Drinking Water Advisories

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1. Introduction

Drinking water is the most personal way each of us interacts with water on a daily basis. We can't live without it. Our access to safe drinking water is, therefore, an important measure of water health. The *Drinking Water Advisories* impact measure, which updates a previous version published in 2017, presents a snapshot of drinking water advisories (DWAs) in Canada.

According to Environment and Climate Change Canada, DWAs are "public health protection messages about real or potential health risks related to drinking water".[1] Drinking water advisories are issued to warn people to not drink water that may be unsafe or is known to not be safe based on water quality test results.[2] Some advisories are short-term, issued when there is an acute issue with a drinking water system that renders its water temporarily unsafe. Such advisories may be issued, for example, when a system is undergoing routine maintenance, when a piece of equipment or infrastructure has failed (such as a broken pump or a water main) or when the system has been impacted by an external event (such as a flood) that prevents it from operating normally. These advisories typically only last a short time – from a few hours to a few days. Other advisories are related to chronic drinking water system deficits, such as lack of properly trained operational personnel, improper design or permanently damaged equipment or infrastructure. In these instances, DWAs can last a long time. Occasionally they last so long as to become essentially permanent, a problem that plagues Indigenous communities above all others in Canada.

The Government of Canada considers DWAs older than a year to be "long term".[3] For our impact measure, we view one year as an unreasonable period to define long-term advisories. DWAs have significant negative impacts on households, businesses and communities affected by them. Those living under advisories may be obliged to boil their tap water before consuming it or to use bottled/tanked water for cooking and drinking. In some cases, such as when water systems are contaminated by a chemical spill, tap water may not be safe to use for any purpose. Regardless of their severity, DWAs impose measures on water users that are inconvenient and, in the case of bottled/tanked water, costly. One year is too long to wait before calling an advisory "long-term" in our view. For this reason, this impact measure uses

[1] See https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/drinking-water-advisories.html

[2] See https://www.sac-isc.gc.ca/eng/1538160229321/1538160276874.

[3] See https://www.sac-isc.gc.ca/eng/1506514143353/1533317130660.

one month to designate long-term advisories. This is more than enough time for DWAs to have significant negative impacts on those living under them. Advisories of more than one year in duration are also presented as part of the impact measure for consistency with Government of Canada reporting.

We consider three types of advisories: boil water advisories, do not consume advisories and cyanobacterial bloom[4] advisories. Data are presented for the country as a whole and for the 10 provinces and three territories. Advisories affecting Indigenous communities are reported separately. Data on DWAs are taken from www.watertoday.ca, the most comprehensive online database of DWAs available.

1. Methodology

No government agency in Canada compiles a comprehensive, national list of DWAs. The closest to this is the so-called "Drinking Water Advisories application" of the Canadian Network for Public Health Intelligence. The jurisdictions that report to this application cover less than half of the Canadian population, however.[5] Regional data are available from provincial, territorial, Indigenous, and municipal governments, but these are difficult to access and not consistent from jurisdiction to jurisdiction.

In the absence of a comprehensive, government data source, data for this impact measure were taken from www.watertoday.ca (WATERTODAY), an independent media website devoted to continuous tracking of DWAs in Canada and several US states. The WATERTODAY website presents DWAs (boil water, do not consume and cyanobacterial bloom advisories) using both interactive maps and data tables. These maps and tables are updated daily using the information available from federal/provincial/territorial, Indigenous and municipal governments. WATERTODAY also draws information from media outlets and the internet. Considerable time and effort are required to consolidate all this information and present it in a consistent fashion. WATERTODAY acknowledges that, despite its best efforts, some new advisories may be missed when first issued and some previously issued DWAs that have been rescinded may remain on its database for a period. WATERTODAY takes active measures to limit the extent to which this happens. Its database is, in our view, the best and most complete portrait of DWAs available in Canada. It should be noted that when a community has issued more than one DWA simultaneously, WATERTODAY combines all DWAs into a single record.

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[4] Cyanobacterial blooms – also known as blue-green algae blooms – occur when concentrations of naturally occurring cyanobacteria reach extreme proportions in ponds, lakes, and coastal waters due to the presence of excess nutrients, especially phosphorous. The blooms are capable of producing toxins that can be hazardous (to the point of lethality) to humans, fish and other wildlife, limiting use of affected waterbodies for recreation, livestock watering and other ends.

[5] See https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/drinking-water-advisories.html

Thus, the total number of DWAs active in the country at any one time will be slightly more than the number of advisories shown on its maps and listed in its data tables.

To analyze the WATERTODAY data for the purposes of this impact measure, tabular data from the WATERTODAY website for each province/territory were copied and pasted into an Excel spreadsheet.[6] The version of the WATERTODAY database we used covered DWAs active in Canada on November 11, 2021.[7] Once the data were copied to Excel, DWAs were sorted by province/territory, date, and type. DWAs older than one month and older than one year were separately identified. DWAs related to Indigenous communities were also separately identified by searching for records that included terms associated with Indigenous communities (e.g., "First Nations", "Reserve", "Band", etc.). This approach may have missed some records related to Indigenous communities with no obvious Indigenous identifier, but we believe there are few such records in the database.[8]

2. Findings

2.1. Findings in general

Our analysis shows that 978 DWAs were active in Canada on November 11, 2021 (Table 1). The majority of these were found in British Columbia (244 advisories, or 25% of the total). Saskatchewan (174 advisories, 18% of total), Newfoundland and Labrador (143 advisories, 15% of total), Quebec (119 advisories, 12% of total), Ontario (114 advisories, 12% of total) and Manitoba (99 advisories, 10% of total) all had more than 10% of total advisories. The remaining provinces/territories contributed relatively few to the total. In particular, the three northern territories combined had only 6 DWAs active on November 11, 2021.

In terms of duration, 896 of the 978 DWAs active on November 11, 2021 (or 92%) had been active for a month or more and 504 (or 52%) had been active for a year or more.

Table 1 – Total drinking water advisories by province/territory, November 11, 2021

Jurisdiction	Total DWAs		
	Older than one month	Older than one year	Total DWAs

[6] For example, the tabular data for British Columbia may be found here: https://www.watertoday.ca/textm-p.asp?province=2&province=2. These data were copied directly from the website and pasted into Excel using "Paste Special->Unicode text" command.

[7] This date was not chosen deliberately. It simply happened to be the date on which the research team compiling the impact measure accessed the WATERTODAY database.

[8] As evidence of this, the number of Indigenous records we identified in the WATERTODAY database is similar to the number of First Nations DWAs identified by the Government of Canada (see https://www.sac-isc.gc.ca/eng/1506514143353/1533317130660).

	Number	Share of total DWAs	Number	Share of total DWAs	Number	Share of total DWAs
Canada	896	92%	504	52%	978	100%
British Columbia	221	91%	120	49%	244	25%
Alberta	13	76%	8	47%	17	2%
Saskatchewan	137	79%	87	50%	174	18%
Manitoba	77	78%	35	35%	99	10%
Ontario	101	89%	36	32%	114	12%
Quebec	92	77%	65	55%	119	12%
Nova Scotia	42	78%	24	44%	54	6%
Prince Edward Island	0	0%	0	0%	0	0%
New Brunswick	7	88%	3	38%	8	1%
Newfoundland and Labrador	132	92%	100	70%	143	15%
Yukon	1	100%	0	0%	1	0%
Northwest Territories	1	100%	1	100%	1	0%
Nunavut	3	75%	1	25%	4	0%

Source: www.watertoday.ca and this report.

Looking at the DWAs active on November 11, 2021 by type, the vast majority were boil water advisories (BWAs; Table 2). Of 978 DWAs active across the country, 905 (93%) were BWAs. A further 46 (5%) were do not consume advisories (DNCAs; Table 3) and the remaining 27 (3%) were cyanobacterial bloom advisories (CBAs; Table 4). This same pattern played out at the sub-national level, where BWAs were the most common in all provinces/territories, ranging from a high 100% in the three northern territories to a low of 74% in Quebec. As with DWAs in general, British Columbia was the jurisdiction with the greatest number of BWAs (214 or 91% of all BWAs). Quebec had the greatest number of DNCAs (24 or 89% of all DNCAs). Ontario was home to nearly all active CBAs (23 or 96% of all CBAs).

In terms of duration, BWAs and DNCAs followed a pattern like that for DWAs overall.[9] The vast majority of BWAs active on November 11, 2021 (92%) had been in place for a month or more and about one half (53%) had been in place for more than a year. For DNCAs, the corresponding values were 89% and 57%.

Table 2 - Boil water advisories by province/territory, November 11, 2021

Jurisdiction	Boil water advisories		
	Older than one month	Older than one year	Total boil water advisories

[9] Note that CBAs, by definition, cannot last more than a year, since cyanobacterial blooms are seasonal. One CBA older than one year was found in the WATERTODAY database but it was removed for the purposes of our analysis on the grounds that it was likely an advisory that mistakenly was not rescinded at the end of the bloom season.

	Number	Share of total boil water advisories	Number	Share of total boil water advisories	Number	Share of total DWAs
Canada	829	92%	478	53%	905	93%
British Columbia	214	91%	117	50%	236	97%
Alberta	13	76%	8	47%	17	100%
Saskatchewan	133	78%	86	51%	170	98%
Manitoba	75	77%	33	34%	97	98%
Ontario	75	86%	33	38%	87	76%
Quebec	68	74%	49	53%	92	77%
Nova Scotia	42	78%	24	44%	54	100%
Prince Edward Island	0	0%	0	0%	0	0%
New Brunswick	4	80%	3	60%	5	63%
Newfoundland and Labrador	131	92%	99	70%	142	99%
Yukon	1	100%	0	0%	1	100%
Northwest Territories	1	100%	1	100%	1	100%
Nunavut	3	100%	1	33%	3	75%

Source: www.watertoday.ca and this report.

Table 3 – Do not consume advisories by province/territory, November 11, 2021

Jurisdiction	Do not consume advisories					
	Older than one month		Older than one year		Total do not consume advisories	
	Number	Share of total do not consume advisories	Number	Share of total do not consume advisories	Number	Share of total DWAs
Canada	41	89%	26	57%	46	5%
British Columbia	7	88%	3	38%	8	3%
Alberta	0	0%	0	0%	0	0%
Saskatchewan	4	100%	1	25%	4	2%
Manitoba	2	100%	2	100%	2	2%
Ontario	3	100%	3	100%	3	3%
Quebec	24	89%	16	59%	27	23%
Nova Scotia	0	0%	0	0%	0	0%
Prince Edward Island	0	0%	0	0%	0	0%
New Brunswick	0	0%	0	0%	0	0%
Newfoundland and Labrador	1	100%	1	100%	1	1%
Yukon	0	0%	0	0%	0	0%
Northwest Territories	0	0%	0	0%	0	0%
Nunavut	0	0%	0	0%	1	25%

Source: www.watertoday.ca and this report.

Table 4 -Cyanobacterial bloom advisories by province/territory, November 11, 2021

Jurisdiction	Cyanobacterial bloom advisories					
	Older than one month		Older than one year*		Total cyanobacteria bloom advisories	
	Number	Share of total cyanobacterial bloom advisories	Number	Share of total cyanobacterial bloom advisories	Number	Share of total DWAs
Canada	26	96%	n/a	n/a	27	3%
British Columbia	0	0%	n/a	n/a	0	0%
Alberta	0	0%	n/a	n/a	0	0%
Saskatchewan	0	0%	n/a	n/a	0	0%
Manitoba	0	0%	n/a	n/a	0	0%
Ontario	23	96%	n/a	n/a	24	21%
Quebec	0	0%	n/a	n/a	0	0%
Nova Scotia	0	0%	n/a	n/a	0	0%
Prince Edward Island	0	0%	n/a	n/a	0	0%
New Brunswick	3	0%	n/a	n/a	3	38%
Newfoundland and Labrador	0	0%	n/a	n/a	0	0%
Yukon	0	0%	n/a	n/a	0	0%
Northwest Territories	0	0%	n/a	n/a	0	0%
Nunavut	0	0%	n/a	n/a	0	0%

Source: www.watertoday.ca and this report.

*CBAs cannot last more than a year since cyanobacterial blooms are seasonal.

2.2. Findings for Indigenous communities

The quality of drinking water in Indigenous communities has long been a source of concern in Canada. The Government of Canada has committed to ending all "long-term" (older than one-year) DWAs in Indigenous communities south of the 60th parallel (commonly referred to as First Nations communities).[10] This commitment was originally made in 2015, with March 31, 2021 set as the target date by which all long-term advisories affecting First Nations communities were to be lifted. In spite of the lifting of 119 long-term advisories since November 2015, the Government of Canada reported that 43 long-term advisories affecting 31 communities (mostly in Ontario) remained in place for First Nations communities as of October 2021. No new date has been set for the removal of the remaining long-term First Nations advisories.

According to the WATERTODAY database, a total of 99 DWAs were in place in Indigenous communities[11] across Canada on November 11, 2021. Of these, 87 (88%) had been in place for

[10] See https://www.sac-isc.gc.ca/eng/1100100034879/1521124927588.

[11] Indigenous communities include both First Nations reserves and Inuit communities.

at least a month and 46 (46%) had been in place for a year or more.[12] Most of the long-term advisories were in Ontario (Table 5). This means that of the 896 DWAs active for one month or more across Canada on November 11, 2021, 10% affected Indigenous communities. Statistics Canada reports[13] that approximately 329,000 Indigenous Canadians, or about 1% of the total Canadian population, lived on First Nation reserves in 2016. This suggests that Indigenous Canadians are disproportionately impacted by long-term DWAs.

Table 5 – Drinking water advisories affecting Indigenous communities by province/territory, November 11, 2021

Jurisdiction	Indigenous community DWAs					
	Older than one month		Older than one year		Total Indigenous community DWAs	
	Number	Share of total DWAs	Number	Share of total DWAs	Number	Share of total DWAs
Canada	87	88%	46	46%	99	10%
British Columbia	11	100%	4	36%	11	5%
Alberta	3	43%	1	14%	7	41%
Saskatchewan	14	88%	3	19%	16	9%
Manitoba	7	88%	7	88%	8	8%
Ontario	46	92%	28	56%	50	44%
Quebec	0	0%	0	0%	0	0%
Nova Scotia	1	100%	1	100%	1	2%
Prince Edward Island	0	0%	0	0%	0	0%
New Brunswick	0	0%	0	0%	0	0%
Newfoundland and Labrador	1	100%	0	0%	1	1%
Yukon	0	0%	0	0%	0	0%
Northwest Territories	1	100%	1	100%	1	100%
Nunavut	3	75%	1	25%	4	100%

Source: www.watertoday.ca and this report.

Assessing the degree to which Canadians, Indigenous or non-Indigenous, are impacted by DWAs is difficult due to the lack of data on the number of individuals, households or businesses impacted by advisories. The WATERTODAY database provides a considerable amount of information for each advisory, including the name of the affected water system; the reason for the advisory; the start date; and the type of advisory. It does not, however, indicate the number or type of water users affected. Without this information it is difficult to compare the social and economic impact of one advisory with another. What is clear is that many advisories are for small, localized water systems (e.g., individual houses/businesses, campgrounds,

[12] The reason for the slight difference in the number of "long-term" advisories reported in the WATERTODAY database and by the Government of Canada is that the former includes Indigenous communities north of the 60th parallel while the latter includes only First Nations communities south of the 60th parallel.
[13] See https://www.statcan.gc.ca/en/subjects-start/indigenous_peoples.

hunting/fishing lodges, farms, etc.). Further analysis of the WATERTODAY database and of the data sources WATERTODAY relies upon would be required to develop a more rigorous assessment of the impacts of DWAs.

2.3. Comparison with previous findings

The previous version of the *Drinking Water Advisories* impact measure, which was reported for June 2017, listed 1,128 DWAs in total, of which 108 were related to Indigenous communities.[14] The corresponding figures from this update are 978 and 99. This suggests that DWAs in general have declined more (13%) than DWAs affecting Indigenous communities (8%). This is despite the Government of Canada's commitment to ending long-term DWAs in Indigenous communities. Of course, it is difficult to determine trends based on just two points in time, since DWAs come and go in response to a variety of influences. In order to better assess changes in DWAs as time goes by, more regular updating of this impact measure will be undertaken in the future.

[14] The previous version of the impact measure also used data from the WATERTODAY database, so the results are comparable. It provided no breakdown of DWAs by type or date, however, so the only comparison possible is for total DWAs and total DWAs in Indigenous communities.