinking Water for First Nations Act). Unfortunately, this reality varies drastically across the country, and First Nations communities are among those whose lacking access to safe drinking water have severely impacted their quality of life. The First Nations water security problem has been an enduring policy issue for years and is an ongoing reminder of the differences in living standards between many First Nations and non-First Nations communities (Gerster and Hessey, 2019); (York, 2019).

Efforts to address this problem have been pursued and addressed by institutions at various levels of government, from the federal and provincial levels to First Nations communities themselves. These initiatives have included encouraging coordination between these agencies to foster some alignment of water governance at all levels. In this way intergovernmental cooperation plays a key role in both water governance and in developing a sustainable solution to the First Nation water security problem.

The multi-barrier approach (MBA) is a prominent model for effective water governance and the main method behind these actions. It is defined as an integrated system of procedures, processes and tools that collectively prevent or reduce the contamination of drinking water from

“source-to-tap” in order to reduce risks to public health (Aboriginal Affairs and Northern Development Canada, 2014). The MBA embraces the kind of intergovernmental cooperation needed to address the First Nation water security problem, but one level of government that is prominently excluded is the local level

In Ontario, municipalities play an active and key role in water governance, from treatment to distribution of water, to owning and operating the facilities that provide these services. While higher order governments legislate, local actors act on strategies and apply the capital and skills necessary to ensure safe drinking water is delivered to communities. Water systems are therefore a key component in local public works, making water a key area of local public administration, and municipalities an important actor in water governance. The latter leads to inquiring what role municipalities may play in contributing to the MBA and the whole First Nation water security file (Walters et al., 2012).

Assuming that Ontario municipalities recognize this and their collective duty to work with all governments and organizations to protect the health of all Canadians, the guiding research question of this paper is: **“to what extent can municipalities support a multi-barrier approach to improving First Nations water security in Ontario?”**. To answer this question, this project explores the different capacities of First Nations and municipalities in terms of their ability to implement the MBA. The goal is to uncover opportunities for First Nations and municipal cooperation to implement an MBA, providing an alternative method to address First Nation water security in Ontario.

To accomplish this goal, the paper collects First Nations and municipal related documents to assess general capacities to implement the MBA’s three barriers: source water protection, water treatment, and water distribution. To organize the data, thematic codes, generated by key words

and topics identified in the literature review, are identified in reviewed documents that describe different components of First Nation and municipal water governance. Data analysis compares keywords and codes along the components of the MBA and are assigned a no, weak, or strong evaluation depending on their contribution to implementation.

Rather than collect interview data from specific communities, the logic of the methodology is to paint a broad picture of the general capacities of First Nations and municipal governments to contribute to an MBA and opportunities where cooperation may enhance implementation efforts to address the water security problem. Doing so will not only help practitioners recognize the range of possible areas for intergovernmental cooperation but may also provide useful background information for future scholars that may wish to study relationships in more depth.

The remainder of the paper is structured as follows. The second chapter describes and outlines the multi-barrier approach to water governance in the context of Canada. The third and fourth chapters provide summaries of the data collected and explore First Nation and municipal capacities to implement the MBA respectively. The final chapter presents the identified opportunities of First Nation-municipal cooperation in addressing water security through the MBA.

## **Chapter 2: Literature Review**

The following chapter provides some background information on the history of water governance in Canada. It fully describes the multi-barrier approach (MBA), its theoretical assumptions, its specific components, and the differing jurisdictions of its application. It concludes with a detailed review of the research methodology and the concept of capacity as used in subsequent chapters.

### **Water Governance in Canada**

The onset of government involvement in actively managing water resources can be traced back to the 19th century with the sanitary revolution (Rogers et al. 2002). The abundance of freshwater and its high public value had proved it to be an important resource, especially with the growing sizes of communities and an increasing need for water. However, as populations grew, and water remained largely unregulated, the need to ration became apparent, prompting governments to intervene. The quality and safety of our drinking water supply became a priority in the 20th century. With the rise of quality and disinfection standards, prioritizing the elimination of life-threatening diseases like typhoid fever, cholera, and other microbiological pathogens that lived in source waters and compromised human health (“From Source to Tap The Multi-Barrier Approach to Safe Drinking Water”, 2002). As a result, these macrolevel trends encouraged the inclusion of water governance into government jurisdiction. Water governance in Canada is made up of political, economic, and administrative institutions that oversee all activity and decision-making pertaining to water. Now in the 21st century, it has developed to involve all levels of government, and its effectiveness is even more pivotal with a public who recognize the importance of equitable access, accountability and transparency in its management (Batchelor, n.d).

## Introduction to the Multi-barrier Approach

The multi-barrier approach (MBA) is also known as the source-to-tap process that seeks to ensure the quality and delivery of safe drinking water. The MBA takes a detailed account of water sources, their surrounding environments, and the potential threats that compromise water's safety for public consumption. At its core, the MBA intends to protect the quality of safe drinking water with the use of multiple barriers that address potential threats at critical points in the source-to-tap process (see figure 2.1) (Health Canada, 2013); (Ministry of Public Works and Government Services, 2006). In Ontario specifically, the rise of the MBA came after the Walkerton, Ontario tragedy of 2000 ("Chapter 1", 2002 ). The recommendations that were produced from the launched inquiry resulted in a dramatic restructuring of how water was to be governed in the province. It also set the tone for increased government intervention and attention on water's immediate impact on public health. In its endorsement for a more cohesive methodology, the MBA offered an increased integration of water planning from the source to consumers' taps, looking at the entire water process from individual and complementary parts (The Multi-Barrier Approach to Safe Drinking Water, n.d.); ("From Source to Tap The Multi-Barrier Approach to Safe Drinking Water", 2002); ("Chapter 3", 2002.); ("Chapter 1", 2002.); ("Draft Users' Guide: National Environmental Standard for Sources of Human Drinking Water" , n.d.), ("Multi-Barrier Approach", n.d.).

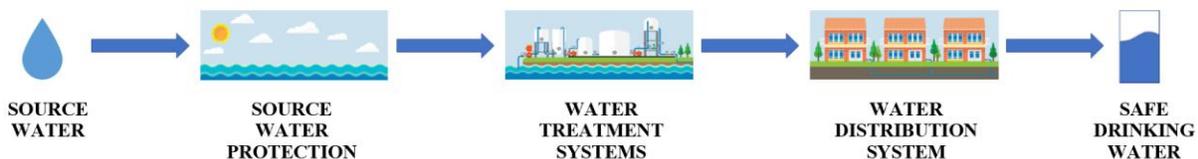


Figure 2.1: Source-to-tap Process (author created)

Deconstructing the MBA reveals two prominent theories that are key to understanding how the MBA can improve water security. The first is the precautionary principle, a concept that embraces a practical risk management perspective that prioritizes safety and public health above all else (“Chapter 3”, 2002). This principle is reflected in the design of the MBA, which is systematically structured to prioritize the anticipation of potential or imminent threats to safety, aiming to mitigate as many risks as possible through the creation of multiple barriers (“Chapter 3”, 2002). The fact that these barriers exist throughout the water system reflects the logic of the second philosophy, the system of redundancies (see figure 2.2). It is more effective to have multiple measures in place to address threats because if one fails, another barrier is there as an added protection. As water moves from source to treatment and distribution, it will have passed numerous barriers that ensure its quality and integrity before arriving to the consumer (Aboriginal Affairs and Northern Development Canada, 2014). Achieving the end goal of safe drinking water, therefore, depends on having clean source waters, effective treatment and sound distribution systems, and the MBA appropriately highlights the importance of each of these barriers in the source-to-tap process.

### The Barriers



<b>First Barrier</b>	• Source Water Protection
<b>Second Barrier</b>	• Water Treatment Systems
<b>Third Barrier</b>	• Water Distribution Systems
<b>Result/Goal</b>	• Safe Drinking Water

Figure 2.2: System of Redundancies in the Multi-barrier Approach (author created)

The first barrier, source water protection, refers to measures that prevent and minimize threats from compromising sources of raw water supplies. Source water includes watersheds like lakes, rivers, underground reservoirs, surface water, aquifers, and groundwater (“Multi-Barrier Approach”, n.d.) (“From Source to Tap The Multi-Barrier Approach to Safe Drinking Water”, 2002). It is here where water is in its most natural state, raw and untreated (Aboriginal Affairs and Northern Development Canada, 2014). Understanding source waters is an important first step in delivering safe drinking water to the public. Providers need to ascertain that the quality is decidedly safe for human consumption, whether it can sustainably supply water for the duration it will be used for, and the overall demand that will be placed on it (“Guidance for Safe Drinking Water in Canada: From Intake to Tap”, 2001). Source water protection can be implemented in many ways, from creating actual protection plans, conducting sanitary surveys, as well as regulating access and exposure to potential threats (“Guidance for Safe Drinking Water in Canada: From Intake to Tap”, 2001)

The second barrier is drinking water treatment, and refers to measures that ascertain the water’s quality and cleanliness prior to its mass distribution (“Multi-Barrier Approach”, n.d.) Treatment includes filtration through sieves and sanitation through UV lighting or chlorination (Aboriginal Affairs and Northern Development Canada, 2014). The treatment that occurs here is considered the primary phase of disinfection, and the part of the process designed to remove physical waste from water and eliminate harmful entities like pathogenic microorganisms that can cause harm to humans (“Protocol for Safe Drinking Water in First Nations Communities”, 2006). Proper water treatment includes routine maintenance and providing the highest quality of training and certification to operators and handlers of the systems (“Guidance for Safe Drinking Water in Canada: From Intake to Tap”, 2001).

The last barrier is drinking water distribution systems, and refers to the design, construction, and operation of physical and other infrastructure that deliver water to households, businesses, and other users (“Multi-Barrier Approach”, n.d.). Water must be maintained throughout the distribution systems after its primary treatment, and must follow governmental by-laws, regulations, system capacity, emergency water storage, and best practices for containing contamination prior to being consumed. Efforts to upkeep water distribution systems include maintenance, testing, and monitoring quality of drinking water (Aboriginal Affairs and Northern Development Canada, 2014). In the last barrier, a second phase of disinfection occurs via a discharge of a residual disinfectant like chlorine to prevent re-growth or re-activation of microorganisms as water is distributed to users (“Protocol for Safe Drinking Water in First Nations Communities”, 2006).

Ideally, all three barriers would work in tandem with one another, complimenting efforts and actions to maximize potential impact on water quality. In practice however, achieving this ideal where all barriers work in perfect alignment is complicated by jurisdictional boundaries in which different governments are responsible for different barriers. As such, the MBA reiterates the importance of intergovernmental cooperation. Unfortunately, the current reality of First Nations communities suggests that water governance practices have yet to grasp this level of alignment.

### **Jurisdictional Boundaries**

All levels of government in the Canadian water system have a role to play in governing water, but at times, the roles and responsibilities of each are unclear. The federal government passed the *Canada Water Act* as a means to “protect existing and future sources of drinking water”

(s. 1.) in Canada. Technically speaking, however, the federal government only has oversight over water on federal lands such as military bases, national parks, and First Nations reserves. With any matter relating to First Nations and water, Health Canada, Environment Canada, Indigenous Services Canada, Crown-Indigenous Relations and Northern Affairs Canada, and Public Works and Procurement all become involved to a certain degree (“From Source to Tap: Guidance on the Multi-Barrier Approach to Safe Drinking Water”, 2004). While First Nations predominantly fall within federal jurisdiction, some leniency and independence are given to Chiefs and band councils in exercising water related duties. Only under these duties can First Nations organize to address the water security problem.

Provincial governments, conversely, are responsible for managing natural resources, which includes water protection, quality, and ensuring drinking water remains of proper standard as stated under section 92 of the *Constitution Act* (“From Source to Tap: Guidance on the Multiple-Barrier Approach to Safe Drinking Water”, 2004). Additionally, the “conservation and management of natural resources, supply and efficient use of water, the minimization of waste, the development of safe and healthy communities, and the protection of public health and safety” are specifically cited as provincial responsibility in section 2 of the *Ontario Planning Act* (1990). All provinces and territories have passed legislation that regulates the protection of water, construction and operation of treatment and distribution systems, as well as standards and guidelines for how management and monitoring must take place (“From Source to Tap: Guidance on the Multi-Barrier Approach to Safe Drinking Water”, 2004). Legislation such as the *Ontario Water Resource Act* regulates the “conservation, protection and management of Ontario’s waters and for their efficient and sustainable use” at the provincial level (s. 1(1)). When it comes to the implementation of these regulations, however, much of this responsibility is downloaded onto local governments.

In their own jurisdictions, municipalities are the primary service providers of water services to their residents and are major investors in their proper governance (“From Source to Tap: Guidance on the Multiple-Barrier Approach to Safe Drinking Water”, 2004). Beyond the actual service delivery, municipalities also have oversight on activities that directly impact water such as winter control (i.e. salting, sanding, snow removal) and waste management, two common sources of watershed pollution. Municipalities also ensure that citizens and businesses alike are following regulatory standards that are set by the province in accordance with water protection and delivery (Walters et al., 2012). Lastly, treatment and distribution systems are commonly housed at the local level and provide another formal role that municipalities play in the water governance system and the application of the MBA.

While each government is assigned their respective jurisdiction, it is evident that there is overlap. Figure 2.3 below demonstrates how all governments are implicated in water and therefore its governance. These intersection points identified are among the many ways in which federal, provincial, and local governments can influence the implementation of the MBA through their connection to water governance. From source water protection, water treatment, to water distribution, each level has a degree of control over activities that ultimately impact water conditions that can have positive or negative implications on their First Nations counterparts. Recognizing that each level of government has the potential to support a First Nations MBA to improve their water security acknowledges an opportunity to explore opportunities of cooperation in depth. The next section will explain how this paper intends to explore opportunities for a First Nation-municipal relationship to implement an MBA.

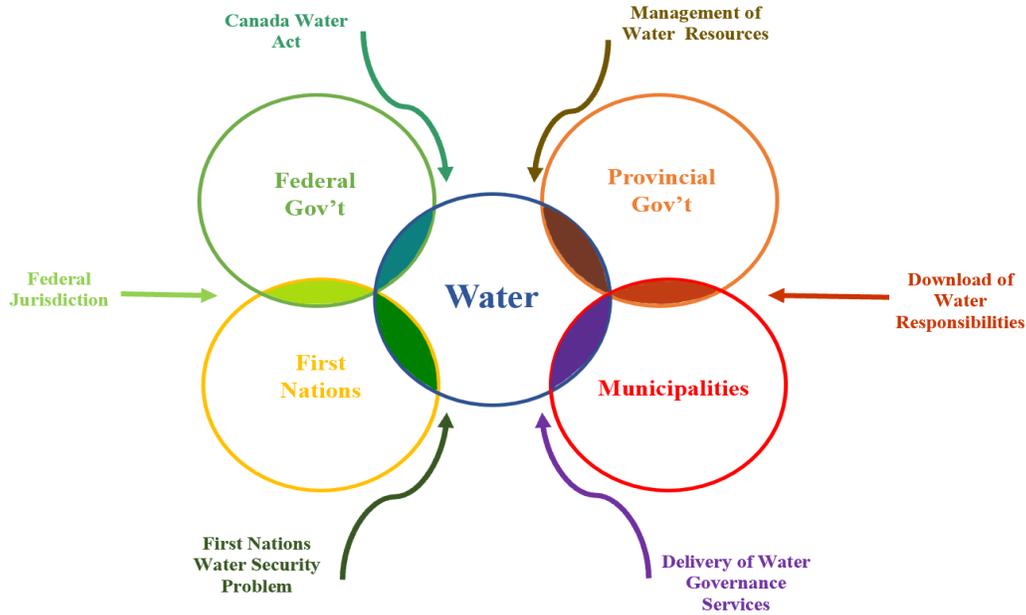


Figure 1.3 Jurisdictional Overlap (author created)

## Data and Methods

The research question of this paper adapted a qualitative coding technique. Through the literature review, a list of keywords that pertained to First Nations and municipal water governance as well as the MBA's three barriers was generated. Selection of data sources involved combing through documents that were freely available online through databases such as Canlii.ca and Open Government Portal, as well as public search engines such as Google and Ontario.ca/laws. The first list of keywords helped with the selection of data sources, filtering items that contained the chosen keywords for analysis (see appendix A for lists of keywords used). In total, 27 types of content, ranging from legislation, regulations, guidelines, standards, and reports were selected and reviewed. Specifically, 11 documents pertained to First Nations water governance, 11 documents pertained to municipalities water governance, and five documents pertained to both.

Capacity is the main variable in the analysis and its definition is inspired by the work of Walters et al. (2012) and Loe and Lukovich (2004). The term refers to the ability to plan, enact, and sustain activities that result in safe drinking water for communities. The “capacity to implement” describes what the state of water governance is currently like in First Nations and municipal governments to implement the MBA. Identifying First Nation capacity maps out what powers they have or do not have to implement the barriers, and the areas in which municipalities should or should not overstep. Finding municipal capacity helped identify what powers are within their jurisdiction to support First Nations implementation of the MBA. Analysis of capacity is on a no-weak-strong spectrum and helps identify where cooperation is most needed and most effective.

To analyze the data, two tiers of codes were assigned to each unit of information that was identified by keywords in the data sources. Appendix B illustrates the full scheme of codes, with the first tier of codes reflecting keywords and concepts relevant to the study and research question (e.g. 1, source water protection). The second tier of sub-codes reflected the presence or lack of capacity of First Nations and municipalities to implement the barriers (e.g. 1.1 indicated First Nations capacity, and 1.2 indicated no First Nations capacity). Additional codes were added to reflect general research topics (e.g. 5.1 indicated mention of First Nations or Aboriginal Government, and 5.3 indicated mention of the MBA).

The “find” functions on browsers helped with identifying any mention of keywords. In cases where there were results, each mention and its corresponding section of text was analyzed and assigned an appropriate code. For example, if a document suggested municipal capacity to oversee a source water protection activity, the code assigned to it would be 1.3, indicating a “municipal capacity to implement barriers for source water protection”. This pattern was applied

for each of the 27 documents reviewed, with each new data point entered into an excel chart that organized the data based on the following scheme:

- a. Type of data source (legislation, regulation, guideline, report)
- b. Relation to First Nations, municipalities, or both
- c. Location of relevant information (Section, title, etc.)
- d. Code assigned based on taxonomic scheme
- e. Capacity (No, Weak, Strong)

With the nature of coding techniques, additional details were uncovered as the research progressed, and so to accommodate the new information, the outlined methodology was performed twice. The second pass of the documents included additional keywords that were added to the network of related concepts that pertained to the MBA, First Nations, and municipalities (see “second-order code” keywords in Appendix C).

### **Discussing Capacity**

As previously mentioned, capacity to implement the MBA is the main unit of analysis. In the same way that water governance takes on many forms, so too does capacity to implement. For the purposes of this paper, managerial, technical, and political capacities to implement the MBA will be explored. Loe and Lukovich (2004), Walters et al. (2012), and Dyck et al. (2015) are among some of the authors who refer to the importance of managerial and technical capacity, speaking directly to the importance of decision making within jurisdictions and the ability to perform technical services as required. The addition of political capacity was inspired by the work of Brown et al., (2015) and Longboat (2013), directing the paper’s focus on intergovernmental cooperation.

**Managerial capacity** refers to a government’s jurisdictional independence to control activities within the source-to-tap system. Having managerial capacity means having the legislative autonomy to coordinate the MBA within their jurisdiction. **Technical capacity** refers

to a government's responsibility to independently implement water policy. Having technical capacity is having access to resources that allow the government to meet and implement water standards through operations, services, or programs. Lastly, **political capacity** refers to a government's ability to independently engage in cooperation over water governance. Having political capacity is being able to build, promote, or maintain partnerships for cooperative water governance internally within the government or externally with other water stakeholders.

The original coding scheme only created two codes to capture the “capacity to implement”, no capacity and capacity, where the latter encompassed its weak and strong variations. As such, determining if a capacity was weak or strong required deeper analysis and consideration of all data points. The determination of a weak or strong managerial, technical, or political capacity therefore was highly subjective, where the final evaluation depended on the capacity's relative significance on implementing the barrier in specific contexts, and not the amount of mentions in the reviewed documentation. For example, in table 3.2, the 15 units of information that indicate a capacity to implement source water protection does not equate to a strong capacity as it is rendered weak in the context of First Nation source water protection as a whole. The table below offers a general guide of how these differing capacities were evaluated (see table 2.1). In the following chapters, that data is evaluated to assess the capacity of First Nations and Ontario municipalities in each of these areas as they relate to source water protection, water treatment, and water distribution.

**Defining Capacity to Implement the MBA (Table 2.1)**

		<b>Examples</b>		
<b>Type of Capacity</b>	<b>Definition</b>	<b>No Capacity</b>	<b>Weak Capacity</b>	<b>Strong Capacity</b>
Managerial	The jurisdictional independence to control activities within the source-to-tap system.	No jurisdictional independence over activities in source-to-tap process; cannot legislate over source water protection, water treatment, or water distribution.	Some jurisdictional independence over activities in source-to-tap process; can legislate over source water protection, water treatment, or water distribution to a limited degree.	Complete jurisdictional independence over activities in source-to-tap process; can legislate over source water protection, water treatment, or water distribution without limitation.
Technical	The responsibility to independently implement water policy.	No responsibility to independently implement water policy.	Some responsibility to independently implement water policy; limited access to resources to implement.	Strong responsibility to independently implement water policy; complete access to resources to implement.
Political	The ability to independently engage in cooperative water governance.	No ability to independently engage in cooperative water governance, internally or externally	Some ability to independently engage in cooperative water governance, internally or externally	Strong ability to independently engage in cooperative water governance, internally or externally

## **Chapter 3: Evaluating First Nations' Water Governance**

The following chapter summarizes the findings of the content analysed for First Nations capacity to implement the MBA, and the table below organizes the 16 documents (see table 3.1). Before exploring their capacity to implement the MBA, an overview into the roots of the water security problem will provide some context into the history of the problem. Overall, the findings suggest that First Nations have a weak capacity to implement the MBA in its entirety, ultimately limited in their managerial, technical, and political activities due to federal oversight.

**Contents Reviewed - First Nations (Table 3.1)**

	<b>Legislation</b>	<b>Regulation</b>	<b>Protocol/Guideline</b>	<b>Report</b>
<b>Federal</b>	<b><i>Canada Water Act</i></b>			
	<i>Canadian Environmental Protection Act</i>			
	<i>Indian Act</i>			
	<i>Safe Drinking Water for First Nations Act</i>		Protocol for Safe Drinking Water in Canada: from Intake to Tap (2001)	
<b>Provincial</b>	<b><i>Clean Water Act</i></b>			
	<b><i>Ontario Planning and Development Act</i></b>			
	<b><i>Ontario Water Resources Act</i></b>			
	<b><i>Planning Act</i></b>			
<b>First Nations</b>	<i>First Nations Land Management Act</i>	<i>Indian Band Council Procedure Regulations</i>	Design Guidelines for First Nation Water Works (2006)	First Nations On-Reserve Source Water Protection Plan (2014)
			Protocol for Safe Drinking Water in First Nations Communities (2006)	Maintenance Management Plan for Drinking Water and Wastewater Systems in First Nations communities (2014)
			Guidance for Providing Safe Drinking Water in Areas of Federal Jurisdiction Version 2 (2013)	

\***Bolded titles** indicate documents evaluated for both First Nations and Municipalities

**Roots of the First Nation Water Security Problem**

It is important to recognize the colonial roots of the First Nation water security problem (Castleden et al., 2017). As settler communities migrated and established themselves across Canada, dependence on accessible freshwater grew as industries were established. Beyond its uses for personal consumption, water eventually acquired an economic value as it became integral for

business (Rogers et al. 2002). Licensing access to freshwater became a rationing mechanism among the population that simultaneously controlled who was granted access. Priority access was considered a right reserved only for senior license holders, of which many settlers were, and many First Nations people were not (Reading et al., 2011). The license system effectively excluded First Nations from consuming and benefiting from the resource and is an example of what Harris and Simms (2016) call colonial water governance.

In modern times, solutions to address the systems and arrangements of colonial water governance and to reduce the differences between the living standards for First Nations and non-First Nations have included major policy and funding initiatives for water facilities during the 1990s and early 2000s (The Walrus, 2019);(Marshall, 2013). Despite these efforts, the water security problem continues to persist. Commonly cited factors for its persistence beyond the jurisdictional confusion explored in this paper, include inadequate resources, unique challenges and circumstances of remote locations, mismanagement, and short-term solutions that have delayed and disrupted progress (York 2019);(Harris and Simms, 2016).

Steps have been taken to improve First Nations' water security and its conditions. Prime Minister Justin Trudeau's government, re-elected in 2019, has committed to working with First Nations communities to "improve water infrastructure on reserves, end long-term drinking water advisories, [and] prevent short-term advisories from becoming long-term" ("Ending long-term drinking water advisories", 2020). As Walters et al. (2012) recognize, however, there is variance in the ability of each First Nations community to address water insecurity and to implement the MBA, and thus no single approach will successfully improve circumstances in every community.

Dyck et al., (2015) identify key challenges that face on-reserve leadership with regards to implementing the MBA specifically. One is community wide suspicion towards elected Chiefs and

band councils, who are often blamed for being unable to protect on-reserve water and land uses as they existed. Another is that current funding models are inadequate to fully implement the MBA , forcing band leadership to choose between prioritizing one or more barriers rather than all of them equally. Some communities, for instance, have chosen to invest money to maintain existing treatment or distribution infrastructure, instead of investing in measures to protect water sources (Dyck et al., 2015).

Access to financial resources is widely referenced as key to achieving water security (Galway, 2016); (Gerster and Hessey, 2019); (Gulli, 2015); (Harris and Simms, 2016); (Palmer 2019). Funding is distributed yearly and is determined by a mechanism that obligates the federal government to provide 80% of a First Nations water-related budget, while First Nations communities themselves are responsible for the other 20%. The reality of many First Nations communities is that they do not have enough financial resources to contribute its 20% which in turn causes denials of financial support, or delays and poor implementation of projects due to lacking funding. The assessment of funding formulas and the rationale behind distribution, while an important element of the capacity necessary to implement the MBA, is beyond the scope of this paper and will not be explored in further detail.

These experiences, as a result, have led many communities to develop a significant distrust in the systems and mechanisms of Canadian water governance (Harris and Simms, 2016); (Gerster and Hessey, 2019). Impacting people across generations and magnifying the disparity between standards of living in the country, the water security problem also highlights social and cultural implications, jeopardizing the identity of First Nations with a culture and heritage closely tied to a relationship with water (Reading et al., 2011). For as long as the water security problem continues, so too do the limits placed on their ability to pursue a life aligned with their traditions, values, and

ways of knowing water (Longboat 2013); (Reading et al., 2011). To begin understanding how these conditions can be improved for First Nations communities, the next section will discuss the outcomes of the data analysis, starting with First Nations capacity to implement source water protection.

### **First Nation Source Water Protection**

Of the 16 documents reviewed, six contained keywords relevant to First Nation source water protection, with 872 mentions of keywords that indicated some degree of capacity to implement. Overall, First Nations have some managerial capacity and strong technical capacity to implement measures of source water protection, especially through source water protection plans. They also have some political capacity to address source water protection with other local stakeholders, though a key responsibility in core reporting does not lie within their purview. While they have capacity to implement measures over their source waters, federal involvement decreases their autonomy, resulting in their **weak capacity** to implement source water protection barriers.

First Nations have a **weak managerial capacity** over source waters because they are subject to the legislation of numerous federal bodies who produce the standards and objectives for water quality on reserves. Through them, First Nations communities navigate the institutional frameworks of water governance to manage their source waters. The *Safe Drinking Water for First Nations Act* gives the Governor-in-Council, on the recommendation of the federal Minister of Indigenous Services, the power to regulate water and wastewater services for First Nations, which includes the protection of drinking water sources from contamination. Under the *Canadian Environmental Protection Act*, contamination of source waters falls under the federal Minister of Environment who sets the codes of practice for pollution prevention and mitigation. Part of this power is the ability to manage aquatic growth in bodies of water. Specifically, it is the federal

Ministry of Environment that decides the method and products used to clean the contaminated water to restore it (s.118, s.119 *CEPA*). This is an example of the high-level oversight and management over source water that sits with the federal government, suggesting that key source water protection measures like mitigating against aquatic growth are not managed at the band council level.

However, First Nations are awarded some degree of managerial capacity over their source waters through the required creation of source water protection plans. According to the *Protocol for Safe Drinking Water* (2014), First Nations must prepare source water protection plans specific to their community, implemented to “prevent, minimize, and control potential sources of contamination...[to] the community’s raw water sources” (Aboriginal Affairs and Northern Development Canada, 2014). There is a recognition that planning be at the water-shed level, and so local leadership such as the Chief, band council, and other governmental actors who oversee land use and community development, have the autonomy to develop these plans in accordance with their local needs. Another managerial power delegated to First Nations, is the administrative ability to “enact laws respecting [...] the protection of the environment” which includes legislating via by-laws over water in their own communities, as long as they align with federal legislation (s.3, *CEPA*).

In terms of technical capacity over source water protection, the data suggests that First Nations have **strong technical capacity**. Via source water protection plans, First Nations create committees, complete risk assessments, identify management actions to mitigate risks in source water, create implementation strategies, and conduct reviews every five years (Aboriginal Affairs and Northern Development Canada, 2014). They therefore have a responsibility to implement these source water protection policies As the *Protocol for Safe Drinking Water in First Nations*

*Communities* states, members of band council are deemed key executors of source water protection on-reserves to prevent, minimise, or control potential sources of contaminants in or near the community's raw water sources suggesting that community leadership has the capacity and obligation to administer these technical services. (Aboriginal Affairs and Northern Development Canada, 2014); ("Protocol for Safe Drinking Water in First Nations Communities", 2006).

In creating source water protection plans, First Nations have **some degree of political capacity** to engage, encourage, prohibit or collaborate with local stakeholders in the development and implementation of their source water protection plan ("Protocol for Safe Drinking Water in First Nations Communities", 2006). Another source of political capacity comes from the *Indian Band Council Procedure Regulations*, which stipulate the powers and legal obligations of band councils given by the federal government. Section 25 states that the band council can create standing or special committees on issues that the council deems important, such as water protection. Creating a water protection committee, for example, would see council and the committee collaborate through the reporting and recommending of action to council on matters conferred to them (s. 28, *Indian Band Council Procedure Regulations*). Other forms of political leverage that First Nations communities have include sitting on the federal environment minister's *National Advisory Committee*. Section 2 of *CEPA* states that the Government of Canada is obligated to "apply knowledge, including aboriginal knowledge, science, and technology, to identify and resolve environmental problems" (s.2, *CEPA*). Additionally, First Nations are to be offered the chance to consult on regulations with direct application on their land if they hold jurisdiction over it. Unfortunately, there are limitations to political capacity, as advising only goes so far with a single representative per province, competing for resources and attention. Further, if

after 60 days the First Nations community does not respond, the Ministry can go ahead and recommend a regulation without consulting it (s.209, *CEPA*).

The last evidence of **weak political capacity** is found in *Guidance for Providing Safe Drinking Water in Areas of Federal Jurisdiction*. It states that a key political capacity over source water protection, core reporting, lies with the federal government. Here the federal government communicate and therefore corroborate with other federal agencies like the Commissioner of the Environment and Sustainable Development on the environmental conditions of water on First Nations. Core reporting identifies and understands key risks and vulnerabilities across all areas of federal responsibility, which in turn help central agencies make informed decisions around funding and other resource priorities. The opportunity to create partnerships over these relevant matters to source water governance are thus not afforded to First Nations, at least within the context of core reporting.

### **First Nation Water Treatment Systems**

Of the 16 documents reviewed, five contained keywords relevant to First Nation water treatment systems, with 186 mentions of keywords that indicated some degree of capacity to implement. Overall, First Nations do not have managerial capacity over water treatment. They do however appear to have some, though weak, technical and political capacity to deliver treatment and administer activities within water treatment systems.

Health Canada has superior jurisdiction over the standards that on-reserve water treatment systems must meet, and so management of treatment activities fall primarily with it. Health Canada sets out the microbiological, chemical, physical, and radiological parameters that trained on-reserve site operators must adhere to using “appropriate analytical equipment and field kits”

(Health Canada, 2013). Further, the legal authority to deliver boil water advisories or close water facilities when treatment activities are ineffective are also federal responsibilities (Ministry of Public Works and Government Services, 2006). The Governor-in-Council, on the federal Minister of Indigenous Services' recommendation, is the regulates and authorizes the provision of operator training and certification to provide the necessary technical expertise to perform these services (*Safe Drinking Water for First Nations Act*); (Health Canada, 2013) Whether in the standards or in the provision of training, jurisdiction over activities in water treatment largely fall outside of the band council's purview, leaving band councils with no managerial capacity over water treatment systems.

While major managerial oversight over treatment is outside band council jurisdiction, Chiefs and councils remain responsible for **some technical services**, such as the consistent testing of water in their community. Band councils specifically, are obligated to sample water, regularly monitor quality, and hire the required personnel to do so as per the *Guidelines for Canadian Drinking Water Quality* ("Water and Wastewater Policy and Level of Services Standards", n.d.); (Health Canada, 2013). The process of implementation is still highly supervised by the Federal government, and so First Nations technical capacity is weak.

Lastly, First Nations political capacity, is indicated in the ability to create maintenance management plans. While they are federally mandated, maintenance management plans are meant to equip First Nations with the tools to improve maintenance activities through their "planning, scheduling, documentation and reporting". This requires the band council to foster and encourage alignment among all water-involved entities in the community, thus necessitating a degree of cooperation. Community-based system operators, federal Circuit Rider Trainers, and Tribal Council representatives from within the community are known to be part of the collaborative

endeavour. The federal mandate to develop maintenance management plans therefore offers **some, though weak, political capacity** to First Nations to create networks within their own community and engage in cooperate water governance to assist with water treatment (Ministry of Aboriginal Affairs and Northern Development, 2014).

### **First Nations Water Distribution System**

Of the 16 documents reviewed, five contained keywords relevant to First Nation source water protection, with 53 mentions of keywords that indicated some degree of capacity to implement. Overall, First Nations have no managerial capacity, and some technical and political capacity to implement water distribution barriers.

The federal Ministry of Public Works and Government Services provides standards for the engineering of water distribution systems for First Nations (Health Canada, 2013). As with source water protection and treatment, the Governor-in-Council, on the federal Minister of Indigenous Service's recommendation, can regulate the provision "location, design, construction, modification, maintenance, operation, and decommissioning of drinking water systems and wastewater systems" (s.4, *Safe Drinking Water for First Nations Act*). As such, First Nations seem to have **no managerial capacity** over their water distribution systems.

There is evidence of **weak technical capacity** over the distribution systems on reserves. Section 81 of the *Indian Act* says that band councils have jurisdiction over the "the construction and regulation of the use of public wells, cisterns, reservoirs and other water supplies". As such, the Chief and council are responsible for ensuring that water and wastewater facilities and systems are designed, constructed, maintained, and operated in accordance with the relevant standards, protocols and guidelines, including that operators are certified to the appropriate level ("Water and

Wastewater Policy and Level of Services Standards”, n.d). For contracted, out-of-house or hired in-house engineers, the *Design Guidelines for First Nations Water Works* provides a general guide for the preparation of plans and specifications for public water supply systems on reserves. The *Protocol for Safe Drinking Water in First Nations Communities* contains standards for the operation of drinking water systems, intended for use by First Nations staff responsible for the water system. Any water system that produces drinking water destined for human consumption, that is funded in whole or in part by Indigenous Services and Crown-Indigenous Relations must comply with the requirements of this protocol. Additionally, the protocol calls for certain distribution practices, such as standby chlorination equipment to ensure adequate disinfection in case of emergency. Proposals for disinfecting agents other than chlorine must be approved by the reviewing authority external to the First Nation. These factors, along with the authority of the federal government over these activities, contribute to the **weakness in their technical capacity** over water distribution.

Keyword results for First Nations capacity to implement water distribution systems generated the weakest results of all the tests and is seen in the lacking evidence of political capacity. The most convincing indication of their **weak political capacity**, however, is deduced from the *Safe Drinking Water for First Nations Act*. In it, the capacity to oversee distribution is dependent on the Governor-in-Council, who on recommendation of the federal Minister of Indigenous Services, may “appoint a manager independent of the First Nation to operate a drinking water system or wastewater system on its First Nation lands” in circumstances deemed necessary by the Minister (*Safe Drinking Water for First Nations Act*, 2013). First Nations leaders may have an existing network of collaborators, generating some administrative or resource support through channels that supported the creation of source water protection plans or maintenance management

plans. Alternatively, they may demonstrate that sufficient capacity to operate their water systems already exist within their organization and that they have the support needed in these external or internal partners. However, any opportunity to continue fostering cooperative decision making over water distribution is significantly dependant on the impressions of the Director informing the Minister, whose opinions are in turn informed by many actors beyond the First Nations community alone.

### Conclusions

Across all three barriers, First Nations have an overall weak capacity to implement the MBA, especially in managing related activities within federal jurisdictions. However, their technical and political capacities are notable in the context of developing source water protection plans and maintenance management plans. These plans are key in supporting First Nations' capacity to implement the MBA and are opportunities for them to demonstrate their capacity to implement the MBA. They also present key areas in which municipal support may enhance the impact of First Nations efforts within their own jurisdictions. Table 3.2 below provides a summary of the coding of First Nations content.

**Summary of Coding – First Nations Capacity to Implement (Table 3.2)**

	<b># of Codes Assigned</b>					
	<b>Source Water Protection</b>		<b>Water Treatment Systems</b>		<b>Water Distribution System</b>	
	<b>1.1</b>	<b>1.2</b>	<b>2.1</b>	<b>2.2</b>	<b>3.1</b>	<b>3.2</b>
<b>Capacity</b>						
Managerial	4	6	2	0	1	0
Technical	1	1	8	6	3	5
Political	10	2	1	0	2	1
<b>Total Units of Information</b>	15	9	11	6	6	6
<b>Overall</b>	Weak		Weak		Weak	

## Chapter 4: Evaluating Municipal Water Governance

The following chapter explores the capacities of Ontario municipalities to implement the MBA. Local governments, compared to their federal, provincial, and First Nations counterparts, have a different perspective to offer on the water security problem. It is here where water is treated, distributed, and interacted with for recreational, industrial, or residential uses. Nearly 70% of municipalities own and operate their water systems, developing a seasoned understanding of their capacities as they pertain to source water protection, water treatment, and water distribution (“Chapter 10”, 2002). They are also directly connected to environmental agencies (such as conservation authorities) who are responsible for water security, which presents a major opportunity for them to support their First Nations counterparts (“Chapter 10”, 2002 ).

Water regulation in Ontario involves a range of actors. The Ministry of Environment establishes water quality standards; the Ministry of Natural Resources oversees water quantity, flood forecasting, watershed management, and water conservation; the Ministry of Health and their Medical Officer of Health are responsible for public health at the local level; the Ministry of Agriculture, Food, and Rural Affairs regulate the runoff from the agricultural industry, and lastly; the Ministry of Municipal Affairs and Housing, through the *Planning Act*, is responsible for protecting surface and ground water (“4. Municipal Government”, 2019). An interesting, non-government body to download responsibilities onto municipalities is the Ontario Clean Water Agency. The agency delivers water and wastewater services such as solutions, training, and resource management, to clients like municipalities, First Nations communities, and businesses. The Ontario Clean Water Agency serves 4.5 million Ontarians and manages a large portion of the province’s outsourced water treatment facilities (“Who we are”, n.d.). Despite its active involvement in water management for Ontario, the *Ontario Water Resource Act*’s confers upon

the Agency the ability to delegate its powers over building, maintaining, and operating water and sewage systems to municipalities given the proper circumstances are in place.

How these inherited responsibilities are used in local level water governance will be explored in the next section. The following table provides an overview of the 16 documents reviewed to identify municipal capacities to implement the MBA (table 4.1). As with chapter 3, capacity to implement the MBA will be discussed by capacity type in the same order: managerial, technical and political. Overall, municipalities also have a weak capacity to implement the MBA. Unlike First Nations however, their individual capacities provide them more agency, and therefore flexibility, to execute their capacities for each of the three barriers, giving them an added edge to implement the MBA, especially through source water protection.

**Content Reviewed - Municipalities (Table 4.1)**

	<b>Legislation</b>	<b>Regulations</b>	<b>Report</b>
Federal	<i>Canada Water Act</i>		
	<i>Safe Drinking Water Act</i>		
Provincial	<b><i>Clean Water Act</i></b>	Drinking Water Systems (O. Reg. 170/03)	Part Two Report of the Walkerton Inquiry: A Strategy for Safe Drinking Water (2002)
	<b><i>Ontario Planning and Development Act</i></b>	Drinking Water Quality Standards (O. Reg. 169/03)	
	<i>Ontario Water Resources Act</i>		
	<b><i>Planning Act</i></b>		
	<i>Environmental Protection Act</i>		
	<i>Environmental Bill of Rights</i>		
	<i>Building Better Communities and Conserving Watersheds Act</i>		
Municipal	<i>Municipal Act</i>		Source Protection Information Atlas
	<i>Municipal Water and Sewage Transfer Act</i>		
	<i>Conservation Authorities Act</i>		

\***Bolded titles** indicate documents evaluated for both First Nations and Municipalities

**Municipal Source Water Protection**

Of the 16 documents reviewed, nine contained keywords relevant to municipal source water protection, with 2,487 mentions of keywords that indicated some degree of capacity to

implement. Overall, municipalities are determined to have **strong managerial, technical, and political capacities** to apply source water protection barriers through their close working relationship with conservation authorities. While the province and associated actors including their appointed Directors, for example, will always have sway and influence, through source protection committees, municipalities can exert themselves and their interests in decision making over source water matters within their jurisdiction.

According to the *Ontario Water Resources Act*, the provincial Minister of Environment has the exclusive jurisdiction to provide oversight over all surface and ground water in the province (s. 29). The Minister also determines if pollution exists and what their causes may be (s. 29 (2)). The ministry's power is delegated through a director who "prohibit[s] or regulate[s] the discharge by any person of sewage into or in any waters" (s. 31). Sources of pollution from agriculture to industry and the management of related activities, are the responsibility of corresponding provincial departments. Water protection from external sources of pollution, therefore, is largely out of municipal hands.

The lead authorities in terms of source water protection, however, are conservation authorities (s. 4, *CWA*). Conservation authorities are mandated to exercise all powers related to drinking water source protection within their specified source protection region (s. 4(2)). Source protection regions are designated areas that group communities by common reliance on a source water, and it is within them that conservation authorities, as source protection authorities, have the power to: provide scientific, technical, or administrative support and resources, cooperate with neighbouring source protection authorities in delivering services, and connect the Ministry of Environment to peer source protection authorities (s. 6). As the source protection authority, conservation authorities establish committees to help exercise their duties, with membership that

include the public and private spheres. Businesses, members of the public-at-large, municipalities, and even First Nations with special permission, can join the source protection committee of their source protection region. In this way, municipalities, alongside conservation authorities, work to mitigate issues that impact the quality or quantity of source water. By extension of their membership on source protection committees, municipalities inherit **strong managerial, technical and political capacities** to implement source water protection (s. 86, *Conservation Authorities Act*).

Under the *Clean Water Act*, the source protection committee has **strong managerial capacity** with their ability to pass policies to help achieve the goals of their assessment report and regulate over activities that pose threats to water security (s. 22). For communities that rely on water from the Great Lakes, the source protection authority can coordinate cooperation between the province and the municipality in recommending policies that assist in achieving targets and conduct monitoring (s. 85). The committee can also develop and implement strategies for risk management and planning to coordinate programs and policies throughout the source protection region they belong to (Walters et al., 2012). Further, there is a dependence of the source protection committee on municipal council who has the power to pass resolutions on proposed source protection plans (s. 24, *Clean Water Act* ). Despite their close involvement with the source protection committee, municipalities must comply with policies set out by the source protection plan and are prohibited from doing any public work or approving any by-law that directly conflicts with objectives and targets set out in the source protection plan (s. 38, *Clean Water Act* ).

Within their own communities, municipal councils have the capacity to pass by-laws to enforce risk management plans and assessments, applications for regulated activities, and

restrictions on land use (s. 55, *Clean Water Act*). There are other instances in which municipalities may have the capacity to act individually, such as when the Minister assigns the responsibility to one or more municipalities to prepare their own source protection plan for a source protection area (s. 26, s. 36(8), *Clean Water Act*). While no municipality may override their own interests against what is deemed priority by the source protection plan, their managerial capacity to manage over source water activities within their jurisdiction is **strong**.

Regarding technical operations, source protection committees have the responsibility of preparing an assessment report for their source protection region (s. 15, *Clean Water Act*). This requires them to identify all watersheds, recharge areas and vulnerable aquifers in the source protection area, characterize the water quality and quantity, all surface water intake protection zones, any drinking water issues, and any significant drinking water threats. This indicates a **strong technical capacity** and responsibility over source water that exists at the local level. Source protection authorities also prepare, submit and report the following to the provincial Director on an annual basis: measures that have been employed to implement source protection plans, measures to cease drinking water threats, measures to ensure activities do not become threats, results of monitoring programs, and the status of objectives achieved (s. 46, *Clean Water Act*). This indicates another way municipalities, through source protection committees, have strong technical capacity. These interactions also suggest that there are opportunities to correspond and cooperate with the provincial government on source water activities or matters brought to local attention, suggesting that there are opportunities for cooperative governance through a **strong political capacity**.

When source protection plans are being reviewed, input from member municipalities bring an added layer of analysis as their organizations work closely with the administration of water.

Beyond source protection authorities, actors who execute source water protection measures, such as water system operators or facility technicians, are often staff members of municipal departments like Public Works, Water Operations and Maintenance, or Environmental Services (Ontario Municipal Knowledge Network, 2013); (City of Belleville, n.d.). Municipal members of source protection committees are therefore well positioned to offer consult or experience in advising the creation of the protection regions new plan (s. 35(4), *Clean Water Act*).

Municipal political capacity to engage in cooperation can be deduced from their many partnerships with formal water governance bodies (“From Source to Tap: Guidance on the Multiple-Barrier Approach to Safe Drinking Water”, 2004). Outside of their work with conservation authorities, municipalities can sit on advisory bodies for the federal Minister of Environment regarding pollution and participate in consultation on issues related to the quality of the environment and environmental emergencies (s. 4, s. 197, s. 323, *Canadian Environmental Protection Act*). Provincially speaking, municipalities can join organizations like the Ontario Municipal Water Association and benefit from formal ties with the Ontario Clean Water Agency. In this way, there are numerous paths for municipalities to exert some political influence to independently and strategically create opportunities for partnership and cooperation externally (Ontario Municipal Water Association, n.d). There are also key opportunities for municipalities to use their internal connections with the source protection committee, to connect across the province. In Ontario, there are 19 source protection committees, and so through conservation authorities, municipalities have a network to other key stakeholders who have a degree of authority over source water activities both in the public and private spheres. Combined, 38 local source protection plans protect municipal sources of water, covering an area that serves 450 systems and 95% of the province’s population (“Source protection”, 2019). This factor alone demonstrates how well-

connected municipalities can be for the sake of water governance and source water protection, if they strategically navigate their involvement with key stakeholder.

On a more local level, municipalities may enter into partnerships with other municipalities in joint enforcement-joint jurisdiction arrangements. In navigating what water related powers are assigned to upper-tier and lower-tier municipalities under the *Municipal Act*, the local governments must coordinate to enforce the source protection authority's and the source protection committee's recommendations. Their managerial capacity is also simultaneously increased with the ability to collaborate with local boards of health, and planning boards to enforce recommendations (s. 47, *Clean Water Act* ).

There is strong alignment between the municipalities that fall within a source protection region. Section 39(6) of the *Clean Water Act* states no undertaking shall occur within the source protection area including construction for public works that does not coincide with the *Clean Water Act* or contradicts with other key water-related policies laid out by the source protection plan. Another way they are strongly integrated is through the mandated alignment between the source protection plan and all member municipalities' official plans. If a municipality falls within a source protection region, their official plan must be consistent with the source protection plan and so collaborative design of these key documents can, and should, take place early in the planning process (s. 40 (1)). These are two other indications of strong political capacity as cooperation within the municipal organization.

### **Municipal Water Treatment Systems**

Of the 16 documents reviewed, ten contained keywords relevant to municipal water treatment systems, with 635 mentions of keywords that indicated some degree of capacity to

implement. Overall, municipalities do not have the managerial ability to control treatment activities as that is a provincially set standard maintained across Ontario. However, municipalities do have some technical and political capacity over their water treatment systems.

The provincial Ministry of Health is responsible for public health at the local level and sets the standard for municipal operation of water treatment systems. For municipalities that own a drinking water system, the overseeing local department, like Public Works or Environmental Services, must submit yearly reports to municipal council that list the treatment system's approval of operation such as their drinking water works permit, their municipal drinking water license, and any other information that enables the owner (municipality) to evaluate capacity of the system to service the municipality ( s. 22(2), *Clean Water Act* ). The activities relating to treatment itself, however, are not decided by municipalities, suggesting that they have **no managerial capacity**.

Municipalities have a **weak technical capacity**, responsible for ensuring that the treated water produced by their systems is physically, chemically, and aesthetically appealing as per provincial standards including the Drinking Water Quality Standards, O.Reg. 169/03. Water treatment is executed closely along a municipality's comprehensive quality management program (Health Canada, 2013). The comprehensive quality management program consists of creating tests for chemical analysis of water and maintenance of systems that allow the overseeing municipal department, like Public Works, to meet provincially set benchmarks. As such, while management of water treatment falls largely out of municipal hands, the technical capacity to perform the tasks are within their scope. With the mandate to carry out these technical tasks, municipalities are responsible for employing an "accredited operating authority" who holds a license holder only given by the Director, and so their staffing needs are also provincially regulated, contributing to

its weak technical capacity (s. 11, s. 13, s. 72 *Safe Drinking Water Act*); (*Drinking Water Quality Standards, O.Reg. 169/03*).

Lastly, municipalities have a **weak political capacity** over water treatment systems. Operation of water systems can be taken over by provincial Directors should they conclude that any part of the treatment system must to be “established, maintained, operated, improved, extended, enlarged, altered, repaired or replaced”. Municipalities must do everything in their power to act on the recommendation of the Director (s. 62, *Ontario Clean Water Act*). Not doing so can lead to an appeal or the Director circumventing the municipality to implement the recommendations themselves in and collaboration with the Ontario Clean Water Agency (s. 73(17)). The latter is the strongest evidence supporting a weak political capacity. Before circumstances progress to the stage of overtaking operations, however, the Ontario Clean Water Agency makes itself available to municipalities should they need assistance in operating their treatment systems. If done strategically and early on enough, municipalities and the Ontario Clean Water Agency can create a cooperative governance partnership over their treatment systems if circumstances and needs are appropriate for this level of intervention. Even if there are no problems brought to the attention of the Director, the Ontario Clean Water Agency is a resource that all municipalities have access to in the provision of training, support, or solutions, assisting them in whatever water governance issue they may have (“What we do”, n.d.).

### **Municipal Water Distribution System**

Of the 16 documents reviewed, eight contained keywords relevant to municipal water distribution systems, with 272 mentions of keywords that indicated some degree of capacity to implement. Overall, municipalities have some managerial and technical capacity to implement water distribution system barriers. The review however suggests that that water distribution related

barriers are best pursued from a political angle, with municipalities having strong ability to enter into service agreements and formal partnerships for cooperative water governance.

In accordance with the *Planning Act*, municipalities can legislate the supply, efficient use, and conservation of water suggesting **weak managerial capacity** over water distribution. As seen in the discussion above about water treatment systems, minister-appointed Directors can direct the clerk of a municipality to “establish, maintain, operate, improve, extend, enlarge, alter, repair, or replace water works... in the public interest” (*Planning Act*). The municipality is obligated to use its power to enforce the Director’s orders, and if they cannot, the directive will be given to the Ontario Clean Water Agency at the expense of the municipality, facilitated by the Local Planning Appeals Tribunal ( s. 62, *Clean Water Act*). Interestingly, municipalities do have the option of going to the Local Planning Appeals Tribunal to resolve disputes against the Director if they see fit (s. 6, *Municipal Waste and Sewage Transfer Act*). While municipalities can organize their own land inventory to coincide with their water needs, the ability of the Director to circumvent them indicates that their managerial capacity over water distribution is weak.

Municipalities appear to have **weak technical capacities** to operate the distribution systems are quite like those explored in their water treatment capacities. Specific to distribution systems, however, municipalities are the only one responsible for ensuring that the distributed water meets the microbiological standards set out by the province’s Drinking Water Quality Standards, O.Reg 169/03. In the same vein, it is the owner’s responsibility to take the “appropriate corrective action” as stipulated by the Drinking Water Systems regulation, O. Reg. 170/03. While the owner is responsible for constructing the entry point of the distribution system in such a way that inhibits the treated water from becoming contaminated, they are instructed to do so by the Province. They must also make sure that the equipment used complies with the province’s

Procedure for Disinfection of Drinking Water, and that any and all adjustments to the equipment are made by certified water system operators (*Drinking Water Systems O.Reg 170/03*). Lastly, the regulation also says that owners of water systems are responsible for the creation of an annual report that summarizes the treatment chemicals, results of tests, and corrective actions, ensuring that these reports are available for provincial review at all times (*Drinking Water Systems O.Reg 170/03*).

Finally, municipalities have **strong political capacity** over water distribution, manifesting in their ability to enter into agreements with other bodies, such as other municipalities, or First Nations, to provide a public utility, (s. 21, s. 23, *Municipal Act*). Additionally, municipalities have the managerial power to zone for contaminated, sensitive or vulnerable areas prohibit the use of land and the erecting, locating or using of any class or classes of buildings or structures on land that is contaminated, contains a sensitive groundwater feature or a sensitive surface water feature, or is within an area identified as a vulnerable area in a drinking water source protection” (s. 34(1) *Planning Act*). This management can develop and sway negotiations with developers and other associated companies creating opportunities for cooperative partnerships over matters pertaining to water distribution.

## **Conclusions**

The analysis suggests that municipalities have stronger managerial, technical, and political capacities to implement the MBA when compared to First Nations. Like First Nations, municipalities are limited in their navigation of federal or provincial water related institutions. However, an evident strength they have is in their close relationship with conservation authorities as the lead source protection authority and the managerial, technical, and political capacities awarded to them particularly in implementing source water protection barriers. With

representation on source protection committees, municipalities have access to the resources and have numerous opportunities to exert influence and advocate for their community level needs in the granted province wide system of water governance. Outside of their work with conservation authorities, however, municipalities can coordinate policy vehicles, such as their official plans and zoning by-laws, to support water initiatives inside and outside their communities. In cases where they need external support, formal connections to the Ontario Clean Water Agency, for example, that allow them to engage in cooperation over water governance. Overall, municipalities have a stronger capacity to implement the MBA. While there are still gaps in their capacity to implement the MBA, the strong capacities they do have position them well to offer support to First Nations in some areas. Table 4.2 below provides a summary of the coding of municipal content.

**Summary of Coding – Municipal Capacity to Implement (Table 4.2)**

	<b># of Codes Assigned</b>					
	Source Water Protection		Water Treatment Systems		Water Distribution System	
<b>Capacity</b>	1.3	1.4	2.3	2.4	3.3	3.4
Managerial	23	29	6	2	5	1
Technical	8	1	19	5	4	1
Political	7	0	8	0	4	0
<b>Total Units of Information</b>	38	30	33	7	13	2
<b>Overall</b>	Strong		Weak		Weak	

## Chapter 5: Discussion and Conclusion

This project explored the institutional arrangements in place that currently allow for water governance, evaluating the rules and procedures that operate in the background of water security. In critically analysing what capacities these institutional arrangements provide, the section below discusses the opportunities for cooperation between First Nations and municipalities in implementing an MBA to water governance.

### Discussion of Findings

Table 5.1 summarizes the managerial, technical, and political capacities of First Nations and municipality to implement the MBA, based on the data and analysis in chapters 3 and 4.

**Opportunities for First Nations-Municipal Implementation of the MBA (Table 5.1)**

First Nation Capacity									
	Source Water Protection			Water Treatment Systems			Water Treatment Systems		
Overall	Weak			Weak			Weak		
Capacity	M	T	P	M	T	P	M	T	P
No									
Weak									
Strong									
	↑	↑	↑	↑	↑	↑	↑	↑	↑
Strong									
Weak									
No									
Capacity	M	T	P	M	T	P	M	T	P
Overall	Strong			Weak			Weak		
	Source Water Protection			Water Treatment Systems			Water Treatment Systems		
Municipal Capacity									

\*M = managerial, T = technical, and P = political. Filled in boxes indicate the capacity strength by category and type of government.

In this figure, the arrows indicate the opportunities, and extent that municipalities may or may not be able to offer support, to a MBA to First Nations communities. Blue arrows indicate areas where municipalities can offer the most valuable support and the red arrows indicate areas where municipalities can offer little to no support. After evaluating both First Nations and municipal capacities to implement the three barriers, it is concluded that the opportunity for cooperative implementation of the MBA exists, and is best pursued in source water protection. The strong managerial, technical, and political capacities of both First Nations and municipalities to implement source water protection measures suggest that a cooperative partnership may be fostered to improve their water security.

Beginning with water treatment standards, both First Nations and municipalities have a lack of managerial capacity which suggests that cooperation is not likely to occur in this area. The technical capacity that First Nations leadership has to inform protection and deliver treatment, as well as curate and implement maintenance management plans may benefit from municipal involvement in identifying threats to shared source waters. This is a key opportunity to consider given that municipalities have some technical capacities over treatment through their own in-house treatment facilities and trained personnel. Like the maintenance management plans of First Nations, municipalities can similarly create their own comprehensive quality management programs that gives them the ability to investigate testing, maintenance, and other variables that impact effectiveness (Health Canada, 2013). This presents an opportunity for cooperation and the sharing of knowledge about common source waters, and the threats and treatments to keep it safe. With their community quality management programs, municipalities can consider meso-level consequences to source waters that not only affect their own community but their neighbouring First Nations reserves before approving or applying their testing methods. As such, implementing

water treatment barriers with First Nations is a feasible mode of cooperation. Whether it manifests in routine reporting, or best practice sharing between water system operators, municipalities can offer in-depth knowledge that may be useful or insightful at best. This information may also be useful in the political sphere where band councils, city councils, and their respective communities can corroborate on key findings and lessons learned in their respective jurisdictions.

Next, water distribution system barriers could benefit from municipalities and First Nations sharing a distribution system through a service sharing agreement (s. 21, s. 23, *Municipal Act*). Entering into a mutually beneficial and agreed on water service agreement is another opportunity to support First Nations communities in pursuing water security. However, if the arrangement is not the preferred option, municipalities can offer support also in the form of best practice sharing. Distribution systems on reserves must follow federal guidelines and protocols and if they do not comply, higher order governments will assume responsibility and appoint external managers to oversee the services. Similarly, municipalities are subject to the province and if the Director finds they do not comply they too can assume responsibility over water services. With experience in navigating similar institutional frameworks, municipalities can offer advice as to what works and what does not in self-serving distribution systems to avoid other governments from absorbing their services. They can also cooperate in the interpretation of guidelines, and the best methods to achieve service standards while sharing strategies to overcome certain limitations in their shared limited technical capacities.

The space with most potential for productive cooperation is within source water protection. First Nations and municipalities have a greater degree of capacity to pursue source water protection barriers, but a forum in which their capacities can be combined is at the source protection committee level. First Nations can participate in the planning process if the community or band

council passes a resolution to follow and apply the provincial legislation. If appointed to the committee, municipal partners can use their managerial, technical, and political capacities to ensure their First Nations counterparts are heard and included in these decision-making processes. In fact, some First Nations communities are already part of these bodies such as the Mohawks of the Bay of Quinte on the Quinte Region Source Protection Committee and Chippewas of the Thames First Nation on the Upper Thames River, Lower Thames Valley and St. Clair Region Conservation Authorities (Quinte Source Water, n.d.);(Thames - Sydenham & Region Drinking Water Source Protection n.d.) Being on the source protection committee also allows for input and feedback as First Nations and municipalities respectively contribute and design their own source water protection plans. Understanding what peers are doing can help inform the steps each party takes to help create cohesiveness in water governance measures across the source protection region. Since First Nations can create their own source water protection plan, they can work with municipalities and their water agencies to help regulate and protect the water so that all the source water protection plans align and complement one another. Within the source protection committee, an entity with political and managerial power to regulate activities, the opportunity to work closely with the province, monitor progress, and secure interjurisdictional alignment over a source protection region, is available to all members and is a key step towards cooperative water security.

Even if First Nations are not part of these committees, municipalities can advocate in their interest and encourage that the initiatives pursued by the committee are not destructive to them or their water in any way. Their authority on the source protection committee is important to recognize, especially given their vote of approval over source protection plans. As such, that power should be used to benefit as many who share those waters within the region. Finally, municipalities have the legislative tools through their official plans and zoning by-laws to ascertain that activities

within the organization uphold a standard that protects water, preserves its integrity, and distributes to the public accordingly. When pursuing any land use or construction, municipalities can employ these documents so that no risks are posed to First Nations communities, such as doing extensive environmental assessments on pre-approved construction sites, or making water conservation a key pillar in the municipality's future development. Municipalities have oversight over their own water impacting activities, and should begin embracing practices that support water security in their daily activities not only for their communities, but for First Nations who are located within a common source protection region.

Chapter 3 indicated that in implementing the MBA, First Nations struggled with communities lacking trust in leadership and lacking resources to properly govern over water, both of which forced them to prioritise and choose which barrier to uphold. However, these challenges can be addressed with municipal involvement, whether it be through leaders sharing best practices in water treatment and distribution, formally acknowledging resource needs through membership on source protection committees, or using legislative tools at the local level to assure that their communities are not adding to the burdens and challenges to water faced on reserves. Put differently, municipalities can support First Nations efforts to implement the MBA by really considering their technical and political influence in treatment and distribution, equipping their First Nations counterparts with resources or a vote of support, and the all around influence they have in source water protection in all three capacities. While the limitations of their support should be grounded in what First Nations desire or request from their local partners, municipalities and their communities should consider the greater impact their actions have on this front.

## **Limitations of Research**

While this research paper offers an approach oriented around First Nations-municipal cooperation to improving water security through the MBA, the research only offers one perspective on the problem. It was not within the scope of the research to go in-depth with each barrier and explore capacities through other vehicles, such as financial systems or staffing needs. Technical and political capacity, specifically, were harder to evaluate objectively through legislation, as can be seen through the significantly less keyword mentions from the content analysis. A more in-depth analysis through individual case studies may provide better insight into the full scope of capacities available to these kinds of governments. Doing so would also help better define what constitutes a weak or strong capacity to implement the MBA. Secondly, the findings put forward also make the primary assumption that First Nations and cooperating municipalities share source waters or are in within a common source protection region that allows them to feasibly cooperate. Some of these suggestions are harder to execute or are not as useful for First Nations communities that are farther from other communities.

## **First Nations-Municipal Cooperation for Water Security**

A final consideration to discuss after identifying and confirming that cooperative opportunities exist is exploring why municipalities should support their First Nations counterparts in achieving water security. When municipal actors have a range of different issues and limitations to navigate within their own jurisdiction, why should municipal actors consider taking an additional file on?

No matter the jurisdiction or boundary, we all belong to the public sphere and should therefore all embrace the responsibility we have to be stewards of water as a shared resource. In

addressing the water security problem, it is imperative for our local communities recognize the contributions they can make to address water governance issues, from our citizens to our water systems operators. First Nations are as entitled to being confident in their water and health as others are in places where water is accessible, safe and abundant. Water is shared by everyone, and taking care of our own communities' supply means simultaneously taking care of that resource for others.

Involving municipalities in a solution towards First Nation water security provides an additional layer of responsibility over a resource which requires support from all governments. The added fact that they are closer to their served populations give them an additional level of accountability that is key to achieving water security. Where local governments are often perceived to be “policy-takers”, obediently applying whatever rules the province of policy makers have developed, this research shows that municipalities have the capacity to be policy makers especially in water governance (Sanction and Janik 2001, 2). In other words, municipalities have a legal obligation to continuously strive to improve their water governance practices for their own communities, but a moral obligation to consider their influence on neighbouring First Nations communities, looking at the capacities they have to support their counterparts in pursuing a multi-barrier approach to water security .

This paper has emphasized how water governance is truly a multi-level government policy area. It is interesting that while the data analysis concluded both First Nations and municipalities to have weak capacities to implement the MBA respectively, it has also identified opportunities for cooperative implementation that has the potential to enhance effectiveness and compliment the objectives each government has sought out. In this way, a major conclusion drawn from this research is that in water governance particularly, intergovernmental cooperation is fundamental. In finding ways to achieve First Nations water security, municipalities can take leadership

alongside their First Nations counterparts to bring water governance into a space of cooperation. Pursuing this route and building this foundation will hopefully equip future generations with the tools to pursue water issues cooperatively, using the MBA as an approach to achieve it.

## References

Aboriginal Affairs and Northern Development Canada. *First Nations On-Reserve Source Water Protection Plan*. 2014. [https://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-HQ-ENR/STAGING/texte-text/source\\_1398366907537\\_eng.pdf](https://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-HQ-ENR/STAGING/texte-text/source_1398366907537_eng.pdf)

Batchelor, Charles. "Water Governance Literature Assessment," n.d. <https://pubs.iied.org/pdfs/G02523.pdf>.

Brown, Brandon, Renata Wachowiak-Smolíková, Nicholas D. Spence, Mark P. Wachowiak and Dan F. Walters. 2015. "Why Do Some First Nations Communities Have Safe Water and Others Not? Socioeconomic Determinants of Drinking Water Risk." *Global Journal of Health Science*; 8: 9, 99-106, doi:10.5539/gjhs.v8n9p99

Building Better Communities and Conserving Watersheds Act, 2017, S.O. 2017, c. 23 <https://www.ontario.ca/laws/statute/s17023>

Canada Water Act, RSC 1985, c C-11, <<http://canlii.ca/t/527q3>>

Canadian Council of Ministers of the Environment. "Multi-Barrier Approach." n.d. <https://web.archive.org/web/20110716030951/http://www.ccme.ca/sourcetotap/mba.html>

Canadian Environmental Protection Act Canadian Environmental Protection Act, 1999, SC 1999, c 33, <<http://canlii.ca/t/53p5t>>

Castleden, Heather, Catherine Hart, Sherilee Harper, Debbie Martin, Ashlee Cunsolo, Robert Stefanelli, Lindsay Day and Kaitlin Lauridsen. 2017. "Implementing Indigenous and Western Knowledge Systems in Water Research and Management (Part 1)" *The International Indigenous Policy Journal*, 8 (4): 1-33.

City of Belleville. "Environmental Services." n.d. <https://belleville.ca/city-hall/directory/environmental-services>

Clean Water Act, 2006, Statute of Ontario 2006, c 22, <http://canlii.ca/t/53nkn>

Conservation Authorities Act, RSO 1990, c C.27, <http://canlii.ca/t/53m33>

Drinking Water Systems, O Reg 170/03, <<http://canlii.ca/t/549ww>>

Drinking Water Quality Standards, O Reg 169/03, <<http://canlii.ca/t/54501>>

- Dyck, Thomas, Ryan Plummer, and Derek Armitage. 2015. "Examining First Nations' approach to protecting water resources using a multi-barrier approach to safe drinking water in Southern Ontario, Canada." *Canadian Water Resources Journal / Revue canadienne des ressources hydriques*, 40:2, 204-223, DOI: 10.1080/07011784.2015.1033759
- Environmental Bill of Rights, 1993, SO 1993, c 28, <<http://canlii.ca/t/54cls>>
- Environmental Protection Act, RSO 1990, c E.19, <<http://canlii.ca/t/54cm1>>
- Federal-Provincial-Territorial Committee on Drinking Water and the CCME Water Quality Task Group. "From Source to Tap: Guidance on the Multi-Barrier Approach to Safe Drinking Water," 2004.  
[https://www.ccme.ca/files/Resources/water/source\\_tap/mba\\_guidance\\_doc\\_e.pdf](https://www.ccme.ca/files/Resources/water/source_tap/mba_guidance_doc_e.pdf).
- Federal-Provincial-Territorial Committee on Drinking Water, and Water Quality Task Group (Canadian Council of Ministers of the Environment). "From Source to Tap The Multi-Barrier Approach to Safe Drinking Water," 11, 2002.  
[https://www.ccme.ca/files/Resources/water/source\\_tap/mba\\_eng.pdf](https://www.ccme.ca/files/Resources/water/source_tap/mba_eng.pdf)
- Federal-Provincial-Territorial Subcommittee on Drinking Water of the Federal-Provincial-Territorial Committee on Environmental and Occupational Health. *Guidance for Safe Drinking Water in Canada: From Intake to Tap*. 2001.  
[https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt\\_formats/hecs-sesc/pdf/pubs/water-eau/guidancetotap-document/guidancetotap-document-eng.pdf](https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/guidancetotap-document/guidancetotap-document-eng.pdf)
- First Nations Land Management Act, SC 1999, c 24, <<http://canlii.ca/t/5433z>>
- Galway, Lindsay. 2016. "Boiling over: A Descriptive Analysis of Drinking Water Advisories in First Nations Communities in Ontario, Canada." *International Journal of Environmental Research and Public Health* 13, no. 505: 1-15.
- Gerster, Jane. Hessey, Krista. "Why some First Nations still don't have clean drinking water — despite Trudeau's promise." *Global News*. Last modified October 3, 2019.  
<https://globalnews.ca/news/5887716/first-nations-boil-water-advisories/>
- Government of Canada. "Ending long-term drinking water advisories." Last modified February 17, 2020. <https://www.sac-isc.gc.ca/eng/1506514143353/1533317130660>
- Government of Canada. "The Multi-Barrier Approach to Safe Drinking Water." Accessed June 4, 2020. <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/water-quality/drinking-water/multi-barrier-approach-safe-drinking-water-environmental-workplace-health-health-canada.html>.

- Government of Canada. "Water and Wastewater Policy and Level of Services Standards (Corporate Manual System)." N.d. <https://www.sac-isc.gc.ca/eng/1312228309105/1533729544122>
- Gulli, Cathy. "Why can't we get clean water to First Nation reserve?". Last modified October 7, 2015. <https://www.macleans.ca/news/canada/why-cant-we-get-clean-water-to-first-nation-reserves/>.
- Harris, Leila. Simms, Rosie. "Colonial and indigenous water governance in unceded indigenous territories in British Columbia." Last modified August 2016. [https://watergovernance.ca/files/2013/01/CWN-EN-Harris\\_WEPGN-2016-6Pager-Web.pdf](https://watergovernance.ca/files/2013/01/CWN-EN-Harris_WEPGN-2016-6Pager-Web.pdf)
- Health Canada. "Guidance for Providing Safe Drinking Water in Areas of Federal Jurisdiction Version 2". 2013. <https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-providing-safe-drinking-water-areas-federal-jurisdiction-version-2.html>
- Indian Act, RSC 1985, c I-5, <<http://canlii.ca/t/5439p>>
- Indian Band Council Procedure Regulations, CRC, c 950, <<http://canlii.ca/t/1559>>
- Indian and Northern Affairs Canada. "Design Guidelines for First Nation Water Works." 2006. [https://www.sac-isc.gc.ca/DAM/DAM-ISC-SAC/DAM-WTR/STAGING/texte-text/dgf\\_1100100034923\\_eng.pdf](https://www.sac-isc.gc.ca/DAM/DAM-ISC-SAC/DAM-WTR/STAGING/texte-text/dgf_1100100034923_eng.pdf)
- Indian and Northern Affairs Canada. "Protocol for Safe Drinking Water in First Nations Communities". 2006. [https://www.sac-isc.gc.ca/DAM/DAM-ISC-SAC/DAM-WTR/STAGING/texte-text/sdw\\_1100100015850\\_eng.pdf](https://www.sac-isc.gc.ca/DAM/DAM-ISC-SAC/DAM-WTR/STAGING/texte-text/sdw_1100100015850_eng.pdf)
- Loe, Rob C. D. Lukovich, Danielle K. "Groundwater Protection on Long Island, New York: A Study in Management Capacity." *Journal of Environmental Planning and Management*, Vol. 47, No. 4, (2004): 517–539. DOI: 10.1080/0964056042000243212
- Longboat, Sheri. 2013. "First Nations Water Security: Security for Mother Earth." *Canadian Woman Studies/Les Cahiers de la Femme* 30, no. 2,3: 6-13.
- Marshall, Tabitha. "Kelowna Accord". *Thecanadianencyclopedia.ca*. July 23, 2013. <https://www.thecanadianencyclopedia.ca/en/article/kelowna-accord>
- Ministry of Aboriginal Affairs and Northern Development. "Maintenance Management Plan for Drinking Water and Wastewater Systems in First Nations Communities." 2014. <https://www.sac-isc.gc.ca/DAM/DAM-ISC-SAC/DAM-WTR/STAGING/texte->

[text/maintenance\\_1398348830503\\_eng.pdf](#)

Ministry of the Environment. “Draft Users’ Guide: National Environmental Standard for Sources of Human Drinking Water.” Government, n.d.

<https://www.mfe.govt.nz/publications/rma/nes-draft-sources-human-drinking-water/html/page1.html>.

Ministry of the Environment, Conservation and Parks. “Source Protection Information Atlas.” n.d.

<https://www.gisapplication.lrc.gov.on.ca/SourceWaterProtection/Index.html?viewer=SourceWaterProtection.SWPViewer&locale=en-US>

Ministry of Public Works and Government Services. *Report of the Expert Panel on Safe Drinking Water for First Nations*. Ottawa, 2006.

<https://www.amnesty.ca/sites/default/files/2006-11r2-445-2006e1fndrinkingwaterreport.pdf>.

Municipal Act, 2001, SO 2001, c 25, <<http://canlii.ca/t/54912>>

Municipal Water and Sewage Transfer Act, 1997, SO 1997, c 6, Sch A, <<http://canlii.ca/t/1k1f>>

O’Connor, Honourable Dennis R. “Chapter 1: An Overview.” Part Two Report of the Walkerton Inquiry: A Strategy for Safe Drinking Water.” 2002.

[http://www.archives.gov.on.ca/en/e\\_records/walkerton/report2/pdf/Chapter\\_1.pdf](http://www.archives.gov.on.ca/en/e_records/walkerton/report2/pdf/Chapter_1.pdf)

O’Connor, Honourable Dennis R. “Chapter 3 : A Multi-Barrier Approach to Drinking Water Safety.” Part Two Report of the Walkerton Inquiry: A Strategy for Safe Drinking Water.” 2002.

[https://web.archive.org/web/20120421035130/http://www.attorneygeneral.jus.gov.on.ca/english/about/pubs/walkerton/part2/Chapter\\_3.pdf](https://web.archive.org/web/20120421035130/http://www.attorneygeneral.jus.gov.on.ca/english/about/pubs/walkerton/part2/Chapter_3.pdf).

O’Connor, Honourable Dennis R. “Chapter 10: The Role of Municipal Governments.” Part Two Report of the Walkerton Inquiry: A Strategy for Safe Drinking Water.” 2002.

[http://www.archives.gov.on.ca/en/e\\_records/walkerton/report2/pdf/Chapter\\_10.pdf](http://www.archives.gov.on.ca/en/e_records/walkerton/report2/pdf/Chapter_10.pdf).

Ontario.ca. “4. Municipal government.” Last modified September 23, 2019.

<https://www.ontario.ca/document/ontario-municipal-councillors-guide-2018/4-municipal-government#section-1>

Ontario.ca. “Source protection.” Last modified September 23, 2019.

<https://www.ontario.ca/page/source-protection>

Ontario.ca. "Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils." Last modified July 4, 2019. <https://www.ontario.ca/page/taking-care-your-drinking-water-guide-members-municipal-councils>

Ontario Clean Water Agency. "Who We Are". Accessed May 31, 2020. <http://www.ocwa.com/who-we-are>.

Ontario Clean Water Agency. "What We Do." N.d. <http://www.ocwa.com/what-we-do>

Ontario Municipal Knowledge Network. "Report on Operator Certification and Training, Succession Planning, & Retention ." Last modified February 2013. <http://www.omkn.ca/OMKN-Docs/Best-Practices/Water-and-Wastewater/2013/RPT20130304BeneficialPracticeReport60239760.aspx>

Ontario Municipal Water Association. "About OMWA." N.d. <https://omwa.org/water3/>

Ontario Planning Act Planning Act, RSO 1990, c P.13, <<http://canlii.ca/t/54b66>>

Ontario Planning and Development Act, 1994, SO 1994, c 23, Sch A, <http://canlii.ca/t/534ck>

Ontario Water Resources Act, RSO 1990, c O.40, <<http://canlii.ca/t/54486>>

Palmater, Pamela. "First Nations water problems a crisis of Canada's own making." Last modified February 6, 2019. <https://policyoptions.irpp.org/magazines/february-2019/first-nations-water-problems-crisis-canadas-making/>

Quinte Source Water. "Committee Members." N.d. <https://quintesourcewater.ca/web/about/source-protection-committee/committee-members/>

Reading, Jeff, Danielle Perron, Namaste Marsden, Robynne Edgar, Bianka Saravanna-Bawan. 2011. "Crisis on Tap: Seeking Solutions for Safe Water for Indigenous Peoples" *Aboriginal Policy Research Consortium International (APRCi)*

Rogers, Peter and Radhika de Silva and Ramesh Bhatia. 2002. "Water is an economic good." *Water Policy* 4 (1): 1-17. (Rogers et al. 2002)

Safe Drinking Water Act, 2002, SO 2002, c 32, <<http://canlii.ca/t/547ht>>

*Safe Drinking Water for First Nations Act, Statutes of Canada* 2013, c 21, <<http://canlii.ca/t/543hg>>

Sancton, Andrew and Janik, Teresa. "Provincial-local relations and drinking water in Ontario."  
Last modified February 19, 2001

Statistics Canada. 28 September 2017. "World Water Day...by the numbers." Accessed  
November 28, 2019.

[https://www.statcan.gc.ca/eng/dai/smr08/2017/smr08\\_215\\_2017#a6](https://www.statcan.gc.ca/eng/dai/smr08/2017/smr08_215_2017#a6).

Thames - Sydenham & Region Drinking Water Source Protection. "Source Protection  
Committee Members." N.d. <https://www.sourcewaterprotection.on.ca/source-protection-committee/committee-members/>

The Walrus. 22 October 2019. "What Would It Look Like to Take the First Nations Water Crisis  
Seriously?." Accessed November 5, 2019. <https://thewalrus.ca/what-would-it-look-like-to-take-the-first-nations-water-crisis-seriously/>.

Walters, Dan, Nicholas Spence, Kayli Kuikman, Budhendra Singh. 2012. "Multi-Barrier  
Protection of Drinking Water Systems in Ontario: A Comparison of First Nation and  
Non-First Nation Communities." *The International Indigenous Policy Journal* 3, no. 3: 1-  
26.

Water Education Foundation. "Point Source vs. Nonpoint Source Pollution." N.d.  
<https://www.watereducation.org/aquapedia-background/point-source-vs-nonpoint-source-pollution>

York, Geoffrey. "In the Neskantaga First Nation, undrinkable water is a crisis of health and  
faith." *The Globe and Mail*. Last modified September 17, 2019.  
<https://www.theglobeandmail.com/canada/article-in-this-ontario-first-nation-undrinkable-water-is-a-crisis-of-health/>

# Appendices

## Appendix A

### Keywords for Data Source Filtering

#### Canlii.ca:

Filters were applied to isolate for location (“Ontario”), types of documents (“legislation”), active status (“all repealed or spent”) and the following keywords: *source water protection, water treatment system, water distribution, First Nation source water protection, First Nation water treatment systems, First Nation water distribution system.*

#### Open Government Portal:

Filters were applied to isolate for organizations (i.e. Environment Canada, Statistics Canada, etc.) and the following keywords: *water quality, drinking water, aboriginal peoples, stats can, health can, ECCC, municipalities, pressures on water quality, municipal wastewater, pollution and waste, primary, secondary, tertiary treatment, water, open water, ground water, freshwater, water quality; water, soil, biota, drinking water, freshwater, boil water advisories, water, drinking water advisories, water quality guidelines, water quality, federal jurisdictions, public health protection, aboriginal reserves, first nations, Ontario, water quality reasons, public water systems, long-term drinking water advisories, groundwater, contaminants.*

## Appendix B

### Codes for Data Analysis

<p><b>1 Source Water Protection (SWP)</b> (e.g. drinking water protection, raw source water)</p> <p>1.1 First Nations Capacity to implement barriers for source water protection</p> <p>1.2 No First Nations capacity implement barriers for source water protection</p> <p>1.3 Municipal Capacity to implement barriers for source water protection</p> <p>1.4 No Municipal capacity to implement barriers for source water protection</p>	<p><b>2 Water Treatment Systems (WTS)</b> (e.g. drinking water treatment systems, utility systems)</p> <p>2.1 First Nations Capacity to implement barriers for water treatment systems</p> <p>2.2 No First Nations capacity to implement barriers for water treatment systems</p> <p>2.3 Municipal Capacity to implement barriers for water treatment systems</p> <p>2.4 No Municipal capacity to monitor or manage MBA to implement barriers for water treatment systems</p>
<p><b>3 Water Distribution Systems (WDS)</b> (e.g. drinking water distribution systems, water utilities)</p> <p>3.1 First Nations capacity to implement barriers for water distribution systems</p> <p>3.2 No First Nations capacity to implement barriers for water distribution systems</p> <p>3.3 Municipal Capacity to implement barriers for water distribution systems</p> <p>3.4 No Municipal capacity to monitor or manage MBA to implement barriers for water distribution systems</p>	<p><b>4 Threats</b></p> <p>4.1 Microbiological Organisms</p> <p>4.2 Pollution</p> <p>4.3 Quality of Water</p>
	<p><b>5 General</b></p> <p>5.1 First Nation, Aboriginal Government</p> <p>5.2 Local Government, Municipality, Municipal</p> <p>5.3 Water</p> <p>5.4 Multi-barrier Approach, Source-to-tap, Integrated Water Resource Management</p>

## Appendix C

### Scheme of Keywords for Data Analysis

