

Catalogue no. 16-403-X

# Survey of Drinking Water Plants

2005 to 2007



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Statistics Canada

Research and development section – Environment Accounts and Statistics Division

# Survey of Drinking Water Plants

2005 to 2007

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December 2009

Catalogue no. 16-403-X

ISSN 1920-6283

Frequency: Biennial

Ottawa

Cette publication est également disponible en français.

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- . not available for any reference period
- .. not available for a specific reference period
- ... not applicable
- 0 true zero or a value rounded to zero
- 0<sup>s</sup> value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
- p preliminary
- r revised
- x suppressed to meet the confidentiality requirements of the *Statistics Act*
- E use with caution
- F too unreliable to be published

## Other symbols

- |                                  |   |
|----------------------------------|---|
| 0 ...                            | the estimate is calculated from a sample where all the responses are equal to zero, such that the coefficient of variation cannot be calculated |
| A Excellent data quality         | coefficient of variation is 0.01% to 4.99%  |
| B Very good data quality         | coefficient of variation is 5.00% to 9.99%  |
| C Good data quality              | coefficient of variation is 10.00% to 14.99%  |
| D Acceptable data quality        | coefficient of variation is 15.00% to 24.99%  |
| E Use with caution               | coefficient of variation is 25.00% to 49.99%  |
| F Too unreliable to be published | coefficient of variation is >49.99% (data are suppressed)   |

## Acknowledgements

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The Survey of Drinking Water Plants was managed by the Environment Accounts and Statistics Division under the direction of Robert Smith, Director and Rowena Orok, Acting Director, and François Soulard, Chief, Research & Development Section. Data collection for this survey was conducted by the Operations and Integration Division (Mel Jones, Director) and the Environment Accounts and Statistics Division.

The survey project team consisted of the following:

Terence Nelligan, project manager  
Cindy De Cuyper, database management and table production  
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Francine Fontaine, questionnaire design  
Nancy LeBrun, questionnaire design  
Robert Lethbridge, questionnaire design  
Annie Bordeleau, questionnaire design  
Sharon Wirth, methodology  
Phil Astles, methodology  
Martin Hamel, methodology  
Natalie Hamel, methodology

Thank you to the following people for the contributions in the areas of data collection, data processing, editing, reviewing, proofreading, dissemination and technical development:

Annick Deschamps	Jacinthe Dionne
Donald McNicol	Cameron Oddy
Selene Chen	Christine Wallace
Crystal Perrier	Luc Lafortune
John Linard	Patrick Cloutier
Monique Deschambault	Laurie Jong
Hélène Laniel	Mark Henry
Hugo Larocque	Michael Wright
Gordon Dewis	Andy Shinnan
Carole Nadeau	

The contributions of the respondents and provincial environmental and health departments were critical to the successful completion of the surveys and are gratefully acknowledged. Special thanks to the following federal department staff for their major contribution to the project:

Laura D'Costa, Health Canada	Jean-Francois Bibeault, Environment Canada
Veronique Morisset, Health Canada	Jim Steeves, Indian and Northern Affairs Canada
France Lemieux, Health Canada	

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## Preface

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The Survey of Drinking Water Plants is conducted to provide Canadians with national and regional information related to the production of drinking water. This is a survey of drinking water plants serving communities of 300 or more people, and asks for information on volumes of water drawn and treated, treatment type, financial aspects of the operation, as well as raw and treated water quality.

This survey is part of the initiative of the Canadian Environmental Sustainability Indicators (CESI) by which Statistics Canada, Environment Canada and Health Canada collaborate to produce environmental surveys and indicators. As part of the CESI initiative, the Survey of Drinking Water Plants was conducted to fulfill the data requirements for the development of a national indicator of source and treated water quality. It was also intended to provide other statistical measures of the links between human activity and environmental quality.

The first survey cycle collected information for the reference years 2005, 2006 and 2007. This report presents key survey results, with a focus on the latest reference year, 2007.



## Highlights

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- In 2007, Canadian drinking water plants processed 5,878 million cubic meters of raw water, the majority of which was surface water.
- In 2007, the majority of the Canadian population (28 million) received their drinking water from plants serving communities of 300 or more people. That year, just under 24 million people received drinking water obtained from surface water sources.
- In 2007, a total of \$885 million in capital expenditures was spent to add, expand or upgrade drinking water plants.
- In 2007, \$807 million was spent on operation and maintenance (O&M). The largest component of these expenses was labour costs (\$302 million).
- Total coliforms levels in untreated surface water peaked in either the late summer or fall for 2005, 2006 and 2007.
- Peak monthly concentrations of *Escherichia coli* (*E. coli*) followed peak monthly temperatures; the presence of *E. coli* in untreated surface water peaked in the fall months for 2005, 2006 and 2007.
- In 2007, 98% of plants treating either surface water or groundwater that reported monthly *E. coli* results never exceeded the federal guideline for drinking water. The results were similar for 2005 and 2006.

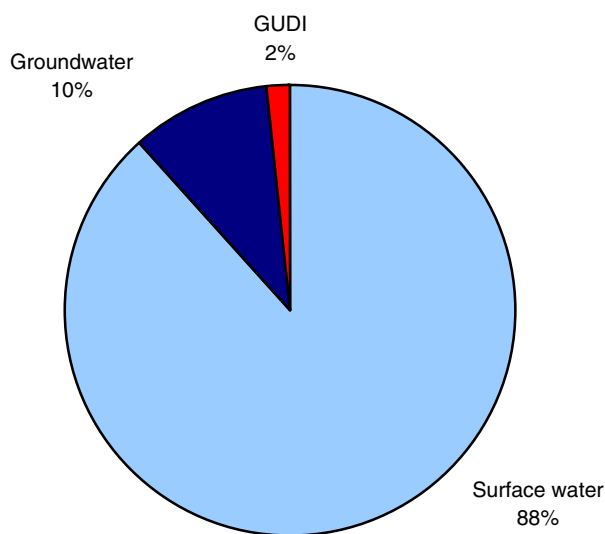
# Results

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## Volumes—raw water

In 2007, Canadian drinking water plants processed 5,878 million cubic meters of raw water, the majority of which was surface water (Table 7). Approximately 88% (5,187 million cubic metres) of the water processed was from surface water sources, while approximately 10% (595 million cubic metres) was from groundwater. Another 2% (97 million cubic metres) was from *groundwater under the direct influence of surface water* (GUDI).<sup>1</sup>

**Chart 1**  
**Raw water volumes, by source water type, 2007**



**Note(s):** GUDI stands for groundwater under the direct influence of surface water.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

The volume of raw water processed by drinking water plants remained relatively stable from 2005 to 2007. In 2005, drinking water plants processed 5,946 million cubic metres, compared to 5,878 million cubic metres in 2007 (Table 7).

## Volumes—treated water

Drinking water plants produced 5,617 million cubic metres of treated<sup>2</sup> water in 2007 (Tables 1 and 2). Volumes of raw water withdrawn from the environment were four percent higher than final treated water volumes as the result of waste produced by various treatment processes which, is either discharged to a sewage works or back into the environment. Volumes of waste associated with treating water will vary by treatment type.

1. *GUDI* refers to groundwater supply sources under conditions where microbial pathogens are able to travel from surface water to the groundwater source. (Daigle, Annie E. and Gina M. Giudice. 2006. "A protocol for determining groundwater under the direct influence of surface water in New Brunswick" in *Water News*. Vol. 25, No. 4.)

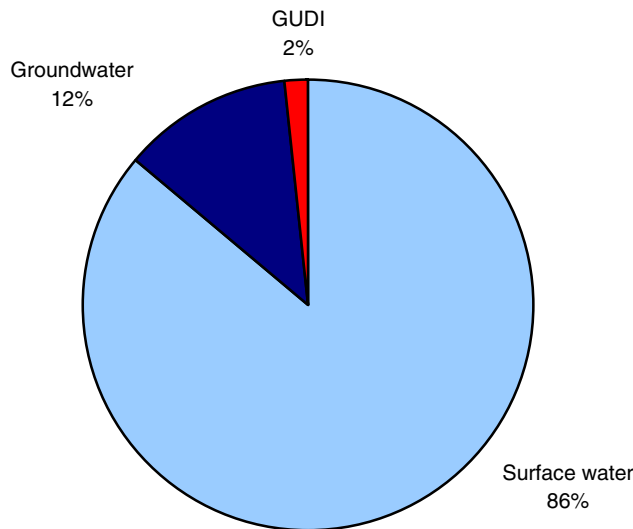
2. Includes potable water conveyed by drinking water plants without treatment.

The volume of treated water produced for consumption remained relatively stable from 2005 to 2007. In 2005, drinking water plants produced 5,706 million cubic metres, compared to 5,617 million cubic metres in 2007 (Tables 1 and 2).

### Population served

In 2007, the majority of the Canadian population (28 million) received their drinking water from plants serving communities of 300 or more people. That year, just under 24 million people received drinking water obtained from surface water sources. Almost three and a half million people were supplied by groundwater sources, and approximately 460,000 people were supplied by a GUDI water supply (Table 5).

**Chart 2**  
Population served, by source water type, 2007



**Note(s):** GUDI stands for groundwater under the direct influence of surface water.  
**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

There was a 2% increase in the population served by drinking water plants, from 27 million in 2005 to 28 million in 2007 (Table 5).

Approximately 5 million Canadians received their water from drinking water plants serving communities of less than 300 people, or had their own water supply. In 2007, 13% of Canadian households had their own water supply, 92% of which was groundwater.<sup>3</sup>

### Capital expenditures

In 2007, a total of \$885 million in capital expenditures was spent to add, expand or upgrade drinking water plants (Table 9). These upgrades include improvements to buildings, machinery, process equipment and other physical assets related to the acquisition and treatment of water, but not its distribution. The majority of these expenditures was spent on surface water plants (\$740 million), while groundwater plants spent \$104 million (Table 9). GUDI plants and plants with combinations of source water accounted for the remainder of capital expenditures.

Capital expenditures varied from year to year, with spending of \$996 million in 2005 and \$1,096 million in 2006.

<sup>3</sup> Statistics Canada, Households and the Environment Survey, CANSIM table 153-0062 (accessed October 14, 2009).

## Operation and maintenance costs

Operation and maintenance (O&M) costs include expenditures on materials (chemicals and replacement parts), labour and energy, but exclude water distribution costs. In 2007, \$807 million was spent on O&M. The largest component of these expenses was labour costs (\$302 million), while materials and energy costs represented \$198 million and \$199 million, respectively. Other costs accounted for the remaining \$108 million (Table 11).

Nationally, in 2007, it cost \$144 of O&M expenditure for treatment plants to produce 1,000 cubic metres of treated water in Canada (or 14¢ per cubic metre). \$54 was attributed to labour costs, while materials and energy cost \$35 and \$36 per 1,000 cubic metres respectively. The remaining \$19 was from other costs (Table 19). These costs do not include the distribution of treated water.

In 2007, it cost \$124 to produce 1,000 cubic metres of treated surface water while it cost \$311 to produce 1,000 cubic metres of treated groundwater (Tables 13 and 14). The higher production volumes for surface water contribute to lower costs per unit of production. O&M costs associated with the acquisition and treatment of water also vary by treatment type and plant size.

## Conventional plants and direct filtration plants

Conventional plants and direct filtration plants produced 55% of treated water in 2007, and provided water to more than half the population (16.5 million people) that received water from drinking water plants (Table 20). Conventional plants apply coagulation, flocculation, sedimentation and granular media filtration in the treatment process. The difference between conventional plants and direct filtration plants is the absence of sedimentation processes in direct filtration.<sup>4</sup>

The O&M costs associated with treating water varied by plant type. In 2007, O&M costs for conventional plants and direct filtration plants were \$161 and \$139 per thousand cubic metres of production, respectively. Overall, in 2007, O&M costs associated with the acquisition and treatment of water ranged from \$79 to \$537 per thousand cubic metres because of differences in treatment technology and plant size (Table 19).

## Water quality

### Taste and odour—Source water quality

Taste and odour issues can occur naturally in surface or groundwater, or can be due to human activity. Taste and odour in water indicate that the water contains various organic or inorganic constituents and may be contaminated.<sup>5</sup>

In 2007, approximately 19% of plants in Canada identified taste and/or odour as a source water issue. Almost 12% of plants in Canada installed or adjusted a process<sup>6</sup> to address these issues (Table 17).

In 2007, no plants in Prince Edward Island, and Yukon and Northwest Territories reported taste and odour issues, while Manitoba had the highest proportion of plants reporting these issues (42%).

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4. Department of National Health and Welfare. 1993. Guidelines for Canadian Drinking Water Quality - Water Treatment Principles and Applications: A manual for the production of Drinking Water. Ottawa: Canadian Water and Wastewater Association.

5. Health Canada. 1979. "Taste." Available from [www.hs-sc.gc.ca/ewh-semt/pubs/water-eau/taste-gout/index-eng.php](http://www.hs-sc.gc.ca/ewh-semt/pubs/water-eau/taste-gout/index-eng.php) (accessed September 23, 2009).

6. Facility processes were installed or specifically adjusted at least twice in the year to address taste and/or odour issues.

## Blue-green algae–Source water quality

Blue-green algae, or *Cyanobacteria*, form in slow-moving or still surface water. These bacteria can produce toxins that are detrimental to human and animal health. Algal blooms occur across Canada, mostly during the warm summer months.<sup>7</sup>

In 2007, fewer than 5% of plants in Canada identified blue-green algae as a source water issue. Almost 3% of plants in Canada installed or adjusted a process<sup>8</sup> to address these issues (Table 18).

In 2007, no plants in Prince Edward Island,<sup>9</sup> Nova Scotia and Yukon and Northwest Territories reported blue-green algae issues, while Saskatchewan had the highest proportion of plants reporting these issues (8%).

### Water quality data

The data presented in this survey report are estimates for the entire population of drinking water plants, with the exception of water quality data. No estimation was conducted on the water quality variables to account for non-response. The results for each water quality parameter are based on the number of plants that reported data for the given parameter and apply only to the total volume of water processed and the population served by those plants.

**Note(s):** Users of water quality data in this survey should be aware that monthly maximum values do not necessarily reflect overall drinking water quality; they could be an indication of operational conditions that may require corrective actions in order to resolve adverse water quality conditions.

Median monthly maximum refers to the median of all the maximum values reported for a particular month and for a particular parameter. The maximum value is the highest test result recorded for a parameter in a given month.

Median monthly average refers to the median of all the average values reported for a particular month and for a particular parameter. The average value is the average of all the test results recorded for a parameter in a given month.

## Turbidity–Source water quality

Turbidity is a measure of cloudiness in a liquid. Turbidity in water is caused by suspended organic and inorganic particles and micro-organisms. Turbidity affects the microbiological quality of water as microbial growth in water occurs mostly on the suspended particles in the water. These microbes can affect human health by causing, for example, gastrointestinal infections.<sup>10</sup>

Turbidity in source water can range from less than one to more than 1,000 Nephelometric Turbidity Units (NTU)<sup>11</sup>. It varies with the season but is usually higher during spring.<sup>12</sup> Chart 3 shows the monthly median maximum and monthly median average turbidity values for raw water processed by both conventional and direct filtration plants. These turbidity data are based on data from 205 conventional and direct filtration plants that reported a monthly turbidity maximum and average for at least 10 months in each reporting year. Eighty percent of these plants monitored turbidity at least once a day.<sup>13</sup>

7. Health Canada. 2008a. "Blue-green algae (*Cyanobacteria*) and their toxins." Available from [www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/cyanobacter-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/cyanobacter-eng.php) (accessed September 23, 2009).

8. Facility processes were installed or specifically adjusted at least weekly for at least two months in the year due to blue-green algae.

9. All the treated water in Prince Edward Island is produced from groundwater sources.

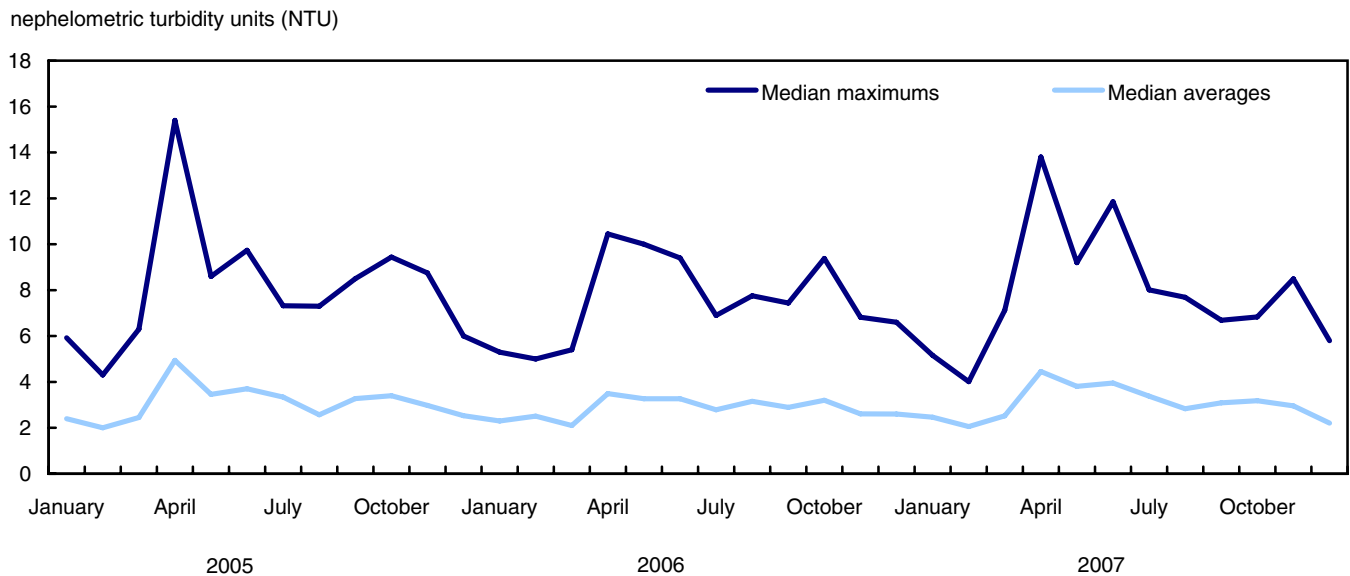
10. Health Canada. 2003. "Turbidity." Available from [www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/turbidity/index-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/turbidity/index-eng.php) (accessed September 23, 2009).

11. Nephelometric Turbidity Units, or NTU, is a common unit of measure for turbidity based on the light scattering properties of the water (Health Canada, 2003).

12. Health Canada. 2003. *Ibid.*

13. In 2007, these 205 plants produced a combined annual production volume of 2,200 million cubic meters, serving 12 million people. These plants withdraw water from surface water sources.

**Chart 3**  
**Turbidity in untreated source water: monthly median maximums and monthly median averages, raw surface water, 2005 to 2007**



**Note(s):** Data are from 205 conventional and direct filtration plants that together produced 2,200 million cubic meters of drinking water in 2007, serving 12 million people.  
**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

Chart 3 shows that, annually, monthly turbidity maximums and averages peaked in April for 2005, 2006 and 2007.

### Turbidity–Treated water quality

The Guidelines for Canadian Drinking Water Quality (GCDWQ) state that for chemically-assisted filtration plants, (that is, conventional treatment plants and direct filtration plants) turbidity should be less than or equal to 0.3 NTU in at least 95% of the measurements made, or at least 95% of the time in each calendar month, and should not exceed 1.0 NTU at any time.<sup>14</sup>

In 2007, the majority of monthly readings for treated water processed by both conventional and direct filtration plants were within the guidelines. Ninety-four percent of monthly maximums were within the 1.0 NTU limit and 91% of monthly averages met the 0.3 NTU limit. The results were similar for 2005 and 2006.

In 2007, 80% of the 205 conventional and direct filtration plants never had a month where their treated water maximum value exceeded the turbidity guideline of 1.0 NTU. Seventy-nine percent of conventional and direct filtration plants never had a monthly average for treated water that exceeded the turbidity guidelines of 0.3 NTU. The results were similar for 2005 and 2006.

14. Health Canada. 2008b. "Guidelines for Canadian Drinking Water Quality – Summary Table." Available from [www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum\\_guide-res\\_recom/index-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php) (accessed October 16, 2009).

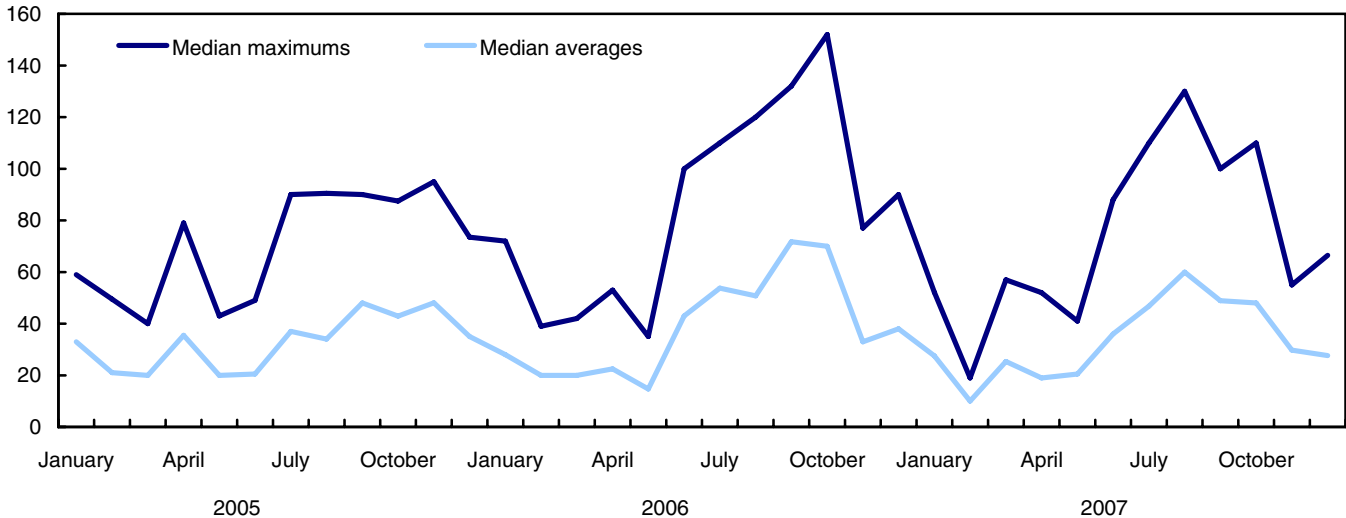
## Total coliforms—Source water quality

Total coliforms are bacteria found in raw water which can indicate the presence of other disease-causing bacteria, such as *Escherichia coli* (*E. coli*).<sup>15</sup> Chart 4 shows the monthly median maximum and average total coliforms counts in raw surface water from 2005 to 2007 based on 176 water sources that reported a monthly maximum and average for at least 10 months in each reporting year.

Chart 4

**Total coliforms in untreated source water: monthly median maximums and monthly median averages, raw surface water, 2005 to 2007**

colony forming units (CFU) per 100 mL



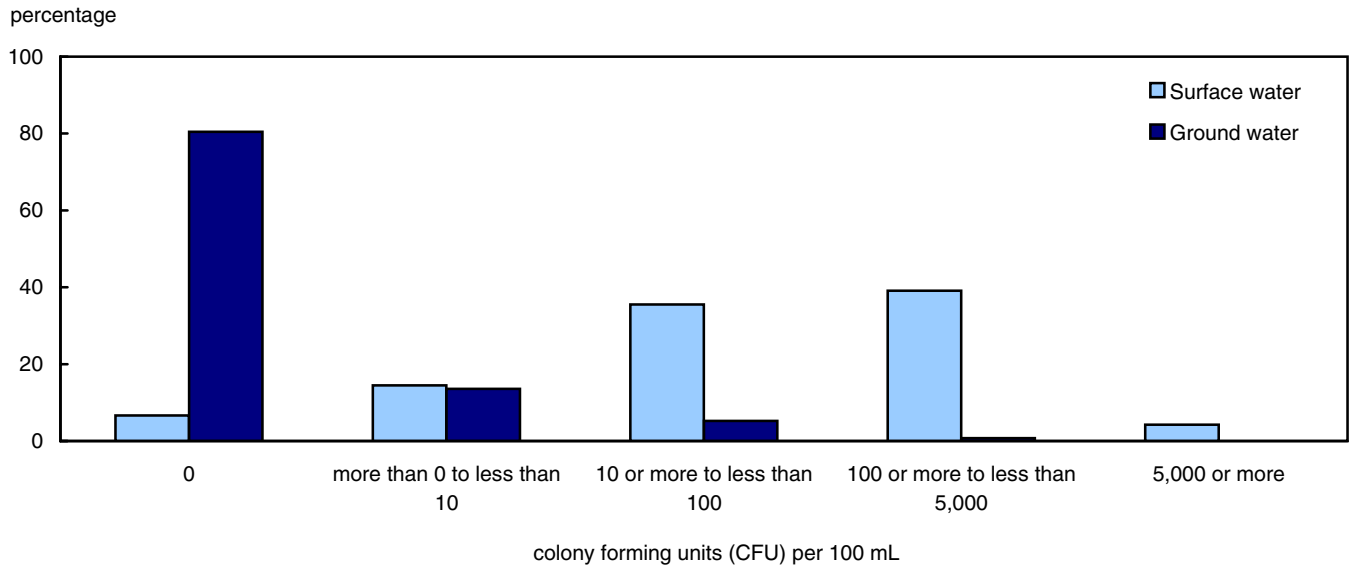
**Note(s):** Data are from 176 plants that together produced 2,790 million cubic meters of drinking water in 2007, serving 15 million people.  
**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

Chart 4 shows that, annually, monthly total coliforms maximums and averages in untreated surface water peaked in either the late summer or fall for 2005, 2006 and 2007.

Chart 5 shows the distribution of monthly maximum total coliforms values in raw water for 2005 to 2007 based on 176 surface water sources and 143 groundwater sources that reported at least 10 months of maximum and average data for each reporting year (no GUDI sources are included). In general, total coliforms concentration is lower for raw groundwater than it is for raw surface water. Ninety-four percent of total coliforms maximums were less than 10 colony forming units (CFU) per 100 millilitres (mL) in groundwater, compared to 21% of monthly maximums for surface water.

15. Health Canada, 2006a. "Total coliforms." Available from [www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/coliforms-coliformes/index-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/coliforms-coliformes/index-eng.php) (accessed September 23, 2009).

**Chart 5**  
**Total coliforms in untreated source water: monthly maximum ranges for raw surface water and groundwater, 2005 to 2007**



**Note(s):** Data are from 176 surface water and 143 groundwater supplies that produced 2,850 million cubic meters of drinking water in 2007, serving 15.6 million people.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

### Total coliforms—Treated water quality

According to the GCDWQ, there must be no total coliforms present in treated water. That means that the level of total coliforms must be zero CFU per 100 mL<sup>16</sup> or the water must not test positive for the presence of total coliforms. In 2007, 97% of the monthly total coliforms data reported in the survey met the water quality guideline.

The treated water results for total coliforms are based on all plant types that reported at least 10 months of monthly maximum and average or presence-absence data for each reporting year (230 surface water and 189 groundwater). In 2007, these plants produced 2,700 million cubic metres of drinking water and served 15 million people.

In 2007, 96% of these plants never had a monthly maximum or average for treated water that exceeded zero CFU per 100 mL, or one month with a sample that tested positive for total coliforms. The results for 2005 and 2006 were 91% and 89%, respectively.

16. Health Canada. 2006a. *Ibid.*

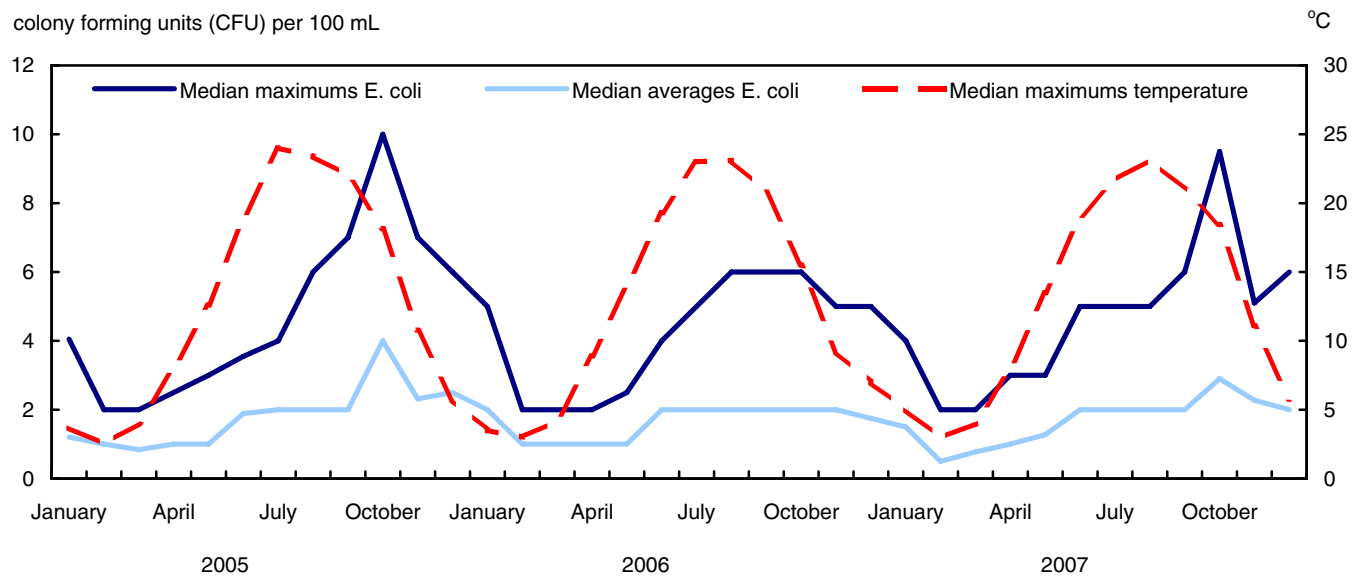


**Escherichia coli (E. coli)–Source water quality**

*E. coli* is a member of the total coliforms group of bacteria and is found exclusively in human and animal faeces. Its presence in water can indicate recent fecal contamination and the possible presence of disease-causing bacteria and viruses.<sup>17</sup>

The monthly median maximum and average values for *E. coli* and the monthly median maximum values for temperature for raw surface water from 96 plants that reported at least 10 months of maximum and average data for each reporting year for both *E. coli* & temperature is shown in Chart 6. These data show the relationship between temperature and *E. coli* concentrations. Peak monthly concentrations of *E. coli* followed peak monthly temperatures; the presence of *E. coli* in these sources of untreated surface water peaked in the fall months.

**Chart 6**  
**Escherichia coli (E. coli) and temperature in untreated source water: monthly median values for maximums and averages, raw surface water, 2005 to 2007**



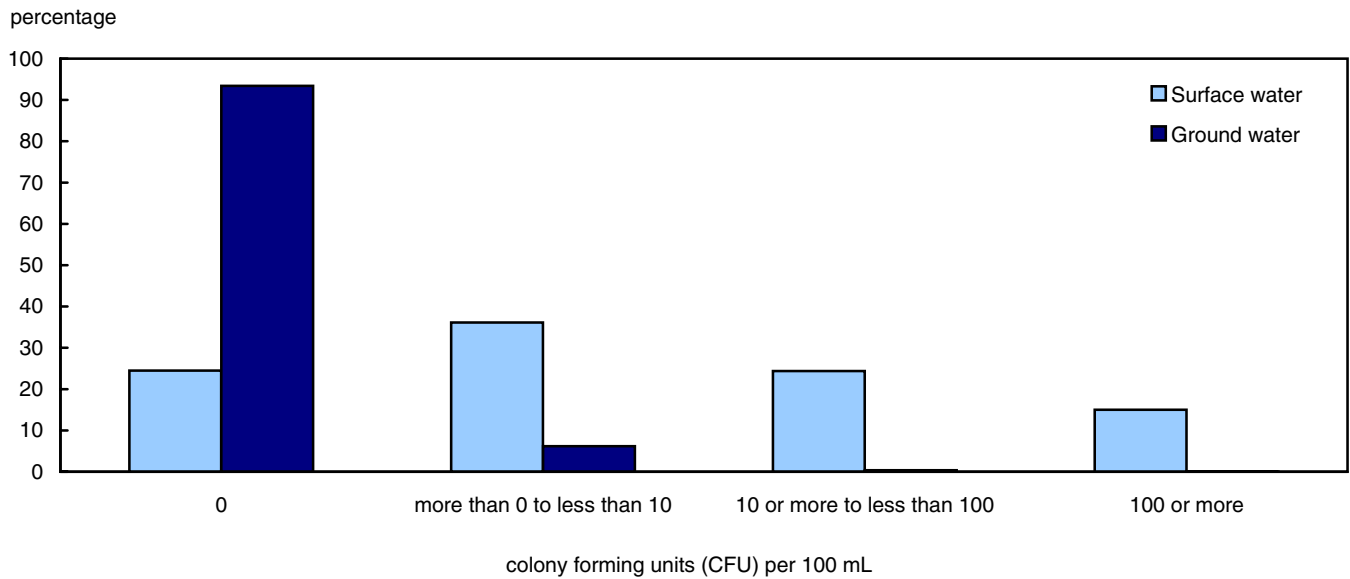
**Note(s):** Data are from 96 plants that produced 2,300 million cubic meters of drinking water in 2007, serving 12.9 million people.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

Chart 7 shows the distribution of maximum monthly *E. coli* values for 2005, 2006 and 2007 for 168 raw surface water and 145 groundwater sources that reported at least 10 months of maximum and average data for each reporting year (no GUDI sources are included). In general, *E. coli* concentrations are lower for raw groundwater than for raw surface water. More than 99% of the groundwater *E. coli* monthly maximums reported in 2007 were less than 10 CFU per 100 mL, compared to 61% of *E. coli* monthly maximums in surface water.

17. Health Canada. 2006b. "Escherichia coli." Available from [www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/escherichia\\_coli/index-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/escherichia_coli/index-eng.php) (accessed September 23, 2009).

**Chart 7**  
***Escherichia coli* (*E. coli*) in untreated source water: monthly maximum ranges for raw surface water and groundwater, 2005 to 2007**



**Note(s):** Data are from 168 surface water and 145 groundwater sources that produced 2,660 million cubic meters, serving 14.4 million people.  
**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

### ***E. coli*–Treated water quality**

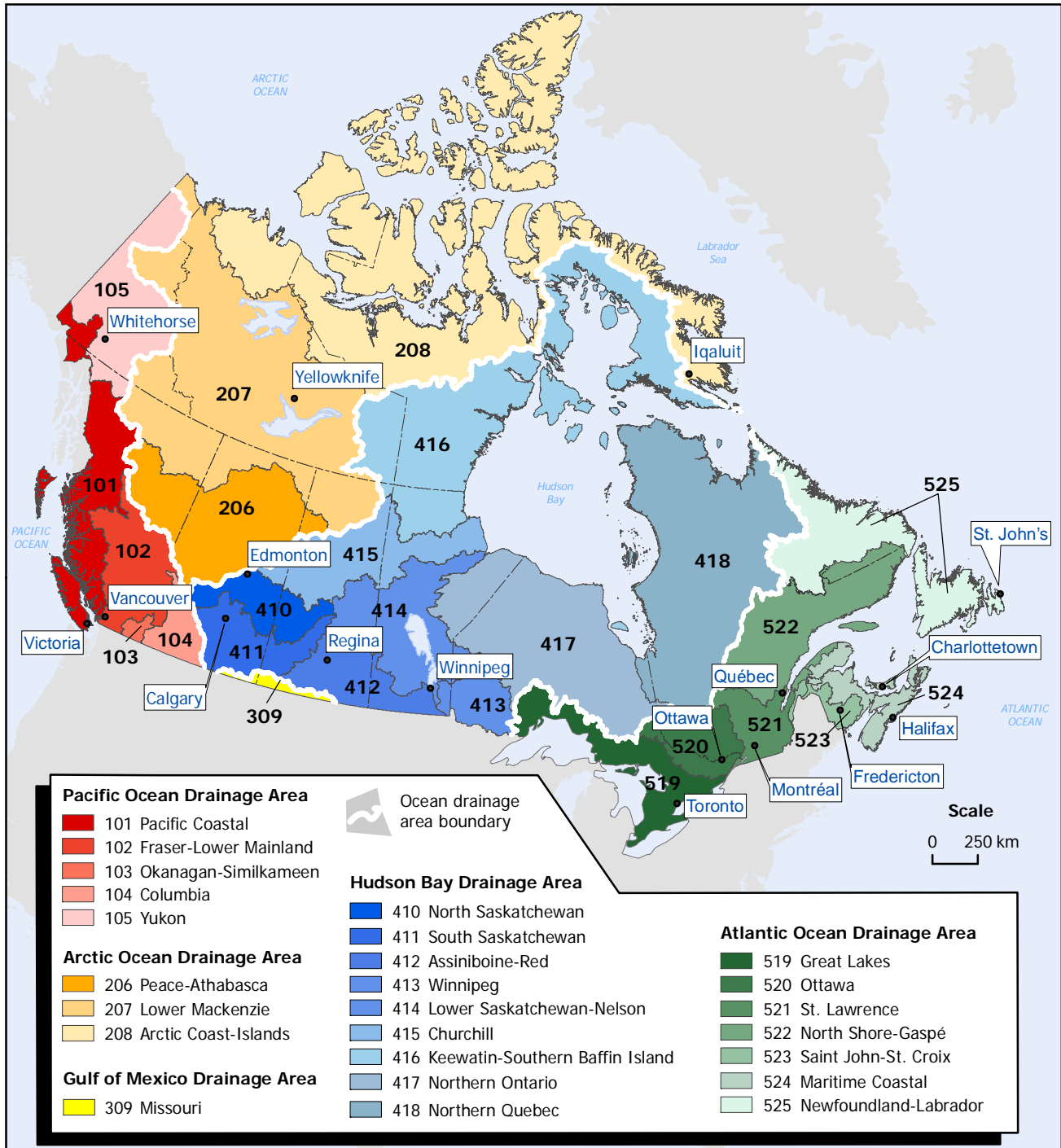
According to the GCDWQ, there must be no *E. coli* present in treated water. That means that the level of *E. coli* must be zero CFU per 100 mL<sup>18</sup> or the water must not test positive for the presence of *E. coli*. In 2007, 98% of the monthly *E. coli* data reported in the survey met the water quality guideline.

The treated water results for *E. coli* are based on all plant types that reported at least 10 months of monthly maximum and average or presence-absence data for each reporting year (197 treating surface water and 184 groundwater). In 2007, these plants produced 2,500 million cubic meters of drinking water and served 13 million people.

In 2007, 98% of these plants never had a monthly maximum or average for treated water that exceeded zero CFU per 100 mL, or one month with a sample that tested positive for *E. coli*. The results were similar for 2005 and 2006.

18. Health Canada. 2006b. *Ibid.*

**Map 1**  
**Drainage regions by ocean drainage area**



**Note(s):** The drainage region codes in this map are used in Tables 3, 4, 6, 8, 10, 12, 15 and 16.

**Source(s):** Statistics Canada, Environment Accounts and Statistics Division.

## Related products

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### Selected publications from Statistics Canada

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11-526-X	Households and the Environment
16-001-M	Environment Accounts and Statistics Analytical and Technical Paper Series
16-002-X	EnviroStats
16-201-X	Human Activity and the Environment: Annual Statistics
16-257-X	Environment Accounts and Statistics Product Catalogue
16-401-X	Industrial Water Use

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### Selected technical and analytical products from Statistics Canada

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16-001-M2007003	Behaviour Study on the Water Quality Index of the Canadian Council of Ministers of the Environment
16-001-M2009007	The Water Yield for Canada As a Thirty-year Average (1971 to 2000): Concepts, Methodology and Initial Results
16-001-M2009008	Agricultural Water Use Survey 2007, Methodology Report à
16-001-M2009010	Drinking Water Decisions of Canadian Municipal Households
16-002-X200700210338	The cost of water in the manufacturing sector
16-002-X200700310457	Population change in Canada's drainage areas
16-002-X200800110541	Agricultural water use in Canada
16-002-X200800210620	Against the flow: Which households drink bottled water?
16-002-X200800310686	Who uses water-saving fixtures in the home?
16-002-X200800410752	Households' use of water and wastewater services
16-002-X200900210889	Measuring renewable water assets in Canada: Initial results and research agenda
16-002-X200900310927	Agricultural water use in 2007: A profile of irrigation

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**Selected CANSIM tables from Statistics Canada**

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153-0059	Households and the environment survey, use of energy-saving lights, Canada and provinces, biennial
153-0060	Households and the environment survey, use of thermostats, Canada and provinces, biennial
153-0061	Households and the environment survey, radon awareness and testing, Canada and provinces, biennial
153-0062	Households and the environment survey, dwelling's main source of water, Canada and provinces, biennial
153-0063	Households and the environment survey, primary type of drinking water consumed, Canada and provinces, biennial
153-0064	Households and the environment survey, use of fertilizer and pesticides, Canada and provinces, biennial
153-0065	Households and the environment survey, awareness of air quality advisories and their influence on behaviours, Canada and provinces, biennial
153-0066	Households and the environment survey, treatment of drinking water, Canada and provinces, biennial

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**Selected surveys from Statistics Canada**

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3881	Households and the Environment Survey
5120	Industrial Water Survey
5145	Agricultural Water Use Survey
5149	Survey of Drinking Water Plants

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**Selected summary tables from Statistics Canada**

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- *Population served by drinking water plants, by source water type and drainage region*

# Statistical tables

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**Table 1**  
**Surface water volumes processed by drinking water plants, by province and territory**

	Raw water			Treated water			Backwash and wastewater <sup>1</sup>		
	2005	2006	2007	2005	2006	2007	2005	2006	2007
millions of cubic metres									
<b>Canada<sup>2</sup></b>	<b>5,263.8<sup>A</sup></b>	<b>5,141.4<sup>A</sup></b>	<b>5,186.3<sup>A</sup></b>	<b>5,031.9<sup>A</sup></b>	<b>4,891.0<sup>A</sup></b>	<b>4,935.0<sup>A</sup></b>	<b>231.9<sup>A</sup></b>	<b>250.4<sup>A</sup></b>	<b>251.3<sup>A</sup></b>
Newfoundland and Labrador	144.8 <sup>B</sup>	129.9 <sup>B</sup>	132.0 <sup>B</sup>	140.4 <sup>B</sup>	124.0 <sup>B</sup>	126.1 <sup>B</sup>	4.3 <sup>B</sup>	5.9 <sup>B</sup>	6.0 <sup>A</sup>
Prince Edward Island	0.0...	0.0...	0.0...	0.0...	0.0...	0.0...	0.0...	0.0...	0.0...
Nova Scotia	103.8 <sup>C</sup>	100.7 <sup>C</sup>	101.6 <sup>C</sup>	100.1 <sup>C</sup>	96.7 <sup>C</sup>	98.1 <sup>C</sup>	3.7 <sup>D</sup>	4.0 <sup>D</sup>	3.5 <sup>D</sup>
New Brunswick	81.4 <sup>A</sup>	78.9 <sup>A</sup>	79.7 <sup>A</sup>	78.7 <sup>A</sup>	76.4 <sup>A</sup>	74.5 <sup>A</sup>	2.7 <sup>A</sup>	2.5 <sup>A</sup>	5.2 <sup>A</sup>
Quebec	1,734.7 <sup>A</sup>	1,651.0 <sup>A</sup>	1,697.4 <sup>A</sup>	1,675.3 <sup>A</sup>	1,580.6 <sup>A</sup>	1,630.2 <sup>A</sup>	59.4 <sup>B</sup>	70.5 <sup>B</sup>	67.2 <sup>A</sup>
Ontario	1,771.8 <sup>A</sup>	1,717.2 <sup>A</sup>	1,732.7 <sup>A</sup>	1,677.3 <sup>A</sup>	1,613.2 <sup>A</sup>	1,635.4 <sup>A</sup>	94.5 <sup>A</sup>	104.0 <sup>A</sup>	97.3 <sup>A</sup>
Manitoba	106.6 <sup>A</sup>	110.3 <sup>A</sup>	106.3 <sup>A</sup>	104.1 <sup>A</sup>	107.3 <sup>A</sup>	103.9 <sup>A</sup>	2.6 <sup>B</sup>	2.9 <sup>B</sup>	2.4 <sup>C</sup>
Saskatchewan	108.3 <sup>A</sup>	115.3 <sup>A</sup>	113.8 <sup>A</sup>	102.6 <sup>A</sup>	109.1 <sup>A</sup>	107.8 <sup>A</sup>	5.7 <sup>A</sup>	6.1 <sup>A</sup>	5.9 <sup>A</sup>
Alberta	462.7 <sup>A</sup>	475.9 <sup>A</sup>	485.4 <sup>A</sup>	411.7 <sup>A</sup>	429.3 <sup>A</sup>	429.8 <sup>A</sup>	50.9 <sup>A</sup>	46.6 <sup>A</sup>	55.5 <sup>A</sup>
British Columbia	741.8 <sup>A</sup>	754.9 <sup>A</sup>	731.1 <sup>A</sup>	733.9 <sup>A</sup>	747.2 <sup>A</sup>	723.0 <sup>A</sup>	7.9 <sup>B</sup>	7.7 <sup>B</sup>	8.1 <sup>B</sup>
Yukon and Northwest Territories	7.8 <sup>B</sup>	7.4 <sup>B</sup>	6.2 <sup>A</sup>	7.6 <sup>B</sup>	7.3 <sup>B</sup>	6.1 <sup>B</sup>	F	F	F

1. Calculated as the difference between raw water withdrawals and final volumes of treated water produced.

2. Excludes Nunavut due to low response.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 2**  
**Groundwater volumes processed by drinking water plants, by province and territory**

	Raw water			Treated water			Backwash and wastewater <sup>1</sup>		
	2005	2006	2007	2005	2006	2007	2005	2006	2007
millions of cubic metres									
<b>Canada<sup>2</sup></b>	<b>682.5<sup>A</sup></b>	<b>680.8<sup>A</sup></b>	<b>691.7<sup>A</sup></b>	<b>674.3<sup>A</sup></b>	<b>670.1<sup>A</sup></b>	<b>681.8<sup>A</sup></b>	<b>8.2<sup>B</sup></b>	<b>10.7<sup>B</sup></b>	<b>9.9<sup>B</sup></b>
Newfoundland and Labrador	12.8 <sup>C</sup>	12.7 <sup>B</sup>	12.7 <sup>B</sup>	12.8 <sup>C</sup>	12.7 <sup>B</sup>	12.7 <sup>B</sup>	0.0...	0.0 <sup>A</sup>	0.0...
Prince Edward Island	9.9 <sup>A</sup>	10.0 <sup>A</sup>	10.0 <sup>A</sup>	9.9 <sup>A</sup>	10.0 <sup>A</sup>	10.0 <sup>A</sup>	0.0...	0.0...	0.0...
Nova Scotia	11.6 <sup>C</sup>	11.4 <sup>C</sup>	12.7 <sup>C</sup>	11.1 <sup>C</sup>	10.8 <sup>C</sup>	12.3 <sup>C</sup>	0.5 <sup>E</sup>	0.6 <sup>E</sup>	0.4 <sup>D</sup>
New Brunswick	31.2 <sup>B</sup>	30.1 <sup>A</sup>	30.4 <sup>A</sup>	30.7 <sup>B</sup>	29.7 <sup>A</sup>	30.0 <sup>A</sup>	0.5 <sup>D</sup>	0.4 <sup>D</sup>	0.4 <sup>D</sup>
Quebec	182.9 <sup>A</sup>	180.5 <sup>A</sup>	186.3 <sup>A</sup>	180.9 <sup>B</sup>	176.9 <sup>A</sup>	182.4 <sup>A</sup>	2.0 <sup>D</sup>	3.6 <sup>C</sup>	3.9 <sup>C</sup>
Ontario	207.6 <sup>A</sup>	207.1 <sup>A</sup>	209.8 <sup>A</sup>	206.3 <sup>A</sup>	205.1 <sup>A</sup>	209.1 <sup>A</sup>	1.3 <sup>C</sup>	2.0 <sup>E</sup>	0.8 <sup>D</sup>
Manitoba	13.0 <sup>C</sup>	14.4 <sup>C</sup>	14.1 <sup>C</sup>	12.4 <sup>C</sup>	13.8 <sup>C</sup>	13.3 <sup>C</sup>	F	0.6 <sup>E</sup>	0.8 <sup>E</sup>
Saskatchewan	23.1 <sup>A</sup>	23.2 <sup>A</sup>	23.1 <sup>A</sup>	21.3 <sup>A</sup>	21.3 <sup>A</sup>	21.2 <sup>A</sup>	1.7 <sup>D</sup>	1.9 <sup>D</sup>	2.0 <sup>D</sup>
Alberta	31.0 <sup>C</sup>	31.5 <sup>C</sup>	32.0 <sup>C</sup>	30.0 <sup>C</sup>	30.6 <sup>C</sup>	31.0 <sup>C</sup>	1.0 <sup>D</sup>	0.9 <sup>E</sup>	1.0 <sup>C</sup>
British Columbia	154.8 <sup>C</sup>	154.9 <sup>C</sup>	154.3 <sup>C</sup>	154.2 <sup>C</sup>	154.2 <sup>C</sup>	153.7 <sup>C</sup>	0.6 <sup>D</sup>	0.6 <sup>E</sup>	0.7 <sup>E</sup>
Yukon and Northwest Territories	4.6 <sup>A</sup>	5.0 <sup>A</sup>	6.2 <sup>A</sup>	4.6 <sup>A</sup>	5.0 <sup>A</sup>	6.2 <sup>A</sup>	0.0...	0.0...	0.0...

1. Calculated as the difference between raw water withdrawals and final volumes of treated water produced.

2. Excludes Nunavut due to low response.

**Note(s):** Includes groundwater under the direct influence of surface water. Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 3**  
**Surface water volumes processed by drinking water plants, by drainage region**

	Drainage region code	Raw water			Treated water			Backwash and wastewater <sup>1</sup>		
		2005	2006	2007	2005	2006	2007	2005	2006	2007
	code	millions of cubic metres								
<b>Canada<sup>2</sup></b>	...	<b>5,263.8<sup>A</sup></b>	<b>5,141.4<sup>A</sup></b>	<b>5,186.3<sup>A</sup></b>	<b>5,031.9<sup>A</sup></b>	<b>4,891.0<sup>A</sup></b>	<b>4,935.0<sup>A</sup></b>	<b>231.9<sup>A</sup></b>	<b>250.4<sup>A</sup></b>	<b>251.3<sup>A</sup></b>
Pacific Coastal and Yukon	101,105	414.7 <sup>A</sup>	428.1 <sup>A</sup>	360.8 <sup>A</sup>	414.5 <sup>A</sup>	427.9 <sup>A</sup>	360.6 <sup>A</sup>	0.2 <sup>E</sup>	0.2 <sup>E</sup>	0.3 <sup>E</sup>
Fraser–Lower Mainland	102	198.9 <sup>A</sup>	195.9 <sup>A</sup>	236.5 <sup>A</sup>	192.9 <sup>A</sup>	190.3 <sup>A</sup>	230.8 <sup>A</sup>	5.9 <sup>A</sup>	5.6 <sup>A</sup>	5.7 <sup>A</sup>
Okanagan–Similkameen	103	87.8 <sup>D</sup>	89.4 <sup>D</sup>	92.2 <sup>D</sup>	87.6 <sup>D</sup>	89.2 <sup>D</sup>	92.1 <sup>D</sup>	F	F	F
Columbia	104	36.9 <sup>D</sup>	37.1 <sup>D</sup>	36.6 <sup>D</sup>	35.8 <sup>D</sup>	35.8 <sup>D</sup>	35.2 <sup>D</sup>	1.1 <sup>E</sup>	1.3 <sup>E</sup>	1.4 <sup>E</sup>
Peace–Athabasca and Lower Mackenzie	206,207	45.1 <sup>A</sup>	47.3 <sup>A</sup>	47.7 <sup>A</sup>	42.1 <sup>A</sup>	44.1 <sup>A</sup>	44.7 <sup>A</sup>	3.0 <sup>C</sup>	3.2 <sup>C</sup>	3.1 <sup>C</sup>
Missouri	309	x	x	x	x	x	x	x	x	x
North Saskatchewan	410	151.2 <sup>A</sup>	156.6 <sup>A</sup>	160.4 <sup>A</sup>	141.4 <sup>A</sup>	146.5 <sup>A</sup>	144.4 <sup>A</sup>	9.8 <sup>A</sup>	10.1 <sup>A</sup>	16.0 <sup>A</sup>
South Saskatchewan	411	329.0 <sup>A</sup>	338.5 <sup>A</sup>	342.1 <sup>A</sup>	288.8 <sup>A</sup>	302.6 <sup>A</sup>	302.9 <sup>A</sup>	40.2 <sup>A</sup>	35.9 <sup>A</sup>	39.2 <sup>A</sup>
Assiniboine–Red	412	140.0 <sup>A</sup>	146.2 <sup>A</sup>	142.3 <sup>A</sup>	135.1 <sup>A</sup>	141.4 <sup>A</sup>	138.1 <sup>A</sup>	5.0 <sup>A</sup>	4.8 <sup>A</sup>	4.2 <sup>A</sup>
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	42.2 <sup>A</sup>	42.7 <sup>A</sup>	42.2 <sup>A</sup>	38.1 <sup>A</sup>	38.2 <sup>A</sup>	37.9 <sup>A</sup>	4.2 <sup>B</sup>	4.5 <sup>B</sup>	4.3 <sup>B</sup>
Northern Quebec	418	F	x	x	F	x	x	F	x	x
Great Lakes	519	1,579.5 <sup>A</sup>	1,531.6 <sup>A</sup>	1,556.6 <sup>A</sup>	1,501.0 <sup>A</sup>	1,442.8 <sup>A</sup>	1,474.9 <sup>A</sup>	78.5 <sup>A</sup>	88.8 <sup>A</sup>	81.7 <sup>A</sup>
Ottawa	520	342.3 <sup>B</sup>	334.6 <sup>B</sup>	330.4 <sup>B</sup>	322.0 <sup>B</sup>	303.5 <sup>B</sup>	310.0 <sup>B</sup>	20.3 <sup>B</sup>	31.1 <sup>C</sup>	20.4 <sup>A</sup>
St. Lawrence	521	1,486.2 <sup>A</sup>	1,405.0 <sup>A</sup>	1,442.2 <sup>A</sup>	1,435.1 <sup>A</sup>	1,355.0 <sup>A</sup>	1,384.6 <sup>A</sup>	51.1 <sup>B</sup>	49.9 <sup>B</sup>	57.7 <sup>B</sup>
North Shore–Gaspé	522	67.7 <sup>A</sup>	68.4 <sup>A</sup>	71.1 <sup>A</sup>	66.2 <sup>A</sup>	66.3 <sup>A</sup>	68.9 <sup>A</sup>	1.5 <sup>D</sup>	2.2 <sup>D</sup>	2.2 <sup>C</sup>
Saint John–St. Croix	523	x	8.0 <sup>A</sup>	8.2 <sup>B</sup>	x	8.0 <sup>A</sup>	8.2 <sup>B</sup>	x	0...	0...
Maritime Coastal	524	187.9 <sup>B</sup>	180.9 <sup>B</sup>	183.0 <sup>B</sup>	181.4 <sup>B</sup>	174.3 <sup>B</sup>	174.3 <sup>B</sup>	6.5 <sup>C</sup>	6.6 <sup>C</sup>	8.7 <sup>B</sup>
Newfoundland–Labrador	525	144.8 <sup>B</sup>	129.9 <sup>B</sup>	132.0 <sup>B</sup>	140.4 <sup>B</sup>	124.0 <sup>B</sup>	126.1 <sup>B</sup>	4.3 <sup>B</sup>	5.9 <sup>B</sup>	6.0 <sup>A</sup>

1. Calculated as the difference between raw water withdrawals and final volumes of treated water produced.

2. Excludes Arctic Coast–Islands and Keewatin–Southern Baffin Island due to low response.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 4**  
**Groundwater volumes processed by drinking water plants, by drainage region**

	Drainage region code	Raw water			Treated water			Backwash and wastewater <sup>1</sup>		
		2005	2006	2007	2005	2006	2007	2005	2006	2007
	code	millions of cubic metres								
<b>Canada<sup>2</sup></b>	...	<b>682.5<sup>A</sup></b>	<b>680.8<sup>A</sup></b>	<b>691.7<sup>A</sup></b>	<b>674.3<sup>A</sup></b>	<b>670.1<sup>A</sup></b>	<b>681.8<sup>A</sup></b>	<b>8.2<sup>B</sup></b>	<b>10.7<sup>B</sup></b>	<b>9.9<sup>B</sup></b>
Pacific Coastal and Yukon	101,105	58.1 <sup>D</sup>	58.3 <sup>D</sup>	57.8 <sup>D</sup>	58.0 <sup>D</sup>	58.2 <sup>D</sup>	57.8 <sup>D</sup>	0.1 <sup>A</sup>	0.1 <sup>A</sup>	0.1 <sup>A</sup>
Fraser–Lower Mainland	102	62.0 <sup>D</sup>	68.4 <sup>D</sup>	68.5 <sup>D</sup>	61.7 <sup>D</sup>	68.1 <sup>D</sup>	68.1 <sup>D</sup>	F	F	F
Okanagan–Similkameen	103	16.9 <sup>B</sup>	16.0 <sup>B</sup>	17.9 <sup>C</sup>	16.9 <sup>B</sup>	16.0 <sup>B</sup>	17.9 <sup>C</sup>	0.0...	0.0...	0.0...
Columbia	104	17.6 <sup>A</sup>	F	F	17.6 <sup>A</sup>	F	F	0.0...	F	F
Peace–Athabasca and Lower Mackenzie	206,207	9.0 <sup>A</sup>	9.9 <sup>A</sup>	9.5 <sup>A</sup>	8.8 <sup>A</sup>	9.6 <sup>A</sup>	9.2 <sup>A</sup>	0.2 <sup>A</sup>	0.3 <sup>A</sup>	0.3 <sup>B</sup>
Missouri	309	x	0.3 <sup>B</sup>	0.3 <sup>A</sup>	x	x	x	x	x	x
North Saskatchewan	410	9.3 <sup>B</sup>	9.7 <sup>B</sup>	9.7 <sup>B</sup>	7.9 <sup>B</sup>	8.7 <sup>B</sup>	8.3 <sup>B</sup>	1.4 <sup>E</sup>	1.1 <sup>E</sup>	1.5 <sup>E</sup>
South Saskatchewan	411	25.1 <sup>D</sup>	25.4 <sup>C</sup>	25.9 <sup>C</sup>	24.5 <sup>D</sup>	24.6 <sup>C</sup>	25.5 <sup>C</sup>	0.6 <sup>E</sup>	F	0.4 <sup>E</sup>
Assiniboine–Red	412	22.8 <sup>B</sup>	23.9 <sup>B</sup>	23.6 <sup>B</sup>	21.7 <sup>B</sup>	22.5 <sup>B</sup>	22.1 <sup>B</sup>	1.1 <sup>E</sup>	1.3 <sup>D</sup>	1.5 <sup>D</sup>
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	13.1 <sup>B</sup>	14.1 <sup>B</sup>	12.6 <sup>B</sup>	12.5 <sup>B</sup>	12.4 <sup>B</sup>	12.0 <sup>B</sup>	0.6 <sup>D</sup>	1.7 <sup>E</sup>	0.6 <sup>D</sup>
Northern Quebec	418	9.4 <sup>A</sup>	13.6 <sup>A</sup>	14.5 <sup>A</sup>	9.4 <sup>A</sup>	x	x	0.1 <sup>A</sup>	x	x
Great Lakes	519	194.6 <sup>A</sup>	193.6 <sup>A</sup>	197.8 <sup>A</sup>	193.9 <sup>A</sup>	193.3 <sup>A</sup>	197.5 <sup>A</sup>	0.7 <sup>D</sup>	F	F
Ottawa	520	20.3 <sup>B</sup>	20.1 <sup>B</sup>	20.0 <sup>A</sup>	20.1 <sup>B</sup>	19.9 <sup>B</sup>	19.7 <sup>A</sup>	0.2 <sup>B</sup>	0.2 <sup>B</sup>	0.3 <sup>C</sup>
St. Lawrence	521	119.9 <sup>B</sup>	115.3 <sup>B</sup>	120.5 <sup>B</sup>	118.1 <sup>B</sup>	112.0 <sup>B</sup>	116.8 <sup>B</sup>	1.8 <sup>D</sup>	3.3 <sup>C</sup>	3.7 <sup>C</sup>
North Shore–Gaspé	522	33.8 <sup>B</sup>	32.1 <sup>B</sup>	31.8 <sup>B</sup>	33.6 <sup>B</sup>	31.9 <sup>B</sup>	31.6 <sup>B</sup>	0.2 <sup>E</sup>	0.2 <sup>E</sup>	0.2 <sup>E</sup>
Saint John–St. Croix	523	x	23.8 <sup>A</sup>	24.0 <sup>A</sup>	x	23.5 <sup>A</sup>	23.7 <sup>A</sup>	x	0.3 <sup>B</sup>	0.3 <sup>B</sup>
Maritime Coastal	524	32.9 <sup>B</sup>	31.9 <sup>A</sup>	33.4 <sup>B</sup>	32.3 <sup>B</sup>	31.2 <sup>A</sup>	32.8 <sup>B</sup>	0.7 <sup>E</sup>	0.8 <sup>D</sup>	0.6 <sup>D</sup>
Newfoundland–Labrador	525	12.8 <sup>C</sup>	12.7 <sup>B</sup>	12.7 <sup>B</sup>	12.8 <sup>C</sup>	12.7 <sup>B</sup>	12.7 <sup>B</sup>	0.0...	0.0 <sup>A</sup>	0.0...

1. Calculated as the difference between raw water withdrawals and final volumes of treated water produced.

2. Excludes Arctic Coast–Islands and Keewatin–Southern Baffin Island due to low response.

**Note(s):** Includes groundwater under the direct influence of surface water. Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).



**Table 5**  
**Population served by drinking water plants, by source water type and province and territory**

	Surface water			Groundwater		
	2005	2006	2007	2005	2006	2007
	persons					
<b>Canada 1</b>	<b>23,486,082</b> A	<b>23,686,820</b> A	<b>23,998,655</b> A	<b>3,256,474</b> A	<b>3,310,860</b> A	<b>3,388,934</b> A
Newfoundland and Labrador	403,648 B	376,474 B	379,389 A	x	x	x
Prince Edward Island	0 ...	0 ...	0 ...	60,074 A	60,427 A	60,827 A
Nova Scotia	388,597 B	389,349 B	394,879 B	58,792 C	59,346 C	60,511 C
New Brunswick	212,201 A	211,736 A	211,379 A	110,662 A	112,921 A	112,996 A
Quebec	5,844,932 A	5,875,002 A	5,949,804 A	847,364 A	853,493 A	867,892 A
Ontario	9,163,966 A	9,227,654 A	9,317,774 A	1,302,012 A	1,330,022 A	1,360,863 A
Manitoba	822,161 A	824,490 A	829,138 A	84,266 C	88,707 B	89,808 B
Saskatchewan	593,140 A	594,027 A	595,078 A	133,356 A	131,663 A	132,394 A
Alberta	2,581,365 A	2,659,175 A	2,751,250 A	120,235 B	124,929 B	130,034 A
British Columbia	3,425,700 A	3,480,251 A	3,526,439 A	514,244 C	521,223 C	538,906 C
Yukon and Northwest Territories	50,372 B	48,662 B	43,525 C	x	x	x
	Groundwater under the direct influence of surface water			Total		
	2005	2006	2007	2005	2006	2007
	persons					
<b>Canada 1</b>	<b>436,749</b> A	<b>445,864</b> A	<b>456,017</b> A	<b>27,197,110</b> A	<b>27,452,621</b> A	<b>27,856,304</b> A
Newfoundland and Labrador	x	x	x	429,494 B	402,690 B	406,364 A
Prince Edward Island	0 ...	0 ...	0 ...	60,074 A	60,427 A	60,827 A
Nova Scotia	0 ...	0 ...	0 ...	447,389 B	448,695 B	455,390 B
New Brunswick	28,214 A	28,254 A	28,265 A	351,077 A	352,912 A	352,640 A
Quebec	172,299 C	177,225 C	186,798 B	6,873,823 A	6,914,798 A	7,016,273 A
Ontario	123,763 A	127,835 A	125,493 A	10,595,652 A	10,685,510 A	10,805,048 A
Manitoba	6,475 D	7,071 D	7,483 D	915,568 A	920,268 A	926,429 A
Saskatchewan	7,168 B	7,579 B	8,793 B	733,665 A	733,269 A	736,265 A
Alberta	20,183 A	19,407 A	20,151 A	2,721,782 A	2,803,511 A	2,901,434 A
British Columbia	60,721 A	60,548 A	61,058 A	4,000,665 A	4,062,022 A	4,126,403 A
Yukon and Northwest Territories	x	x	x	67,919 B	68,520 B	69,230 B

1. Excludes Nunavut due to low response.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 6**  
**Population served by drinking water plants, by source water type and drainage region**

	Drainage region code	Surface water			Groundwater		
		2005	2006	2007	2005	2006	2007
	code	persons					
<b>Canada 1</b>	...	<b>23,486,082<sup>A</sup></b>	<b>23,686,820<sup>A</sup></b>	<b>23,998,655<sup>A</sup></b>	<b>3,256,474<sup>A</sup></b>	<b>3,310,860<sup>A</sup></b>	<b>3,388,934<sup>A</sup></b>
Pacific Coastal and Yukon <sup>2</sup>	101,105	2,315,837 <sup>A</sup>	2,345,382 <sup>A</sup>	2,371,455 <sup>A</sup>	175,888 <sup>C</sup>	177,901 <sup>C</sup>	185,734 <sup>B</sup>
Fraser–Lower Mainland <sup>3</sup>	102	801,593 <sup>A</sup>	817,507 <sup>A</sup>	825,720 <sup>A</sup>	x	x	x
Okanagan–Similkameen	103	188,894 <sup>B</sup>	194,989 <sup>B</sup>	201,328 <sup>B</sup>	30,335 <sup>B</sup>	30,286 <sup>B</sup>	32,828 <sup>B</sup>
Columbia	104	106,501 <sup>D</sup>	107,191 <sup>D</sup>	106,860 <sup>D</sup>	35,688 <sup>A</sup>	38,045 <sup>B</sup>	38,859 <sup>B</sup>
Peace–Athabasca and Lower Mackenzie	206,207	259,084 <sup>A</sup>	270,212 <sup>A</sup>	277,209 <sup>A</sup>	x	x	x
Missouri	309	x	x	x	x	x	x
North Saskatchewan	410	1,026,825 <sup>A</sup>	1,040,495 <sup>A</sup>	1,057,460 <sup>A</sup>	53,638 <sup>B</sup>	54,586 <sup>B</sup>	55,243 <sup>B</sup>
South Saskatchewan	411	1,606,728 <sup>A</sup>	1,660,912 <sup>A</sup>	1,730,482 <sup>A</sup>	82,825 <sup>B</sup>	87,879 <sup>B</sup>	92,207 <sup>B</sup>
Assiniboine–Red	412	1,032,054 <sup>A</sup>	1,034,466 <sup>A</sup>	1,038,519 <sup>A</sup>	138,473 <sup>B</sup>	137,900 <sup>B</sup>	139,541 <sup>B</sup>
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	216,610 <sup>A</sup>	216,819 <sup>A</sup>	217,058 <sup>A</sup>	71,975 <sup>B</sup>	74,713 <sup>B</sup>	73,441 <sup>B</sup>
Northern Quebec	418	F	x	x	x	x	x
Great Lakes	519	8,149,639 <sup>A</sup>	8,200,928 <sup>A</sup>	8,280,934 <sup>A</sup>	1,230,896 <sup>A</sup>	1,258,473 <sup>A</sup>	1,288,214 <sup>A</sup>
Ottawa	520	1,522,329 <sup>A</sup>	1,542,946 <sup>A</sup>	1,558,968 <sup>A</sup>	96,021 <sup>B</sup>	98,579 <sup>B</sup>	102,607 <sup>A</sup>
St. Lawrence	521	4,906,941 <sup>A</sup>	4,907,286 <sup>A</sup>	4,945,360 <sup>A</sup>	557,383 <sup>B</sup>	559,804 <sup>B</sup>	575,411 <sup>B</sup>
North Shore–Gaspé	522	305,203 <sup>A</sup>	325,722 <sup>A</sup>	356,107 <sup>A</sup>	x	151,113 <sup>A</sup>	149,114 <sup>A</sup>
Saint John–St. Croix	523	33,544 <sup>A</sup>	33,534 <sup>A</sup>	33,561 <sup>A</sup>	83,732 <sup>A</sup>	84,827 <sup>A</sup>	84,904 <sup>A</sup>
Maritime Coastal	524	606,951 <sup>A</sup>	607,245 <sup>A</sup>	612,426 <sup>A</sup>	174,099 <sup>A</sup>	176,168 <sup>A</sup>	177,730 <sup>A</sup>
Newfoundland–Labrador	525	403,648 <sup>B</sup>	376,474 <sup>B</sup>	379,389 <sup>A</sup>	x	x	x
	Drainage region code	Groundwater under the direct influence of surface water			Total		
	code	2005	2006	2007	2005	2006	2007
		persons					
<b>Canada 1</b>	...	<b>436,749<sup>A</sup></b>	<b>445,864<sup>A</sup></b>	<b>456,017<sup>A</sup></b>	<b>27,197,110<sup>A</sup></b>	<b>27,452,621<sup>A</sup></b>	<b>27,856,304<sup>A</sup></b>
Pacific Coastal and Yukon <sup>2</sup>	101,105	36,570 <sup>A</sup>	36,632 <sup>A</sup>	37,050 <sup>A</sup>	2,528,295 <sup>A</sup>	2,559,915 <sup>A</sup>	2,594,238 <sup>A</sup>
Fraser–Lower Mainland <sup>3</sup>	102	x	x	x	1,078,230 <sup>B</sup>	1,099,089 <sup>B</sup>	1,119,612 <sup>B</sup>
Okanagan–Similkameen	103	4,733 <sup>D</sup>	4,469 <sup>E</sup>	4,348 <sup>D</sup>	223,962 <sup>B</sup>	229,744 <sup>B</sup>	238,504 <sup>B</sup>
Columbia	104	0 <sup>A</sup>	0 <sup>A</sup>	0 <sup>A</sup>	142,189 <sup>C</sup>	145,236 <sup>C</sup>	145,719 <sup>C</sup>
Peace–Athabasca and Lower Mackenzie	206,207	x	x	x	317,200 <sup>A</sup>	327,692 <sup>A</sup>	335,192 <sup>A</sup>
Missouri	309	0 <sup>A</sup>	0 <sup>A</sup>	0 <sup>A</sup>	4,110 <sup>A</sup>	3,984 <sup>A</sup>	4,004 <sup>A</sup>
North Saskatchewan	410	4,766 <sup>A</sup>	4,789 <sup>A</sup>	4,869 <sup>A</sup>	1,085,229 <sup>A</sup>	1,099,870 <sup>A</sup>	1,117,572 <sup>A</sup>
South Saskatchewan	411	19,805 <sup>A</sup>	19,086 <sup>A</sup>	19,830 <sup>A</sup>	1,709,358 <sup>A</sup>	1,767,877 <sup>A</sup>	1,842,519 <sup>A</sup>
Assiniboine–Red	412	8,733 <sup>D</sup>	9,694 <sup>C</sup>	11,241 <sup>C</sup>	1,179,259 <sup>A</sup>	1,182,060 <sup>A</sup>	1,189,301 <sup>A</sup>
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	4,025 <sup>A</sup>	3,990 <sup>A</sup>	3,990 <sup>A</sup>	295,277 <sup>A</sup>	295,522 <sup>A</sup>	294,489 <sup>A</sup>
Northern Quebec	418	0 <sup>A</sup>	0 <sup>A</sup>	0 <sup>A</sup>	44,751 <sup>A</sup>	53,430 <sup>A</sup>	53,701 <sup>A</sup>
Great Lakes	519	121,682 <sup>A</sup>	125,727 <sup>A</sup>	123,369 <sup>A</sup>	9,508,127 <sup>A</sup>	9,585,127 <sup>A</sup>	9,693,436 <sup>A</sup>
Ottawa	520	11,362 <sup>C</sup>	13,191 <sup>B</sup>	13,207 <sup>B</sup>	1,633,009 <sup>A</sup>	1,654,716 <sup>A</sup>	1,674,782 <sup>A</sup>
St. Lawrence	521	155,429 <sup>C</sup>	156,770 <sup>C</sup>	166,290 <sup>C</sup>	5,619,753 <sup>A</sup>	5,632,938 <sup>A</sup>	5,698,840 <sup>A</sup>
North Shore–Gaspé	522	x	4,469 <sup>A</sup>	4,523 <sup>A</sup>	470,927 <sup>A</sup>	481,304 <sup>A</sup>	509,744 <sup>A</sup>
Saint John–St. Croix	523	26,604 <sup>A</sup>	26,670 <sup>A</sup>	26,682 <sup>A</sup>	143,880 <sup>A</sup>	145,030 <sup>A</sup>	145,147 <sup>A</sup>
Maritime Coastal	524	3,010 <sup>B</sup>	2,984 <sup>B</sup>	2,983 <sup>B</sup>	784,059 <sup>A</sup>	786,398 <sup>A</sup>	793,139 <sup>A</sup>
Newfoundland–Labrador	525	x	x	x	429,494 <sup>B</sup>	402,690 <sup>B</sup>	406,364 <sup>A</sup>

1. Excludes Arctic Coast–Islands and Keewatin–Southern Baffin Island due to low response.

2. Overestimated because some plants located here serve Fraser–Lower Mainland.

3. Underestimated because some of the population is served by plants located in Pacific Coastal.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 7**  
**Raw water volumes processed by drinking water plants, by source water type and province and territory**

	Surface water			Groundwater		
	2005	2006	2007	2005	2006	2007
millions of cubic metres						
<b>Canada 1</b>	<b>5,263.8</b> A	<b>5,141.4</b> A	<b>5,186.3</b> A	<b>588.6</b> A	<b>587.1</b> A	<b>595.2</b> A
Newfoundland and Labrador	144.8 B	129.9 B	132.0 B	x	x	x
Prince Edward Island	0.0 ...	0.0 ...	0.0 ...	9.9 A	10.0 A	10.0 A
Nova Scotia	103.8 C	100.7 C	101.6 C	11.6 C	11.4 C	12.7 C
New Brunswick	81.4 A	78.9 A	79.7 A	26.1 B	25.1 B	25.5 A
Quebec	1,734.7 A	1,651.0 A	1,697.4 A	150.4 A	147.9 A	150.9 A
Ontario	1,771.8 A	1,717.2 A	1,732.7 A	189.9 A	189.5 A	192.1 A
Manitoba	106.6 A	110.3 A	106.3 A	11.8 C	13.1 C	12.6 C
Saskatchewan	108.3 A	115.3 A	113.8 A	22.0 A	22.0 A	21.8 A
Alberta	462.7 A	475.9 A	485.4 A	23.8 D	24.7 C	25.2 C
British Columbia	741.8 A	754.9 A	731.1 A	134.5 C	134.6 C	134.5 C
Yukon and Northwest Territories	7.8 B	7.4 B	6.2 A	x	x	x
Groundwater under the direct influence of surface water						
	2005	2006	2007	2005	2006	2007
Total						
millions of cubic metres						
<b>Canada 1</b>	<b>93.9</b> B	<b>93.7</b> B	<b>96.5</b> A	<b>5,946.3</b> A	<b>5,822.2</b> A	<b>5,878.0</b> A
Newfoundland and Labrador	x	x	x	157.6 B	142.6 B	144.7 B
Prince Edward Island	0.0 ...	0.0 ...	0.0 ...	9.9 A	10.0 A	10.0 A
Nova Scotia	0.0 ...	0.0 ...	0.0 ...	115.4 C	112.1 C	114.2 C
New Brunswick	5.0 A	4.9 A	4.9 A	112.6 A	109.0 A	110.1 A
Quebec	32.5 C	32.6 C	35.4 C	1,917.6 A	1,831.5 A	1,883.7 A
Ontario	17.8 A	17.6 A	17.7 A	1,979.4 A	1,924.3 A	1,942.6 A
Manitoba	1.2 E	1.3 E	1.5 D	119.6 A	124.7 A	120.5 A
Saskatchewan	1.0 B	1.1 B	1.3 B	131.4 A	138.4 A	136.9 A
Alberta	7.3 B	6.8 A	6.8 A	493.7 A	507.4 A	517.4 A
British Columbia	20.3 B	20.3 A	19.8 B	896.6 A	909.8 A	885.5 A
Yukon and Northwest Territories	x	x	x	12.4 A	12.4 A	12.4 A

1. Excludes Nunavut due to low response.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 8**  
**Raw water volumes processed by drinking water plants, by source water type and drainage region**

	Drainage region code	Surface water			Groundwater		
		2005	2006	2007	2005	2006	2007
	code	millions of cubic metres					
<b>Canada 1</b>	...	<b>5,263.8</b> A	<b>5,141.4</b> A	<b>5,186.3</b> A	<b>588.6</b> A	<b>587.1</b> A	<b>595.2</b> A
Pacific Coastal and Yukon	101,105	414.7 A	428.1 A	360.8 A	48.7 D	48.2 D	48.4 D
Fraser–Lower Mainland	102	198.9 A	195.9 A	236.5 A	x	x	x
Okanagan–Similkameen	103	87.8 D	89.4 D	92.2 D	10.8 B	10.9 B	12.1 B
Columbia	104	36.9 D	37.1 D	36.6 D	17.6 A	F	F
Peace–Athabasca and Lower Mackenzie	206,207	45.1 A	47.3 A	47.7 A	x	x	x
Missouri	309	x	x	x	x	0.3 B	0.3 A
North Saskatchewan	410	151.2 A	156.6 A	160.4 A	8.6 B	x	x
South Saskatchewan	411	329.0 A	338.5 A	342.1 A	17.9 D	18.6 D	19.1 D
Assiniboine–Red	412	140.0 A	146.2 A	142.3 A	21.4 B	22.2 B	21.6 B
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	42.2 A	42.7 A	42.2 A	12.2 B	13.3 B	11.8 B
Northern Quebec	418	F	x	x	9.4 A	13.6 A	14.5 A
Great Lakes	519	1,579.5 A	1,531.6 A	1,556.6 A	177.3 A	176.4 A	180.5 A
Ottawa	520	342.3 B	334.6 B	330.4 B	17.9 B	17.5 B	17.4 B
St. Lawrence	521	1,486.2 A	1,405.0 A	1,442.2 A	90.9 B	86.5 B	88.9 B
North Shore–Gaspé	522	67.7 A	68.4 A	71.1 A	x	31.4 B	31.2 B
Saint John–St. Croix	523	x	8.0 A	8.2 B	19.5 B	19.1 B	19.3 B
Maritime Coastal	524	187.9 B	180.9 B	183.0 B	32.4 B	31.5 A	32.9 B
Newfoundland–Labrador	525	144.8 B	129.9 B	132.0 B	5.1 E	5.0 D	4.8 D

	Drainage region code	Groundwater under the direct influence of surface water			Total		
		2005	2006	2007	2005	2006	2007
	code	millions of cubic metres					
<b>Canada 1</b>	...	<b>93.9</b> B	<b>93.7</b> B	<b>96.5</b> A	<b>5,946.3</b> A	<b>5,822.2</b> A	<b>5,878.0</b> A
Pacific Coastal and Yukon	101,105	9.4 A	10.1 A	9.4 A	472.8 A	486.4 A	418.7 A
Fraser–Lower Mainland	102	x	x	x	260.8 A	264.3 B	305.0 A
Okanagan–Similkameen	103	6.1 D	5.1 D	5.8 E	104.8 C	105.5 D	110.1 D
Columbia	104	0.0 A	0.0 A	0.0 A	54.5 C	48.8 D	47.8 D
Peace–Athabasca and Lower Mackenzie	206,207	x	x	x	54.1 A	57.2 A	57.2 A
Missouri	309	0.0 A	0.0 A	0.0 A	1.1 A	x	x
North Saskatchewan	410	0.7 A	x	x	160.5 A	166.3 A	170.1 A
South Saskatchewan	411	7.2 B	6.7 A	6.7 A	354.1 A	363.9 A	367.9 A
Assiniboine–Red	412	1.5 E	1.7 D	2.0 D	162.9 A	170.0 A	165.9 A
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	0.9 A	0.8 A	0.8 A	55.3 A	56.8 A	54.8 A
Northern Quebec	418	0.0 A	0.0 A	0.0 A	F	x	x
Great Lakes	519	17.3 A	17.2 A	17.2 A	1,774.1 A	1,725.2 A	1,754.4 A
Ottawa	520	2.4 C	2.6 B	2.6 B	362.6 B	354.7 B	350.4 B
St. Lawrence	521	29.0 D	28.8 D	31.6 C	1,606.1 A	1,520.3 A	1,562.7 A
North Shore–Gaspé	522	x	0.6 A	0.6 A	101.5 A	100.5 A	102.9 A
Saint John–St. Croix	523	x	4.7 A	4.7 A	33.3 B	31.8 A	32.2 A
Maritime Coastal	524	0.5 B	0.5 B	0.5 C	220.8 B	212.9 B	216.4 B
Newfoundland–Labrador	525	7.7 A	7.7 A	7.9 A	157.6 B	142.6 B	144.7 B

1. Excludes Arctic Coast–Islands and Keewatin–Southern Baffin Island due to low response.

Note(s): Figures may not add up to totals due to rounding.

Source(s): Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 9**  
**Total capital expenditures of drinking water plants, by main source water type and province and territory**

	Surface water <sup>1</sup>			Groundwater <sup>1</sup>			Groundwater under the direct influence of surface water <sup>1</sup>		
	2005	2006	2007	2005	2006	2007	2005	2006	2007
	millions of dollars								
<b>Canada <sup>2</sup></b>	<b>821.2<sup>A</sup></b>	<b>930.1<sup>A</sup></b>	<b>740.2<sup>B</sup></b>	<b>111.8<sup>C</sup></b>	<b>112.1<sup>B</sup></b>	<b>103.6<sup>B</sup></b>	<b>13.8<sup>B</sup></b>	<b>14.0<sup>A</sup></b>	<b>12.4<sup>A</sup></b>
Newfoundland and Labrador	40.0 <sup>E</sup>	x	8.5 <sup>B</sup>	F	x	F	0.0...	0.0...	0.0...
Prince Edward Island	0.0...	0.0...	0.0...	x	x	x	0.0...	0.0...	0.0...
Nova Scotia	3.8 <sup>E</sup>	x	8.5 <sup>E</sup>	1.3 <sup>E</sup>	x	2.2 <sup>E</sup>	0.0...	0.0...	0.0...
New Brunswick	0.8 <sup>B</sup>	x	x	1.5 <sup>D</sup>	x	x	x	0.7 <sup>A</sup>	x
Quebec	141.4 <sup>C</sup>	106.2 <sup>C</sup>	93.2 <sup>E</sup>	29.8 <sup>D</sup>	19.5 <sup>D</sup>	28.0 <sup>D</sup>	3.0 <sup>D</sup>	2.4 <sup>D</sup>	1.5 <sup>E</sup>
Ontario	269.1 <sup>B</sup>	327.6 <sup>A</sup>	214.4 <sup>A</sup>	49.1 <sup>C</sup>	54.9 <sup>C</sup>	45.1 <sup>B</sup>	8.7 <sup>C</sup>	7.0 <sup>A</sup>	7.8 <sup>A</sup>
Manitoba	x	x	x	x	x	x	x	x	x
Saskatchewan	x	x	16.0 <sup>A</sup>	F	x	4.1 <sup>E</sup>	x	x	F
Alberta	92.4 <sup>A</sup>	173.9 <sup>A</sup>	161.3 <sup>A</sup>	3.6 <sup>E</sup>	9.5 <sup>E</sup>	8.8 <sup>E</sup>	0.1 <sup>A</sup>	0.2 <sup>A</sup>	0.7 <sup>A</sup>
British Columbia	160.7 <sup>A</sup>	162.7 <sup>A</sup>	146.6 <sup>A</sup>	10.1 <sup>E</sup>	12.1 <sup>E</sup>	7.1 <sup>E</sup>	x	0.4 <sup>A</sup>	x
Yukon and Northwest Territories	F	F	F	x	x	x	x	x	x
	All other source water combinations			Total					
	2005	2006	2007	2005	2006	2007	2005	2006	2007
	millions of dollars								
<b>Canada <sup>2</sup></b>	<b>49.4<sup>D</sup></b>	<b>39.5<sup>C</sup></b>	<b>28.6<sup>B</sup></b>	<b>996.2<sup>A</sup></b>	<b>1,095.7<sup>A</sup></b>	<b>884.9<sup>A</sup></b>			
Newfoundland and Labrador	F	0.0...	0.0...	40.8 <sup>E</sup>	20.7 <sup>E</sup>	8.7 <sup>B</sup>			
Prince Edward Island	0.0...	0.0...	0.0...	x	x	x			
Nova Scotia	F	F	F	5.1 <sup>D</sup>	10.3 <sup>E</sup>	10.7 <sup>E</sup>			
New Brunswick	x	x	x	3.2 <sup>B</sup>	9.6 <sup>B</sup>	7.2 <sup>B</sup>			
Quebec	14.0 <sup>E</sup>	8.4 <sup>E</sup>	1.9 <sup>D</sup>	188.2 <sup>C</sup>	136.4 <sup>C</sup>	124.7 <sup>E</sup>			
Ontario	30.0 <sup>E</sup>	21.7 <sup>B</sup>	21.3 <sup>A</sup>	356.9 <sup>B</sup>	411.2 <sup>A</sup>	288.6 <sup>A</sup>			
Manitoba	x	x	x	96.0 <sup>A</sup>	109.7 <sup>A</sup>	84.0 <sup>A</sup>			
Saskatchewan	x	0.1 <sup>B</sup>	0.5 <sup>A</sup>	30.6 <sup>D</sup>	24.3 <sup>A</sup>	20.7 <sup>B</sup>			
Alberta	F	F	F	96.1 <sup>A</sup>	183.5 <sup>A</sup>	170.8 <sup>A</sup>			
British Columbia	x	7.3 <sup>E</sup>	F	172.1 <sup>A</sup>	182.5 <sup>A</sup>	158.6 <sup>A</sup>			
Yukon and Northwest Territories	x	x	x	F	F	F			

1. Represents sources having 90 to 100 % of the indicated water type.

2. Excludes Nunavut due to low response.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 10**  
**Total capital expenditures of drinking water plants, by main source water type and drainage region**

	Drainage region code	Surface water <sup>1</sup>			Groundwater <sup>1</sup>			Groundwater under the direct influence of surface water <sup>1</sup>		
		2005	2006	2007	2005	2006	2007	2005	2006	2007
	code	millions of dollars								
<b>Canada <sup>2</sup></b>	...	<b>821.2<sup>A</sup></b>	<b>930.1<sup>A</sup></b>	<b>740.2<sup>B</sup></b>	<b>111.8<sup>C</sup></b>	<b>112.1<sup>B</sup></b>	<b>103.6<sup>B</sup></b>	<b>13.8<sup>B</sup></b>	<b>14.0<sup>A</sup></b>	<b>12.4<sup>A</sup></b>
Pacific Coastal and Yukon <sup>3</sup>	101,105	137.9 <sup>A</sup>	137.5 <sup>A</sup>	108.4 <sup>A</sup>	F	F	3.3 <sup>E</sup>	x	x	x
Fraser–Lower Mainland <sup>4</sup>	102	x	7.6 <sup>A</sup>	25.0 <sup>A</sup>	1.4 <sup>E</sup>	x	0.9 <sup>E</sup>	x	x	x
Okanagan–Similkameen	103	F	10.4 <sup>D</sup>	3.5 <sup>B</sup>	0.0 <sup>A</sup>	F	F	0.0...	0.0...	0.0...
Columbia	104	6.4 <sup>E</sup>	4.4 <sup>E</sup>	F	0.9 <sup>D</sup>	F	F	0.0...	0.0...	0.0...
Peace–Athabasca and Lower Mackenzie	206,207	19.3 <sup>E</sup>	35.1 <sup>E</sup>	30.7 <sup>E</sup>	x	x	x	x	x	x
Missouri	309	x	x	x	x	x	x	0.0...	0.0...	0.0...
North Saskatchewan	410	18.5 <sup>A</sup>	75.8 <sup>A</sup>	82.8 <sup>A</sup>	F	0.6 <sup>D</sup>	4.1 <sup>E</sup>	x	x	x
South Saskatchewan	411	73.2 <sup>A</sup>	84.2 <sup>A</sup>	69.9 <sup>A</sup>	3.5 <sup>E</sup>	8.4 <sup>E</sup>	6.9 <sup>E</sup>	0.1 <sup>A</sup>	0.2 <sup>A</sup>	0.7 <sup>A</sup>
Assiniboine–Red	412	x	x	x	8.6 <sup>D</sup>	x	x	x	x	0.5 <sup>E</sup>
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	20.9 <sup>D</sup>	21.1 <sup>E</sup>	10.2 <sup>D</sup>	8.1 <sup>E</sup>	2.5 <sup>E</sup>	0.8 <sup>C</sup>	0.0...	0.0...	0.0...
Northern Quebec	418	F	F	F	F	x	x	0.0...	0.0...	0.0...
Great Lakes	519	210.4 <sup>B</sup>	274.8 <sup>A</sup>	180.9 <sup>A</sup>	40.7 <sup>C</sup>	51.6 <sup>C</sup>	43.3 <sup>B</sup>	8.7 <sup>C</sup>	6.9 <sup>A</sup>	7.4 <sup>A</sup>
Ottawa	520	36.1 <sup>D</sup>	38.2 <sup>C</sup>	F	2.3 <sup>D</sup>	4.9 <sup>E</sup>	3.6 <sup>B</sup>	0.0 <sup>A</sup>	x	x
St. Lawrence	521	144.3 <sup>C</sup>	88.5 <sup>C</sup>	48.9 <sup>B</sup>	24.2 <sup>E</sup>	14.3 <sup>D</sup>	19.1 <sup>E</sup>	3.0 <sup>D</sup>	2.1 <sup>D</sup>	1.4 <sup>E</sup>
North Shore–Gaspé	522	3.0 <sup>A</sup>	F	x	x	x	6.4 <sup>E</sup>	x	x	x
Saint John–St. Croix	523	x	0.3 <sup>A</sup>	0.7 <sup>A</sup>	x	x	0.5 <sup>E</sup>	0.6 <sup>A</sup>	0.6 <sup>A</sup>	1.4 <sup>A</sup>
Maritime Coastal	524	4.2 <sup>D</sup>	13.2 <sup>D</sup>	11.7 <sup>E</sup>	2.8 <sup>D</sup>	4.3 <sup>D</sup>	5.4 <sup>D</sup>	x	x	x
Newfoundland–Labrador	525	40.0 <sup>E</sup>	19.7 <sup>E</sup>	8.5 <sup>B</sup>	F	1.0 <sup>E</sup>	F	0.0...	0.0...	0.0...
	Drainage region code	All other source water combinations			Total					
		2005	2006	2007	2005	2006	2007			
	code	millions of dollars								
<b>Canada <sup>2</sup></b>	...	<b>49.4<sup>D</sup></b>	<b>39.5<sup>C</sup></b>	<b>28.6<sup>B</sup></b>	<b>996.2<sup>A</sup></b>	<b>1,095.7<sup>A</sup></b>	<b>884.9<sup>A</sup></b>			
Pacific Coastal and Yukon <sup>3</sup>	101,105	x	x	x	146.5 <sup>A</sup>	146.8 <sup>A</sup>	111.9 <sup>A</sup>			
Fraser–Lower Mainland <sup>4</sup>	102	F	F	0.1 <sup>A</sup>	3.5 <sup>C</sup>	13.3 <sup>D</sup>	26.2 <sup>A</sup>			
Okanagan–Similkameen	103	0.7 <sup>E</sup>	3.1 <sup>D</sup>	F	F	13.5 <sup>D</sup>	8.2 <sup>E</sup>			
Columbia	104	0.0...	0.0...	0.0...	7.3 <sup>E</sup>	6.5 <sup>E</sup>	9.6 <sup>E</sup>			
Peace–Athabasca and Lower Mackenzie	206,207	0.0...	0.0...	0.0...	19.4 <sup>E</sup>	36.0 <sup>E</sup>	30.8 <sup>E</sup>			
Missouri	309	0.0...	0.0...	0.0...	x	0.0 <sup>C</sup>	x			
North Saskatchewan	410	x	x	x	24.9 <sup>D</sup>	79.5 <sup>A</sup>	87.2 <sup>A</sup>			
South Saskatchewan	411	0.0...	0.0...	0.0...	76.9 <sup>A</sup>	92.8 <sup>A</sup>	77.4 <sup>A</sup>			
Assiniboine–Red	412	x	x	x	104.5 <sup>A</sup>	114.2 <sup>A</sup>	86.6 <sup>A</sup>			
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	0.0...	0.0...	0.0...	29.1 <sup>D</sup>	23.6 <sup>E</sup>	10.9 <sup>D</sup>			
Northern Quebec	418	0.0...	F	0.0...	F	9.5 <sup>E</sup>	F			
Great Lakes	519	30.0 <sup>E</sup>	21.7 <sup>B</sup>	21.3 <sup>A</sup>	289.8 <sup>B</sup>	354.9 <sup>A</sup>	252.9 <sup>A</sup>			
Ottawa	520	0.0...	F	0.0...	38.4 <sup>D</sup>	46.0 <sup>C</sup>	74.2 <sup>E</sup>			
St. Lawrence	521	1.4 <sup>E</sup>	2.2 <sup>E</sup>	1.4 <sup>E</sup>	172.9 <sup>C</sup>	107.1 <sup>C</sup>	70.8 <sup>B</sup>			
North Shore–Gaspé	522	x	x	x	16.9 <sup>D</sup>	11.0 <sup>E</sup>	8.6 <sup>E</sup>			
Saint John–St. Croix	523	x	x	x	1.4 <sup>A</sup>	1.2 <sup>A</sup>	x			
Maritime Coastal	524	x	x	x	7.0 <sup>D</sup>	19.2 <sup>D</sup>	17.4 <sup>D</sup>			
Newfoundland–Labrador	525	F	0.0...	0.0...	40.8 <sup>E</sup>	20.7 <sup>E</sup>	8.7 <sup>B</sup>			

1. Represents sources having 90 to 100 % of the indicated water type.

2. Excludes Arctic Coast–Islands and Keewatin–Southern Baffin Island due to low response.

3. Overestimated because some plants located here serve Fraser–Lower Mainland.

4. Underestimated because some of this region is served by plants located in Pacific Coastal.

**Note(s):** Data do not include costs associated with the distribution of treated water (see page 7 of the questionnaire). Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 11**  
**Operation and maintenance costs of drinking water plants, by province and territory**

	2005				
	Materials	Labour	Energy	Other	Total
	millions of dollars				
<b>Canada 1</b>	<b>183.6</b> A	<b>283.1</b> A	<b>185.4</b> A	<b>87.5</b> A	<b>739.6</b> A
Newfoundland and Labrador	3.7	5.2	3.8	1.6	14.2
Prince Edward Island	0.1	0.2	0.2	0.0	0.5
Nova Scotia	7.2	5.6	3.7	0.7	17.3
New Brunswick	2.7	4.3	2.6	1.8	11.3
Quebec	41.4	69.7	56.1	19.7	186.8
Ontario	61.3	101.9	74.0	35.2	272.4
Manitoba	9.0	10.2	4.7	3.5	27.4
Saskatchewan	14.1	24.1	8.9	6.2	53.3
Alberta	30.0	30.5	16.5	10.3	87.4
British Columbia	13.2	27.7	12.7	7.5	61.1
Yukon and Northwest Territories	0.9	3.7	2.3	F	7.9
	2006				
	Materials	Labour	Energy	Other	Total
	millions of dollars				
<b>Canada 1</b>	<b>186.8</b> A	<b>287.1</b> A	<b>190.5</b> A	<b>93.1</b> A	<b>757.5</b> A
Newfoundland and Labrador	4.2	4.8	4.0	2.1	15.1
Prince Edward Island	0.1	0.3	0.2	0.0	0.6
Nova Scotia	7.6	5.7	3.9	1.1	18.4
New Brunswick	2.8	4.4	2.6	1.7	11.5
Quebec	43.0	70.1	55.4	19.5	188.0
Ontario	62.5	107.3	75.4	39.2	284.4
Manitoba	9.9	10.3	5.1	3.3	28.5
Saskatchewan	14.7	18.8	9.6	7.7	50.8
Alberta	26.8	33.2	17.6	10.1	87.8
British Columbia	14.1	28.0	14.0	7.5	63.6
Yukon and Northwest Territories	1.0	4.0	2.8	F	8.7
	2007				
	Materials	Labour	Energy	Other	Total
	millions of dollars				
<b>Canada 1</b>	<b>197.9</b> A	<b>301.7</b> A	<b>199.3</b> A	<b>108.3</b> A	<b>807.2</b> A
Newfoundland and Labrador	4.5	5.1	4.2	2.1	16.0
Prince Edward Island	0.1	0.3	0.2	0.0	0.7
Nova Scotia	8.3	6.0	4.2	0.9	19.4
New Brunswick	3.1	4.8	2.9	1.7	12.4
Quebec	42.8	72.0	57.2	20.9	193.0
Ontario	62.9	111.1	79.6	50.7	304.3
Manitoba	10.0	11.0	5.2	3.6	29.9
Saskatchewan	16.1	20.9	9.8	7.3	54.1
Alberta	32.5	36.3	19.0	11.0	98.8
British Columbia	16.1	30.7	14.0	8.7	69.5
Yukon and Northwest Territories	1.3	3.5	3.0	F	9.1

1. Excludes Nunavut due to low response.

**Note(s):** Data do not include costs associated with the distribution of treated water (see page 7 of the questionnaire). Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 12**  
**Operation and maintenance costs of drinking water plants, by drainage region**

	Drainage region code	2005				Total
		Materials	Labour	Energy	Other	
	code	millions of dollars				
<b>Canada 1</b>	...	<b>183.6</b> A	<b>283.1</b> A	<b>185.4</b> A	<b>87.5</b> A	<b>739.6</b> A
Pacific Coastal and Yukon <sup>2</sup>	101,105	4.8 B	9.8 B	3.9 D	2.7 D	21.2 B
Fraser–Lower Mainland <sup>3</sup>	102	5.3 B	10.0 B	5.6 C	2.7 D	23.6 B
Okanagan–Similkameen	103	1.5 C	4.1 B	1.7 D	1.0 B	8.2 B
Columbia	104	1.3 E	3.5 C	1.4 D	0.6 D	6.7 D
Peace–Athabasca and Lower Mackenzie	206,207	7.7 C	10.6 A	5.7 B	2.5 E	26.5 B
Missouri	309	x	0.2 C	0.0 C	x	0.4 B
North Saskatchewan	410	12.6 B	16.6 E	3.5 B	0.9 D	33.5 C
South Saskatchewan	411	15.7 A	18.9 B	13.0 B	9.4 B	57.0 A
Assiniboine–Red	412	12.1 A	14.3 A	6.9 A	5.0 D	38.3 A
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	9.0 A	12.3 B	5.9 B	6.4 B	33.6 A
Northern Quebec	418	x	0.5 D	0.5 C	x	1.6 D
Great Lakes	519	51.4 A	86.8 A	64.6 A	30.4 A	233.2 A
Ottawa	520	12.8 C	16.4 A	11.4 A	4.6 E	45.3 B
St. Lawrence	521	31.6 A	57.3 A	46.5 A	14.0 C	149.5 A
North Shore–Gaspé	522	3.2 B	5.5 B	3.9 B	2.2 C	14.7 B
Saint John–St. Croix	523	1.1 B	2.0 B	1.3 B	0.7 E	5.0 C
Maritime Coastal	524	9.5 B	9.1 B	5.9 B	2.5 D	27.0 B
Newfoundland–Labrador	525	3.7 C	5.2 B	3.8 C	1.6 B	14.2 B
	Drainage region code	2006				Total
	code	millions of dollars				
<b>Canada 1</b>	...	<b>186.8</b> A	<b>287.1</b> A	<b>190.5</b> A	<b>93.1</b> A	<b>757.5</b> A
Pacific Coastal and Yukon <sup>2</sup>	101,105	5.2 B	10.2 B	4.1 C	2.3 D	21.8 B
Fraser–Lower Mainland <sup>3</sup>	102	5.6 B	9.6 B	6.2 C	3.0 C	24.3 B
Okanagan–Similkameen	103	1.7 D	4.7 B	1.9 D	1.1 B	9.4 B
Columbia	104	1.3 E	3.2 D	1.5 D	0.7 E	6.7 D
Peace–Athabasca and Lower Mackenzie	206,207	8.2 C	11.7 A	6.7 C	2.6 E	29.2 B
Missouri	309	0.1 D	0.2 C	0.0 C	0.0 C	0.4 B
North Saskatchewan	410	9.8 A	11.0 A	3.6 B	0.9 C	25.3 A
South Saskatchewan	411	15.1 A	20.8 B	14.1 A	9.2 B	59.1 A
Assiniboine–Red	412	13.2 A	14.9 A	7.3 A	5.1 C	40.6 A
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	9.5 A	12.8 A	6.3 B	6.7 B	35.3 A
Northern Quebec	418	0.5 C	0.7 B	0.8 A	0.3 A	2.3 A
Great Lakes	519	52.0 A	90.0 A	65.6 A	34.7 A	242.3 A
Ottawa	520	12.9 B	17.7 A	11.5 A	4.4 E	46.6 B
St. Lawrence	521	33.1 A	57.7 A	45.4 A	14.6 C	150.8 A
North Shore–Gaspé	522	3.3 B	5.8 A	4.2 B	1.9 C	15.2 B
Saint John–St. Croix	523	1.1 B	2.0 B	1.3 B	0.8 E	5.2 C
Maritime Coastal	524	10.0 B	9.3 B	6.1 B	2.7 D	28.1 B
Newfoundland–Labrador	525	4.2 B	4.8 B	4.0 C	2.1 A	15.1 B

See notes at the end of the table.



Table 12 – continued

## Operation and maintenance costs of drinking water plants, by drainage region

	Drainage region code	2007				Total
		Materials	Labour	Energy	Other	
		code				
		millions of dollars				
<b>Canada 1</b>	...	<b>197.9</b> A	<b>301.7</b> A	<b>199.3</b> A	<b>108.3</b> A	<b>807.2</b> A
Pacific Coastal and Yukon 2	101,105	6.3 C	11.3 B	3.8 C	2.3 D	23.7 B
Fraser–Lower Mainland 3	102	6.3 B	10.7 B	6.6 C	3.6 C	27.1 B
Okanagan–Similkameen	103	1.9 D	4.5 B	2.0 C	1.2 C	9.7 B
Columbia	104	1.2 E	3.8 E	1.6 D	1.0 E	7.5 D
Peace–Athabasca and Lower Mackenzie	206,207	10.4 B	11.7 A	7.0 B	3.4 E	32.5 A
Missouri	309	0.1 D	0.2 C	0.0 D	0.0 D	0.4 B
North Saskatchewan	410	12.3 B	12.4 A	3.8 B	1.4 D	29.9 B
South Saskatchewan	411	17.4 A	23.0 B	15.0 A	10.2 B	65.6 A
Assiniboine–Red Winnipeg, Lower	412	13.6 A	16.0 A	7.4 A	5.2 C	42.2 A
Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	9.6 A	13.7 A	6.8 B	6.7 C	36.8 A
Northern Quebec	418	0.7 D	0.7 D	0.9 A	0.4 C	2.7 C
Great Lakes	519	52.9 A	93.2 A	70.0 A	45.0 A	261.1 A
Ottawa	520	12.7 C	17.7 A	10.4 A	F	46.4 C
St. Lawrence	521	32.4 A	59.5 A	47.6 A	14.9 B	154.4 A
North Shore–Gaspé	522	3.7 C	6.2 A	4.3 B	2.0 C	16.1 A
Saint John–St. Croix	523	1.2 B	2.2 B	1.4 B	0.9 E	5.7 B
Maritime Coastal	524	10.8 B	9.7 B	6.5 B	2.5 D	29.5 B
Newfoundland–Labrador	525	4.5 B	5.1 B	4.2 B	2.1 A	16.0 B

1. Excludes Arctic Coast–Islands and Keewatin–Southern Baffin Island due to low response.

2. Overestimated because some plants located here serve Fraser–Lower Mainland.

3. Underestimated because some of this region is served by plants located in Pacific Coastal.

**Note(s):** Data do not include costs associated with the distribution of treated water (see page 7 of the questionnaire). Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 13**  
**Operation and maintenance costs of drinking water plants per treated surface water volume, by province and territory**

	2005				
	Materials	Labour	Energy	Other	Total
	dollars per thousand cubic metres				
<b>Canada 1</b>	<b>28.1<sup>A</sup></b>	<b>41.8<sup>A</sup></b>	<b>29.4<sup>A</sup></b>	<b>11.7<sup>B</sup></b>	<b>111.0<sup>A</sup></b>
Newfoundland and Labrador	23.9 <sup>C</sup>	33.8 <sup>B</sup>	22.7 <sup>B</sup>	10.9 <sup>C</sup>	91.3 <sup>B</sup>
Prince Edward Island	...	...	...	...	...
Nova Scotia	60.9 <sup>C</sup>	43.7 <sup>B</sup>	28.1 <sup>B</sup>	3.0 <sup>E</sup>	135.8 <sup>B</sup>
New Brunswick	20.4 <sup>A</sup>	31.0 <sup>A</sup>	18.2 <sup>A</sup>	15.3 <sup>E</sup>	84.9 <sup>A</sup>
Quebec	20.1 <sup>B</sup>	35.1 <sup>A</sup>	27.9 <sup>A</sup>	8.0 <sup>D</sup>	91.0 <sup>A</sup>
Ontario	25.8 <sup>A</sup>	45.5 <sup>A</sup>	37.7 <sup>A</sup>	13.3 <sup>A</sup>	122.2 <sup>A</sup>
Manitoba	68.0 <sup>B</sup>	68.4 <sup>B</sup>	34.7 <sup>C</sup>	23.5 <sup>B</sup>	194.5 <sup>B</sup>
Saskatchewan	94.2 <sup>A</sup>	110.8 <sup>A</sup>	56.9 <sup>A</sup>	41.6 <sup>C</sup>	303.5 <sup>A</sup>
Alberta	65.6 <sup>A</sup>	58.6 <sup>A</sup>	33.1 <sup>A</sup>	23.2 <sup>B</sup>	180.5 <sup>A</sup>
British Columbia	12.7 <sup>B</sup>	24.4 <sup>A</sup>	7.9 <sup>B</sup>	4.5 <sup>B</sup>	49.4 <sup>A</sup>
Yukon and Northwest Territories	85.6 <sup>E</sup>	401.9 <sup>D</sup>	239.4 <sup>E</sup>	F	832.4 <sup>D</sup>
	2006				
	Materials	Labour	Energy	Other	Total
	dollars per thousand cubic metres				
<b>Canada 1</b>	<b>29.0<sup>A</sup></b>	<b>44.6<sup>A</sup></b>	<b>30.7<sup>A</sup></b>	<b>13.1<sup>A</sup></b>	<b>117.4<sup>A</sup></b>
Newfoundland and Labrador	30.6 <sup>B</sup>	35.2 <sup>B</sup>	27.0 <sup>B</sup>	15.8 <sup>B</sup>	108.6 <sup>B</sup>
Prince Edward Island	...	...	...	...	...
Nova Scotia	66.9 <sup>C</sup>	46.8 <sup>B</sup>	31.5 <sup>B</sup>	8.1 <sup>E</sup>	153.2 <sup>B</sup>
New Brunswick	21.8 <sup>A</sup>	32.5 <sup>A</sup>	18.5 <sup>A</sup>	14.2 <sup>E</sup>	87.0 <sup>A</sup>
Quebec	21.7 <sup>A</sup>	37.6 <sup>A</sup>	28.9 <sup>A</sup>	8.3 <sup>D</sup>	96.5 <sup>A</sup>
Ontario	26.8 <sup>A</sup>	49.9 <sup>A</sup>	39.0 <sup>A</sup>	16.3 <sup>A</sup>	132.0 <sup>A</sup>
Manitoba	71.4 <sup>B</sup>	68.2 <sup>B</sup>	37.0 <sup>C</sup>	19.8 <sup>B</sup>	196.4 <sup>B</sup>
Saskatchewan	93.5 <sup>A</sup>	106.2 <sup>A</sup>	59.6 <sup>A</sup>	47.6 <sup>B</sup>	307.0 <sup>A</sup>
Alberta	56.2 <sup>A</sup>	60.8 <sup>A</sup>	34.1 <sup>A</sup>	20.8 <sup>B</sup>	171.9 <sup>A</sup>
British Columbia	13.2 <sup>B</sup>	24.9 <sup>A</sup>	9.0 <sup>B</sup>	5.0 <sup>A</sup>	52.1 <sup>A</sup>
Yukon and Northwest Territories	104.5 <sup>D</sup>	443.3 <sup>C</sup>	298.5 <sup>E</sup>	F	950.2 <sup>E</sup>
	2007				
	Materials	Labour	Energy	Other	Total
	dollars per thousand cubic metres				
<b>Canada 1</b>	<b>30.6<sup>A</sup></b>	<b>46.7<sup>A</sup></b>	<b>32.1<sup>A</sup></b>	<b>14.9<sup>B</sup></b>	<b>124.3<sup>A</sup></b>
Newfoundland and Labrador	33.1 <sup>B</sup>	37.1 <sup>B</sup>	28.2 <sup>B</sup>	15.8 <sup>B</sup>	114.2 <sup>B</sup>
Prince Edward Island	...	...	...	...	...
Nova Scotia	71.5 <sup>C</sup>	49.3 <sup>C</sup>	32.2 <sup>B</sup>	4.6 <sup>E</sup>	157.7 <sup>B</sup>
New Brunswick	25.0 <sup>A</sup>	35.5 <sup>A</sup>	21.6 <sup>A</sup>	14.8 <sup>E</sup>	97.0 <sup>A</sup>
Quebec	21.0 <sup>B</sup>	37.4 <sup>A</sup>	28.9 <sup>A</sup>	8.9 <sup>D</sup>	96.3 <sup>A</sup>
Ontario	26.3 <sup>A</sup>	52.0 <sup>A</sup>	41.0 <sup>A</sup>	19.8 <sup>A</sup>	139.1 <sup>A</sup>
Manitoba	74.4 <sup>A</sup>	73.5 <sup>B</sup>	39.1 <sup>C</sup>	23.6 <sup>B</sup>	210.6 <sup>B</sup>
Saskatchewan	100.0 <sup>A</sup>	120.4 <sup>A</sup>	60.9 <sup>A</sup>	45.3 <sup>C</sup>	326.6 <sup>A</sup>
Alberta	68.8 <sup>A</sup>	66.8 <sup>A</sup>	37.0 <sup>A</sup>	23.1 <sup>A</sup>	195.6 <sup>A</sup>
British Columbia	16.1 <sup>B</sup>	28.2 <sup>B</sup>	9.6 <sup>B</sup>	6.5 <sup>B</sup>	60.5 <sup>A</sup>
Yukon and Northwest Territories	155.1 <sup>E</sup>	436.5 <sup>B</sup>	373.3 <sup>D</sup>	F	1,144.0 <sup>C</sup>

1. Excludes Nunavut due to low response.

**Note(s):** Data do not include costs associated with the distribution of treated water (see page 7 of the questionnaire). Includes groundwater under the direct influence of surface water. Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

Table 14

## Operation and maintenance costs of drinking water plants per treated groundwater volume, by province and territory

	2005				
	Materials	Labour	Energy	Other	Total
	dollars per thousand cubic metres				
<b>Canada 1</b>	<b>68.1<sup>A</sup></b>	<b>118.7<sup>B</sup></b>	<b>59.9<sup>A</sup></b>	<b>47.0<sup>B</sup></b>	<b>293.7<sup>A</sup></b>
Newfoundland and Labrador	23.8 <sup>A</sup>	30.3 <sup>E</sup>	F	2.3 <sup>E</sup>	134.2 <sup>D</sup>
Prince Edward Island	8.4 <sup>A</sup>	23.4 <sup>A</sup>	17.9 <sup>A</sup>	1.6 <sup>A</sup>	51.4 <sup>A</sup>
Nova Scotia	103.4 <sup>D</sup>	111.5 <sup>E</sup>	78.9 <sup>D</sup>	F	331.8 <sup>E</sup>
New Brunswick	36.9 <sup>D</sup>	65.9 <sup>B</sup>	41.3 <sup>C</sup>	18.6 <sup>E</sup>	162.7 <sup>C</sup>
Quebec	47.5 <sup>B</sup>	66.0 <sup>A</sup>	57.0 <sup>A</sup>	40.8 <sup>C</sup>	211.3 <sup>A</sup>
Ontario	93.7 <sup>A</sup>	131.6 <sup>A</sup>	53.5 <sup>A</sup>	66.8 <sup>B</sup>	345.6 <sup>A</sup>
Manitoba	166.3 <sup>C</sup>	262.5 <sup>B</sup>	89.1 <sup>B</sup>	F	611.4 <sup>C</sup>
Saskatchewan	214.0 <sup>B</sup>	620.8 <sup>E</sup>	148.2 <sup>B</sup>	92.3 <sup>C</sup>	1,075.3 <sup>D</sup>
Alberta	111.2 <sup>B</sup>	259.6 <sup>B</sup>	115.5 <sup>B</sup>	26.7 <sup>D</sup>	513.1 <sup>B</sup>
British Columbia	27.1 <sup>C</sup>	69.1 <sup>B</sup>	50.7 <sup>A</sup>	30.9 <sup>C</sup>	177.9 <sup>B</sup>
Yukon and Northwest Territories	31.5 <sup>A</sup>	61.5 <sup>A</sup>	74.2 <sup>A</sup>	3.9 <sup>A</sup>	171.2 <sup>A</sup>
	2006				
	Materials	Labour	Energy	Other	Total
	dollars per thousand cubic metres				
<b>Canada 1</b>	<b>73.2<sup>A</sup></b>	<b>112.4<sup>A</sup></b>	<b>64.6<sup>A</sup></b>	<b>48.5<sup>A</sup></b>	<b>298.7<sup>A</sup></b>
Newfoundland and Labrador	26.6 <sup>B</sup>	35.0 <sup>E</sup>	83.9 <sup>E</sup>	F	149.6 <sup>D</sup>
Prince Edward Island	14.1 <sup>A</sup>	30.6 <sup>A</sup>	18.8 <sup>A</sup>	1.6 <sup>A</sup>	65.1 <sup>A</sup>
Nova Scotia	107.3 <sup>D</sup>	112.1 <sup>E</sup>	82.7 <sup>C</sup>	F	332.3 <sup>D</sup>
New Brunswick	42.4 <sup>C</sup>	72.7 <sup>B</sup>	42.9 <sup>C</sup>	21.2 <sup>E</sup>	179.3 <sup>C</sup>
Quebec	55.8 <sup>B</sup>	65.7 <sup>A</sup>	60.2 <sup>A</sup>	42.5 <sup>C</sup>	224.3 <sup>A</sup>
Ontario	99.9 <sup>A</sup>	138.6 <sup>A</sup>	63.1 <sup>A</sup>	67.4 <sup>B</sup>	368.9 <sup>A</sup>
Manitoba	171.3 <sup>C</sup>	230.3 <sup>B</sup>	82.3 <sup>B</sup>	92.4 <sup>E</sup>	576.3 <sup>C</sup>
Saskatchewan	219.3 <sup>B</sup>	350.4 <sup>B</sup>	149.3 <sup>B</sup>	121.3 <sup>B</sup>	840.4 <sup>B</sup>
Alberta	96.7 <sup>C</sup>	282.0 <sup>B</sup>	115.7 <sup>B</sup>	42.9 <sup>D</sup>	537.3 <sup>B</sup>
British Columbia	29.5 <sup>C</sup>	66.4 <sup>B</sup>	52.9 <sup>A</sup>	27.5 <sup>C</sup>	176.2 <sup>B</sup>
Yukon and Northwest Territories	35.2 <sup>A</sup>	62.6 <sup>A</sup>	72.0 <sup>A</sup>	3.6 <sup>A</sup>	173.4 <sup>A</sup>
	2007				
	Materials	Labour	Energy	Other	Total
	dollars per thousand cubic metres				
<b>Canada 1</b>	<b>75.2<sup>A</sup></b>	<b>113.7<sup>A</sup></b>	<b>64.7<sup>A</sup></b>	<b>56.9<sup>B</sup></b>	<b>310.5<sup>A</sup></b>
Newfoundland and Labrador	21.1 <sup>D</sup>	27.8 <sup>E</sup>	87.4 <sup>E</sup>	F	139.3 <sup>C</sup>
Prince Edward Island	14.2 <sup>A</sup>	31.6 <sup>A</sup>	20.1 <sup>A</sup>	1.7 <sup>A</sup>	67.5 <sup>A</sup>
Nova Scotia	108.5 <sup>D</sup>	93.1 <sup>E</sup>	81.9 <sup>D</sup>	F	321.0 <sup>D</sup>
New Brunswick	43.5 <sup>C</sup>	78.3 <sup>B</sup>	45.6 <sup>C</sup>	20.5 <sup>E</sup>	188.0 <sup>C</sup>
Quebec	53.1 <sup>B</sup>	65.9 <sup>A</sup>	61.4 <sup>A</sup>	41.2 <sup>C</sup>	221.6 <sup>A</sup>
Ontario	101.3 <sup>A</sup>	131.4 <sup>A</sup>	61.6 <sup>A</sup>	93.8 <sup>B</sup>	388.0 <sup>A</sup>
Manitoba	181.3 <sup>C</sup>	274.5 <sup>B</sup>	93.4 <sup>C</sup>	94.3 <sup>E</sup>	643.5 <sup>C</sup>
Saskatchewan	259.6 <sup>C</sup>	390.5 <sup>B</sup>	160.1 <sup>B</sup>	117.1 <sup>C</sup>	927.3 <sup>B</sup>
Alberta	105.1 <sup>B</sup>	290.6 <sup>B</sup>	116.6 <sup>A</sup>	38.9 <sup>D</sup>	551.3 <sup>B</sup>
British Columbia	31.0 <sup>D</sup>	72.7 <sup>B</sup>	50.9 <sup>A</sup>	28.9 <sup>C</sup>	183.5 <sup>B</sup>
Yukon and Northwest Territories	33.5 <sup>A</sup>	62.9 <sup>A</sup>	68.5 <sup>A</sup>	7.9 <sup>A</sup>	172.8 <sup>A</sup>

1. Excludes Nunavut due to low response.

**Note(s):** Data do not include costs associated with the distribution of treated water (see page 7 of the questionnaire). Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 15**  
**Operation and maintenance costs of drinking water plants per treated surface water volume, by drainage region**

Drainage region code	2005					
	Materials	Labour	Energy	Other	Total	
code	dollars per thousand cubic metres					
<b>Canada 1</b>	...	<b>28.1</b> A	<b>41.8</b> A	<b>29.4</b> A	<b>11.7</b> B	<b>111.0</b> A
Pacific Coastal and Yukon <sup>2</sup>	101,105	7.8 B	14.3 B	2.9 A	1.7 B	26.6 B
Fraser–Lower Mainland <sup>3</sup>	102	18.5 B	29.9 A	11.6 A	4.9 A	65.0 A
Okanagan–Similkameen	103	12.4 D	38.2 C	14.1 C	9.7 D	74.5 C
Columbia	104	30.8 E	66.9 D	27.2 E	10.6 E	135.4 D
Peace–Athabasca and Lower Mackenzie	206,207	169.7 B	220.8 B	116.4 C	53.1 E	560.0 B
Missouri	309	X	X	X	X	X
North Saskatchewan	410	76.7 B	59.5 A	15.5 A	4.0 E	155.6 A
South Saskatchewan	411	45.0 A	47.4 A	37.5 A	29.1 B	158.9 A
Assiniboine–Red	412	62.3 A	66.2 A	33.9 A	23.3 C	185.7 A
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	188.4 B	229.7 B	116.6 C	123.7 C	658.4 B
Northern Quebec	418	F	F	F	F	F
Great Lakes	519	23.5 A	43.7 A	36.8 A	12.6 A	116.6 A
Ottawa	520	34.1 D	38.6 B	30.6 B	F	115.8 D
St. Lawrence	521	18.4 A	34.9 A	28.3 A	7.2 C	88.8 A
North Shore–Gaspé	522	33.2 B	58.9 A	33.5 A	12.5 B	138.1 A
Saint John–St. Croix	523	35.2 A	61.8 A	32.3 A	13.2 A	142.5 A
Maritime Coastal	524	41.4 B	35.5 B	22.5 B	8.2 E	107.6 A
Newfoundland–Labrador	525	23.9 C	33.8 B	22.7 B	10.9 C	91.3 B

Drainage region code	2006					
	Materials	Labour	Energy	Other	Total	
code	dollars per thousand cubic metres					
<b>Canada 1</b>	...	<b>29.0</b> A	<b>44.6</b> A	<b>30.7</b> A	<b>13.1</b> A	<b>117.4</b> A
Pacific Coastal and Yukon <sup>2</sup>	101,105	8.1 B	14.4 B	3.3 B	1.7 B	27.4 B
Fraser–Lower Mainland <sup>3</sup>	102	19.7 A	29.2 A	13.9 A	7.3 A	70.1 A
Okanagan–Similkameen	103	13.1 D	43.9 C	15.9 C	10.2 D	83.1 B
Columbia	104	33.2 E	68.7 D	31.2 E	9.5 E	142.6 D
Peace–Athabasca and Lower Mackenzie	206,207	172.4 B	222.5 B	128.6 D	51.8 E	575.2 B
Missouri	309	X	X	X	X	X
North Saskatchewan	410	56.0 A	58.2 A	15.8 A	3.4 D	133.3 A
South Saskatchewan	411	42.4 A	50.5 A	38.8 A	26.2 B	158.0 A
Assiniboine–Red	412	64.1 A	66.4 A	35.4 A	21.9 D	187.9 A
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	189.9 B	234.6 B	123.7 C	132.1 C	680.3 B
Northern Quebec	418	343.5 E	443.4 E	346.6 A	F	1,164.6 D
Great Lakes	519	24.0 A	47.4 A	37.8 A	15.7 A	124.9 A
Ottawa	520	38.4 D	43.8 B	32.8 A	F	127.1 C
St. Lawrence	521	19.8 A	37.3 A	29.1 A	7.8 C	93.9 A
North Shore–Gaspé	522	35.6 B	64.5 A	38.8 A	13.7 C	152.6 A
Saint John–St. Croix	523	38.0 A	69.1 A	35.1 A	17.0 A	159.1 A
Maritime Coastal	524	45.3 B	37.6 B	24.3 B	10.1 D	117.4 A
Newfoundland–Labrador	525	30.6 B	35.2 B	27.0 B	15.8 B	108.6 B

See notes at the end of the table.

Table 15 – continued

## Operation and maintenance costs of drinking water plants per treated surface water volume, by drainage region

Drainage region code	2007					Total
	Materials	Labour	Energy	Other		
code	dollars per thousand cubic metres					
<b>Canada 1</b>	...	<b>30.6</b> A	<b>46.7</b> A	<b>32.1</b> A	<b>14.9</b> B	<b>124.3</b> A
Pacific Coastal and Yukon 2	101,105	12.5 C	19.9 C	3.2 B	2.3 E	37.9 C
Fraser–Lower Mainland 3	102	19.2 A	28.3 A	12.9 A	8.1 A	68.4 A
Okanagan–Similkameen	103	13.8 D	40.1 D	16.4 C	11.6 D	81.9 C
Columbia	104	28.2 D	68.9 D	34.2 E	14.6 E	146.0 D
Peace–Athabasca and Lower Mackenzie	206,207	219.4 B	218.1 A	138.2 B	68.2 E	643.9 A
Missouri	309	X	X	X	X	X
North Saskatchewan	410	70.0 A	65.6 A	16.7 A	3.3 D	155.6 A
South Saskatchewan	411	48.3 A	57.2 A	41.5 A	29.9 B	177.0 A
Assiniboine–Red	412	69.6 A	71.8 A	36.2 A	24.0 C	201.6 A
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	189.7 B	251.6 B	132.6 C	135.0 D	708.9 B
Northern Quebec	418	321.8 E	F	219.0 E	F	851.1 E
Great Lakes	519	23.6 A	49.2 A	40.1 A	18.8 A	131.8 A
Ottawa	520	36.7 D	42.1 C	28.2 C	F	122.8 D
St. Lawrence	521	18.9 A	37.5 A	29.7 A	7.9 C	94.1 A
North Shore–Gaspé	522	38.7 C	68.9 A	39.3 A	14.6 B	161.4 A
Saint John–St. Croix	523	43.2 A	74.9 A	39.9 A	18.1 A	176.1 A
Maritime Coastal	524	49.2 B	40.1 B	26.0 B	8.4 E	123.8 B
Newfoundland–Labrador	525	33.1 B	37.1 B	28.2 B	15.8 B	114.2 B

1. Excludes Arctic Coast–Islands and Keewatin–Southern Baffin Island due to low response.

2. Some plants located here serve Fraser–Lower Mainland.

3. Some of the region is served by plants located in Pacific Coastal.

**Note(s):** Data do not include costs associated with the distribution of treated water (see page 7 of the questionnaire). Includes groundwater under the direct influence of surface water. Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 16**  
**Operation and maintenance costs of drinking water plants per treated groundwater volume, by drainage region**

	Drainage region code	2005				Total
		Materials	Labour	Energy	Other	
		dollars per thousand cubic metres				
<b>Canada 1</b>	...	<b>68.1<sup>A</sup></b>	<b>118.7<sup>B</sup></b>	<b>59.9<sup>A</sup></b>	<b>47.0<sup>B</sup></b>	<b>293.7<sup>A</sup></b>
Pacific Coastal and Yukon <sup>2</sup>	101,105	31.2 <sup>B</sup>	76.1 <sup>C</sup>	54.6 <sup>B</sup>	40.7 <sup>B</sup>	202.6 <sup>B</sup>
Fraser–Lower Mainland <sup>3</sup>	102	29.4 <sup>D</sup>	71.8 <sup>D</sup>	58.7 <sup>A</sup>	30.7 <sup>D</sup>	190.7 <sup>C</sup>
Okanagan–Similkameen	103	26.5 <sup>E</sup>	44.8 <sup>B</sup>	34.3 <sup>B</sup>	F	115.2 <sup>B</sup>
Columbia	104	9.9 <sup>D</sup>	61.3 <sup>B</sup>	23.2 <sup>C</sup>	11.9 <sup>C</sup>	106.3 <sup>B</sup>
Peace–Athabasca and Lower Mackenzie	206,207	52.2 <sup>B</sup>	137.7 <sup>A</sup>	90.9 <sup>A</sup>	32.2 <sup>C</sup>	313.0 <sup>A</sup>
Missouri	309	146.9 <sup>C</sup>	581.8 <sup>C</sup>	96.9 <sup>D</sup>	89.8 <sup>C</sup>	915.4 <sup>A</sup>
North Saskatchewan	410	233.6 <sup>D</sup>	F	172.9 <sup>C</sup>	42.4 <sup>C</sup>	1,573.7 <sup>E</sup>
South Saskatchewan	411	134.6 <sup>C</sup>	278.6 <sup>B</sup>	112.1 <sup>B</sup>	45.9 <sup>E</sup>	571.3 <sup>B</sup>
Assiniboine–Red	412	175.0 <sup>B</sup>	260.3 <sup>B</sup>	113.7 <sup>B</sup>	90.8 <sup>E</sup>	639.8 <sup>B</sup>
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	145.7 <sup>C</sup>	293.0 <sup>B</sup>	115.7 <sup>B</sup>	134.9 <sup>E</sup>	689.2 <sup>B</sup>
Northern Quebec	418	44.0 <sup>E</sup>	58.0 <sup>D</sup>	48.3 <sup>C</sup>	18.3 <sup>D</sup>	168.5 <sup>D</sup>
Great Lakes	519	88.9 <sup>A</sup>	115.8 <sup>A</sup>	49.8 <sup>A</sup>	64.0 <sup>B</sup>	318.4 <sup>A</sup>
Ottawa	520	96.7 <sup>D</sup>	221.5 <sup>C</sup>	82.0 <sup>B</sup>	34.4 <sup>B</sup>	434.6 <sup>B</sup>
St. Lawrence	521	52.4 <sup>B</sup>	69.8 <sup>B</sup>	56.5 <sup>B</sup>	39.1 <sup>D</sup>	217.8 <sup>B</sup>
North Shore–Gaspé	522	29.6 <sup>C</sup>	45.9 <sup>C</sup>	49.5 <sup>C</sup>	40.5 <sup>D</sup>	165.5 <sup>C</sup>
Saint John–St. Croix	523	30.7 <sup>C</sup>	58.6 <sup>B</sup>	43.0 <sup>C</sup>	27.7 <sup>E</sup>	160.1 <sup>C</sup>
Maritime Coastal	524	61.2 <sup>C</sup>	83.8 <sup>D</sup>	56.4 <sup>C</sup>	31.3 <sup>E</sup>	232.7 <sup>C</sup>
Newfoundland–Labrador	525	23.8 <sup>A</sup>	30.3 <sup>E</sup>	F	2.3 <sup>E</sup>	134.2 <sup>D</sup>

	Drainage region code	2006				Total
		Materials	Labour	Energy	Other	
		dollars per thousand cubic metres				
<b>Canada 1</b>	...	<b>73.2<sup>A</sup></b>	<b>112.4<sup>A</sup></b>	<b>64.6<sup>A</sup></b>	<b>48.5<sup>A</sup></b>	<b>298.7<sup>A</sup></b>
Pacific Coastal and Yukon <sup>2</sup>	101,105	35.0 <sup>C</sup>	79.7 <sup>C</sup>	55.0 <sup>A</sup>	32.8 <sup>B</sup>	202.6 <sup>B</sup>
Fraser–Lower Mainland <sup>3</sup>	102	27.5 <sup>D</sup>	61.2 <sup>C</sup>	55.1 <sup>B</sup>	24.7 <sup>D</sup>	168.4 <sup>C</sup>
Okanagan–Similkameen	103	41.2 <sup>E</sup>	52.9 <sup>C</sup>	37.1 <sup>B</sup>	F	139.7 <sup>D</sup>
Columbia	104	10.4 <sup>E</sup>	60.8 <sup>C</sup>	36.4 <sup>D</sup>	28.5 <sup>C</sup>	136.2 <sup>B</sup>
Peace–Athabasca and Lower Mackenzie	206,207	56.3 <sup>A</sup>	190.3 <sup>B</sup>	102.4 <sup>A</sup>	35.2 <sup>B</sup>	384.3 <sup>A</sup>
Missouri	309	113.8 <sup>D</sup>	578.6 <sup>B</sup>	88.9 <sup>D</sup>	126.5 <sup>D</sup>	907.7 <sup>A</sup>
North Saskatchewan	410	196.0 <sup>C</sup>	309.1 <sup>C</sup>	159.1 <sup>C</sup>	52.9 <sup>D</sup>	717.2 <sup>C</sup>
South Saskatchewan	411	108.3 <sup>D</sup>	286.9 <sup>C</sup>	114.9 <sup>C</sup>	59.3 <sup>D</sup>	569.4 <sup>B</sup>
Assiniboine–Red	412	194.8 <sup>B</sup>	259.1 <sup>B</sup>	108.6 <sup>B</sup>	92.7 <sup>E</sup>	655.1 <sup>B</sup>
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	178.5 <sup>B</sup>	317.0 <sup>B</sup>	127.8 <sup>B</sup>	130.0 <sup>C</sup>	753.3 <sup>A</sup>
Northern Quebec	418	27.8 <sup>C</sup>	39.4 <sup>B</sup>	50.6 <sup>A</sup>	23.5 <sup>A</sup>	141.3 <sup>B</sup>
Great Lakes	519	96.2 <sup>A</sup>	118.5 <sup>A</sup>	58.7 <sup>A</sup>	67.3 <sup>B</sup>	340.7 <sup>A</sup>
Ottawa	520	68.9 <sup>D</sup>	246.2 <sup>C</sup>	88.1 <sup>B</sup>	41.6 <sup>B</sup>	444.9 <sup>B</sup>
St. Lawrence	521	69.6 <sup>C</sup>	74.0 <sup>B</sup>	61.8 <sup>B</sup>	44.7 <sup>D</sup>	250.2 <sup>B</sup>
North Shore–Gaspé	522	28.9 <sup>C</sup>	46.4 <sup>B</sup>	50.5 <sup>C</sup>	32.6 <sup>D</sup>	158.3 <sup>C</sup>
Saint John–St. Croix	523	34.3 <sup>C</sup>	60.1 <sup>B</sup>	44.0 <sup>C</sup>	F	169.1 <sup>C</sup>
Maritime Coastal	524	68.5 <sup>C</sup>	88.1 <sup>C</sup>	59.0 <sup>B</sup>	30.4 <sup>E</sup>	246.0 <sup>C</sup>
Newfoundland–Labrador	525	26.6 <sup>B</sup>	35.0 <sup>E</sup>	83.9 <sup>E</sup>	F	149.6 <sup>D</sup>

See notes at the end of the table.

Table 16 – continued

## Operation and maintenance costs of drinking water plants per treated groundwater volume, by drainage region

Drainage region code	2007					
	Materials	Labour	Energy	Other	Total	
	dollars per thousand cubic metres					
<b>Canada 1</b>	...	<b>75.2<sup>A</sup></b>	<b>113.7<sup>A</sup></b>	<b>64.7<sup>A</sup></b>	<b>56.9<sup>B</sup></b>	<b>310.5<sup>A</sup></b>
Pacific Coastal and Yukon 2	101,105	35.3 <sup>D</sup>	80.7 <sup>C</sup>	53.7 <sup>A</sup>	30.9 <sup>B</sup>	200.6 <sup>B</sup>
Fraser–Lower Mainland 3	102	27.7 <sup>E</sup>	63.6 <sup>C</sup>	56.1 <sup>A</sup>	26.4 <sup>D</sup>	173.8 <sup>C</sup>
Okanagan–Similkameen	103	45.3 <sup>E</sup>	51.2 <sup>C</sup>	35.9 <sup>B</sup>	F	140.5 <sup>D</sup>
Columbia	104	16.7 <sup>E</sup>	119.1 <sup>C</sup>	31.2 <sup>C</sup>	42.4 <sup>D</sup>	209.4 <sup>C</sup>
Peace–Athabasca and Lower Mackenzie	206,207	60.9 <sup>A</sup>	209.7 <sup>B</sup>	82.4 <sup>A</sup>	37.1 <sup>B</sup>	390.0 <sup>B</sup>
Missouri	309	120.8 <sup>D</sup>	609.2 <sup>B</sup>	106.3 <sup>D</sup>	95.8 <sup>E</sup>	932.1 <sup>A</sup>
North Saskatchewan	410	288.4 <sup>E</sup>	380.0 <sup>C</sup>	176.8 <sup>C</sup>	123.6 <sup>E</sup>	968.9 <sup>D</sup>
South Saskatchewan	411	129.7 <sup>B</sup>	282.4 <sup>C</sup>	113.9 <sup>B</sup>	48.8 <sup>D</sup>	574.7 <sup>B</sup>
Assiniboine–Red	412	188.6 <sup>C</sup>	294.2 <sup>B</sup>	116.8 <sup>C</sup>	90.2 <sup>E</sup>	689.8 <sup>B</sup>
Winnipeg, Lower Saskatchewan–Nelson, Churchill and Northern Ontario	413,414,415,417	200.7 <sup>B</sup>	354.4 <sup>B</sup>	144.5 <sup>B</sup>	129.7 <sup>D</sup>	829.3 <sup>B</sup>
Northern Quebec	418	24.6 <sup>A</sup>	35.1 <sup>A</sup>	47.3 <sup>A</sup>	21.6 <sup>A</sup>	128.5 <sup>A</sup>
Great Lakes	519	97.7 <sup>A</sup>	109.2 <sup>A</sup>	56.5 <sup>A</sup>	93.5 <sup>B</sup>	356.8 <sup>A</sup>
Ottawa	520	68.9 <sup>D</sup>	264.1 <sup>C</sup>	94.1 <sup>A</sup>	41.3 <sup>B</sup>	468.3 <sup>B</sup>
St. Lawrence	521	65.3 <sup>B</sup>	75.2 <sup>B</sup>	63.9 <sup>B</sup>	42.5 <sup>D</sup>	246.9 <sup>B</sup>
North Shore–Gaspé	522	32.1 <sup>C</sup>	45.3 <sup>B</sup>	49.8 <sup>C</sup>	31.4 <sup>D</sup>	158.7 <sup>B</sup>
Saint John–St. Croix	523	33.3 <sup>C</sup>	64.7 <sup>B</sup>	48.0 <sup>C</sup>	34.1 <sup>E</sup>	180.1 <sup>C</sup>
Maritime Coastal	524	67.7 <sup>C</sup>	83.7 <sup>D</sup>	61.0 <sup>C</sup>	30.3 <sup>E</sup>	242.7 <sup>C</sup>
Newfoundland–Labrador	525	21.1 <sup>D</sup>	27.8 <sup>E</sup>	87.4 <sup>E</sup>	F	139.3 <sup>C</sup>

1. Excludes Arctic Coast–Islands and Keewatin–Southern Baffin Island due to low response.

2. Some plants located here serve Fraser–Lower Mainland.

3. Some of the region is served by plants located in Pacific Coastal.

**Note(s):** Data do not include costs associated with the distribution of treated water (see page 7 of the questionnaire). Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

Table 17

## Percentage of drinking water plants by source water taste or odour issue and province and territory

	Taste or odour					
	Source water issue for facility 1			Processes installed or adjusted to address it 2		
	2005	2006	2007	2005	2006	2007
	percentage of plants					
<b>Canada 3</b>	<b>19.6<sup>A</sup></b>	<b>18.9<sup>A</sup></b>	<b>19.3<sup>A</sup></b>	<b>11.0<sup>B</sup></b>	<b>11.4<sup>B</sup></b>	<b>11.7<sup>A</sup></b>
Newfoundland and Labrador	27.3 <sup>E</sup>	23.7 <sup>E</sup>	29.6 <sup>E</sup>	F	F	F
Prince Edward Island	0.0...	0.0...	0.0...	0.0...	0.0...	0.0...
Nova Scotia	17.1 <sup>E</sup>	17.1 <sup>E</sup>	17.1 <sup>E</sup>	F	F	F
New Brunswick	0.0...	0.0...	5.0 <sup>A</sup>	0.0...	5.7 <sup>E</sup>	F
Quebec	15.0 <sup>B</sup>	15.1 <sup>B</sup>	15.4 <sup>B</sup>	7.5 <sup>C</sup>	8.0 <sup>C</sup>	8.3 <sup>B</sup>
Ontario	19.5 <sup>B</sup>	19.5 <sup>B</sup>	18.2 <sup>B</sup>	11.0 <sup>B</sup>	11.8 <sup>B</sup>	12.6 <sup>B</sup>
Manitoba	43.7 <sup>C</sup>	42.3 <sup>C</sup>	42.3 <sup>C</sup>	32.4 <sup>C</sup>	31.6 <sup>C</sup>	30.0 <sup>D</sup>
Saskatchewan	27.8 <sup>C</sup>	27.7 <sup>C</sup>	27.5 <sup>C</sup>	20.7 <sup>B</sup>	22.1 <sup>B</sup>	22.8 <sup>B</sup>
Alberta	27.7 <sup>B</sup>	23.8 <sup>B</sup>	21.1 <sup>B</sup>	21.9 <sup>B</sup>	21.7 <sup>B</sup>	22.6 <sup>B</sup>
British Columbia	12.7 <sup>C</sup>	12.7 <sup>C</sup>	13.9 <sup>C</sup>	5.3 <sup>E</sup>	5.3 <sup>E</sup>	5.7 <sup>E</sup>
Yukon and Northwest Territories	0.0...	0.0...	0.0...	0.0...	0.0...	0.0...

1. The question asked was: "Has taste and/or odour been identified as a source/raw water issue for this facility?"

2. The question asked was: "Were facility processes installed or specifically adjusted at least twice in each year to address taste and/or odour?"

3. Excludes Nunavut due to low response.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 18**  
**Percentage of drinking water plants by source water blue-green algae issue and province and territory**

	Blue-green algae					
	Source water issue for facility <sup>1</sup>			Processes installed or adjusted to address it <sup>2</sup>		
	2005	2006	2007	2005	2006	2007
	percentage of plants					
<b>Canada <sup>3</sup></b>	<b>3.9<sup>B</sup></b>	<b>4.0<sup>B</sup></b>	<b>4.7<sup>B</sup></b>	<b>2.0<sup>B</sup></b>	<b>2.1<sup>B</sup></b>	<b>2.6<sup>B</sup></b>
Newfoundland and Labrador	F	F	F	0.0...	0.0...	0.0...
Prince Edward Island	0.0...	0.0...	0.0...	0.0...	0.0...	0.0...
Nova Scotia	0.0...	0.0...	0.0...	0.0...	0.0...	0.0...
New Brunswick	0.0...	0.0...	5.0 <sup>A</sup>	0.0...	0.0...	0.0...
Quebec	1.3 <sup>D</sup>	1.9 <sup>D</sup>	3.7 <sup>C</sup>	0.7 <sup>E</sup>	1.0 <sup>E</sup>	2.4 <sup>D</sup>
Ontario	4.6 <sup>C</sup>	4.8 <sup>B</sup>	5.1 <sup>B</sup>	3.2 <sup>C</sup>	3.1 <sup>C</sup>	3.6 <sup>C</sup>
Manitoba	6.2 <sup>E</sup>	6.2 <sup>E</sup>	6.2 <sup>E</sup>	6.0 <sup>E</sup>	6.0 <sup>E</sup>	6.0 <sup>E</sup>
Saskatchewan	8.5 <sup>C</sup>	8.5 <sup>C</sup>	7.6 <sup>C</sup>	7.1 <sup>C</sup>	7.1 <sup>C</sup>	6.5 <sup>C</sup>
Alberta	5.4 <sup>E</sup>	4.3 <sup>E</sup>	4.4 <sup>E</sup>	1.8 <sup>D</sup>	1.8 <sup>D</sup>	1.8 <sup>D</sup>
British Columbia	7.4 <sup>C</sup>	7.4 <sup>C</sup>	6.9 <sup>C</sup>	F	F	F
Yukon and Northwest Territories	0.0...	0.0...	0.0...	0.0...	0.0...	0.0...

1. The question asked was: "Has blue-green algae been identified as a source/raw water issue for this facility?"

2. The question asked was: "Were facility processes installed or specifically adjusted at least weekly for at least two months in each year, due to blue-green algae?"

3. Excludes Nunavut due to low response.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).



**Table 19**  
**Operation and maintenance costs of drinking water plants per treated water volume, by treatment category**

Treatment category <sup>1</sup>	2005				
	Materials	Labour	Energy	Other	Total
	dollars per thousand cubic metres				
<b>Canada<sup>2</sup></b>	<b>32.2<sup>A</sup></b>	<b>49.6<sup>A</sup></b>	<b>32.5<sup>A</sup></b>	<b>15.3<sup>A</sup></b>	<b>129.6<sup>A</sup></b>
Conventional treatment	39.8 <sup>A</sup>	53.8 <sup>A</sup>	36.1 <sup>A</sup>	15.3 <sup>B</sup>	145.0 <sup>A</sup>
Direct filtration	29.0 <sup>B</sup>	48.2 <sup>A</sup>	35.7 <sup>A</sup>	14.6 <sup>B</sup>	127.4 <sup>A</sup>
Granular media filtration	10.8 <sup>B</sup>	38.3 <sup>D</sup>	28.4 <sup>A</sup>	4.6 <sup>B</sup>	82.2 <sup>B</sup>
Cartridge or bag filter	121.7 <sup>E</sup>	F	F	F	F
Slow sand filtration	25.5 <sup>C</sup>	34.1 <sup>D</sup>	21.4 <sup>B</sup>	4.4 <sup>E</sup>	85.5 <sup>C</sup>
Granular media and slow sand filtration	108.9 <sup>D</sup>	137.1 <sup>C</sup>	82.1 <sup>D</sup>	36.0 <sup>E</sup>	364.1 <sup>D</sup>
Granular media filtration and cartridge or bag	x	x	x	x	x
Membrane filtration	57.4 <sup>D</sup>	79.5 <sup>C</sup>	50.0 <sup>C</sup>	31.8 <sup>D</sup>	218.8 <sup>C</sup>
Membrane filtration and granular media	12.4 <sup>D</sup>	17.1 <sup>C</sup>	37.5 <sup>A</sup>	31.0 <sup>C</sup>	98.0 <sup>B</sup>
Membrane filtration with cartridge or bag or slow sand	35.7 <sup>D</sup>	56.9 <sup>C</sup>	30.9 <sup>D</sup>	11.0 <sup>C</sup>	134.4 <sup>C</sup>
Disinfection only	23.8 <sup>B</sup>	50.7 <sup>B</sup>	25.1 <sup>A</sup>	10.3 <sup>B</sup>	109.9 <sup>A</sup>
Disinfection and other (unfiltered systems)	33.6 <sup>A</sup>	43.8 <sup>A</sup>	20.0 <sup>A</sup>	21.1 <sup>B</sup>	118.5 <sup>A</sup>
No treatment	28.8 <sup>A</sup>	56.9 <sup>A</sup>	57.7 <sup>A</sup>	44.8 <sup>B</sup>	188.2 <sup>A</sup>
No disinfection with other treatment	39.1 <sup>B</sup>	53.6 <sup>C</sup>	58.8 <sup>B</sup>	21.7 <sup>D</sup>	173.1 <sup>B</sup>
Treatment category <sup>1</sup>	2006				
	Materials	Labour	Energy	Other	Total
	dollars per thousand cubic metres				
<b>Canada<sup>2</sup></b>	<b>33.6<sup>A</sup></b>	<b>51.6<sup>A</sup></b>	<b>34.3<sup>A</sup></b>	<b>16.7<sup>A</sup></b>	<b>136.2<sup>A</sup></b>
Conventional treatment	40.8 <sup>A</sup>	57.7 <sup>A</sup>	37.7 <sup>A</sup>	16.5 <sup>B</sup>	152.7 <sup>A</sup>
Direct filtration	28.3 <sup>A</sup>	50.2 <sup>A</sup>	37.2 <sup>A</sup>	18.8 <sup>B</sup>	134.5 <sup>A</sup>
Granular media filtration	11.3 <sup>B</sup>	32.0 <sup>A</sup>	29.4 <sup>A</sup>	5.5 <sup>B</sup>	78.2 <sup>A</sup>
Cartridge or bag filter	119.4 <sup>E</sup>	F	F	F	F
Slow sand filtration	28.1 <sup>B</sup>	39.0 <sup>D</sup>	22.8 <sup>B</sup>	6.2 <sup>E</sup>	96.0 <sup>C</sup>
Granular media and slow sand filtration	178.6 <sup>E</sup>	151.7 <sup>D</sup>	95.6 <sup>D</sup>	28.6 <sup>D</sup>	454.5 <sup>D</sup>
Granular media filtration and cartridge or bag	x	x	x	x	x
Membrane filtration	74.6 <sup>B</sup>	93.2 <sup>A</sup>	59.1 <sup>A</sup>	43.7 <sup>C</sup>	270.7 <sup>B</sup>
Membrane filtration and granular media	14.2 <sup>D</sup>	21.0 <sup>C</sup>	38.6 <sup>A</sup>	28.7 <sup>C</sup>	102.6 <sup>B</sup>
Membrane filtration with cartridge or bag or slow sand	36.4 <sup>C</sup>	63.8 <sup>B</sup>	31.2 <sup>D</sup>	11.0 <sup>B</sup>	142.4 <sup>C</sup>
Disinfection only	22.7 <sup>B</sup>	52.5 <sup>B</sup>	26.4 <sup>A</sup>	12.2 <sup>B</sup>	113.8 <sup>A</sup>
Disinfection and other (unfiltered systems)	37.3 <sup>A</sup>	45.6 <sup>A</sup>	22.7 <sup>A</sup>	22.0 <sup>B</sup>	127.6 <sup>A</sup>
No treatment	29.5 <sup>B</sup>	52.2 <sup>A</sup>	56.0 <sup>A</sup>	34.8 <sup>B</sup>	172.6 <sup>A</sup>
No disinfection with other treatment	48.3 <sup>B</sup>	59.0 <sup>C</sup>	62.7 <sup>B</sup>	21.8 <sup>D</sup>	191.8 <sup>B</sup>
Treatment category <sup>1</sup>	2007				
	Materials	Labour	Energy	Other	Total
	dollars per thousand cubic metres				
<b>Canada<sup>2</sup></b>	<b>35.2<sup>A</sup></b>	<b>53.7<sup>A</sup></b>	<b>35.5<sup>A</sup></b>	<b>19.3<sup>A</sup></b>	<b>143.7<sup>A</sup></b>
Conventional treatment	43.2 <sup>A</sup>	60.4 <sup>A</sup>	38.8 <sup>A</sup>	18.9 <sup>B</sup>	161.3 <sup>A</sup>
Direct filtration	28.8 <sup>A</sup>	52.6 <sup>A</sup>	38.3 <sup>A</sup>	18.9 <sup>B</sup>	138.6 <sup>A</sup>
Granular media filtration	11.5 <sup>B</sup>	32.7 <sup>A</sup>	29.0 <sup>A</sup>	5.9 <sup>B</sup>	79.2 <sup>A</sup>
Cartridge or bag filter	158.5 <sup>E</sup>	F	F	F	537.5 <sup>E</sup>
Slow sand filtration	27.2 <sup>B</sup>	36.6 <sup>D</sup>	25.6 <sup>B</sup>	12.6 <sup>E</sup>	102.1 <sup>D</sup>
Granular media and slow sand filtration	146.4 <sup>E</sup>	169.0 <sup>D</sup>	103.7 <sup>E</sup>	30.9 <sup>E</sup>	450.0 <sup>D</sup>
Granular media filtration and cartridge or bag	x	x	x	x	x
Membrane filtration	76.0 <sup>B</sup>	100.7 <sup>A</sup>	74.5 <sup>A</sup>	63.5 <sup>C</sup>	314.7 <sup>B</sup>
Membrane filtration and granular media	11.9 <sup>D</sup>	18.7 <sup>C</sup>	41.4 <sup>A</sup>	27.3 <sup>C</sup>	99.3 <sup>B</sup>
Membrane filtration with cartridge or bag or slow sand	50.9 <sup>D</sup>	75.8 <sup>B</sup>	35.4 <sup>D</sup>	17.3 <sup>B</sup>	179.4 <sup>C</sup>
Disinfection only	27.6 <sup>B</sup>	62.7 <sup>B</sup>	31.7 <sup>A</sup>	12.3 <sup>B</sup>	134.3 <sup>A</sup>
Disinfection and other (unfiltered systems)	36.3 <sup>B</sup>	42.3 <sup>A</sup>	21.2 <sup>A</sup>	27.8 <sup>B</sup>	127.6 <sup>A</sup>
No treatment	28.2 <sup>B</sup>	50.7 <sup>A</sup>	55.0 <sup>A</sup>	35.8 <sup>B</sup>	169.7 <sup>A</sup>
No disinfection with other treatment	47.3 <sup>B</sup>	62.1 <sup>C</sup>	64.2 <sup>B</sup>	23.9 <sup>D</sup>	197.5 <sup>B</sup>

1. Plants were assigned to a category based on the reported treatment processes in section 4 of the questionnaire. Refer to Appendix I for the main processes applied in each treatment category.

2. Excludes Nunavut due to low response.

**Note(s):** Data do not include costs associated with the distribution of treated water (see page 7 of the questionnaire). Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

**Table 20**  
**Number of drinking water plants, population served, treated water volume and operation and maintenance costs by treatment category**

	Drinking water plants <sup>1</sup>	Population served			Treated water volume			Operation and maintenance costs <sup>2</sup>		
	2005 to 2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
	number	persons			millions of cubic metres			millions of dollars		
Treatment category <sup>3</sup>										
<b>Canada <sup>4</sup></b>	<b>2,158<sup>A</sup></b>	<b>27,197,110<sup>A</sup></b>	<b>27,452,621<sup>A</sup></b>	<b>27,856,304<sup>A</sup></b>	<b>5,706.2<sup>A</sup></b>	<b>5,561.1<sup>A</sup></b>	<b>5,616.8<sup>A</sup></b>	<b>739.6<sup>A</sup></b>	<b>757.5<sup>A</sup></b>	<b>807.2<sup>A</sup></b>
Conventional treatment	471 <sup>A</sup>	13,719,600 <sup>A</sup>	13,870,826 <sup>A</sup>	14,088,512 <sup>A</sup>	2,690.4 <sup>A</sup>	2,625.9 <sup>A</sup>	2,665.4 <sup>A</sup>	390.2 <sup>A</sup>	401.1 <sup>A</sup>	430.0 <sup>A</sup>
Direct filtration	105 <sup>B</sup>	2,305,173 <sup>A</sup>	2,339,873 <sup>A</sup>	2,381,136 <sup>A</sup>	435.6 <sup>A</sup>	421.5 <sup>A</sup>	420.9 <sup>A</sup>	55.5 <sup>B</sup>	56.7 <sup>B</sup>	58.3 <sup>B</sup>
Granular media filtration	178 <sup>B</sup>	2,054,259 <sup>A</sup>	2,064,311 <sup>A</sup>	2,072,861 <sup>A</sup>	740.6 <sup>A</sup>	689.3 <sup>A</sup>	714.2 <sup>A</sup>	60.9 <sup>B</sup>	53.9 <sup>A</sup>	56.5 <sup>A</sup>
Cartridge or bag filter	x	x	x	11,208 <sup>E</sup>	F	F	F	x	x	x
Slow sand filtration	9 <sup>D</sup>	114,825 <sup>E</sup>	114,081 <sup>E</sup>	113,270 <sup>E</sup>	18.0 <sup>E</sup>	17.1 <sup>E</sup>	16.8 <sup>E</sup>	1.5 <sup>E</sup>	1.6 <sup>E</sup>	1.7 <sup>E</sup>
Granular media and slow sand filtration	27 <sup>D</sup>	32,580 <sup>E</sup>	32,001 <sup>E</sup>	x	7.5 <sup>E</sup>	7.5 <sup>E</sup>	7.3 <sup>E</sup>	2.7 <sup>D</sup>	3.4 <sup>D</sup>	3.3 <sup>D</sup>
Granular media filtration and cartridge or bag	x	x	x	x	x	x	x	x	x	x
Membrane filtration	63 <sup>C</sup>	464,985 <sup>C</sup>	465,698 <sup>B</sup>	513,964 <sup>B</sup>	112.4 <sup>D</sup>	104.3 <sup>B</sup>	104.3 <sup>B</sup>	24.6 <sup>B</sup>	28.2 <sup>B</sup>	32.8 <sup>B</sup>
Membrane filtration and granular media	29 <sup>D</sup>	792,767 <sup>A</sup>	797,278 <sup>A</sup>	793,427 <sup>A</sup>	126.3 <sup>A</sup>	130.2 <sup>A</sup>	141.7 <sup>A</sup>	12.4 <sup>B</sup>	13.4 <sup>B</sup>	14.1 <sup>B</sup>
Membrane filtration with cartridge or bag or slow sand	9 <sup>E</sup>	x	x	x	x	x	x	3.7 <sup>C</sup>	4.0 <sup>C</sup>	5.1 <sup>C</sup>
Disinfection only	674 <sup>A</sup>	3,065,986 <sup>A</sup>	3,068,309 <sup>A</sup>	3,108,571 <sup>A</sup>	660.9 <sup>A</sup>	649.9 <sup>A</sup>	569.4 <sup>B</sup>	72.7 <sup>A</sup>	74.0 <sup>A</sup>	76.5 <sup>B</sup>
Disinfection and other (unfiltered systems)	346 <sup>A</sup>	3,820,838 <sup>A</sup>	3,855,670 <sup>A</sup>	3,903,267 <sup>A</sup>	745.7 <sup>A</sup>	741.1 <sup>A</sup>	805.2 <sup>A</sup>	88.4 <sup>A</sup>	94.5 <sup>A</sup>	102.8 <sup>A</sup>
No treatment	187 <sup>B</sup>	545,004 <sup>D</sup>	559,937 <sup>D</sup>	565,244 <sup>D</sup>	115.4 <sup>D</sup>	123.9 <sup>C</sup>	121.3 <sup>D</sup>	21.7 <sup>D</sup>	21.4 <sup>D</sup>	20.6 <sup>D</sup>
No disinfection with other treatment	41 <sup>C</sup>	109,641 <sup>D</sup>	108,982 <sup>D</sup>	109,019 <sup>D</sup>	21.0 <sup>D</sup>	19.0 <sup>D</sup>	18.4 <sup>D</sup>	3.6 <sup>D</sup>	3.6 <sup>D</sup>	3.6 <sup>D</sup>

1. Estimates for all three years are calculated for a target population defined as drinking water plants serving a population of 300 or more persons in 2007.

2. Data do not include costs associated with the distribution of treated water (see page 7 of the questionnaire).

3. Plants were assigned to a category based on the reported treatment processes in section 4 of the questionnaire. Refer to Appendix I for the main processes applied in each treatment category.

4. Excludes Nunavut due to low response.

**Note(s):** Figures may not add up to totals due to rounding.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).

# Data sources and methodology

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## Reference period

The information contained in this report reflects the quantity and quality of raw/source water and treated/potable<sup>1</sup> water processed by individual drinking water treatment plants, the treatment systems used and the associated costs for the calendar years 2005, 2006 and 2007. The intention is to make the **Survey of Drinking Water Plants** a biennial survey.

## Survey frame

The target population is composed of drinking water facilities licensed and regulated by provincial/territorial agencies that draw and process raw/source water from the environment and convey treated/potable water for consumption. The survey does not include information on the distribution of treated water. The target population is derived from a survey frame that was built in 2007 when Statistics Canada requested the inventories of drinking water plants held by the provinces and territories.

Excluding systems that supply water to communities with less than 300 people and other regulated systems that service schools, camp grounds, commercial establishments, provincial parks, etc., a survey frame of approximately 2,600 drinking water facilities serving communities of 300 or more people was compiled, the majority being publicly-owned (municipal) systems.

During collection and follow-up with non-respondents, approximately 400 drinking water facilities on the frame were identified as being out-of-scope (that is, the facilities served fewer than 300 people in 2007 or systems that only distributed water). Due to low response in Nunavut, and given that there is neither historical information nor a sufficient outside source of information for Nunavut, Nunavut is not included in any of the estimates.

## Coverage and sample selection

This survey is a census with a cross-sectional design. Data are collected for all units of the target population, therefore no sampling is done.

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1. Includes potable water conveyed by drinking water plants without treatment

## Data collection and processing

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Responding to this survey is mandatory. Data were collected directly from survey respondents using mail out – mail back questionnaires.

Mail out occurred in June 2008 and respondents were asked to return the completed questionnaires within 60 days of receipt. The surveys were addressed to a contact person who was either responsible for, or had knowledge of, the drinking water facility being surveyed. A letter explaining the purpose of the survey, the requested return date and the legal requirements of response was included with the mail-out package.

Data were collected using one of two questionnaires: the printed version mailed to all respondents, or an electronic PDF form which allowed data to be entered and saved. The electronic PDF form, once completed, needed to be printed and mailed back. Telephone and fax follow-up were used to obtain data from respondents who returned incomplete questionnaires or who failed to respond.

Returned questionnaires were scanned using an imaging system that captured the data for transfer into a database. Some data were manually keyed in. Capture and edit software was then applied to run edit checks on the data which served to identify real or potential response errors.

## Data quality

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Sampling error arises from the fact that the information obtained from a sample of the population is applied to the entire population. Since the Survey of Drinking Water Plants is a census, the sampling error is zero.

Data response error may be due to questionnaire design, the characteristics of a question, inability or unwillingness of the respondent to provide correct information, misinterpretation of the questions or conceptual problems. These errors are controlled through careful questionnaire design and testing and the use of simple concepts and consistency checks.

Processing errors may occur at various stages of processing such as data entry, editing and tabulation. Measures have been taken to minimize these errors.

Non-response errors result when plants refuse to answer, are unable to respond or are too late in reporting. Missing data items are imputed for partial non-responses (that is, when mandatory questions are answered and some other questions are left unanswered).

Total non-response (that is, when mandatory questions are left unanswered) is dealt with by adjusting the weights assigned to the responding units, such that one responding unit might also represent other non-responding units with similar characteristics (that is, province, drainage region, source water type, size of population served). The error in the estimates due to total non-response is called total non-response error. The pattern of total non-response, the estimation method, the number of respondents and the variability associated with each measured variable determines the total non-response error. If the total non-respondents are assumed to be randomly "selected" from the population, then the respondents may be treated statistically as a random sample. Under this assumption, a possible measure of total non-response error is the coefficient of variation (CV). It represents the variability of the estimate as a proportion of the estimate.

A Excellent data quality	CV is 0.01% to 4.99%
B Very good data quality	CV is 5.00% to 9.99%
C Good data quality	CV is 10.00% to 14.99%
D Acceptable data quality	CV is 15.00% to 24.99%
E Use with caution	CV is 25.00% to 49.99%
F Too unreliable to be published	CV is >49.99% (data are suppressed)

## Response rates

The response rate for the survey was 54% in reference year 2005, 56% in reference year 2006 and 56% in reference year 2007. Overall, 58% of the population responded in one or more of the reference years 2005, 2006 and 2007. Note: There was low response to the survey from drinking water plants in Nunavut. Nunavut is not included in the response rate, nor is it included in any of the data tables.

## Error detection

Many factors affect the accuracy of data produced in a survey. For example, respondents may have made errors in interpreting questions, answers may have been incorrectly entered on the questionnaires, and errors may have been introduced during the data capture or tabulation process. Every effort was made to reduce the occurrence of such errors in the survey. Providing an electronic PDF questionnaire was intended to improve data quality in two manners: First, entry errors were reduced by building edits directly into the form. Secondly, PDF forms printed out by respondents improved the quality of the data captured by the imaging process.

Returned data are first entered and checked using capture and edit software. This procedure verifies that all mandatory cells have been filled in, that certain values lie within acceptable ranges, that questionnaire flow patterns have been respected, and that totals equal the sum of their components. Collection officers evaluate the edit failures and concentrate follow-up efforts accordingly. Phone follow-ups were performed to verify information in cases where edit checks had failed.

Further data checking is performed by subject matter officers who review returned data that has been identified statistically as outliers and who compare returned data from 2005, 2006 and 2007 to determine if data differences between years are reasonable. In some instances, collection officers are asked to confirm responses with the respondents. Subject matter officers also research drinking water plants (annual reports, web sites, etc.) in an effort to verify information submitted by respondents.

## **Imputation**

Statistical imputation is used for records with incomplete questionnaire responses. Six methods of imputation were used for the Survey of Drinking Water Plants: deterministic imputation (only one possible value for the field to impute), imputation by linear regression, trend imputation, imputation by ratio, donor imputation (using a "nearest neighbour" approach to find a valid record that is, most similar to the record requiring imputation in terms of treated water volume and other characteristics) and manual imputation. The criteria for ratio and donor imputation were various combinations of water treatment type, source water type and geographical location (province, region, or Canada). No imputation was conducted on water quality variables.

## **Estimation**

In the estimation process, the response values are multiplied by a factor (weight) adjustment to account for plants in the population who could not be contacted or who refused to participate in the survey. No estimation was conducted on water quality variables.

## **Quality evaluation**

This is the first time this survey has been conducted. In addition to analyzing individual responses for consistency within a questionnaire, both individual responses and weighted estimates of totals were compared to outside sources, where possible.

## Variables measured

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The survey questionnaire was designed in consultation with specialists at Statistics Canada, Health Canada, Environment Canada, and provincial agencies that regulate drinking water facilities. The information collected included the sources of raw water, the volumes of raw and treated water processed by the drinking water plants, the classification of the drinking water plants, the treatment processes used, and the quality of the raw and treated water. Capital expenditures and operation and maintenance costs related to drinking water treatment were also collected.

## Basic definitions

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**Capital expenditures** include costs related to the acquisition and treatment, but not the distribution, of water. They include money spent to add, expand or upgrade physical assets such as property, buildings, machinery and process equipment/infrastructure, including capitalized costs related to waste treatment processes (that is, backwash processing and residuals disposal). They also include construction and engineering costs.

**Conventional plants and direct filtration plants**—Conventional plants apply coagulation, flocculation, sedimentation and granular media filtration in the treatment process. The difference between conventional plants and direct filtration plants is the absence of sedimentation processes in direct filtration.<sup>1</sup>

**Escherichia coli** or **E. coli** refers to a bacterial species whose habitat is exclusively the intestinal tract of humans and warm-blooded animals.<sup>2</sup>

**Groundwater** refers to water found in underground aquifers which supplies wells and springs.<sup>3</sup>

**Groundwater Under the Direct Influence (GUDI)** of surface water refers to groundwater supply sources under conditions where microbial pathogens are able to travel from surface water to the groundwater source.<sup>4</sup>

**Operation and maintenance (O&M) costs** include costs related to the acquisition and treatment, but not the distribution, of water. It includes materials (chemicals and replacement parts), labour (internal and external staff, including lab personnel), energy, waste disposal and residuals handling, analytical/sampling costs and any associated administration and service costs directly related to O&M (consultants and contractors). They also include costs related to waste treatment processes (that is, backwash processing and residuals disposal).

**Raw water** refers to water in its natural state, prior to any treatment.<sup>5</sup>

**Source water** refers to water in its natural or raw state, prior to being withdrawn for treatment and distribution.<sup>6</sup>

**Surface water** refers to water from sources open to the atmosphere such as rivers, lakes and reservoirs.<sup>7</sup>

**Total coliforms** refers to a group of bacteria that are found in the intestinal tract of humans and warm-blooded animals, and also in the natural environment.<sup>8</sup>

**Treated water** refers to water that has been treated and is ready to be conveyed to consumers. In this survey it also includes potable water conveyed by drinking water plants without treatment.

**Turbidity** refers to the cloudy appearance of water caused by the presence of tiny organic or inorganic particles.<sup>9</sup>

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1. Department of National Health and Welfare, 1993, *op. cit.*

2. Department of the Environment and Local Government, New Brunswick. 2006. "Environment and Local Government: 2005-2006 Annual Report." Available from [www.gnb.ca/0009/0010-e.asp](http://www.gnb.ca/0009/0010-e.asp) (accessed October 16, 2009).

3. Canadian Council of Ministers of the Environment and Federal-Provincial-Territorial Committee on Environmental and Occupational Health. 2004. "From source to tap: Guidance on the multi-barrier approach to safe drinking water." Available from [www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/tap-source-robinet/index-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/tap-source-robinet/index-eng.php) (accessed September 30, 2009).

4. Daigle and Giudice, 2006, *op. cit.*

5. Canadian Council of Ministers of the Environment and Federal-Provincial-Territorial Committee on Environmental and Occupational Health, 2004, *op. cit.*

6. Canadian Council of Ministers of the Environment and Federal-Provincial-Territorial Committee on Environmental and Occupational Health, 2004, *Ibid.*

7. Canadian Council of Ministers of the Environment and Federal-Provincial-Territorial Committee on Environmental and Occupational Health, 2004, *Ibid.*

8. Department of the Environment and Local Government, New Brunswick, 2006, *op. cit.*

9. Canadian Council of Ministers of the Environment and Federal-Provincial-Territorial Committee on Environmental and Occupational Health, 2004, *op. cit.*



# Appendix I

## Treatment categories by main processes applied

Text table 1

Treatment categories by main processes applied

Treatment Category	Main treatment processes applied							Other processes
	Disinfection <sup>1</sup>	Coagulation and, or flocculation	Clarification, sedimentation	Granular media filtration <sup>2</sup>	Membrane (micro, ultra, nano filtration or reverse osmosis)	Slow sand <sup>3</sup>	Cartridge bag <sup>3</sup>	
Conventional treatment	X	X	X	X	...	...	...	...
Direct filtration	X	X	...	X	...	...	...	...
Granular media filtration <sup>2</sup>	X	...	...	X	...	...	...	...
Cartridge or bag filter	X	...	...	...	...	...	X	...
Slow sand filtration <sup>3</sup>	X	...	...	...	...	X	...	...
Granular media and slow sand filtration <sup>3</sup>	X	...	...	X	...	X	...	...
Granular media filtration <sup>2</sup> and cartridge or bag	X	...	...	X	...	...	X	...
Membrane filtration <sup>4</sup>	X	...	...	...	X	...	...	...
Membrane filtration <sup>4</sup> and granular media <sup>2</sup>	X	...	...	X	X	...	...	...
Membrane filtration <sup>4</sup> with cartridge or bag or slow sand	X	...	...	...	X	(X) <sup>5</sup>	(X) <sup>5</sup>	...
Disinfection only	X	...	...	...	...	...	...	...
Disinfection and other (unfiltered systems)	X	...	...	...	...	...	...	X
No treatment	...	...	...	...	...	...	...	...
No disinfection with other treatment	...	...	...	...	...	...	...	X

1. Chlorination (hypochlorites or chlorine gas), chlorine dioxide, chloramination, uv-irradiation, ozonation.

2. Granular activated carbon (GAC) may or may not be part of the filters with multi media.

3. May include some systems that apply clarification, sedimentation processes.

4. May include some systems that apply coagulation, flocculation, clarification, sedimentation.

5. Membrane systems with either cartridge or bag or slow sand.

**Note(s):** For all systems, some pre-treatment (for example, screening) and other treatment processes may also be applied; configuration of plants will vary.

**Source(s):** Statistics Canada, 2009, Environment Accounts and Statistics Division, Survey of Drinking Water Plants (survey number 5149).