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SDG 6, Infectious Diseases, and Climate Change

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Abstract

Background

Canada is committed to implementing the 2015 United Nations Sustainable Development Goals, including Goal 6, to ensure safe drinking water for all by 2030. Canada set targets to resolve drinking water advisories in Canada, including long-term, public-system advisories on First Nations reserves (Target 6.1.1). Access to clean drinking water is key to closing health gaps between Indigenous and non-Indigenous populations, as outlined in Truth and Reconciliation Call to Action 19, and vital for preventing infectious diseases. With a recent renewal of the Public Health Core Competencies prioritizing equity-driven principles, climate change jeopardizing water security, and Canada off track to meet its 2030 goal, now is the time for bold, equity-driven efforts to fulfill SDG 6 by 2030. This narrative review summarizes the status of Target 6.1.1, including Canada's past and recent federal investments in improving drinking water quality and access for First Nations communities on reserve between 1990 and 2025, and how climate change may hinder progress in addressing these advisories.

Methods

A narrative review was conducted to summarize the progress in resolving drinking water advisories on public water systems on First Nations reserves in Canada, as well as climate change threats to water quality, quantity, and security.

Results

According to federal reports, since 1991, approximately $13 billion has been invested towards improving water and wastewater infrastructure on First Nations, with 147 long-term drinking water advisories lifted since 2015. Budget 2024 reported 94% of on-reserve First Nations communities had clean tap water from public, federally-funded water systems. However, as of March 11, 2025, 35 long-term boil water advisories were in effect for 33 First Nations communities. Evidence suggests that climate change threats, such as flooding, drought, increased temperatures, wildfires, and permafrost degradation, will contaminate water sources further, placing additional pressures on water treatment systems and infrastructure.

Discussion

Indigenous Peoples hold sovereign, inherent, and treaty rights to clean water, yet many communities live under long-term boil water advisories. Colonialism, forced displacement, systemic discrimination, and economic marginalization have disproportionately affected the health and wellbeing of First Nations peoples, Inuit, and Métis people. These inequities were especially apparent during the COVID-19 pandemic when limited water access and overcrowded housing impeded hand hygiene and social distancing for many First Nations communities. Although federal funding and the SDG 6 target exclude Inuit in Inuit Nunangat, the Inuit

homeland also experiences water advisories, with a staggering 298 boil water advisories reported between 2015 and 2020. To fully uphold Indigenous Peoples' inherent human right to water, it is essential to address the underlying issues of inequitable and inadequate water and waste infrastructure among Indigenous Peoples.

Conclusion

This review summarizes the status of drinking water advisories on public systems on First Nations reserves, efforts towards addressing the advisories, and climate-related risks to water security. The findings emphasize the need for transformative public health efforts focused on climate-resilient water systems and health equity to meet the 2030 target, and highlight the importance of Indigenous sovereignty in improving water security amid the climate crisis.

Abbreviations

AANDC — Aboriginal Affairs and Northern Development Canada
AFN — Assembly of First Nations
AFNWA — Atlantic First Nations Water Authority
AGI — Acute gastrointestinal infection
BWA — Boil water advisory
CBWM — Community-based Water Monitoring Program
CCoHI — Chiefs Committee on Housing and Infrastructure
CELA — Canadian Environmental Law Association
CIF — Canadian Indicator Framework
CRTP — Circuit Rider Training Program
CUPE — Canadian Union of Public Employees
DBP — Disinfection by-product
DIAND — Department of Indian Affairs and Northern Development
DOC — Dissolved organic carbon
DWA — Drinking water advisory
DWS — Drinking water system
FNWWAP — First Nations Water and Wastewater Action Plan
ICIF — Indigenous Community Infrastructure Fund
INAF — Indigenous and Northern Affairs Canada
ISC — Indigenous Services Canada
ITK — Inuit Tapiriit Kanatami
JTWG — Joint Technical Working Group
O&M — Operation and maintenance
OAG — Office of the Auditor General
PACP — Standing Committee on Public Accounts
RCAP — Royal Commission on Aboriginal Peoples
SDG 6 — Sustainable Development Goal 6
SDG 16 — Sustainable Development Goal 16
SDGs — Sustainable Development Goals
TRC — Truth and Reconciliation Commission
UNDRIP — United Nations Declaration on the Rights of Indigenous Peoples
UNCESC — United Nations Committee for Economic, Social, and Cultural Rights
WASH — Water, sanitation, and hygiene
W&WW — Water and wastewater

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Introduction

Approximately 80% of common infectious diseases are transmitted by hands alone and nearly 90% of diarrheal deaths in children under five can be attributed to drinking water, sanitation, and hygiene (WASH) issues (1). This makes access to safe WASH one of the most effective ways to reduce the global burden of infectious diseases. When clean water and sanitation are not available, individuals can unknowingly ingest fecal pathogens (i.e., viruses, bacteria, and/or parasites in feces) by having unwashed hands or from exposures to contaminated water, objects, or food. This form of entry for the pathogen into the human body, also known as a fecal-oral route, can lead to fecal-oral diseases such as norovirus, rotavirus, *Clostridium difficile* (*C. diff*), and more. Consumption of fecally-contaminated water can lead to waterborne infections, the most common of which include *Escherichia coli* (*E. coli*), cholera, campylobacteriosis, dysentery, giardiasis, Hepatitis A, salmonellosis, and typhoid fever. The main symptom shared by all eight of these waterborne diseases is diarrhea—the second leading cause of death for children under the age of five worldwide. In fact, approximately 1 million people are estimated to die from diarrhea each year due to unsafe drinking water and the inability to practice basic hygiene practices (2).

Clean water is also vital for preventing the spread of non-fecal infectious diseases transmitted through contaminated hands, objects, and food, and for keeping sores and wounds clean. For example, during the COVID-19 pandemic, clean water and sanitation were essential for preventing the spread of SARS-CoV-2—the virus causing COVID-19—and remain essential for future pandemic preparedness in Canada (3). The Government of Canada delivered key messaging on proper hand hygiene to reduce the spread of SARS-CoV-2, including handwashing with soap and water for at least 20 seconds (or using an alcohol-based hand sanitizer containing at least 60% alcohol) and avoiding touching one's eyes, nose, or mouth with unwashed hands (4). In addition to hand hygiene etiquette, public health authorities advised and/or enforced quarantine and isolation, including recommendations to stay home, maximize physical distance from other household members while sick, and limit time spent in shared spaces (4). However, it remains difficult, if not impossible, for many Indigenous communities to adhere to public health advice while they are living in overcrowded and inadequate homes without access to clean tap water (5, 6).

Despite Canada having 20% of the world's freshwater supply, 400,000 people in Canada are without access to clean drinking water, the majority of whom are First Nations peoples, Inuit, and Métis people (7). The lack of clean drinking water exacerbates existing and long-standing socio-economic gaps between Indigenous and most non-Indigenous populations in Canada—

gaps that are rooted in the enduring legacy of colonialism and systemic marginalization. These inequities, such as social and geographic isolation, limited access to healthcare, economic barriers, higher rates of underlying medical conditions, and inadequate infrastructure, increase the risk of infectious diseases among Indigenous peoples (8-10).

In 2015, Canada committed to the United Nations Sustainable Development Goal 6 (SDG 6) which aims to ensure safe water and sanitation are available and sustainably managed for all people by 2030. Canada's national target for the SDG 6, as outlined in the Canadian Indicator Framework for the SDGs, is to resolve all long-term drinking water advisories (DWAs) for public systems[1] on First Nation reserves (Target 6.1.1)(13, 14). While significant investments and initiatives have been made to achieve this target, the 2030 end date is quickly approaching, and 35 long-term boil water advisories (BWAs) remain on public water systems on First Nations reserves as of March 11, 2025 (15). Furthermore, the ongoing climate crisis is likely to contaminate drinking water sources and overwhelm water systems, treatment, and infrastructure, thereby, increasing the risk of additional DWAs in Canada (16). The purpose of this narrative review is to summarize the historic and recent investments towards resolving long-term DWAs on public systems on First Nation reserves (Target 6.1.1) and the potential impacts of climate change on DWAs.

Background

Sustainable Development Goal Target 6.1.1

SDG 6 aims to ensure that safe water and sanitation are available and sustainably managed for all people (3). The Goal, along with 16 other Goals and 169 targets, was adopted in 2015 by United Nations Member States for the agenda, *Transforming Our World: The 2030 Agenda for Sustainable Development*, which aimed to stimulate collective action in areas of critical importance for the survival of people and the planet (17). As a member state of the United Nations, Canada has since developed national responses to achieving the Goals and targets set forth in the Agenda, such as launching the Canadian Indicator Framework (CIF) with 76 indicators to measure Canada's progress towards achieving the SDGs (18). Canada's ambition for SDG 6 is to ensure all people in Canada have safe and sustainable access to drinking water

[1] Public water systems on First Nations reserves are defined as those that are federally-funded by Indigenous Services Canada and include any water system on First Nations reserves that serves public facilities (e.g., community centres, schools) or five or more households. In contrast, private water systems are not federally funded and are defined as wells and cisterns serving fewer than five households. Private well owners are responsible for ensuring their water quality meets provincial or territorial drinking water standards (11, 12).

and use it in a sustainable manner. Table 1 lists Canada's indicators and targets for SDG 6 according to the CIF.

Table 1. Indicators and Targets for SDG 6 according to the Canadian Indicator Framework (14).

Indicator	Target(s)
6.1.1 Number of long-term drinking water advisories on public systems on reserves	Resolving all long-term DWAs on public systems on First Nations reserves south of the 60th parallel
6.2.1 Percentage of municipalities across Canada with sustained drinking water advisories	No specific target
6.3.1 Annual percent change in water usage across different sectors of the economy and for households	No specific target
6.4.1 Percentage or number of Canadian rivers that can support plants and animals (water quality)	No specific target
6.5.1 – 6.6.1 Percentage of wastewater systems in Canada that meet the effluent quality standards of the Wastewater Systems Effluent Regulations or an equivalency agreement	By March 2030, 85% of wastewater systems on First Nations reserves achieve effluent quality standards By December 2040, 100% of wastewater systems on First Nations reserves achieve effluent quality standards

While achieving all targets is essential to realize Canada's commitment to SDG 6, Canada's 2015 national target was to resolve all long-term drinking water advisories on public systems on First Nation reserves (Target 6.1.1) by 2021 (12, 13). At the time of the 2015 commitment, this accounted for 800 public water systems on First Nations reserves with DWAs; however, by 2021, the number of public systems with long-term DWAs needing resolution had risen to 1,050 (12, 19). After failing to meet the 2021 target, Canada recommitted to resolving all long-term DWAs on public systems on First Nations reserves without setting a target deadline for their completion (20). Currently, there is no specific deadline in Canada's commitment to resolve all long-term DWAs on public systems on First Nations reserves. Nevertheless, as a member state of the UN's 2030 Agenda for Sustainable Development, Canada has committed to implementing the Agenda, which includes ensuring available and sustainably managed water and sanitation for all by 2030 (17).

Boil Water Advisories and Climate Change Across Inuit Nunangat

It is important to acknowledge that the federal funding for SDG 6, and the SDG 6 targets, do not address the pressing issues of long-term DWAs north of the 60th parallel in Inuit Nunangat—the Inuit homelands of 51 communities, encompassing 35% of Canada's landmass and 50% of

Canada's coastline (21). Recognized and protected in land claims agreements, Inuit Nunangat holds rights and governance systems in the four regions of Nunatsiavut (Labrador), Nunavik (northern Quebec), Nunavut, and the Inuvialuit Settlement Region (the northwestern part of the Northwest Territories). Instead of falling under federal jurisdiction, the responsibility of DWAs in Inuit Nunangat is coordinated between hamlet governments and the governments of these four regions. The treatment of drinking water is managed by local governments while the monitoring of water quality is handled by municipal and regional governments in the region (6) .

In a joint submission report to the UN Special Rapporteur on the human rights to safe drinking water and sanitation, the Inuit Circumpolar Council and Inuit Tapiriit Kanatami (ITK) reported 298 BWAs issued in 29 communities in the Inuit Nunangat region between January 1, 2015 and October 1, 2020 (6, 22). Fifteen BWAs lasted longer than three months while four BWAs lasted longer than 12 months (6). Figure 1 shows the number of BWAs, number of affected communities, and total days under BWAs for the four regions of Inuit Nunangat.

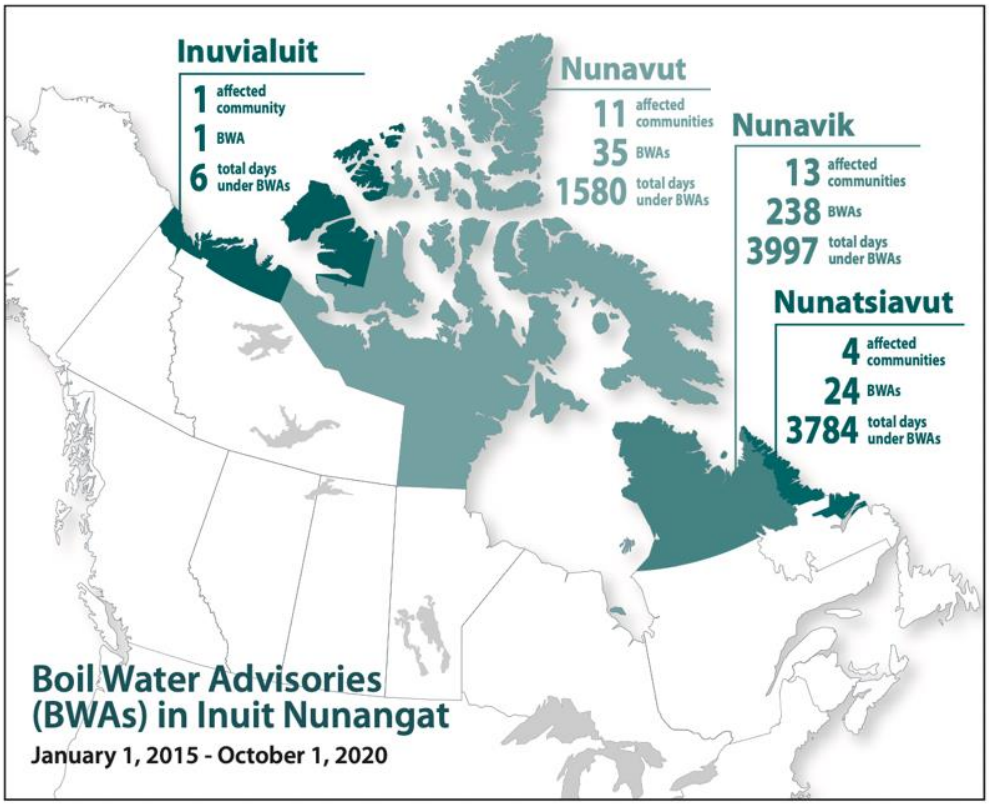

Figure 1. BWAs and duration in Inuit Nunangat, January 1, 2015 to October 1, 2020. Reproduced from ITK (6).

Most of the BWAs and water emergencies in Inuit Nunangat resulted from certain climatic conditions and inadequate water infrastructure (6, 22, 23). The ongoing infrastructure issues are

also compounded by overcrowding and housing shortages. For instance, in 2018, 52% of Inuit living in Inuit Nunangat resided in crowded homes, compared to 37% of First Nations living on reserves and 9% of non-Indigenous Canadians (6).

Under water emergencies, many Inuit must rely on drinking water stored in containers and trucked water (24-26). One stark example of this occurred on October 12, 2021 when the Government of Nunavut flew in 80,000 litres of bottled water to Iqaluit after fuel contaminated the community's drinking water and prompted a state of emergency (26, 27). The reliance on stored water, as opposed to unlimited tap water, has been shown to increase the risks of infectious disease transmission due to limiting the amount of water available for hand washing (28).

Adding to these challenges is the significant impact of climate change to Inuit Nunangat, including permafrost thaw, storm surges, severe coastal erosion, and the loss of nearly 40% of sea ice cover. In Inuit Nunangat, permafrost has traditionally been collected from nearby freshwater lakes and ponds and melted as sources of drinking water (21). However, warming temperatures caused by climate change have accelerated permafrost thaw, reducing the surface area of available freshwater and making water sources less predictable (29). This jeopardizes water security across the region.

According to Natan Obed, President of ITK, temperatures in the region have risen nearly three times faster than the global average during the president's lifetime. Most of the Inuit Nunangat region is built on permafrost, and studies predict that by 2050, much of the infrastructure in the area will be affected by thawing permafrost (21). Existing infrastructure is also becoming increasingly vulnerable to coastal erosion, storm surges, and extreme weather events (21).

Despite being at the forefront of climate change, Inuit have largely been excluded from climate change policy and practice in Canada. To shape decision-making and advance Inuit-driven climate initiatives during the climate crisis, ITK launched the *National Inuit Climate Change Strategy* in 2019 which identifies five Inuit-driven priority actions. Among these priority areas are calls to address infrastructure issues worsened by climate change. For example, one such call asks for long-term and flexible funding, training, and learning opportunities to enable Inuit to efficiently develop climate-resilient infrastructure (21).

This review of Canada's progress on SDG 6 focuses on First Nations communities living on reserve and excludes Inuit across Inuit Nunangat. However, as highlighted above, the issue of DWAs and impacts of climate change on water security extend beyond First Nations

communities living on reserve. Further attention is needed to support Inuit in strengthening water security amid the warming climate.

Drinking Water Advisories (DWAs)

Health Canada recommends that all jurisdictions use the *Guidelines for Canadian Drinking Water Quality* to establish provincial and territorial drinking water quality requirements (30). The guidelines indicate the maximum acceptable concentrations of contaminants in drinking water, as well as treatment goals, to ensure that the consumption or general usage of drinking water will not lead to adverse health effects in humans. If drinking water tests indicate that the water is potentially or known to be unsafe, or if there are issues in the drinking water system (DWS), such as equipment failures, breaks in the water line, inadequately treated water, or a lack of trained personnel to run, test, or monitor the DWS, DWAs will be released to warn individuals to not consume or use the water (30).

DWAs can either be sustained (lasting more than 15 days), short-term (lasting one year or less), or long-term (lasting for more than one year)(31). Three types of DWAs exist in Canada:

1. **Boil water advisories (BWAs)** advise people to boil tap water for at least one minute before drinking the water. People are also advised against using tap water for purposes where the water may be accidentally ingested, such as using tap water for cooking, preparing drinks, feeding pets, brushing teeth, washing foods, or making infant formula. Infants, toddlers, and the elderly are advised to have sponge baths rather than bathe with tap water to avoid swallowing the water. These advisories are most often issued when there are problems in the equipment or processes used for water treatment or in the DWS. However, the presence of pathogens in the water can also result in a BWA being issued. For example, in 2023, 87% of BWAs were due to treatment or DWS equipment and process-related problems, while 11% were due to microbiological water quality parameters (e.g., coliform bacteria or elevated turbidity levels), and 2% were due to the detection of *E. coli* (32, 33).
2. **"Do not consume" advisories (or "Do not drink" advisories)** warn individuals to not use their tap water for general purposes other than bathing adults and older children. These advisories are issued when contaminants that cannot be removed by boiling are identified in the water (e.g., lead)(33).
3. **"Do not use" advisories** warn against using tap water for any reason. These advisories are issued when the water poses a health risk such as irritating the skin, eyes, or nose, and the water contains pollutants that cannot be removed by boiling (33).

In Canada, BWAs represent 98% of DWAs, while "Do not consume" and "Do not use" advisories represent 2% of advisories each year (34).

For most Canadian residents, including First Nations living off-reserve, provincial or territorial drinking water quality regulations ensure that the drinking water reaching a consumer's tap is clean, safe, and reliable, with each municipality overseeing treatment facilities (13). For First Nations living on reserves south of the 60th parallel, however, a regulatory gap exists in which the responsibility for drinking water is shared by First Nations communities and the federal government, specifically Indigenous Services Canada (ISC). ISC is responsible for 100%[2] of the funding for the design, construction, upgrading, planning, procurement, commissioning, and operation and maintenance[3] (O&M) of all DWSs on First Nations reserves, as well as the training and certification of water operators to run the DWSs, while Chiefs and councils are responsible for the day-to-day management including water sampling, testing, and issuing DWAs (36). If First Nations communities on reserves have concerns about drinking water quality, an Environmental Health Officer funded by the federal government is required to assess the quality of the drinking water and advise Chiefs and councils on whether to issue DWAs as well as the type of DWA. Once notified, First Nations Chiefs and councils issue DWAs for communities on reserve while provincial, territorial, and local governments issue the advisories for populations who do not identify as First Nations or who do not live on a reserve (31).

ISC recommends that the testing and treatment of drinking water in federally-funded First Nations reserves follow the more stringent of either provincial/territorial water quality and treatment criteria or the federal requirements set out in Health Canada's *Guidelines for Canadian Drinking Water Quality* (30). Unlike provinces and territories, however, there is currently no federal legislation or legal enforcement mechanism to ensure that the drinking water quality on First Nations reserves meets the national water quality guidelines (37, 38). Rather, drinking water quality on First Nations reserves typically relies on voluntary compliance with the national drinking water quality guidelines, leaving First Nations on reserves without the same legal protections for safe drinking water as populations living off-reserve (38).

[2] Before 2020, the cost distribution was structured such that ISC covered 80% of the O&M costs of DWSs while First Nations were responsible for the remaining 20%.

[3] O&M funding is generally intended to cover the essential expenses needed to operate and maintain W&WW systems, along with related equipment. This includes salaries, benefits, and training for operators; necessary supplies and materials such as chemicals and fuel; tools, parts, and equipment for daily operations and maintenance; utility costs (e.g., electricity); contracted repair and maintenance services; and the full cost of Municipal-type Service Agreements for water and wastewater services (35).

Drinking Water Systems (DWSs)

DWSs are inherently complex and require a multi-barrier approach with four key components to prevent the presence of water-borne contaminants in drinking water:

1. Protect raw water sources from contamination;
2. Treat drinking water effectively;
3. Maintain and operate the water distribution system; and
4. Test the treated water routinely to confirm its quality (36).

Given the numerous steps for drinking water protection, DWSs can be expensive to construct and manage, making them vulnerable to breakdowns (38).

In a DWS, raw water is first distributed from a central surface water source, such as a major river system or lake, to a treatment facility for disinfection (e.g., chlorination and/or filtration). After the treated water leaves the treatment plant, a complex network of pipes, valves, hydrants, service lines, and storage facilities, known as the drinking water distribution system, carries treated water to its location of end use. The distribution system is critical in providing clean drinking water as it is the last component of the DWS before treated water reaches a consumer's tap (39).

Standard piped water delivery is the most effective way of delivering clean water to individuals. However, installing pipes in local terrain can be costly and labour-intensive, particularly in remote areas that are not easily accessible by road. Therefore, communities may use trucks to transport treated water to cisterns or rely on wells to serve individual households. These private water systems (i.e., wells and cisterns serving individual households) are not federally funded and local operators or owners of the cisterns and wells are responsible for ensuring the water quality meets provincial or territorial drinking water standards, as well as regularly cleaning, disinfecting, and maintaining the cisterns and wells (38).

Small DWSs represent the majority of federally-funded public systems. Health Canada defines small DWSs as systems serving between 501 and 5,000 people, whereas very small systems are defined as those serving between 26 and 500 people, and micro-systems are defined as systems serving fewer than 25 people (excluding private wells of individual households)(39). As with private DWSs, small DWSs use wells to source groundwater confined in aquifers rather than sourcing from surface waters. However, communities relying on small DWSs often face challenges such as insufficient funding, resources, and trained personnel, hindering their ability to meet the same system sufficiency and treatment standards as larger DWSs (40). Furthermore,

groundwater sources can be vulnerable to contamination from anthropogenic activities, such as waste disposal (e.g., municipal landfills and industrial waste disposal sites), leaking gasoline storage or septic tanks, and agricultural runoff (e.g., fertilizers, pesticides, and manure), as well as contamination from saltwater intrusion in which seawater contaminates freshwater aquifers in coastal areas (41).

The majority of BWAs occur in very small DWSs. In fact, in 2021, 89% of BWAs were issued for DWSs serving communities of 500 people or less (42). This disproportionate number of BWAs occurring in small DWSs is a common finding among several studies (16, 40, 43). For example, a study by Moghaddam-Ghadimi and colleagues (2023) found that between 2005 and 2021, communities with fewer than 500 people experienced 82% of the long-term BWAs lasting between 1 and 5 years and 93% of the long-term BWAs lasting between 5 and 15 years in Canada (16). Moreover, frequent and repeated BWAs were most common in small communities, with some communities experiencing 40 repeated BWAs between 2005 and 2021. After analyzing the causes of BWAs in the 15-year time period, the study concluded that the main reasons for BWAs in small DWSs were line breaks or pressure losses in the distribution system (16). Interestingly, this finding differed from the typical media narratives, which claimed that treatment failures and/or pathogen detection were the main reasons for issuing BWAs. Furthermore, the study concluded that water distribution systems were the primary source of water safety risks for Canadians, as most of the BWAs issued in Canada between 2005 and 2020 were linked to failures in the distribution system infrastructure (16).

Methodology

This narrative review is a synthesis of publicly available academic literature, grey literature, and media sources (e.g., news reports) on Canada's progress in achieving SDG 6 Target 6.1.1—resolving DWAs on federally-funded First Nations reserves—as well as the impact of climate change on water security. Sources were gathered through searches of academic databases (e.g., PubMed, ScienceDirect), Google Scholar, and relevant websites (e.g., Government of Canada, Statistics Canada, Indigenous Services Canada's SDG webpages). Reference lists of key publications were also reviewed to identify additional articles. The search used combinations of the following search terms: Canada, clean water, climate change, climate resilience, drinking water, drinking water advisories, drought, federal budget, First Nations, flooding, global warming, increased temperatures, Indigenous, Indigenous knowledge, permafrost, rising temperatures, water safety, water security, boil water advisories, Sustainable Development Goal 6, and wildfires.

A narrative review approach was selected to synthesize the diverse literature on water and wastewater (W&WW) investments for First Nations peoples, as well as the impacts of climate change on water security. Unlike systematic and literature reviews, narrative reviews are not designed to be comprehensive and inclusive of all relevant literature on a topic and do not require predetermined inclusion or exclusion criteria (44). Instead, the approach offers a broad overview of existing work, identifying themes based on the literature reviewed, and setting the stage for future, more comprehensive research (44). Accordingly, it is important to acknowledge that the overview of investments and efforts to improve W&WW systems on First Nations reserves between 1990 and 2025 are not inclusive of all initiatives undertaken by the federal government and First Nations communities over this 35-year period, such as various engagement sessions, public hearings, advocacy work, parliamentary rulings, and other governmental proceedings. Nevertheless, this review offers a summary of key budgets, inquiries, and investments aimed at resolving BWAs and improving W&WW systems on First Nations reserves, along with a general overview of how climate change may affect DWSs across Canada.

Findings

History of Financial Supports and Legislation for Safe Water on First Nations Reserves, 1990 – 2015

Beginning on July 1, 1867, when the Dominion of Canada was established, the *British North America Act* granted Parliament jurisdiction over "Indians and Lands reserved for the Indians,"[4] labelling First Nations with status as "Indians." Nearly ten years later, the highly invasive and paternalistic 1876 *Indian Act* consolidated previous regulations pertaining to First Nations to provide the federal Department of Indian Affairs with control over First Nations status, bands, and reserves, including every aspect of life on reserves (49, 50). With a primary focus of assimilating First Nations peoples, the *Indian Act* was amended nearly every year between 1867 and 1927, imposing an increasing number of controls over the lives of First Nations (50, 51). It was not until 1977 that a federal policy was enacted to improve the living conditions on reserves, with the intent:

[4] Use of the terms "Indians" and "Aboriginal" are included for the purpose of quoting the *Constitution Act,* 1867, the 1990 *Green Plan*, and direct quotations. Inuit were later ruled as "Indians" in 1939 by the Supreme Court of Canada, forcing Inuit lands to fall under federal jurisdiction and grouping First Nations and Inuit under the umbrella term "Aboriginal people." Métis peoples were not recognized as Indigenous peoples until the 1982 *Constitution Act* which, for the first time, recognized "Aboriginal people" as a collective term encompassing the three distinct groups of First Nations peoples, Inuit, and Métis people of Canada (45-48).

> "to provide Indian homes and communities with the physical infrastructure that meets commonly accepted health and safety standards, is similar to that available in neighbouring, non-Indian communities or comparable locations, and is operated and maintained according to sound management practices" (52)(p. 22).

However, in the ensuing decades, clean water and sanitation continued to be a recurring problem for First Nations communities (53).

Canada's *Green Plan*, 1990

Canada introduced its *Green Plan* in 1990, an ambitious environmental health policy that recognized the interconnectedness of pollution, environmental degradation, and human health. The plan outlined national targets aimed at protecting both the environment and public health from anthropogenic pollution while advancing the goal of sustainable development. One of the sections of the plan focused on strengthening partnerships with Indigenous peoples and the importance of protecting the lands for their traditional livelihoods and well-being. However, Indigenous peoples were often referred to collectively in the plan without specifying which of the three, distinct Indigenous population groups (First Nations peoples, Inuit, or Métis people) each target or commitment addressed.

The plan acknowledged how anthropogenic activities (e.g., clear cut logging, hydroelectric plants, pipelines, new roads, mines, etc.) harmed the land, water, and wildlife on reserves, and advocated for the importance of having Indigenous peoples actively involved in the decision-making processes and implementation of projects affecting their communities. Commitments by the federal government to protect the land and health of Indigenous peoples were listed, however the commitments did not provide target deadlines or further details on how each of the commitments would be achieved. The commitments made specifically for First Nations peoples, Inuit (referred to in the plan as "Arctic Indigenous peoples"), and Indigenous peoples collectively, include:

- "Special priority" (54) to accelerate the provision of W&WW systems to First Nations communities;
- Assist First Nations communities in developing environmental action plans, including conducting environmental assessments and developing environmental standards, and in turn, participating in provincial environmental assessments and regulatory processes;
- Support the creation of Indigenous environmental consultation mechanisms;
- Train First Nations administrators for environmental consultation mechanisms;
- Co-develop with First Nations an inventory of on-reserve environmental issues;

- Develop and release the 1991 *Health and Environment Action Plan* that includes commitments to:
    - Collaborate with Indigenous peoples to conduct environmental health risk assessments of contaminants for Indigenous peoples living in the Great Lakes basin and develop mechanisms to protect their health,
    - Initiate a program focusing on how environmental contaminants affect pregnancy and child development,
    - Develop a program focusing on health risks posed by foods for Arctic Indigenous peoples;
- Partner with Arctic Indigenous peoples to implement a five-year Arctic environmental strategy to achieve sustainable development in the Canadian Arctic through several elements including, but not limited to, managing Arctic contaminants, cleaning and managing waste, improving water quality, and protecting Arctic ecosystems;
- Strengthen legislation and regulation enforcement mechanisms including recruiting Indigenous peoples for enforcement programs; and
- Collaborate with First Nations communities for wildlife conservation and research, as listed in the 1990 *National Wildlife Policy for Canada*.

Another section of the plan acknowledged unsafe W&WW services as one of the most important environmental issues burdening First Nations communities. The plan promised that the federal government would significantly accelerate the provision of W&WW systems to First Nations reserves to "address health and safety problems," with "virtually all the projects" implemented by First Nations communities (54).

According to the Minister of Environment in 1990, the federal government had been spending $1.3 billion every year on the environment before the *Green Plan* was released. In addition to the $1.3 billion in annual spending, the *Green Plan* committed to spending $3 billion in new funds for the next five years. When combined with existing projects, the plan projected that nearly $10 billion would be spent between 1990-1995, representing a 50% increase in annual spending by 1995. Indigenous and Northern Affairs Canada (INAF) was identified as the federal body responsible for supporting First Nations peoples and Inuit in addressing environmental concerns and preserving the environmental integrity of the land north of the 60th parallel. Métis people were not explicitly included in the plan (54). Further details on the federal government's commitments can be found in Chapters 1-A, IV-A, and VIE of the plan (54). For more context on other historic and existing federal legislation relating to safe water in First Nations communities, including the 1986 *Canada Water Act* and 1999 *First Nations Land Management Act*, refer to the *Legal Analysis of the 2006 Expert Panel on Safe Drinking Water for First Nations Volume 2* (52).

Investments and Inquiries, 1991 – 1997

The Royal Commission on Aboriginal Peoples (RCAP) was established in 1991 to investigate and propose solutions to the challenges[5] affecting the relationship between the federal government, Canadian society as a whole, and First Nations peoples, Inuit, and Métis people. According to the RCAP, a total of $487.6 million was spent between 1991 and 1996 to install and expand W&WW systems on First Nations reserves, with the percent of houses on reserve with water and wastewater systems rising from 86.5% and 80% in 1990-1991 to 92.1% and 85.6% in 1993-1994, respectively (56, 57). Despite this funding, a 1995 survey by Health Canada and the Department of Indian Affairs and Northern Development (DIAND)[6] revealed that approximately one-quarter (211) of 863 on-reserve First Nations water systems examined, and 64 of 425 wastewater systems examined, failed to meet basic health and safety standards (58, 59). Remediation work had been completed in just 36 of the 211 deficient water systems and 12 of the 64 deficient wastewater systems, while 76 and 16 water and wastewater systems still required engineering studies to assess the cost of necessary remedial work before any repairs could begin. For the remaining 99 water systems and 36 wastewater systems where remedial work had already started or the structural issues had been assessed by engineers, the study estimated it would cost $214 million and $57 million, respectively, to correct the deficiencies. Overall, RCAP estimated a total cost of at least $460 million to remediate all the W&WW systems assessed and install new systems where adequate systems did not exist (56). While the federal government committed to spending $500 million over the following three years (1996 to 1999) for remedial action, the RCAP report determined that, at that pace, it would take up to nine years to complete the remedial work. Accordingly, the RCAP urged the federal government to accelerate the pace of remedial work by investing an additional $50 to $60 million per year, aiming to complete repairs to the 211 on-reserve First Nations water systems and 64 community wastewater systems within five years.

The inadequately funded and managed W&WW systems had severe health consequences for several First Nations communities. For instance, between 1992 and 1994, a shigellosis epidemic in Manitoba was attributed to inadequate W&WW infrastructure and poor housing conditions. Although First Nations peoples made up only 8% of Manitoba's population at the time, they

[5] The Commission was established in the wake of the 1990 Kanyen'kehà:ka Resistance (also known as the Kanesatake Resistance or Oka Crisis)—a land dispute between the Kanyen'kehà:ka (Mohawk) Nation and the town of Oka, Quebec. The conflict arose from a proposed expansion of a golf course and the development of townhouses on Kanesatake land, which included a Kanyen'kehà:ka burial ground. This dispute led to a 78-day standoff between Kanyen'kehà:ka protesters, the Quebec police, the Royal Canadian Mounted Police (RCMP), and the Canadian Army (55).

[6] DIAND was later renamed to Aboriginal Affairs and Northern Development Canada (AANDC) in 2011 and renamed again to Indigenous and Northern Affairs Canada (INAC) in 2015. In 2017, INAC evolved into Crown-Indigenous Relations and Northern Development and Indigenous Services Canada (ISC)(58).

accounted for 69% of the reported shigellosis cases. The study concluded that 90% of these cases could have been prevented had adequate W&WW systems and housing facilities been in place (56).

The Circuit Rider Training Program, 1994 - present

The Circuit Rider Training Program (CRTP) was introduced in 1994 as a two-year pilot project in Ontario—funded by Health Canada and facilitated by the Assembly of First Nations (AFN) in Ottawa—to provide hands-on, on-site training to operators of First Nations W&WW systems. By 2000, annual funding for the program ranged between $2 million and $3 million, supporting the training of local W&WW operators on First Nations reserves. The goal of the program was to have all operators certified within three years, as certification would become mandatory in 2003 (60, 61). In 2009, the Ministry of Indian Affairs expanded the program's funding to ensure accessibility for all First Nations across Canada and by 2019, 74% of water system operators and 60% of wastewater system operators had obtained certification (62, 63). According to ISC, as of 2024, approximately $12 million are currently invested in the CRTP annually (64).

Investments and Inquiries, 2000 – 2015

In 2001, Health Canada and DIAND released the *National Assessment of Water and Wastewater Systems in First Nations Communities: Summary Report* as a follow-up to their 1995 survey. Alarmingly, the assessment found that the proportion of on-reserve water systems posing significant health risks had risen dramatically—from one-quarter in 1995 to nearly three-quarters by 2001 (65). A few years later, the federal government reported in the *2005 Report of the Commissioner of the Environment and Sustainable Development to the House of Commons* that $1.9 billion had been spent between 1995 and 2003 on providing safe drinking water and wastewater services to First Nations reserves (66). The Commissioner concluded that:

> "[w]hen it comes to the safety of drinking water, residents of First Nations communities do not benefit from a level of protection comparable to that of people who live off reserves. This is partly because there are no laws and regulations governing the provision of drinking water in First Nations communities, unlike other communities" (66)(p. 1-2).

The Commission presented five key recommendations to the House of Commons, which were accepted by both INAC and Health Canada:

1. Establishing a regulatory framework for drinking water systems on reserves;
2. Defining and clarifying applicable design standards and codes;
3. Strengthening monitoring of water systems and ensuring consistent follow-up;

4. Creating institutions to support capacity building within communities; and
5. Submitting regular progress reports to Parliament (66, 67).

In Budget 2003, the federal government committed $600 million over five years (2003-2008) for a new *First Nations Water Management Strategy*. This investment was in addition to $1 billion already invested to improve testing, reporting, training, and resource capacity for water quality concerns on First Nations reserves, bringing the total funding to $1.6 billion investment over five years (67, 68). The strategy was designed to address all high-risk systems by the end of March 2008, using the following seven-step approach:

1. Upgrading and constructing new W&WW systems to meet established standards;
2. Enhancing water quality monitoring through a coordinated compliance and reporting framework;
3. Establishing a sustainable O&M program for facilities;
4. Improving the training programs for system operators;
5. Developing comprehensive water quality management protocols and policies;
6. Increasing public awareness about the strategy in First Nations communities; and
7. Establishing clear and integrated standards for water protection (67).

Case Study: Kashechewan First Nation

The Kashechewan reserve was built on a floodplain along the Albany River—a location chosen by the federal government in the early 1900s despite warnings from community elders that it was not a good location. Compounding the community's water challenges, the water treatment plant was located downstream from a sewage lagoon. As a result, the Cree community of Kashechewan First Nation faced frequent water contamination issues and flooding nearly every spring (65, 69).

In 2003, the Kashechewan reserve in Ontario's James Bay Coast was placed under a BWA due to increased turbidity and sediment in the water. Only accessible by boat or airplane, the community was forced to rely on shipments of bottled water from the federal government. Two years later, in 2005, the long-term BWA was still in effect and the community was forced to evacuate nearly 1,000 of its residents following an emergency order from the Ontario government. The evacuation was prompted by dangerously high levels of *E. coli* in the community's drinking water. Large quantities of chlorine were pumped into the community's nine-year-old water system in an attempt to eliminate the *E. coli*, however, due to a broken chlorine injector, excessive concentrations of chlorine were released into the drinking water. This over-chlorination led to chronic skin conditions, open sores, and rashes among residents (69).

After decades of advocacy for relocation to higher ground, in 2006, the federal government committed $500 million to move the community. However, when the federal election resulted in a change in government, the relocation plan was deemed too expensive. Instead, in 2007, $200 million was pledged to rebuild the area of Kashechewan First Nation in its current location, although much of that funding was ultimately spent on repeated evacuations during the flood season (70).

In 2019, the federal government reaffirmed its commitment to relocate the 2,000 residents of Kashechewan First Nations to higher ground by 2029. The Chief from Kashechewan First Nation chose a site on higher ground, 30 km north of Kashechewan First Nation's current location, as the preferred relocation and in 2024, ISC shared that staff had been hired to work on the relocation project (70, 71). However, ISC also noted that the relocation project was complex and may not be finished before 2029 (71). In the meantime, Kashechewan First Nation continues to face annual evacuations and advocate for relocation, with spring now commonly referred to as their "evacuation season" (70).

Plan of Action for Drinking Water in First Nations Communities, 2006-2010

On March 21, 2006, DIAND and AFN announced the *Plan of Action for Drinking Water in First Nations Communities* (henceforth referred to as the "Plan of Action"), highlighting the following five commitments for DIAND:

1. Establish an expert panel to guide the development of a regulatory framework for drinking water quality in First Nations communities (later formed as the Expert Panel on Safe Drinking Water for First Nations);
2. Ensure oversight of water systems by ensuring mandatory training is provided for all treatment-plan operators, as well as a regime;
3. Issue the Protocol for Safe Drinking Water in First Nations Communities with clear standards for the design, construction, and O&M of drinking water systems on First Nations reserves, as well as a requirement for annual performance inspections;
4. Implement remedial plans to lift DWAs, starting with the 21 priority communities that have both high-risk DWSs and DWAs[7]; and
5. Commit to reporting on the progress of the Plan of Action (67, 72)

[7] The 21 First Nations communities identified under the Priority Community Category in March 2006 included: Pabineau, Woodstock, Kitigan Zibi Anishinabeg, Shoal Lake, Constant Lake, Moose Deer Point, Northwest Angle No. 37, Ochiichagwe'babigo-ining, Kingfisher, Muskrat Dam Lake, Wabigoon Lake Ojibway, Dene Tha', Driftpile, Frog Lake, Semiahmoo, Shuswap, Toqhaht, Canoe Creek, Lake Babine Nation—Community of Fort Babine, Toosey, and Taku River Tlingit (67).

In the following months, the federal government released its 2006 budget and committed $60 million over two years to support implementation of the Plan of Action (73). That same year, the Minister of Indian Affairs and Northern Development, with support from the AFN, established the Expert Panel on Safe Drinking Water to explore timelines for a regulatory framework to be introduced. Several witnesses from First Nations communities, including the AFN, testified before the Standing Senate Committee on Aboriginal Peoples, concluding that while a regulatory framework was necessary to ensure the accessibility of safe drinking water, the regulation alone would not be sufficient unless investments were made to increase human resource capacity within the communities (52). For example, in a committee proceeding on May 16, 2007, the Chief Executive Officer of AFN, Richard Jock, shared,

> "[w]e can have the highest standards but if there is not a systematic way to enforce them they will be meaningless" (74).

Overall, the Expert Panel concluded that regulatory frameworks:

> "…depend on adequate investment in both human resources and physical assets. Regulation without the investment needed to build capacity may even put drinking water safety at risk by diverting badly needed resources into regulatory frameworks and compliance costs"(52)(p.18).

The Standing Senate Committee on Aboriginal People agreed with the views expressed by the Expert Panel and recommended that DIAND undertake an independent needs assessment of both physical and human resources of First Nations W&WW systems. This assessment would include consultations to explore options regarding legislative frameworks, as proposed by the Expert Panel (52, 65). The report concluded that:

> "[s]ustained investment in the capacity of First Nations community water systems and of those running the systems is absolutely essential to ensure First Nations people on-reserve enjoy safe drinking water. Without this investment, we risk introducing a regulatory regime that burdens communities and does little to help them meet legislated standards" (65)(p. 9).

Following the release of the 2006 Plan of Action, INAC published annual progress reports from 2006 to 2010, detailing updates on the Plan's five key commitments (67, 75-78). Table 2 lists the progress in lifting DWAs and lowering the risk level of high-risk DWSs in the 21 priority communities. Key updates from each of the progress reports are summarized below.

2006 Progress Report

(1) Regulatory Framework for Drinking Water Quality in First Nations Communities

- Established an Expert Panel to examine and propose options for a regulatory framework for safe drinking water in First Nations communities. The panel heard from over 100 First Nations and non–First Nations presenters between July and August 2006 and submitted its final report to the Minister of INAC in November 2006. The Minister planned to discuss the report with their colleagues and the National Chief of the Assembly of First Nations (67).

(2) Ensuring DWS Oversight Through Operator Training and Regimes

- Launched operational support systems, including a 24-hour technical support hotline available to all First Nations by December 2006, and Ontario's Safe Water Operations Program. The Ontario program involved hiring arm's-length, qualified, full-time service providers (contracted by First Nations with oversight of service providers) to deliver on-site supervision and training to communities most in need (such as those without local certified operators and with significant operational issues).

- Expanded the number of water treatment system operators who achieved the first level of certification or greater through the CRTP from 8% in March 2003 to 35% of all operators in November 2006. This represented 392 out of 1,107 water system operators and back-up operators at the time.

- Strengthened the CRTP by: expanding the program to all First Nations; establishing a communication network among regional Circuit Rider Trainers to share best practices; and adapting the training of operators to ensure that certification is achieved under provincial regimes and training adheres to the Protocol for Safe Drinking Water in First Nations Communities. Work was underway to install remote monitoring equipment in all high-risk DWSs and offer frequent, on-site assessments by oversight operators by 2007-2008 (67).

(3) Issuing the Protocol for Safe Drinking Water in First Nations Communities

- Issued and put into effect the Protocol for Safe Drinking Water in First Nations Communities on March 21, 2006 (67).

(4) Removing 21 First Nations Communities from the Priority Community Category

- Decreased the number of high-risk, public DWSs on First Nations reserves from 193 in March 2006 to 114 in December 2006.

- Of the 21 First Nations under the Priority Community category (identified in March 2006), six had their DWAs lifted (Constance Lake, Wabigoon Lake Ojibway, Dene Tha', Driftpile, Shuswap, and Taku River Tlingit). Ochiichagwe'Babigo'Ining First Nation had their DWA temporarily lifted in March 2006, but it was reinstated in September 2006. Fifteen First Nations remained under the Priority Community category.

- Progress was not provided on lowering risk levels of the DWSs in the priority communities.

- Fifteen First Nation communities remained in the Priority Community Category: Pabineau, Woodstock, Kitigan Zibi Anishinabeg, Shoal Lake 40, Moose Deer Point, Northwest Angle No. 37, Ochiichagwe'babigo-ining, Kingfisher, Muskrat Dam Lake, Frog Lake, Semiahmoo, Toqhaht, Canoe Lake, Lake Babine Nation—Community of Fort Babine, and Toosey (67).

(5) Reporting on the Progress of the Plan of Action.

- Released the first progress report in December 2006 (67).

2007 Progress Report

(1) Regulatory Framework for Drinking Water Quality in First Nations Communities

- Tabled the final report of the Expert Panel in the House of Commons in December 2006. New legislative water quality standards for First Nations were announced in Budget 2007, with plans to choose a regulatory option and propose a regulatory framework in the Spring of 2007 (75).

(2) Ensuring DWS Oversight Through Operator Training and Regimes

- Eight communities received water service providers through the Safe Water Operations Program.
- Expanded the number of water treatment system operators who achieved the first level of certification or greater through the CRTP from 35% in November 2006 to 37.4% of all operators in March 2007. This represented 418 out of 1,117 water system operators and back-up operators at the time.
- Continued strengthening the CRTP with plans to install remote monitoring equipment in all high-risk DWSs and offer frequent, on-site assessments by oversight operators by March 2008 (75).

(3) Issuing the Protocol for Safe Drinking Water in First Nations Communities

- Planned improvements to the Protocol such as the integration of Health Canada's procedures for issuing and lifting DWAs (aimed at improving response times and reducing the duration of advisories) and incorporation of Environment Canada's technical manuals on source water protection planning (75).

(4) Removing 21 First Nations Communities from the Priority Community Category

- Decreased the number of high-risk, public DWSs on First Nations reserves from 114 in December 2006 to 97 in March 2007.

- Since the 2006 Progress report, an additional five communities had their risk level reduced from high to either medium or low (Constance Lake, Woodstock, Ochiichagwe'Babigo'Ining, Driftpile, and Shuswap), while one First Nation community (Ochiichagwe'Babigo'Ining) had their DWA lifted in March 2007.

- Fourteen First Nation communities remained in the Priority Community Category: Pabineau, Kitigan Zibi Anishinabeg, Shoal Lake 40, Moose Deer Point, Northwest Angle No. 37, Kingfisher, Muskrat Dam Lake, Dene Tha'-Chateh and Bushe River, Frog Lake, Semiahmoo, Toqhaht, Canoe Lake, Lake Babine Nation—Community of Fort Babine, and Toosey (75).

(5) Reporting on the Progress of the Plan of Action.

- Released the second progress report in March 2007 (75).

2008 Progress Report

(1) Regulatory Framework for Drinking Water Quality in First Nations Communities

- No major updates (76).

(2) Ensuring DWS Oversight Through Operator Training and Regimes

- Expanded the number of water treatment system operators who achieved the first level of certification or greater through the CRTP from 37.4% in March 2007 to 41% of all water operators in Fall 2007. This represented 475 out of 1,152 water system operators and back-up operators at the time (76).

(3) Issuing the Protocol for Safe Drinking Water in First Nations Communities

- Continued planning improvements to the Protocol (integration of Health Canada's procedures for addressing DWAs and Environment Canada's guidance materials)(76).

(4) Removing 21 First Nations Communities from the Priority Community Category

- Decreased the number of high-risk, public DWSs on First Nations reserves from 97 in March 2007 to 85 systems in January 2008.
- Since the 2007 Progress report, an additional seven communities had their risk level reduced (Frog Lake, Semiahmoo, Toqhaht, Canoe Lake, Lake Babine Nation—Community of Babine, Toosey, and Taku River Tlingit), while two communities had their DWAs lifted (Chateh in Dene Tha' First Nation and Moose Deer Point).

- Six First Nation communities remained in the Priority Community Category: Pabineau, Kitigan Zibi Anishinabeg, Shaol Lake 40, Northwest Angle No. 37, Kingfisher, and Muskrat Dam Lake (76).

(5) Reporting on the Progress of the Plan of Action.

- Released the third progress report in January 2008 (76).

2009 Progress Report

(1) Regulatory Framework for Drinking Water Quality in First Nations Communities

- Consultations held between February and March 2009 with First Nations, regional organizations, and provincial/territorial government representatives on the development of a legislative framework for drinking water (77).

(2) Ensuring DWS Oversight Through Operator Training and Regimes

- Expanded the number of water treatment system operators who achieved the first level of certification or greater through the CRTP from 41% in Fall 2007 to 64% of all water operators in March 2009.

- Fourteen additional Circuit Rider Trainers were hired for a total of 54 (77).

(3) Issuing the Protocol for Safe Drinking Water in First Nations Communities

- Workshops held with First Nation technical organizations to hear feedback on the Protocol for preparing a revised version (77).

(4) Removing 21 First Nations Communities from the Priority Community Category

- Decreased the number of high-risk, public DWSs on First Nations reserves from 85 systems in January 2008 to 48 in April 2009.

- Since the 2008 Progress report, an additional two communities had their risk level reduced (Papineau and Kingfisher). No priority communities had DWAs lifted.

- Four First Nations remained in the Priority Community category: Northwest Angle No. 37, Kitigan Zibi Anishinabeg, Shoal Lake No. 40, and Muskrat Dam Lake (77).

(5) Reporting on the Progress of the Plan of Action.

- Released the fourth progress report in April 2009 (77).

2010 Progress Report

(1) Regulatory Framework for Drinking Water Quality in First Nations Communities

- Held engagement sessions between the federal government and First Nation organizations in Fall 2009 and Winter 2010 to discuss regional issues regarding the proposed federal legislation (78).

(2) Ensuring DWS Oversight Through Operator Training and Regimes

- Decreased the number of water treatment system operators who achieved the first level of certification or greater through the CRTP from 64% in March 2009 to 60% in March 2010.

- Eleven additional Circuit Rider Trainers were hired for a total of 65 (78).

(3) Issuing the Protocol for Safe Drinking Water in First Nations Communities

- Released a revised Protocol titled *Protocol for Centralised Drinking Water Systems in First Nations Communities* (78).

(4) Removing 21 First Nations Communities from the Priority Community Category

- The number of high-risk, public DWSs on First Nations reserves increased from 48 in April 2009 to 49 in April 2010.

- Since the 2009 Progress report, one more community (Northwest Angle No.37) had their risk level reduced. No priority communities had DWAs lifted.

- Three First Nations remained in the Priority Community category: Kitigan Zibi Anishinabeg, Shoal Lake No. 40, and Muskrat Dam Lake (78).

(5) Reporting on the Progress of the Plan of Action.

- Released the fifth and final progress report in April 2010 (78).

Table 2. Progress on Addressing the 21 Priority Communities with Both High-risk DWSs and a DWA, Progress Reports 2006-2010.

21 Priority First Nation Communities	December 2006 Progress Report (67)	March 2007 Progress Report (75)	January 2008 Progress Report (76)	April 2009 Progress Report (77)	April 2010 Progress Report (78)
Pabineau				Risk level reduced.	
Woodstock		Risk level reduced.			
Kitigan Zibi Anishinabeg					
Shoal Lake 40					
Constant Lake	DWA lifted.	Risk level reduced.			
Moose Deer Point			DWA lifted.		
Northwest Angle No. 37					Risk level reduced.
Ochiichagwe'babigo-ining	Risk level reduced. DWA lifted.				
Kingfisher				Risk level reduced.	
Muskrat Dam Lake					
Wabigoon Lake Ojibway	DWA lifted.				
Dene Tha'-Chateh and Bushe River.	DWA lifted in both Chateh and Bushe River.	DWA added in Chateh (returned to Priority Community category).	DWA lifted in Chateh.		
Driftpile	DWA lifted.				
Frog Lake			Risk level reduced.		
Semiahmoo			Risk level reduced.		
Shuswap	DWA lifted.	Risk level reduced.			
Toqhaht			Risk level reduced.		
Canoe Lake			Risk level reduced.		
Lake Babine Nation—Community of Fort Babine		Risk level reduced.			
Toosey			Risk level reduced.		
Taku River Tlingit	DWA lifted.		Risk level reduced.		
Total Remaining Priority Communities	15	14	6	4	3

Investments and Inquiries, 2008 - 2015

Despite the total funding invested to improve the provision of safe drinking water for First Nations on reserves between 1991 and 2007, DWAs continued to affect First Nations communities. According to Health Canada's 2009 report, *Drinking Water Advisories in First Nations Communities in Canada: A National Overview 1995-2007*, between 1995 and 2007, a total of 162 communities were under long-term DWAs for more than one year. Of these, 57 (35%) were in effect for up to 2 years, 24 (15%) up to 3 years, 37 (23%) up to 4 years, 13 (8%) up to 5 years, 11 (7%) up to 6 years, five (3%) up to 7 years, ten (6%) up to 8 years, three (2%) up to 9 years, one (1%) up to 10 years, and another (1%) up to 13 years. On average, 85% of the long-term DWAs continued into the following year after the year they were set, while only 15% were lifted within a year (79, 80).

Several federal commitments were made in the years following the 2006 and 2007 reports to improve W&WW systems on First Nations reserves. The *First Nations Water Management Strategy (2003–2008)* and Aboriginal Affairs and Northern Development Canada's (AANDC) *Plan of Action for Drinking Water (2006–2008)* were succeeded by a new health initiative in 2008 titled the *First Nations Water and Wastewater Action Plan* (FNWWAP). As part of Budget 2008, the federal government allocated an additional $330 million over two years to support FNWWAP. Additionally, as summarized previously from the 2009 Progress Report, the government announced plans to hold engagement sessions with First Nations and provincial and territorial governments to discuss a preferred approach for incorporating and adapting existing provincial/territorial regulations for a legislative framework for water quality on First Nations reserves (73, 77). Thirteen engagement sessions were held between February and March 2009 with 544 First Nations members. Discussions centred around funding, community engagement for proposed regulations, protecting First Nations and treaty rights, protecting source water from off-reserve contamination threats, and recognizing water as sacred for First Nations peoples (73, 77, 81). The following year, Budget 2009 committed $165 million to building or upgrading 18 W&WW systems and by 2010, Budget 2010 renewed the FNWWAP with a commitment of $330 million over two years, extending the program until 2012 (73, 77).

On May 26, 2010, the *Safe Drinking Water for First Nations Act* (Bill S-11) was introduced to the Senate to develop federal regulations governing the provision of drinking water to First Nations communities and to set quality standards for W&WW systems (73). However, the Act's initial form faced significant opposition from many First Nations communities, associations, and Chiefs. According to a 2023 progress report on access to safe drinking water in First Nations communities by the Minister of Indigenous Services, First Nations repeatedly called for the Act to be repealed and replaced due to concerns including: inadequate, unpredictable, and

unsustainable funding; potential infringements on First Nations' and treaty rights; insufficient protections for source water; and a lack of sufficient engagement with First Nations representatives during its development (35). The Canadian Environmental Law Association (CELA) also opposed the Act, arguing that it was unconstitutional under section 35 of the *Constitution Act*, 1982. CELA claimed that the Act disregarded recommendations from the Expert Panel and the Commissioner of Environment and Sustainable Development to build capacity among First Nations to manage W&WW systems since no resources were explicitly allocated in the Act for this purpose. Testimonies from First Nations witnesses before the Committee further underscored these concerns, describing the Act as inadequate for ensuring safe drinking water and wastewater systems on reserves (81). Meanwhile, the AFN Chief, speaking before the Standing Committee, labelled the Act as paternalistic while both the Union of BC Indian Chiefs and Chiefs of Ontario called for either its abandonment or significant revision of its approach (81). More information on the *Safe Drinking Water for First Nations Act*, including its eventual repeal, is discussed in the section "2021 ICIF and Settlement Agreement" of this document.

The following year, the *National Assessment of First Nations W&WW Systems* report was published, assessing 807 water systems serving 560 First Nations between 2009 and 2010. The report found that nearly three-quarters (73%) of the water systems on First Nations reserves were categorized as either high risk or medium risk of health and safety issues. Additionally, of the 192 high risk water systems, 150 were flagged for a high risk of exceeding the *Guidelines for Canadian Drinking Water Quality's Maximum Acceptable Concentration* of bacteria (82). This exceedance impacted 16% of the on-reserve First Nation population (82). The *First Nations W&WW Action Plan* was renewed a third time in 2012 with another $330 million commitment for two years, and a fourth time by the *Economic Action Plan* in 2014 with further commitments of $323.4 million for two years (83, 84). Overall, the federal government invested nearly $556 million towards the *First Nations W&WW Action Plan*, totalling nearly $1.4 billion on W&WW activities between 2008 and 2012 (85).

Despite the concerns and opposition raised by First Nations surrounding the *Safe Drinking Water for First Nations Act*, the bill came into force in 2013 and by November 2015, 105 long-term DWAs were still in effect on public systems on First Nations reserves (19, 81). Coinciding with the UN 2030 Agenda for Sustainable Development in 2013, Canada committed to achieving SDG 6 and ending all long-term DWAs on First Nations reserves by March 31, 2021 (12, 86). Despite the previous funds and commitments, however, Canada was unsuccessful in achieving the target by March 2021 (87).

Federal Investments Towards Target 6.1.1, 2016-2025

According to the 2024 federal budget, since the government's 2015 commitment, over $6.3 billion was invested to improve W&WW infrastructure and accelerate progress in ending both long-term and short-term DWAs on public systems on First Nations reserves. As a result, 144 long-term DWAs were lifted by the release of the federal budget and 271 short-term[8] advisories were addressed before becoming long-term advisories. This led to 94% of First Nations communities on reserves having access to clean water from public systems. The budget does not, however, go into detail as to how the long- and short-term advisories were specifically addressed (89). Figure 2 illustrates the federal funding dedicated to W&WW services on First Nations reserves between 2016 and 2024.

[8] According to ISC, ISC and First Nations communities work together to resolve short-term DWAs in various ways, including: training water operators, such as through the Circuit Rider Training Program, to manage water systems when no trained operators are available; funding operational supports, such as centralized water and wastewater operations hubs so that certified water operators can ensure the safe functioning of water treatment plants; ensuring that First Nations communities have trained personnel to test and verify the quality of the water when no trained personnel are available; and supporting community-based testing and monitoring (88).

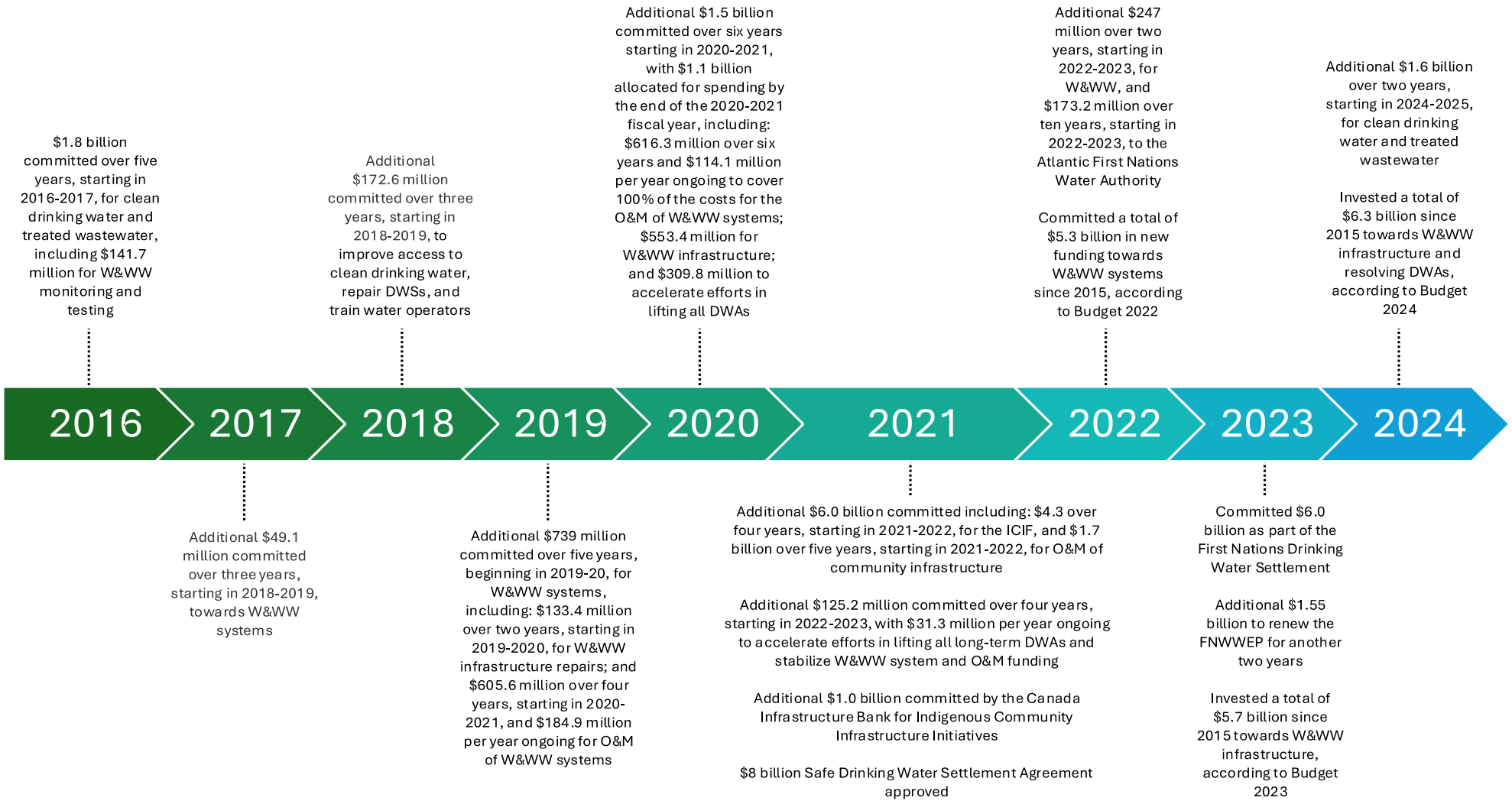

Figure 2. Federal commitments to on-reserve W&WW systems, 2016-2024.

Note. Funding pertains exclusively to public W&WW systems on First Nations reserves that are financially supported by ISC. Data is sourced from the federal Budget's 2016-2019 (90-93); 2020 *Fall Economic Statement* (94); federal Budget's 2021-2024 (89, 95-97); ISC's Briefing Note, *Appearance before the Standing Committee on Public Accounts on OAG Report 3: Access to Safe Drinking Water in First Nations Communities, November 30, 2023 (98);* the Parliamentary Budget Officer's 2021 report, *Clean Water for First Nations: Is the Government Spending Enough?* (95); and ISC's *2023-2024 Departmental Results Report* (99).

Investments between 2016 and 2020

Between 1996 and 2015, the base budget from INAC to fund W&WW systems on First Nations reserves was limited to an annual 2% increase. This arbitrary 20-year funding cap did not account for population growth, inflation, or the evolving needs of First Nations communities, resulting in a legacy of underfunded W&WW systems that required significant restoration (100). As shown in Figure 2, Budget 2016 announced $1.8 billion to improve W&WW delivery over five years starting in 2016-2017 (90). The announcement finally lifted the funding cap from INAC for W&WW systems on First Nations reserves, resulting in a 22% increase in funding by 2020-2021 relative to what would have been provided under the funding cap (101). An additional $141.7 million was committed over five years to Health Canada for its Community-based Water Monitoring Program (CBWM) to improve drinking water monitoring and testing in First Nations communities (102). Since then, Budget 2017 committed $49.1 million over three years (starting in 2018-2019), followed by Budget 2018, which committed $172.7 million over three years (beginning in the same year). Budget 2019 then significantly increased funding, committing $739 million over five years, including $184.9 million every year thereafter (starting in 2019-2020)(91-93). Despite the continued investments, however, the percentage of water systems on First Nations reserves categorized as high- or medium-risk of health and safety concerns was still 43% in 2019-2020—the same percentage as in 2014-2015 (103).

While there was no Budget 2020 due to the COVID-19 pandemic, the 2020 Fall Economic Statement announced $1.5 billion, starting in 2020-2021, to accelerate efforts in lifting long-term BWAs and improving W&WW infrastructure in First Nations communities. Of this amount, $1.1 billion was set to be spent by the end of the 2020-2021 fiscal year, with $114.1 million allocated annually thereafter (94). The funding included $616.3 million over six years for O&M of W&WW systems, $309.8 million to lift long-term DWAs on public systems on reserves, and an ongoing $114.1 million per year to fulfill the commitment to clean drinking water in First Nations communities (98). Additionally, the funds aimed to revise ISC's O&M funding formula, shifting from the previous 80:20 cost-sharing model (where ISC covered 80% of W&WW system costs and First Nations covered the remaining 20%) to ISC covering 100% of the costs (103).

The Office of the Auditor General (OAG) noted that the formula for calculating O&M costs had been outdated since 1998, often failing to cover the promised 80% and leaving many First Nations struggling to meet the remaining costs. To address this, ISC allocated $140 million in 2020–2021 to cover 100% of the O&M costs for First Nations W&WW systems (98). The revised funding model also sought to address salary disparities between First Nations water system operators on and off reserve. For example, a 2018 department study found that First Nations operators on reserve earned 30% less than water operators off-reserve, making it difficult to retain qualified personnel (12, 104). By 2021, this wage gap had widened to 42%, with on-

reserve operators earning an average salary of $40,400 compared to $70,000 for off-reserve operators (98).

Recognizing the need for reform, the OAG conducted an audit in 2021 to assess the federal government's progress in meeting its commitment to resolve all long-term DWAs on public systems on First Nations reserves by March 31, 2021. The audit also assessed funding requirements for O&M of drinking water infrastructure, highlighting a need to amend the existing policy and funding formula and improve salaries for First Nation water operators on reserves. The OAG tabled its report in February 2021 with five recommendations for ISC to work with First Nations communities and eliminate all long-term DWAs (12, 98). By June 2021, the Standing Committee on Public Accounts (PACP) released its own report, *Access to Safe Drinking Water in First Nation Communities*, echoing the OAG's recommendations. The PACP report recommended that ISC provide regular progress reports on its recommendations (98). Following the Fall 2021 election, the PACP re-adopted its report in February 2022, and ISC provided the PACP with two progress reports in June 2022 and March 2023 (98, 105). Table 3 outlines the OAG's recommendations, Committee's reporting requirements, and ISC's progress report submissions.

Table 3. Summary of OAG Recommendations, PACP Reporting Requirements, and ISC Progress Reports.

Theme	2021 OAG Report Recommendations (12)	2021 PACP Reporting Requirements (103)	Deadline(s) for the PACP Report's Recommendations (103)	ISC's Report Submission Dates (98, 105)
Resolving long-term DWAs and implementing long-term solutions	ISC should collaborate with First Nations communities to enhance efforts aimed at eliminating long-term drinking water advisories and preventing new ones from occurring. ISC should also work alongside First Nations to establish lasting solutions that ensure continuous access to safe drinking water in their communities.	ISC should release a comprehensive plan, developed in collaboration with First Nation, detailing ISC's long-term strategy for ensuring sustainable drinking water systems on First Nations reserves. The plan should include the objectives and deadlines, investments made towards resolving long-term DWAs, and the current number of long-term and short-term DWAs.	March 31, 2022, with annual progress reports until 2026. The final progress report (due March 31, 2026) must outline the long-term solutions that were implemented in all communities impacted by long-term DWAs since 2015.	Submitted on June 9, 2022 and March 31, 2023.
Detecting and proactively correcting issues in DWSs	ISC should work with First Nations to proactively identify and resolve issues in water systems to prevent recurring advisories.	ISC should specify the actions taken to identify and proactively address underlying issues in water systems proactively.	September 30, 2022. A final report was also required to be provided by April 30, 2023.	Submitted on June 9, 2022. According to the PACP 2022 report, no further reports were required for this topic (105).
O&M funding	In consultation with First Nations, ISC should prioritize determining the necessary funding for the O&M of drinking water infrastructure and amend the existing policy and funding formula to ensure adequate financial support.	ISC should share the progress made to their funding policy and formula for O&M drinking water infrastructure in First Nations communities, including salaries for DWS operators.	April 30, 2022. A final report was also required to be provided by April 30, 2023.	Submitted on June 9, 2022 and March 31, 2023.
Developing and implementing a drinking water regulatory regime	In consultation with First Nations, ISC should establish and implement a regulatory framework for safe drinking water in First Nations communities.	ISC should have ongoing negotiations with First Nations regarding drinking water regulations.	April 30, 2022 and annually thereafter until a drinking water regulatory framework is established.	Submitted on June 9, 2022 and March 31, 2023.

Note. ISC's progress report for 2024 has not been publicly released, as of April 1, 2025. Further details on ISC's efforts, including interim milestones and target completion dates, can be found in the June 2022 and March 2023 ISC progress reports.

By March 2021, 101 long-term DWAs had been lifted across 73 First Nations communities since 2015. By the end of 2021–2022, ISC reported spending $316.9 million to cover 100% of the O&M costs for W&WW systems—an increase from the previous 80:20 cost-sharing model (35). However, despite the consistent increase in funding promises and advancements in eliminating long-term DWAs between 2015 and 2020, the March 31, 2021 target to eliminate all long-term DWAs on First Nations reserves was not achieved and 58 long-term advisories remained for 38 communities (87).

2021 ICIF and Settlement Agreement

Since the March 2021 target passed, significant investments and legislation have been made towards improving clean water for First Nations. For example, with over 50% of local labour from community members, a new $30 million water treatment plant was constructed in Shoal Lake #40 First Nation in 2021 (a community in Ontario that supplies drinking water to Winnipeg, Manitoba), finally lifting a 25-year BWA (106). By 2023, nearly 300 young adults and children who had spent their entire lives without access to clean, potable water were finally provided with safe, clean, and reliable drinking water (79).

Budget 2021 committed $1.7 billion over five years, starting in 2021-2022, to fund O&M costs of community infrastructure on First Nations reserves, with $388.9 million allocated every year thereafter. It also announced $4.3 billion, starting in 2021-2022, for a distinctions-based fund entitled the Indigenous Community Infrastructure Fund (ICIF)(92, 107, 108). This $4.3 billion promise was in addition to a commitment by the Canada Infrastructure Bank to invest $1.0 billion towards Indigenous community infrastructure initiatives. The ICIF was developed to support immediate infrastructure needs for First Nations, as identified and prioritized by First Nations partners, for infrastructure projects including W&WW facilities, housing, health facilities, and more (107). Beginning in the 2022-2023 fiscal year, Budget 2021 also proposed an additional $125.2 million over four years to support the delivery of clean drinking water and health and social services on reserves (108).

In December 2021, an $8 billion *Safe Drinking Water for First Nations Class Action Settlement Agreement* was approved by the Federal court and the Manitoba Court of Queen's Bench (109, 110). The Settlement Agreement asserted that the federal government breached its commitments and the Charter of Rights and Freedoms by failing to ensure First Nations communities had access to clean drinking water, and that this breach in obligations harmed members of First Nations communities physically, financially, emotionally, and spiritually (110). The Settlement Agreement included compensation for 142,000 eligible people from 258 First

Nations who were affected by long-term DWAs between November 20, 1995 and June 20, 2021 (110, 111). It also included commitments to ensure eligible individuals would have "regular access"9 to clean drinking water in their homes. Terms of the Settlement Agreement required the Government of Canada to spend:

- $1.438 billion in compensations to First Nations Class Members;
- $50 million towards First Nations with specified injuries caused by using water under the DWA or by restricted access to safe water due to a DWAs;
- at least $6 billion between June 20, 2021 and March 31, 2030 on the construction, upgrading, operation, and maintenance of water infrastructure to support clean drinking water of sufficient quantity on reserves by March 31, 2030, with at least $400 million spent per year;
- $20 million, through to 2025, to fund a First Nations Advisory Committee on Safe Drinking Water to work closely with ISC;
- $9 million, through to 2025, to fund First Nations-led water governance initiatives by Class Members; and
- $50 million to administer the Settlement Agreement (110).

The Settlement Agreement was developed not only to address breaches of commitments under the Charter of Rights and Freedoms but also in response to concerns raised by First Nations about the 2013 Safe Drinking Water for First Nations Act. These concerns centred around inadequate funding, lack of meaningful engagement, and the failure to recognize First Nations' rights. In response, the Settlement Agreement required Canada to repeal the *Safe Drinking Water for First Nations Act* (Bill S-11) and replace it with legislation developed in consultation with First Nations (110). In alignment with the Settlement Agreement, Bill S-11 was officially repealed in June 2022 (37). Further, the Agreement required Canada to commit to taking all reasonable actions to remove long-term DWAs affecting Class Members, including following all steps in ISC's Long-Term Drinking Water Advisory Action Plan (110). The claims application for the Settlement Agreement closed on March 7, 2024.

Budget 2022 and the AFNWA

Since Bill S-11 came into force in 2013, AFN advocated against the legislation and proposed developing an improved, replacement legislation with guidance from ISC and a joint Technical

[9] "Regular access" was defined in the Settlement Agreement as having water of sufficient quantity for all usual and necessary uses, such as drinking, bathing, sanitation, personal hygiene, laundry, food preparation, and dishwashing, comparable to the regular and necessary uses of water in a similarly situated Canadian home. Regular access included water supplied by both public, federally-funded water systems and private water systems (provided approval was granted through a band council resolution or another acceptable form of authorization for private water systems on reserves)(110).

Working Group (JTWG) on safe drinking water legislation for First Nations (112). In 2022, the Special Chiefs Assembly released an emergency resolution titled *Re-Commitment to Co-Development of Replacement Legislation for Safe Drinking Water for First Nations* which directed AFN to call on the federal government to halt its Bill S-11 legislation development and replace it with legislation that was co-developed with First Nations. The emergency resolution was passed and the JTWG was officially formed in the summer of 2022, alongside the repeal of Bill S-11 (112, 113). The JTWG was set to regularly report to the Chief's Committee on First Nations Safe Drinking Water Legislation and the federal government on the co-developed proposed legislation (114).

After the emergency resolution passed, the AFN's Chiefs Committee on Housing and Infrastructure (CCoHI) began several regional and national engagement sessions with First Nations communities, Chiefs, and leaders to assist in the development of replacement legislation. Engagement sessions included a virtual Legislative Water Summit (October 12, 2022), a virtual National Legal Think Thank (October 13, 2022), and the Third Annual Water Summit (October 27, 2022)(115). Other engagement sessions by AFN included the Sixth Annual Water Symposium and Trade Show (February 7-9, 2023)(116), a Youth Safe Drinking Water Summit (August 28-29, 2023)(117), the Fourth Annual Water Summit (November 22, 2023)(118), the Seventh Annual Water Symposium (April 15-18, 2024)(119), and most recently, a conference titled National Housing and Infrastructure Conference: Mind the Gap—Advancing First Nations Housing, Infrastructure & Drinking Water (February 19-21, 2025)(120).

As shown in Figure 2, Budget 2022 committed $247 million over two years, starting in 2022-2023, towards W&WW infrastructure (97). The 2022 federal budget also promised $173.2 million over ten years for Canada's first infrastructure service delivery transfer agreement with the Atlantic First Nations Water Authority (AFNWA). The AFNWA became the country's first Indigenous Water Utility, assuming responsibility for the O&M and capital upgrades of all W&WW services in up to 17 participating First Nations—collectively representing 60% of on-reserve Atlantic First Nations (121, 122). According to ISC, as of December 2022, the government invested $3.03 billion to support W&WW projects in 589 First Nations communities. Of that, $761.2 million was spent on infrastructure repairs, upgrades, and construction of W&WW to resolve long-term DWAs (35).

Progress in 2023

First Nations Clean Water Act (Bill C-61)

After years of advocacy by First Nations peoples, Budget 2023 committed $6 billion to the 2021 *Safe Drinking Water for First Nations Class Action Settlement Agreement* and replaced the 2013 *Safe Drinking Water for First Nations Act* with a proposed *First Nations Clean Water Act* (the Water Act)(123). The Water Act was co-developed with First Nations to lay the foundation for a First Nations-led water institution and affirm First Nations' inherent rights to self-govern water infrastructure on, in, and under First Nation lands (124). Aligned with the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the bill further recognized the right of First Nations to receive water services of comparable quality and quantity to those received by non-Indigenous people (123-125). The Water Act was tabled as Bill C-61 on December 11, 2023 (123). Three key highlights of the Water Act include:

- ownership and self-governing of water resources, ensuring that provincial water laws do not apply on, in and under reserve land;
- minimum standards for water quality and quantity on reserve land, along with substantive equality, ensuring First Nations receive water services comparable to those received by persons in non-Indigenous communities; and
- a non-derogation clause ensuring that the rights granted by the Water Act to not diminish or infringe upon pre-existing rights or freedoms (124, 126).

Furthermore, with regard to drinking water quality standards, item 14 of the Water Act states, "[s]ubject to the choice specified by a First Nation governing body, the quality of drinking water on the First Nation lands of that First Nation must at least meet the guidelines set out in the Guidelines for Canadian Drinking Water Quality or the drinking water standards in place in the province or territory where the First Nation lands are located" (124)(p. 11).

2023 ISC Progress Reports

On March 31, 2023, ISC submitted three progress reports to the PACP as per the 2021 PACP Reporting Requirements (Table 2). The key updates from each report are listed below:

1. Report 1—Progress on Resolving Long-Term Drinking Water Advisories and Implementing Solutions:
    - By March 2023, 138 long-term DWAs were lifted;
    - A total of $5.6 billion was allocated from 2015 to 2025-2026 to repair W&WW systems and support O&M.
2. Report 2—Final Report on Operations and Maintenance Funding:

    - ISC funding for O&M of W&WW systems on First Nations reserves increased from 80% (pre-2020) to 100%, and the formula to calculate O&M costs was amended.
3. Report 3—Progress on Developing and Implementing a Regulatory Regime:
    - *The Safe Drinking Water for First Nations Act* was repealed, and a draft of the replacement legislation was shared with all First Nations rights holders and organizations in February 2023 for review and feedback;
    - The Joint Working Group on Safe Drinking Water and Wastewater for First Nations Legislation was established (35).

Water Legislation Governance

On February 17, 2023, ISC shared a draft of the replacement legislation for safe drinking water on First Nations reserves with First Nations rights holders and organizations, setting a 30-day deadline for feedback. AFN advocated for more time to review the legislation and the consultation period was extended by one month until April 23, 2023. Despite this extension and the feedback by AFN, however, the updated legislation still failed to incorporate all the key elements requested by AFN. As a result, in May 2023, AFN formally requested that the Minister of ISC delay the announcement of the final legislation. An updated version of the draft legislation was formally shared with AFN on July 21, 2023, and continued to undergo revisions for improvement. AFN has maintained ongoing engagement sessions about safe drinking water and legislation for First Nations, and the JTWG continues to meet regularly with ISC to co-develop and refine the proposed legislation (112).

Progress in Budget 2024

The second reading of the Water Act (Bill C-61) began in the House of Commons in February 2024 and finished six months later in June 2024. Six months after that, in December 2024, the Chair of the Standing Committee on Indigenous and Northern Affairs presented the committee's report on the Water Act to the House of Commons. However, due to the prorogation of Parliament on January 6, 2025, progress on the Water Act halted (37). In response to the federal government's resignation in January 2025, AFN National Chief, Cindy Woodhouse Nepinak, warned that a change in government may prevent the Water Act from being re-introduced, emphasizing that the "federal government must reintroduce this legislation as a priority and work with First Nations to ensure solutions that uphold our rights and responsibilities to water" (127, 128).

The 2024 federal budget committed $1.6 billion over two years to support safe W&WW services in First Nations communities, starting in the 2024-2025 fiscal year. However, the budget did not specify how the funds would be distributed across different W&WW initiatives. Additionally, according to statements made by AFN and the Canadian Union of Public Employees (CUPE), the $1.6 billion promise was not new funding but rather repurposed from prior commitments (129, 130). Overall, the 2024 federal budget recorded spending a total of $6.3 billion since 2015 to address critical W&WW infrastructure gaps, aiming to accelerate progress in eliminating both long-term and short-term DWAs in First Nations communities on reserve. Budget 2024 also noted that 84% of long-term DWAs had been lifted since 2015 (Figure 3)(89).

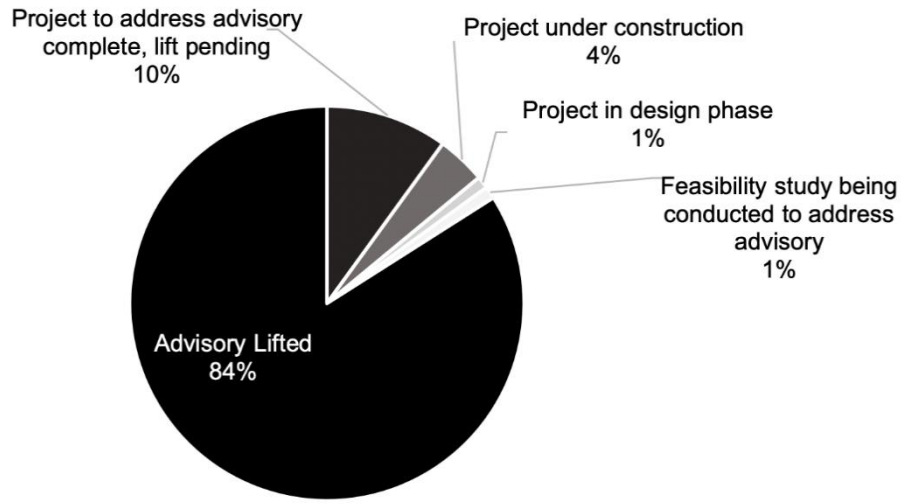

Figure 3. Progress on lifting long-term DWAs on First Nations reserves, as of Budget 2024. Reproduced from Budget 2024 (89).

While the financial investments in lifting BWAs represent a positive step by the federal government, much of the progress can also be attributed to community-driven efforts and local advocacy by First Nations peoples. For example, in July 2024, Star Blanket Cree Nation in Treaty 4 Territory, Saskatchewan, successfully lifted a 17-year BWA that had been in place since 2007, benefiting its 300 residents. This achievement was the result of the community's dedication and collaborative efforts with ISC to build a new $10.5 million water treatment plant (131, 132). Similarly, Northwest Angle #33, located in Treaty 3 in Ontario's Kenora District, completed a new, community-led water treatment plant in July 2023, lifting three BWAs for its 100 residents. The plant replaced three pumphouses that had been under DWAs since 2011 and 2016. ISC allocated $19 million to support the construction of the plant and the community hired a trained water operator for the O&M of the plant. To add more community water operators, ISC funded a water operator training program through the Centralized Water and Wastewater Hub, run by the Anishinaabeg of Kabapikotawangag Resource Council (133).

Case Study: Canada's Longest-standing, 30-year BWA in Neskantaga First Nation

Neskantaga First Nation, a remote community 440 km northeast of Thunder Bay, has endured a 30-year BWA since February 1, 1995—Canada's longest-standing boil water advisory. Despite being near Attawapiskat Lake and the Otoskwin River, residents must rely on bottled water that is flown in at a cost of $6,000 per trip on a weekly or biweekly basis and funded by the federal government. The community water distributor, Derek Moonias, is tasked with making multiple trips per week to the airport to collect up to 25 boxes of bottled water for the community (111, 134). A timeline of the 30-year BWA in Neskantaga First Nation is summarized below.

1950s-1980s

The water crisis burdening Neskantaga First Nation dates back to the 1950s when the community was relocated to the Hudson's Bay Company post, Lansdowne House. There, the children were forced to attend the Lansdown House School—a mandatory day school (previously categorized as an "Indian Day School") run by the Anglican Church (111). The goal of the school was to assimilate First Nations children in their communities and eradicate their culture and language (135). At the same time, the community was forced to boil the tap water because the nearby Attawapiskat Lake was contaminated and unsafe for consumption (111).

1980-1995

In the 1980s, persistent flooding and deteriorating infrastructure forced the community to uproot to a peninsula along Attawapiskat Lake, known as Grandmother's Point, about a 20-minute drive west of the previous location (111, 136). According to Elder Leo Moonias, one of the incentives offered by the federal government for the relocation was a promise of clean, running water in every home (111). A new water treatment plant was built in the early 1990s using a sand slow-filter, however, the filter was unsuitable for removing microorganisms from the cold waters of Attawapiskat Lake and could not handle the lake's high turbidity (111). According to a 2019 lawsuit filed by Neskantaga First Nation and Curve Lake First Nation against the federal government over the prolonged drinking water advisories (a lawsuit that later led to an $8 billion settlement agreement), the sand slow-filter system was experimental and untested at the time. The lawsuit also claimed that federal personnel stationed in Neskantaga had access to a separate, fully functional clean water system (111). By February 1, 1995, the community was placed under a BWA due to high levels of trihalomethanes in the water. Residents described the tap water as resembling ginger ale, with government reports later identifying design flaws and poor maintenance as contributing factors to the water's murky colouration (111).

2000-2020

One decade later, in 2005, the federal government installed a temporary reverse-osmosis unit to produce clean drinking water. However, according to the 2019 lawsuit, the new unit only placed the community on a lower priority list while waiting for a permanent water system upgrade. The water crisis faced by Neskantaga First Nations also exacerbated mental health issues in the community, with Neskantaga declaring a state of emergency in 2013 due to a youth suicide epidemic—an epidemic still in effect today (111).

By 2017, the federal government allocated $8.8 million for a new water treatment plant (111). After multiple delays, including a $1.9 legal settlement for the contractors to complete the upgrades and a test run of the system resulting in wastewater discharge flooding the community's sewage system, the plant was finally completed in 2019 (134, 136). Despite this, in October 2020, the water pump's seal broke, releasing mineral oil into the community's water reservoir and forcing an evacuation of all 300 residents to Thunder Bay during the COVID-19 pandemic. The broken seal was eventually replaced (111).

Although subsequent water quality tests conducted by the government in 2020 confirmed that the plant produced water meeting Canada's drinking water quality standards, community leaders chose to maintain the BWA due to lingering distrust. Many residents had long reported skin rashes and sores from bathing in the tap water, fueling widespread distrust about its safety (111, 134). The Minister of ISC, Patty Hajdu, acknowledged the skepticism, remarking in 2020:

> "[h]ow could they trust the water [after everything they've been through]?"(111).

2025

In January 2025, the Chief of Neskantaga First Nation submitted a project approval request for a new water treatment plant, citing the psychological toll that the 30-year BWA has had on the community:

> "[t]here's the mental health portion of it—it's going to be a long process. It's been 10,936 days [as of Jan. 10, 2025] since the boil water advisory was issued. How long is it going to take for the people to trust the water?"(111).

While the Minister of Indigenous Services supported the request, the fate of the request is currently stalled as Parliament prorogued in January 2025 (134).

Status of BWAs on First Nations Reserves as of 2025

Between 1991 and January 29, 2025, approximately $13 billion was invested towards W&WW infrastructure on First Nations reserves, of which $7.1 billion was invested since 2015 (56, 137, 138). Despite these investments and 147 long-term DWAs having been lifted, as of March 11, 2025, 35 long-term BWAs remain in effect for 33 communities, including four new advisories placed in 2025 (Figure 4)(137). Of the 35 long-term BWAs, one is in Atlantic Canada, five are in Manitoba, five are in Saskatchewan, and 24 are in Ontario (15)(Figure 5), with durations ranging from 2 to 30 years (Figure 6). While Canada has failed to resolve all long-term DWAs on public systems on First Nations reserves, the number has decreased, on average, since 2015 (Figure 7), with efforts underway to lift the remaining advisories (Figure 8).

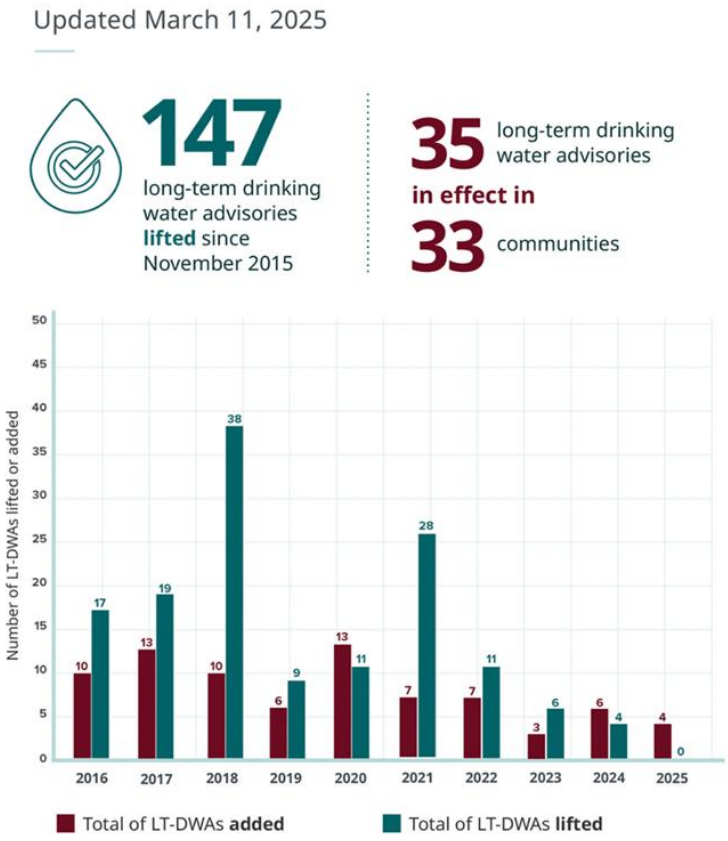

Figure 4. Number of long-term drinking water advisories lifted on First Nations reserves compared to the number added, as of March 11, 2025. Reproduced from ISC on April 21, 2025 (137).

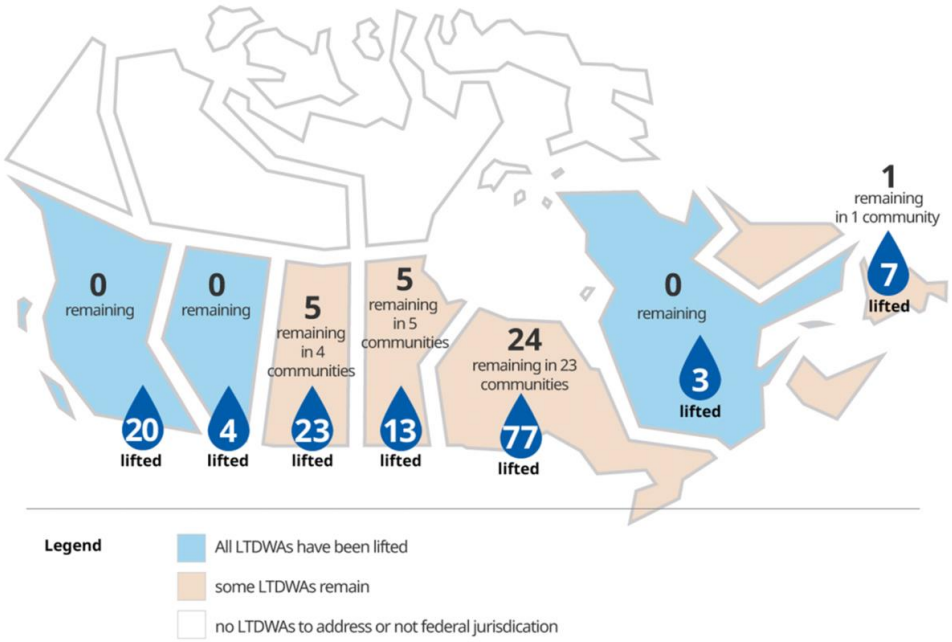

Figure 5. Map of long-term drinking water advisories on First Nations reserves south of the 60th parallel, as of March 11, 2025. Reproduced from ISC on April 21, 2025 (139).

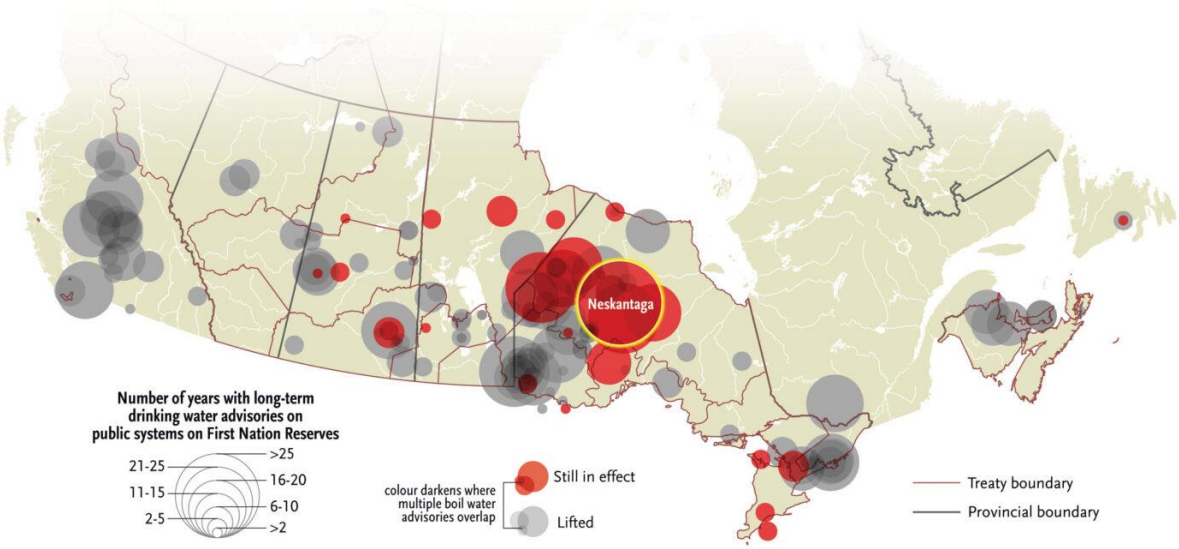

Figure 6. Duration of long-term DWAs on First Nations reserves, as of October 2024. Reproduced from Canadian Geographic on March 31, 2025 (111).

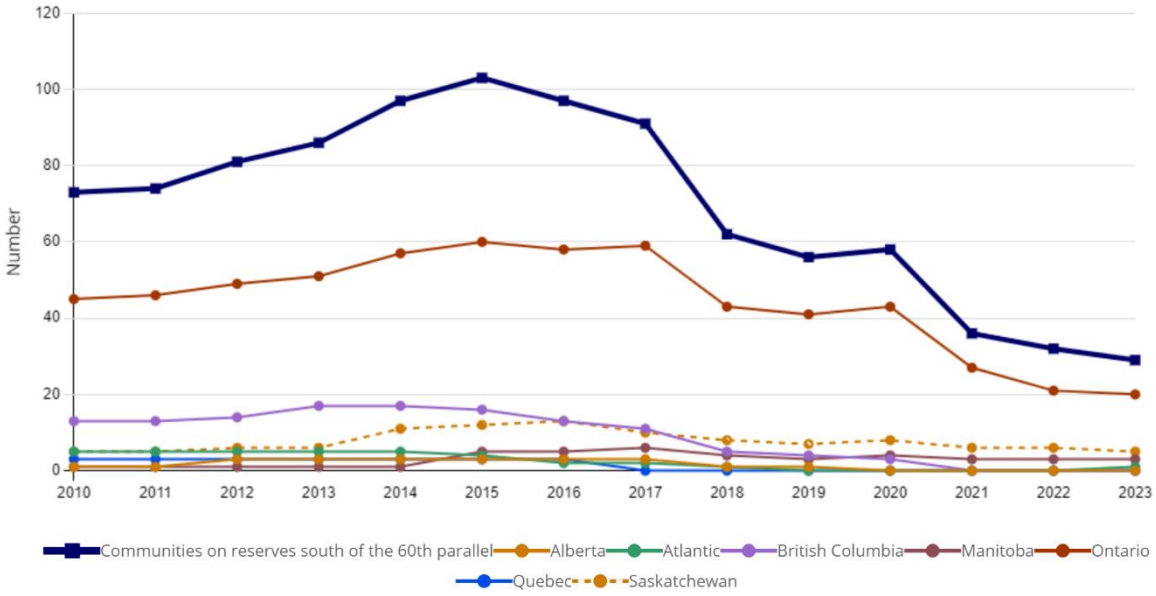

Figure 7. Total number of long-term drinking water advisories on public systems on First Nations reserves south of the 60th parallel, stratified by geographical area, 2010-2023. Reproduced from CIF on September 4, 2024 (140).

An example of the details, location, duration, and status of long-term advisories, as of August 1, 2024, are presented in Table A1 in the appendix.

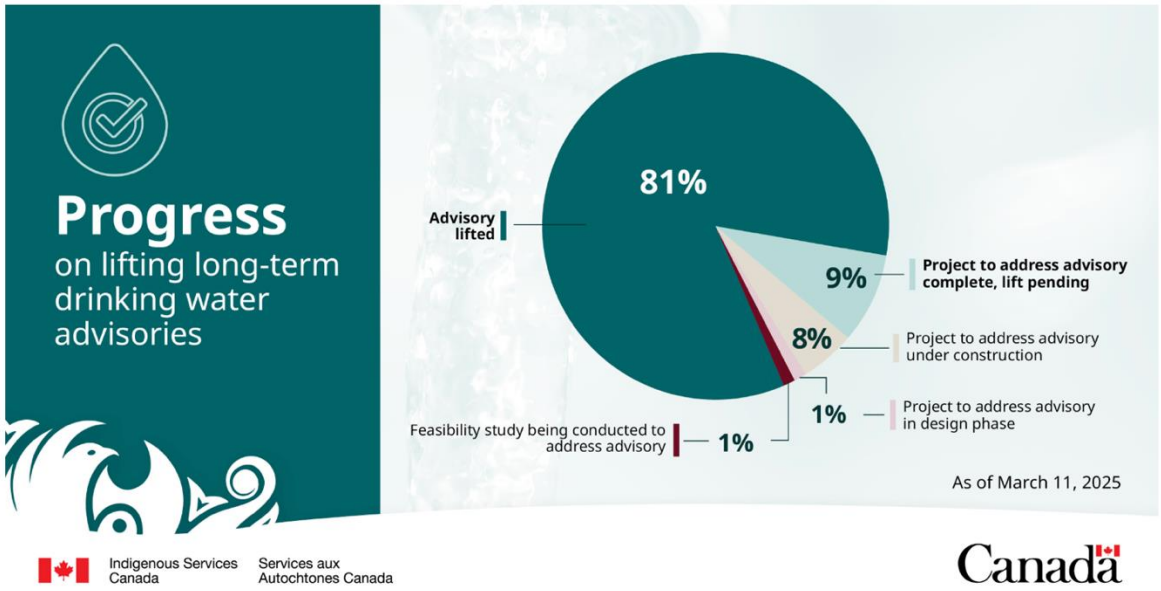

Figure 8. Progress on lifting long-term DWAs, as of March 11, 2025. Reproduced from ISC on April 21, 2025 (137).

According to the Office of the Parliamentary Budget Officer's 2021 report, *Clean Water for First Nations: Is the Government Spending Enough*?, the federal funding spent for First Nations reserves since 2016-2017, along with the planned spending through to 2025-2026, would be sufficient to meet the immediate infrastructure needs of the public W&WW systems, as well as future capital investments through to 2025-2026 (95). However, calculations revealed that this funding would only cover two-thirds of the amount required for W&WW O&M costs, leaving an average annual funding gap of $138 million (95).

Discussions about the need for a regulatory framework for drinking water quality on First Nations reserves have dated back to the 1990 *Green Plan* (54). However, as of 2025, there is still no federal legislation or enforcement mechanism to ensure that drinking water quality on First Nations reserves meets national standards. The lack of regulation remains despite several efforts over the years, such as the establishment of the expert panel in 2006 to guide the development of legislation, the 2010 introduction and 2022 repeal of Bill S-11, the establishment of the JTWG in 2022 to co-develop and refine replacement legislation with ISC, and extensive advocacy and engagement sessions by First Nations (12, 37, 38, 52, 73, 81, 103, 110, 114, 115). Overall, the failure to enforce standards underscores the persistent challenges in achieving water health equity for First Nations peoples—challenges that are only exacerbated by the impacts that climate change has on water security.

Impacts of Climate Change on DWSs in Canada

Access to suitable quality and sufficient quantity of drinking water are two key components of water security. Climatic variables, such as droughts, wildfires, air and water temperature, and precipitation, influence both water availability and quality. These changes can also affect the concentrations of climate-sensitive pathogens and toxins in drinking water sources, such as algae, cyanobacteria, enteric bacteria, enteric viruses, *Salmonella*, and *Campylobacter*. As a result, W&WW treatment demands are likely to increase as climate change progresses, placing additional stress on existing DWSs, as demonstrated in Figure 9 (16).

Flooding

Floods are increasingly linked to the contamination of drinking water sources through polluted runoff from land and sewage system overflows. Floodwaters can carry biological contaminants (e.g., bacteria, viruses, and parasites) and chemical pollutants from industrial, agricultural, or residential waste into water supplies, thereby, increasing the risk of waterborne illnesses (141). For instance, one study found that children in flood-affected homes had nearly twice the risk of developing acute gastrointestinal infections (AGI) compared to children from non-flood-affected

homes (142). This highlights the critical role of DWAs, which are often issued post-flood to reduce the risk of waterborne illnesses while water treatment systems work to restore water quality (141).

As climate change increases precipitation and warmer temperatures increase snowmelt, the risk of contaminants flushing into water sources rises, further threatening water safety (143, 144). Flooding creates ideal conditions for vectors and pathogens that rely on standing water, such as mosquitoes carrying West Nile virus (145). Additionally, saltwater from the ocean can intrude into coastal aquifers, contaminating groundwater sources (141). The growing frequency of water-related climate threats, such as saltwater intrusion, sea-level rise, flooding, and storm surges, pose a growing risk to water security, particularly for Indigenous communities in flood-prone or coastal areas (141).

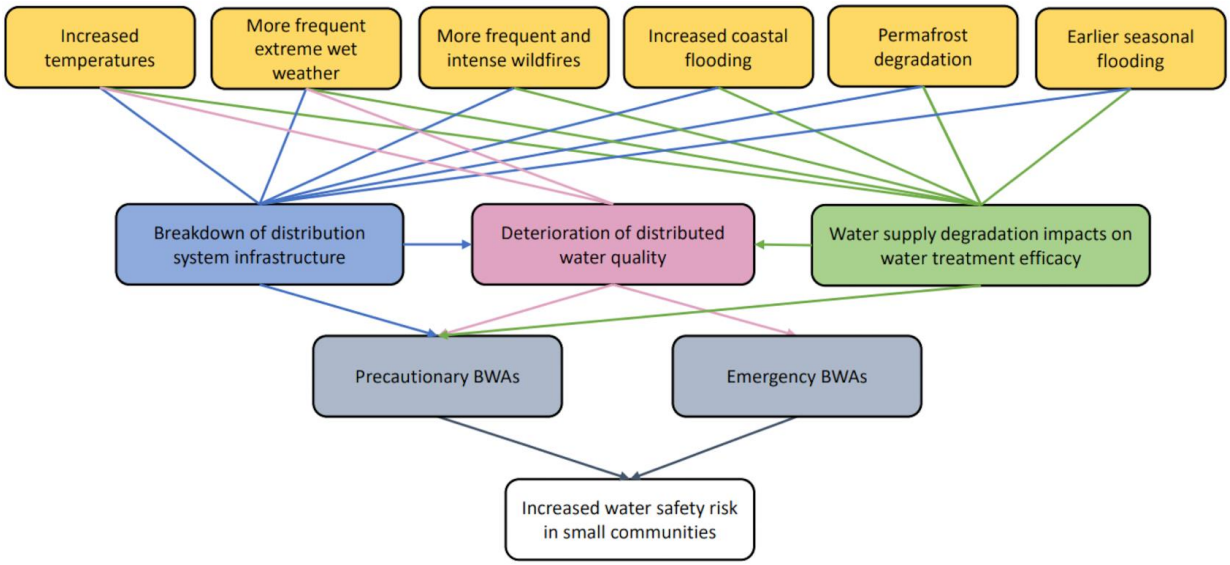

Figure 9. Impacts of climate change on DWAs. Reproduced from Moghaddam-Ghadimi et al. 2023 (16).

Drought

The most immediate impact of drought is reduced water availability due to depleted water sources. As water plays a key role in sanitation and hygiene, water scarcity can increase the risk of infectious diseases, such as diarrheal illnesses (e.g., *E. coli*, Salmonellosis, Giardia infection), especially when hygiene practices are relaxed to preserve water (146). As drought persists, concerns about water quantity may shift to concerns about water quality. Reduced water volume and flow can promote the survival and growth of pathogens in water (146). During drought, contaminants that would typically be flushed away into surface water bodies can also accumulate on land, particularly in areas where water levels are low (141). Once precipitation

and river flows resume, these accumulated contaminants, including pathogens, can run off more easily into drinking water sources. This not only increases the risk of flooding but also the concentrations of contaminants and pathogens, further increasing the risk of waterborne diseases (147). Additionally, warm and dry weather associated with drought may encourage higher levels of recreational water use. This, in turn, increases the potential exposure to contaminated water sources (141). This cycle of contamination and increased water usage during drought conditions exacerbates the vulnerability of communities to water quality issues.

Increased Temperatures

Climate change is projected to increase water temperatures, which can exacerbate water quality issues. Warmer waters are associated with facilitating the duration and severity of cyanobacterial blooms and algal growth, microorganisms that cause waterborne illnesses (e.g., *Naegleria fowleri*), and higher levels of pollutants (e.g., sediment, nutrients, salts, pesticides)(148, 149). Many drinking water distribution systems also use chlorine to prevent waterborne microbial diseases and bacterial regrowth due to its ability to eliminate nearly all pathogenic organisms including bacteria, protozoa, and enteric viruses (150). However, chlorine has been shown to decay rapidly under warmer water conditions (151, 152). For instance, a study by Fisher and colleagues (2024) predicted that the rate of chlorine decay nearly doubles for every 4 to 10°C rise in water temperature (152). As such, the American Water Works Association recommends that water distribution systems adjust doses of residual chlorine to mitigate the impact of rising water temperatures due to climate change (153).

Wildfires

Approximately two-thirds of Canadians rely on drinking water sourced from lakes, rivers, and reservoirs, most of which are situated in forested regions (154). During a wildfire, dead biomass, ash, fire retardants, and debris from burnt surfaces can directly contaminate water sources, leading to increased levels of dissolved organic carbon (DOC), nutrients (e.g., nitrates, nitrites, phosphorous), metals (e.g., manganese, iron), pH, and debris in the water (155, 156). These changes alter water chemistry, increasing turbidity (i.e., water cloudiness) and promoting algal blooms in reservoirs, making the water unsafe for use (157). For example, in the aftermath of the 2025 Los Angeles Palisades Fire, Pacific Palisades residents were advised against using tap water for drinking, cooking, or bathing due to wildfire-induced contamination (158). Similarly, during the 2016 Fort McMurray wildfire, ash from burned forest floors contaminated the Athabasca River, resulting in brown-coloured water with elevated DOC levels. When treated with chlorine, the DOC can react to form toxic disinfection by-products (DBPs), requiring higher doses of

chemicals to remove impurities (154, 159). The formation of DBPs significantly increased water treatment costs in Fort McMurray (154). Moreover, a 2016 study reported that algal blooms following wildfires heightened the reactivity between chlorine and DOC, further increasing DBP formation risks (159).

Wildfires can compact or erode forest soils, reducing the burnt ground's natural ability to filter and store water before it enters drinking water sources. This degradation often results in less predictable water supplies downstream and increased risks of flooding (160). Post-fire rains further exacerbate these issues by washing contaminants, ash, and eroded soil into receiving water sources (161). In fact, the majority of wildfire impacts on water quality are linked to heavy rainfall events following wildfires (162).

Beyond direct contamination of water sources, wildfires also pose risks to DWSs, particularly in communities located at the intersection of the built and natural environment (also known as wildland-urban interface communities)(156, 163). Volatile and semi-volatile organic compounds (e.g., benzene, methylene) can infiltrate water lines through the burning or melting of plastic pipes, open fire hydrants, or water storage tank vents, complicating water treatment efforts (156, 158).

The effects of wildfires on water quality can persist for months to more than a decade after fires are extinguished (156, 164). Turbidity and cyanobacterial blooms in water sources may not peak until months after the fire, while heavy metals in water may peak 1-2 years later (165, 166). DOC levels in water may persist even longer, with one study estimating DOC levels remain affected in water for more than a decade after severe wildfires, leading to the potential formation of DBPs (164). Overall, the impacts of wildfires on water quality are significant, posing challenges for water treatment facilities long after fires are extinguished.

Permafrost Degradation

Approximately 40% of Canada is underlain by permafrost (16, 167). As temperatures rise and permafrost thaws, surrounding soils can slump and heave, making grounds unstable and shifting pipes that were previously secured in frozen, continuous permafrost. Consequently, permafrost thaw can lead to breaks in pipes, pressure losses, and cross-contaminations of drinking water with sewage from damaged sewage pipes (16, 168, 169). These effects are particularly apparent in northern Arctic communities where some communities are left without water for weeks due to damaged DWSs (168, 170, 171).

Thawing permafrost may also release accumulated contaminants, such as mercury and industrial chemicals, into surface waters (172). Studies have found associations between permafrost degradation and changes in concentrations of particulate or organic matter, nutrients, and ionic species in surface water, although the extent of these changes depend on factors such as the volume of ground ice and soil characteristics (172-175). These shifts in water quality due to permafrost thaw can also require costly infrastructure repairs (168). For instance, in a Nunavut community, permafrost thaw was linked to seasonal spikes of hardness, chloride, and conductivity in the community's water source. As a result, the community was required to invest in expensive water treatment equipment (reverse osmosis membranes) to meet water-quality standards (16, 176).

Discussion

Indigenous Rights to Water

Indigenous Peoples have sovereign, inherent, and treaty rights to waters in their traditional territories. Not only is water critical for the natural environment and human health, but for many First Nations, Inuit, and Métis peoples in Canada, water is sacred and holds power as a living being. As part of a holistic system integral to Indigenous Peoples' cultural, spiritual, physical well-being, water is often used for cultural practices, including ceremonies, and to pursue livelihoods (177-180). Furthermore, many Indigenous teachings and creation stories have an underlying message that "water is life" and is a gift from the Creator carrying specific roles and responsibilities for its protection (177-179, 181). This sacred connection with water underscores the need for Indigenous sovereignty to water on their traditional territories—an inherent right that is essential for the health and resilience of First Nations, Inuit, and Métis communities.

The United Nations Committee for Economic, Social, and Cultural Rights (UNCESC) recognizes clean, sufficient, accessible, and affordable water as a fundamental human right (182). Additionally, UNDRIP further recognizes the right of Indigenous Peoples to maintain their spiritual relationship with water (Article 25), establish priorities and strategies for its use on their traditional lands (Article 32.1), and protect their waters from external exploitation unless free, prior, and informed consent is granted (Article 32.2)(183). Given these international commitments, more work needs to be done to respect Indigenous Peoples' right to water, as highlighted by the remaining DWAs in First Nations and Inuit communities.

In 2024, UN Special Rapporteur on the Human Rights to Safe Drinking Water and Sanitation, Pedro Arrojo-Agudo, described Canada's DWAs on First Nations reserves as "flagrant breaches

of the human right to safe drinking water"(184). After meeting with government officials, civil society groups, and First Nations leaders in parts of Nunavut, Ontario, Alberta, and British Columbia, the official urged Canada to strengthen federal and provincial efforts to enshrine First Nations' rights to clean water (184). This urgency of addressing water inequities is underscored in the Truth and Reconciliation Commission's Call to Action 19, which demands that the Canadian government address disparities between Indigenous and non-Indigenous health outcomes (185).

Indigenous Health Disparities

The displacement and removal of Indigenous Peoples from their traditional lands, along with discrimination, economic marginalization, and structural inequities rooted in colonialism, have affected Indigenous Peoples' health and wellbeing. This is especially true for Indigenous peoples living in remote, isolated areas with limited access to healthcare (5, 186, 187). As a result, age-standardized disease prevalence and mortality rates are consistently higher among Indigenous Peoples compared to non-Indigenous populations for several conditions, including gastrointestinal and hepatic infections, chronic liver disease and cirrhosis, heart disease, diabetes, certain respiratory viral diseases, both intentional and unintentional injuries, and tuberculosis (5, 188). For example, the rates of tuberculosis disease among Inuit and First Nation populations in 2020 were over 455 and 71 times higher, respectively, than the Canadian-born, non-Indigenous population (189). A similar gap in health outcomes between Indigenous and non-Indigenous populations is evident in life expectancy. In 2011, the probability of living to age 75 was 53% for First Nation males and 66% for First Nation females—22 and 18 percentage points lower, respectively, than that of non-Indigenous Canadians (190). For Inuit households, the probabilities were 51% for males and 63% for females, 25 and 21 percentage points lower, respectively, while for Métis households, the probabilities were 64% for males and 74% for females—12 and 10 percentage points lower than that of non-Indigenous households (190).

There is currently no national surveillance systems for waterborne outbreaks in Canada (191). However, a scoping review of drinking water quality in Canada concluded an increased risk of negative health outcomes for First Nations communities with poor drinking water quality, with gastrointestinal infections as the most commonly reported health issue (192). While many cases of gastrointestinal illness are mild and self-limiting, they can still progress to fatal stages. In fact, gastrointestinal illness remains a leading contributor to infant mortality in the Arctic (193). The review also identified other health issues in First Nations communities linked to unsafe drinking water including: skin conditions such as eczema and skin cancer; higher rates of infant mortality and birth defects; and elevated levels of diabetes, obesity, and cardiovascular disease, often due

to a reliance on sugary, carbonated beverages in the absence of clean water (192). Furthermore, in 1999, the reported incidence rate for shigellosis (an acute intestinal illness linked to consuming contaminated food and water) was 74.1 per 100,000 First Nations living on reserve across Canada—an incidence rate 26 times higher than the 2.8 reported cases per 100,000 people living off-reserve (194).

Researchers have identified overcrowded housing and inadequate W&WW systems as contributors to the disproportionate burden of infectious diseases, such as shigellosis in First Nations communities (28). For example, a 1997 study examined how crowded housing and water delivery methods influenced shigellosis rates in Manitoba First Nations communities. The study found that higher household densities were correlated with increased shigellosis rates in the community, and that shigellosis rates were six times higher in communities relying on truck-to-barrel water delivery than communities with piped systems (28).

Historical and ongoing issues with inadequate water infrastructure, as a result of colonial practices and policies, have made it difficult for many First Nation communities to follow public health standards relating to WASH, such as hand hygiene and the treatment and distribution of water. This has led to higher rates of infection and death for these communities during epidemics. For example, during the 2009 H1N1 epidemic, many homes in Garden Hill First Nation, Manitoba, lacked any water service due to inadequate water infrastructure. As a result, the community experienced disproportionate rates of infection and death. By 2018, 180 of 384 houses surveyed in Garden Hill still lacked any running water (5). A similar situation was highlighted in 2019, when the Quebec ombudsperson raised concerns about frequent water shortages at the Innulitsivik Health Center, noting such shortages made it "difficult, if not impossible, to comply with basic hygiene measures" (195).

These challenges were echoed during the COVID-19 pandemic when many Indigenous communities were unable to follow public health recommendations, such as frequent hand washing and social distancing, due to limited water availability and inadequate housing. For instance, in May 2020, Wasagamack First Nation in Manitoba had no access to water amid a COVID-19 lockdown. At the same time, nearly half of the population lived in overcrowded housing with numerous people sharing rooms, making social distancing nearly impossible (5, 196). Meanwhile, the city of Iqaluit, in Nunavut, experienced seven priority water leaks in the first quarter of 2020 during stay-at-home COVID-19 orders, exceeding its daily water limit by approximately 300,000 liters (6). Similarly, in Inukjuak, Nunavik, only one of three sewage trucks was functioning in November 2020, leaving households without water for up to two weeks while septic tanks became too full to function (6).

The disproportionate number of water shortages in First Nations communities, combined with overcrowding, inadequate W&WW infrastructure, and higher rates of comorbidities, have placed many First Nation communities at greater risks of infection during outbreaks. As noted, this was emphasized during the COVID-19 pandemic (197). For instance, one study found that First Nations and Métis experienced significantly higher age-standardized COVID-19 mortality rates of 85.5 and 29.4 deaths per 100,000 population, respectively, compared to the general population's rate of 19.1 per 100,000 population. Furthermore, over half of those who died from COVID-19 in these communities had three or more comorbidities at the time of death (198).

Incorporating Health Equity

Indigenous Health Equity Fund

Administered by ISC, the Indigenous Health Equity Fund was introduced in 2024-2025 to address the unique challenges faced by First Nations, Inuit, and Métis communities in accessing quality and culturally safe health services (199). The fund promises to provide $200 million annually over a ten-year period ($2 billion total) including $190 million each year to distinctions-based health funding—long-term funding for Indigenous health priorities in areas such as public health, health infrastructure, primary care, and mental wellness. The remaining $10 million per year represents the Targeted Initiative Fund—funding for specific, short-term, and innovative Indigenous health projects, such as research into new health technologies or initiatives aimed at addressing Indigenous health priorities (199). Each project under the Targeted Initiative Fund is eligible to receive upwards of $500,000 total. Due to a large number of applications for the Targeted Initiative Fund during the 2024-2025 fiscal year, ISC changed the application process for 2025-2026 and now, directly invites eligible groups and organizations to submit a proposal.

While the Indigenous Health Equity Fund is not directly aimed at addressing long-term DWAs on public systems in First Nations communities, it represents a significant first step towards closing the health gap between Indigenous and non-Indigenous populations. By addressing the underlying issues of inequitable and inadequate health infrastructure among Indigenous Peoples, as well as supporting Indigenous-led priorities in health, the fund helps mitigate the broader impacts of DWAs and other systemic challenges affecting the health and well-being of Indigenous communities.

Water Justice and SDG 16

Beyond access to safe WASH, efforts toward SDG 6 also contribute cross-sectorally to other SDGs, including SDG 16, which promotes peaceful and inclusive societies and equal access to justice (200). The goal aligns with the broader human rights framework by ensuring population groups who are disadvantaged economically, socially, and politically are not marginalized or mistreated, and have their individual human rights respected and upheld. SDG 16B, a sub-goal of SDG 16, specifically calls for non-discriminatory policies and laws (200). In the context of resolving DWAs on First Nations reserves (SDG 6), advancing SDG 16 alongside SDG 6 can include respecting and upholding First Nations Peoples' inherent and treaty rights to clean water and water self-governance. It also means ensuring laws and policies relating to the governance and provision of clean drinking water are equity-driven and not discriminatory against First Nations Peoples living on reserve. As such, ensuring First Nations on reserve benefit from equitable drinking water laws, policies, and standards compared to off-reserve populations, as well as upholding their inherent human and treaty rights to water, will advance both SDG 6 and SDG 16 in Canada (200).

Core Competencies and Indicators for Health Equity

In addition to aligning with the Truth and Reconciliation Commission (TRC) Call to Action #19—to address health inequalities between Indigenous and non-Indigenous peoples in Canada—advancing SDG 6 aligns with the health equity focus in the *Core Competencies for Public Health in Canada, Release 2.0* (185, 201). The core competencies are essential knowledge, skills, and attitudes for the practice of public health in Canada and are organized into seven categories. While diversity and inclusiveness were identified as one category in the original 2008 version, health equity and social justice were not explicitly included as a category. In the 2021 report by Canada's Chief Public Health Officer, the need to update the 2008 Core Competencies was emphasized, highlighting calls for equity and decolonization, as well as addressing the impacts of climate change on public health (201). The 2025 *Core Competences for Public Health in Canada, Release 2.0* identifies equity-driven principles as an overarching and priority theme across all competency categories for improved and strengthened public health in Canada (201). Within the new Health Equity and Social Justice category, six competencies work towards addressing health equity, social justice, racism, stigma, discrimination, power imbalances, oppression, and/or the rights of First Nations peoples, Inuit, and Métis people. The six competencies are listed below:

1. Applying health equity and social justice objectives and principles in one's work;
2. Challenging racism and all forms of stigma and discrimination to build and sustain a culture of equity and justice;
3. Engaging with the TRC's Calls to Action and upholding the inherent rights of Indigenous Peoples, as outlined in UNDRIP;
4. Analyzing the effects of intersecting systems of power and oppression on experiences of privileges and disadvantages;
5. Demonstrating knowledge about how to address power imbalances, discrimination, and oppression which drive health inequities; and
6. Identifying ways to integrate racial equity goals into policy, practice, and norms.

The seventh competency relates specifically to equity and social justice for people of African descent:
Recognizing the impacts of slavery and colonization, as well as human rights, for people of African descent.

The National Collaborating Centre for Infectious Diseases (NCCID) and National Collaborating Centre for Determinants of Health (NCCDH) have underscored the importance of incorporating public health system indicators10 into planning and policy to achieve better health outcomes for all Canadians (202, 203). Addressing health inequities for First Nations communities requires a wide-angle approach that incorporates First Nations determinants of health and involves First Nations communities in all aspects of decisions (202-204). The NCCID and NCCDH report, *Measuring What Counts: Equity Prompts for Public Health Preparedness and Resilience*, highlights that involvement from communities experiencing disadvantages is integral at all levels of public health planning for emergency preparedness, response, and recovery (202). A total of 67 indicators with health equity prompts are described in the report to measure public health emergency readiness and demonstrate how inequities and disadvantages can be incorporated into emergency decision-making (202). Adapted from the NCCID and NCCDH health equity prompts, the following prompts may help encourage decision-makers to consider health equity in DWA mitigation and resolution efforts, and involve First Nations stakeholders in all decisions, policies, and programs regarding water safety on First Nations reserves.

[10] Public health indicators refer to measurable variables that assess the health status of populations and the performance of health systems. Indicators can include rates of disease, mortality, and the performance of health systems, such as the availability, accessibility, quality, and efficiency of healthcare services (202).

Governance and leadership
Are First Nations stakeholders included in the leadership, governance, and decision-making structures for public water systems on First Nations reserves? Are the policies and procedures embedded with equity focused values and principles that address systemic disadvantages and align with the TRC Calls to Action?

Planning process
Do emergency plans and protocols relating to water safety on First Nations reserves integrate equity considerations with explicit attention to the needs and strengths of First Nations communities living on reserve? Are these plans aligned with the TRC Calls to Action and do they incorporate culturally safe practices? Do the plans account for intersecting factors like sex, gender, age, geographic location, and socioeconomic status?

Risk assessment
Are risk assessments to inform water safety plans and protocols explicit about the systemic factors contributing to disadvantages for First Nations communities living on reserve? Are data disaggregated by key demographic factors such as sex, age, race, ethnicity, and geographic location? Were the risk assessments developed in partnership with representatives from affected First Nations communities?

Resources
Are W&WW resources, such as trained community water operators, allocated with explicit attention to the needs of First Nations communities living on reserve? Do resource management systems include protocols for equitable procurement and distribution for First Nations populations in rural, remote, or underserved areas? Are financial resources sufficient to support the additional needs of these populations, and are they distributed transparently and justly?

Collaborative networks
Do network partnerships include agencies and representatives focused on First Nations communities living on reserve? Are these partnerships actively contributing to equity-driven decision-making? Are responsibilities to prioritize the health needs of disadvantaged First Nations communities clearly understood by all partners?

Community engagement
Are community engagement efforts inclusive of representatives from First Nations communities living on reserve? Is there a commitment to sustained engagement with these communities beyond the immediate drinking water emergency? Are trust-building measures, such as transparent communication, feedback mechanism, and ongoing support, part of the engagement strategy?

Communication
Do communication strategies ensure that all messages are accessible and culturally appropriate for First Nations communities living on reserve? Are diverse platforms used to reach communities with varying levels of technology access? Are community leaders engaged in co-creating messages that reflect the strengths and needs of disadvantaged groups?

Workforce capacity
Do water O&M training programs include explicit instructions on health equity, cultural competency, and the specific needs of the First Nations community? Is training focused on intersectionality and structural determinants of health? Is there a process for continuously assessing and updating training to reflect evolving best practices and community needs?

Surveillance and monitoring
Are robust monitoring and evaluation processes in place to assess the effectiveness of equity-driven water safety initiatives? Do these processes include feedback loops with the affected First Nations communities? Are data disaggregated by key demographic factors to track progress in addressing systemic inequities? Are adjustments made as necessary to improve outcomes?

Learning and evaluation
Are self-assessment processes designed to explicitly assess equity outcomes (e.g., explicit checks on the ability to include and reflect the needs and risks of First Nations communities living on reserve, the strengths and successes of these communities, and leverage community assets)? Does the evaluation include an assessment of the organization's capacity to address health equity, including cultural competency, understanding of structural determinants, and the ability to engage affected First Nations communities living on reserve?

Practice and experience
Are practice exercises and drills (e.g., simulations, emergency activations, table-top exercises) for water emergencies designed and conducted with explicit attention to the participation and needs of First Nations communities living on reserve? Do these exercises include scenarios that test the organization’s ability to address intersectional vulnerabilities (e.g., gender, age, socioeconomic status)? Are past experiences and lessons learned reviewed through an equity lens? Is there a process to incorporate these reflections into future practice to continuously improve the organization’s ability to serve First Nations communities living on reserve?

NCCID and NCCDH also list four fundamental questions for centring health equity in public health decision-making (202, 203). In the context of water safety on First Nations reserves, decision-makers should explicitly apply an equity lens to assess the impact of W&WW policy or

program options. The following questions were adapted from the questions in the NCCID and NCCDH's report:

1. Are First Nations populations living on reserve likely to be disadvantaged by the W&WW policy or program in relation to another option being considered?
2. Are there anticipated differences in the relative effectiveness of the W&WW policy or program option for First Nations populations living on reserve? If yes, what are they?
3. Are there different baseline conditions across groups or settings such that the effectiveness of the W&WW policy or program option would be different, and/or the problem more or less important, for First Nations populations living on reserve? If yes, what are those conditions?
4. Are there factors that need to be considered when implementing the W&WW policy or program to ensure inequities are not increased and, if possible, reduced for First Nations living on reserve? If yes, what are those factors? (202, 203).

The lack of access to clean potable water among both First Nations communities on reserves, and the associated health outcomes (e.g., gastrointestinal infections, skin conditions) reflect the ongoing environmental and health inequities burdening First Nations communities. These inequities, including the remaining 35 BWAs in 33 communities on reserve as of March 11, 2025, make it clear that the current decision-making systems and structures in place are continuing to disadvantage First Nations communities living on reserve while providing unfair advantages to other populations based on their identity or position in society (137). Overall, by incorporating health equity into decision-making processes for water safety, decision-makers can recognize how and where water safety policies or programs impact First Nations populations differently than other population groups or settings. This recognition, combined with equity-driven initiatives involving First Nations stakeholders in all stages of decision-making, may help advance progress in resolving the remaining DWAs and preventing future DWAs from occurring on First Nations reserves.

Conclusion

Despite efforts and significant funding aimed at achieving Target 6.1.1, 35 long-term DWAs remain on public DWSs on First Nations reserves as of March 11, 2025 (15). These ongoing challenges are deeply rooted in decades of inadequate investment in water infrastructure and treatment facilities—a legacy of Canada's historical neglect of Indigenous Peoples and the systemic racism entrenched in policies such as the 1876 *Indian Act*.

It is important to reiterate that as a narrative review, this review is not exhaustive of all initiatives taken to improve access to clean drinking water on First Nations reserves and may reflect evidence selection bias. Nevertheless, this review offers a broad overview of past and recent federal investments to improve DWSs systems on First Nations reserves, as well as the potential impacts of climate change on DWSs.

The findings in this review emphasize the urgent need for transformative public health efforts to resolve all DWAs and ensure water infrastructure is climate-resilient to prevent future DWAs from occurring. As one of PHAC's six National Collaborating Centres, NCCID identifies knowledge gaps relating to infectious diseases and facilitates the use of evidence to support collaborative public health responses and policy development. As such, this review hopes to propel the conversation forward on the urgency of policy action for clean drinking water for First Nations reserves, as per Canada's SDG 6 national target, especially in light of climate change and long-standing delays.

As noted in this review, federal activities related to W&WW systems primarily focus on First Nations populations living on federally-funded reserves, as outlined in the *Indian Act*, and exclude Indigenous populations living outside the reserve system (50, 63). Consequently, there is limited publicly available data on drinking water quality and waterborne illnesses among Inuit, Métis populations, and First Nations populations living off reserve. While this review and Canada's national target for SDG 6 focuses on First Nations communities living on reserve, Canada's broader SDG 6 ambition is to ensure that all people in Canada have access to clean drinking water (14). Therefore, with the 2030 SDG 6 deadline approaching, this review also aims to highlight the need to expand policy discussions and actions to include all regions and populations—particularly Inuit living across Inuit Nunangat who are at the forefront of climate change and not explicitly mentioned in Canada's SDG 6 commitments.

Engaging with First Nations peoples living on- and off-reserve, Inuit, and Métis peoples on how to improve water quality and address waterborne diseases—and importantly, acting on their recommendations—not only advances Canada's SDG 6 goals, but also affirms Indigenous Peoples' inherent rights to clean water, as outlined in UNDRIP, and aligns with the TRC Call to Action #19 to reduce health disparities between Indigenous and non-Indigenous populations (183, 185). Moving forward, future research and funding should prioritize Indigenous-led, sustainable, and climate-resilient water security initiatives and infrastructure. Furthermore, collaboration with First Nations peoples, Inuit, and Métis peoples is also needed to quantify the number of waterborne illnesses in these populations compared to non-Indigenous groups—particularly given the absence of a national surveillance system for waterborne outbreaks and

the limited data currently available. Finally, policy and practice relating to climate change and water security would benefit from incorporating mathematical modelling to project the impacts of climate change on DWAs under current and future adaptations of greenhouse gas mitigation policies.

The end date of Target 6.1.1 is quickly approaching in 2030 and the impacts of climate change are projected to intensify as global temperatures continue to rise (205). Respecting Indigenous Peoples' inherent and treaty rights to self-govern their water, as well as upholding their human right to have access to clean drinking water, are critical steps towards achieving Canada's SDG 6 national target (Target 6.1.1) and its broader ambition of clean water for all. Given the current climate crisis, Canada's commitment to SDG 6, as well as its commitments to UNDRIP, the Truth and Reconciliation Commission's Calls to Action, and the *First Nations Clean Water Act* (Bill C-61), now is the time for bold, equity-driven action.

Appendix

Table A1. Example of long-term BWA statuses as of August 1, 2024, ordered by the initiation date of long-term status (15, 139).

Region	First Nation	Water system name	Date advisory became long-term*	Reason for advisory	Status of project
Ontario	Neskantaga First Nation	Neskantaga Public Water System	February 1996	N/A	Construction is substantially complete for upgrading the water treatment system, and an action plan is underway to address outstanding issues. Supports provided by the Ontario Clean Water Agency and for a Water Systems Infrastructure Assessment, funded by ISC. Additional supports provided by the First Nations-led "Trust the Taps" with funding by ISC.
Ontario	Eabametoong First Nation	Eabametoong Public Water System	August 2002	N/A	Expansion and upgrade to water treatment system is substantially complete. Efforts are underway to address outstanding issues.
Ontario	Sandy Lake	Sandy Lake Public Water System	October 2003	N/A	Interim upgrades completed in July 2020 and long-term upgrades in 2023. Operational supports provided by the Ontario First Nations Technical Services Corporation (OFNTSC) Centralized Water and Wastewater Hub, funded by ISC. Lift recommended in July 2024.**
Ontario	Muskrat Dam Lake	Muskrat Dam Public Water System	October 2004	N/A	New water treatment plant constructed in 2020. Efforts are underway to address outstanding issues.
Ontario	Marten Falls	Marten Falls Public Water System	July 2006	N/A	Replaced water treatment system and associated facility upgrades are complete. Project underway to address outstanding concerns from community members (scheduled to be complete in August 2024).
Ontario	Bearskin Lake	Semi-Public Water Systems (cisterns) serving the Bearskin Lake Community Centre, Youth Centre, Arena, and Daycare	March 2007	N/A	Construction of new cisterns complete. Consistent maintenance, operations, and monitoring required.
Ontario	Gull Bay (Kiashke Zaaging Anishinaabek)	Gull Bay Public Water System	April 2010	N/A	New water treatment plant complete. Work underway with the community's contractor to address remaining technical deficiencies. Operational supports provided by OFNTSC Centralized Water and Wastewater Hub, funded by ISC.

Ontario	Nibinamik First Nation	Nibinamik Public Water System	February 2014	N/A	Construction of expansion and upgrades to water treatment system are underway. Projected lift date: December 2024.
Saskatchewan	Peepeekisis Cree Nation No.81	Poitras Well	April 2014	N/A	Repairs to water treatment system completed in 2020. Lift recommended in July 2018.**
Saskatchewan	Peepeekisis Cree Nation No.81	Peepeekisis Main Public Water System	February 2016	N/A	Repairs to water treatment system completed in 2020. Lift recommended in July 2018.**
Ontario	Chippewas of Georgina Island	Georgina Island Public Water System	April 2017	N/A	Upgrades and expansion to the water treatment plant are substantially complete. Minor issues are currently being addressed by the community. The Ogemawahj Tribal Council Water and Wastewater Hub is supporting local operators.
Manitoba	Tataskweyak Cree Nation	Tataskweyak Cree Public Water System	May 2018	N/A	Upgrades to existing W&WW treatment systems were completed in 2019. Long-term solution designs have begun with projected completion of Summer/Fall 2025. Projected lift date: December 2025.
Saskatchewan	Little Pine	Little Pine Public Water System	November 2019	N/A	Upgraded water treatment plant. Interim repairs to water system completed. Waiting on water operation training to be completed. Supports provided by the Circuit Rider Training Program.
Manitoba	Shamattawa First Nation	Shamattawa Public Water System	December 2019	N/A	Community is only accessible by air or winter road. Upgrade and expansion of water treatment plant underway. Supports provided by the Circuit Rider Training Program.
Ontario	Chippewas of Nawash First Nation	Cape Croker Public Water System	January 2020	N/A	Construction of a new water treatment plant is underway. Projected lift date: October 2024.
Ontario	Anishnaabeg of Naongashiing	Anishnaabeg of Naongashiing Big Island (Saug-A-Gaw-Sing) Water Treatment System	February 2020	N/A	Water treatment plant replaced by new treatment system. Upgrades and expansion were completed in 2023. Water sampling is underway in the community, after which, the advisory can be lifted. Projected lift date: September 2024.
Ontario	North Spirit Lake	North Spirit Lake Public Water System	April 2020	N/A	Equipment upgrades and repairs completed, operational improvements in process. Supports provided by the Keewaytinook Okimakanak Tribal Council Centralized Water and Wastewater Hub, funded by ISC.
Ontario	Oneida Nation of the Thames	Oneida Public Water System	September 2020	N/A	Feasibility study complete to build a connection to an existing municipal water system including distribution system upgrades. Projected lift date: November 2025.
Ontario	Deer Lake	Deer Lake Public Water System	October 2020	N/A	Interim upgrades to water treatment system complete with operating improvements ongoing. Feasibility study is underway. Supports provided by the Keewaytinook Okimakanak Tribal Council Centralized Water and Wastewater Hub, funded by ISC.

Ontario	Bearskin Lake	Semi-Public Water System serving the Bearskin Lake Nursing Station	February 2021	N/A	Construction underway of a new water treatment system. Projected lift date: September 2024.
Ontario	North Caribou Lake	North Caribou Lake Water Treatment System	March 2021	N/A	Construction of a new water treatment plant is underway. Feasibility study and a packaged treatment unit were completed. Supports provided by Windigo First Nations Council Centralized Water Treatment Hub, funded by ISC. Projected lift date: September 2024.
Saskatchewan	Okanese	Okanese Public Water System	August 2021	N/A	Construction of a new water treatment plant began in Spring 2024. Projected lift date: April 2026.
Manitoba	Mathias Colomb	Mathias Colomb Townsite Public Water System	September 2021	N/A	Upgrade and expansion of a water treatment plant, including the addition of a new pumping station, are underway to mitigate wastewater overflows from the sewage system. Projected lift date: October 2025.
Ontario	Chippewas of the Thames First Nation	Chippewas of the Thames Water Treatment System	December 2022	Water production could not meet water demands.	Action plan developed and bottling stations were installed. Leaks in the distribution system were completed. Feasibility study underway.
Ontario	Fort Severn	Fort Severn Water Treatment System	December 2022	Repairs required for the above ground raw water reservoir.	Repairs to the water reservoir were completed in July 2023. Upgrades are underway to the treatment plant. Projected lift date: September 2024.
Ontario	Gakijiwanong Anishinaabe Nation (formerly Lac La Croix First Nation)	Lac La Croix Water Treatment System	January 2023	N/A	Emergency repairs and feasibility study were completed. Design is underway. Supports provided by the Pwi-Di-Goo-Zing Ne-Yaa-Zhing Advisory Services Water and Wastewater Hub, funded by ISC.
Atlantic	Miawpukek	Conne River Public Water System — Bernard Road Area	December 2023	Low water pressure in the distribution system.	Design underway for upgrades to the water system.
Saskatchewan	English River First Nation	La Plonge No.192 Public Water System	May 2024	Low water pressure in the distribution system.	Upgrades underway. Projected lift date: October 2024.

Ontario	Slate Falls Nation	Slate Falls Public Water System	June 2024	Equipment damage by a power surge; low water pressure in the distribution system.	Repairs to the water treatment system completed. Plan underway to address outstanding operational challenges. Supports provided by Windigo Hub.
Manitoba	Tootinaowaziibeeng Treaty Reserve	Tootinaowaziibeeng Public Water System	July 2024	N/A	Implementation of an action plan is underway. Containerized water treatment bottling plant was installed in Fall 2023 and will be commissioned in September 2024. Feasibility study completed in June 2024 with anticipated completion in March 2025. Construction to repair the plant is planned for September 2024 with anticipated completion in Summer 2024. Supports provided by the Circuit Rider Training Program. Projected lift date: June 2025.
Ontario	Wawakapewin	Long Dog Public Water System	July 2024	High turbidity (high amount of organic particles) present in the filtration system.	Action plan and assessment of the treatment plant in progress. Supports provided by the Shibogama Tribal Council Centralized Water and Wastewater Hub, funded by ISC.

Note. Only some of the advisories included specific details as to why the advisory was put in place.

* The date the advisory became long-term is typically one year after the DWA was set in a community. For example, by the time the long-term advisory had begun in August 2002 for Eabametoong Public Water System, a DWA had already been in place for one year since August 2001.
** Recommended by an environmental public health officer to the Chief and council.

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