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MUNICIPAL WASTEWATER TREATMENT

CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

Canada

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Environment and Climate Change Canada
Public Inquiries Centre
12th Floor Fontaine Building
200 Sacré-Coeur Blvd
Gatineau QC K1A 0H3
Telephone: 1-800-668-6767 (in Canada only) or 819-938-3860
Email: enviroinfo@ec.gc.ca

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CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

MUNICIPAL WASTEWATER TREATMENT

August 2023

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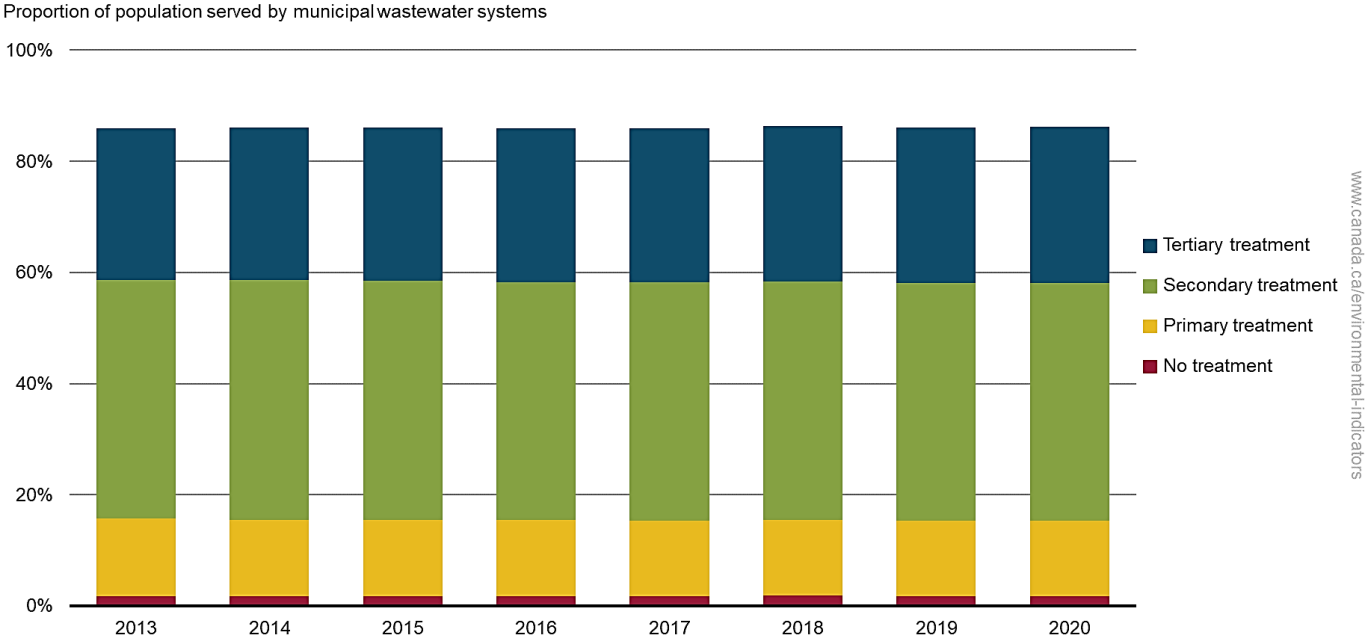
Municipal wastewater treatment

Every day, millions of cubic metres (m^3) of wastewater are discharged from homes, businesses, institutions, and industries into city sewer systems. Municipal wastewater is one of the largest sources of pollution to surface water in Canada. Before being released to the environment, wastewater needs to be treated. A higher level of wastewater treatment leads to a cleaner effluent and a smaller impact on the environment. The indicators show the level of wastewater treatment provided to the Canadian population and present the proportion of wastewater systems meeting the effluent quality national standards.

Key results

- Over the 2013 to 2020 period, the proportion of the population served by municipal wastewater systems remained stable at about 86%
- Since 2013, the proportion of population served by each treatment category remained stable with around 28.1%, 42.7% and 13.6% for tertiary, secondary and primary treatments, respectively
- About 1.8% of the population was served by systems discharging untreated wastewater
- In 2020, 13.8% of the population was not served by municipal wastewater systems[1]

Figure 1. Proportion of population served by municipal wastewater systems, Canada, 2013 to 2020



Data for Figure 1

Note: Only the population served by municipal wastewater systems with a daily flow of 100 m^3 or more was considered. Data were unavailable for the populations located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador.
Source: Statistics Canada (2023) Table 38-10-0125-01 Population served by municipal wastewater systems by treatment category.

Municipal wastewater refers to used water from homes, businesses, industries, and institutions that drain into sewers. It contains sanitary sewage and is sometimes combined with stormwater from rain or melting snow draining off rooftops, lawns, parking lots and roads. Municipal wastewater can contain human and other organic waste, nutrients, pathogens, microorganisms, suspended solids and household and industrial chemicals. Treating

[1] The population not served by municipal wastewater systems corresponds to the population that either had their own on-site wastewater system (such as septic systems) or were served by other systems with daily flows of less than 100 m^3 per day, or by other facilities outside the scope of the surveys.

wastewater before it is released into lakes and rivers reduces the risks posed to human health and the environment.[2]

The treatment processes presented in Figure 1 can be summarized as follows:

- No treatment: No treatment process or only screening and/or grit removal
- Primary treatment: Removing a portion of suspended solids and organic matter by physical and/or chemical processes
- Secondary treatment: Removing organic matter and suspended solids using biological treatment processes and secondary settlement
- Tertiary treatment: Removing specific substances of concern (solids, nutrients and/or contaminants) after secondary treatment using a number of physical, chemical or biological processes

A variety of factors, including Canada's physical geography and population density influence the proportion of population served by municipal sewers. For example, communities where population is spread over a large geographical area are challenged when it comes to providing centralized infrastructures to collect and treat wastewater. Those communities tend to rely on independent systems, such as septic systems, or small-scale collective systems. In this indicator, their populations would be considered as "not covered by this indicator". The efficiency of those treatment systems can be similar to larger municipal wastewater systems.

[2] Canadian Council of Ministers of the Environment (2020) Municipal Wastewater Effluent Strategy | CCME. Retrieved on 4 June 2023.

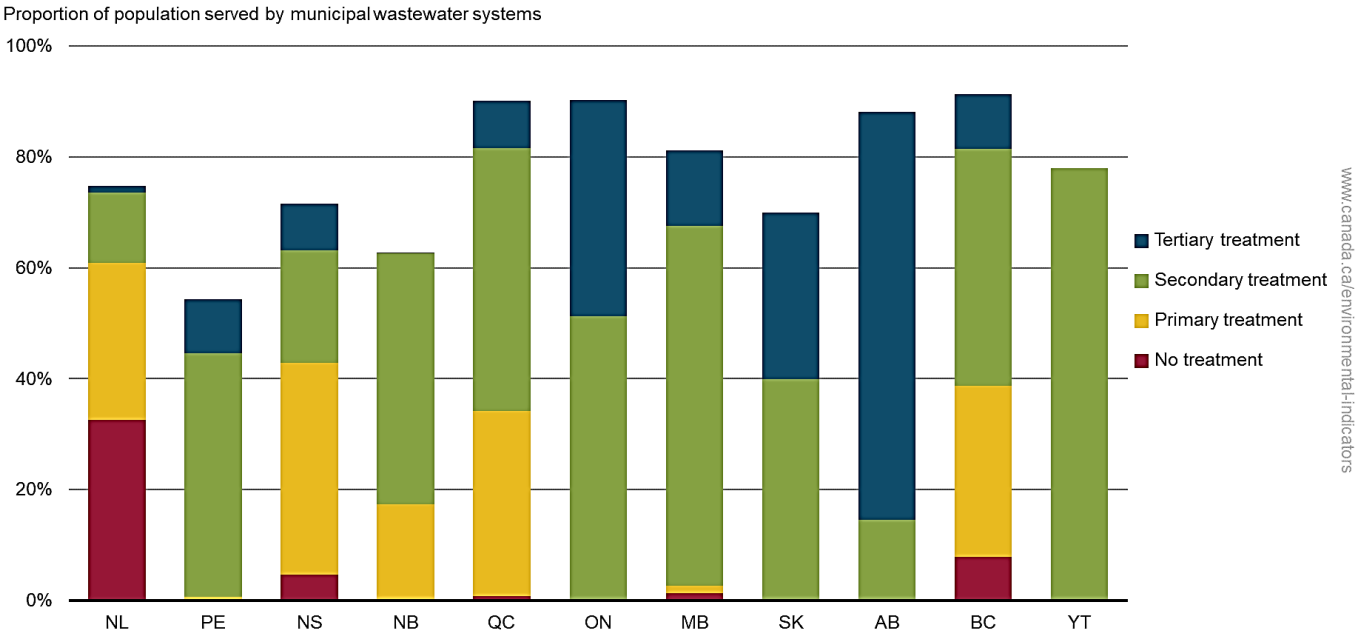
Population served by municipal wastewater systems by province and territory

Key results

In 2020,

- The proportion of population served by municipal wastewater systems varied from 54.3% in Prince Edward Island to 91.4% in British-Columbia[3]
- Alberta had the highest proportion of population (73.6%) served by tertiary-level wastewater treatment
- Nova Scotia had the highest proportion of population (38.2%) served by primary-level wastewater treatment
- A significant proportion of the Newfoundland and Labrador population (32.6%) was served by municipal systems that discharge wastewater to the environment with no prior treatment

Figure 2. Proportion of population served by municipal wastewater systems by province and territory, Canada, 2020



Data for Figure 2

Note: Only the population served by municipal wastewater systems with a daily flow of 100 m^3 or more was considered. Data were unavailable for the populations located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador.
Source: Statistics Canada (2023) Table 38-10-0125-01 Population served by municipal wastewater systems by treatment category.

Much of the Canadian population is served by wastewater collection and treatment systems; however, the proportion of population served, and the level of treatment applied to wastewater varies widely by province and territory. The majority of systems that discharge untreated wastewater are located in coastal communities. Inland provinces tend to have higher levels of treatment in order to protect freshwater resources.

[3] The population not served by municipal wastewater systems corresponds to the population that either had their own on-site wastewater system or were served by other systems with daily flows of less than 100 m^3 per day, or by other facilities outside the scope of the surveys.

Population served by municipal wastewater systems in selected countries

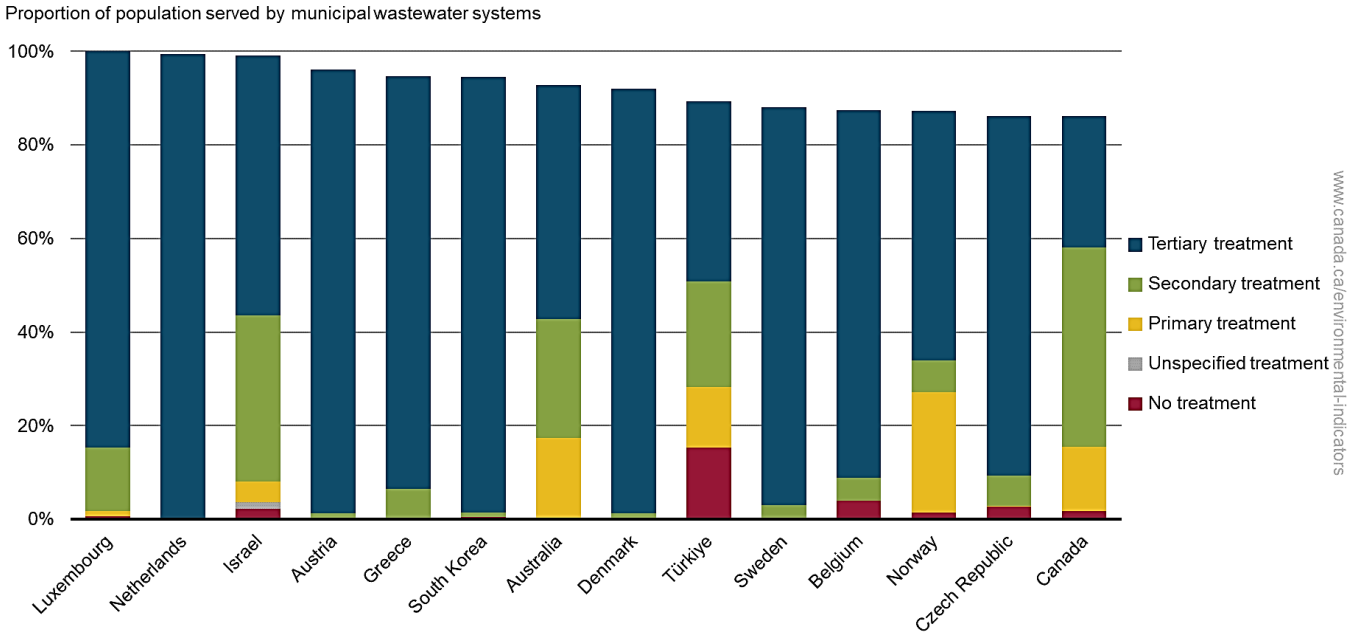
This indicator compares the proportion of the population served by municipal wastewater systems in Canada with the 24 countries from the Organisation for Economic Co-operation and Development for which data were available for the year 2020.

Key results

In 2020,

- Canada ranked 14th out of 24 countries for proportion of population served by municipal wastewater systems at about 86%[4]
- Luxembourg reported that 100% of their population was served by a municipal wastewater system
- 38.5% to 99.4% of the population from the selected countries were served by a public wastewater system using a tertiary treatment, which is more than in Canada (28.1%)

Figure 3. Proportion of population served by municipal wastewater systems, selected countries, 2020



Data for Figure 3

Note: The graph shows the 14 member countries from the Organisation for Economic Co-operation and Development with the highest proportion of population served by public sewerage systems in 2020. The year 2020 was the most recent year for which data were available for Canada. For Canada, only the population served by municipal wastewater systems with a daily flow of 100 m^3 or more was considered.
Source: Organisation for Economic Co-operation and Development (2023) Connection rates to wastewater treatment database. Statistics Canada (2023) Population served by municipal wastewater systems by treatment category.

The countries with the highest proportion of population connected by treatment category were:

- Norway for the primary treatment with 25.6%
- Israel for the secondary treatment with 35.6%
- the Netherlands for the tertiary treatment with 99.4%

[4] For Canada, the population not served by municipal wastewater systems corresponds to the population that either had their own on-site wastewater system or were served by other systems with daily flows of less than 100 m^3 per day, or by other facilities outside the scope of the surveys.

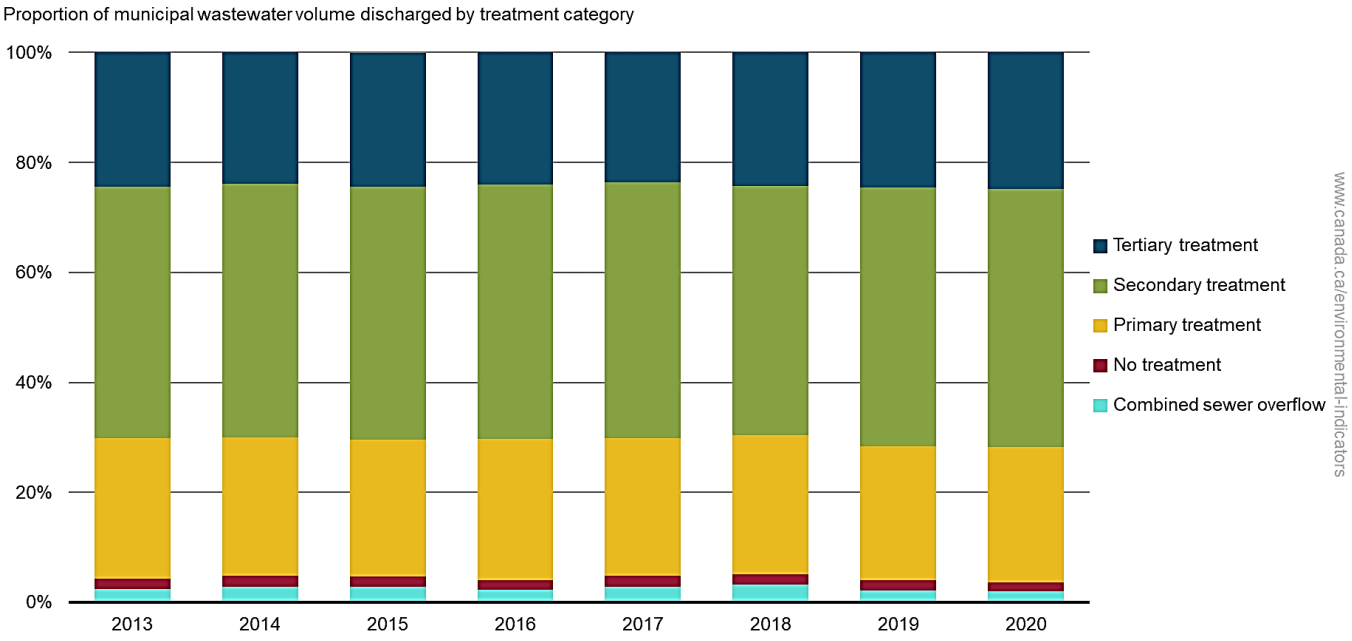
After Australia, Canada has the lowest population density among the selected countries.[5] This factor could have an influence on the development of centralized wastewater treatment infrastructures.

Municipal wastewater volume discharged by treatment category

Key results

- Over the 2013 to 2020 period, 95.7% to 96.3% of the municipal wastewater collected underwent a treatment (primary, secondary, or tertiary) before being discharged
- In 2020, 3.7% of the volume of municipal wastewater discharged was untreated[6]

Figure 4. Proportion of municipal wastewater volume discharged by treatment category, Canada[7], 2013 to 2020.



Data for Figure 4

Note: Combined sewer overflows correspond to the stormwater and wastewater conveyed into a combined sewer that are discharged directly into receiving waters because they exceed the capacity of the sewer system or treatment plant. Data were unavailable for the sewer systems located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador.
Source: Statistics Canada (2023) Table 38-10-0124-01 Wastewater volumes discharged from municipal sewage systems by treatment category (x 1,000,000) and Table 38-10-0100-01 Combined sewer overflow discharge volumes (x 1,000,000).

Between 2013 and 2020, the volume of municipal wastewater discharged remained relatively stable, ranging from 5 690 million m^3 to 6 162 million m^3.

In 2020, the volume of municipal wastewater discharged with no treatment was 219 million m^3, corresponding to 3.7% of the total volume discharged. This includes 116.9 million m^3 from combined sewer overflows. In 2019, the volume of untreated wastewater discharged amounted to approximately 243 million m^3 (including 135 million m^3

[5] World Bank (2023) Urban population (% of total population) | Data (worldbank.org). Retrieved on May 10, 2023.

[6] The wastewater considered untreated includes combined sewer overflows. Combined sewer overflows correspond to the stormwater and wastewater conveyed into a combined sewer that are discharged directly into receiving waters because they exceed the capacity of the sewer system or treatment plant.

[7] Data on Quebec's combined sewer overflow volume is not available for years 2018, 2019 and 2020.

from combined sewer overflows), or 4% of the total volume conveyed by municipal wastewater systems in Canada, with exception of Quebec whose combined sewer overflow volumes have not been available since 2017.

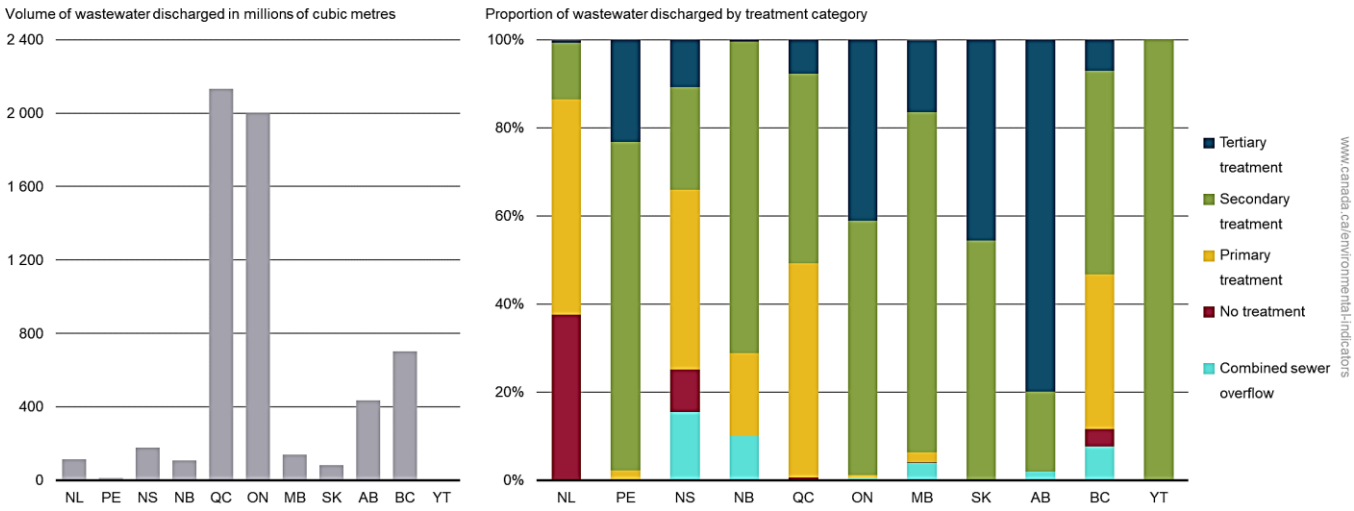
Municipal wastewater volume discharged by treatment category by province and territory

Key results

In 2020:

- Quebec and Ontario accounted for the majority of wastewater discharged nationally, with respective volumes of 2 132 and 1 998 million m^3
- Municipal wastewater was almost entirely treated at secondary or tertiary levels in Alberta, Saskatchewan Ontario, Prince Edward Island, Yukon, and, to a lesser extent, Manitoba
- Municipal wastewater in Newfoundland and Labrador, Nova Scotia, and Quebec were mostly, at best, treated at a primary level

Figure 5. Volume and proportion of municipal wastewater discharged by treatment category by province and territory, Canada, 2020



Data for Figure 5

Note: Combined sewer overflows correspond to the stormwater and wastewater conveyed into a combined sewer that are discharged directly into receiving waters because they exceed the capacity of the sewer system or treatment plant. Data were unavailable for the sewer systems located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador.
Source: Statistics Canada (2023) Table 38-10-0124-01 Wastewater volumes discharged from municipal sewage systems by treatment category (x 1,000,000) and Table 38-10-0100-01 Combined sewer overflow discharge volumes (x 1,000,000).

The level of treatment applied to wastewater varies widely by province and territory. In 2020, the provinces and territory with the highest proportion of wastewater discharged by treatment category were:

- Newfoundland and Labrador for untreated wastewater with 37.6%
- Newfoundland and Labrador for primary treatment, with 48.8%
- Yukon for secondary treatment, with 100%
- Alberta for tertiary treatment, with 79.9%

Municipal wastewater effluent quality

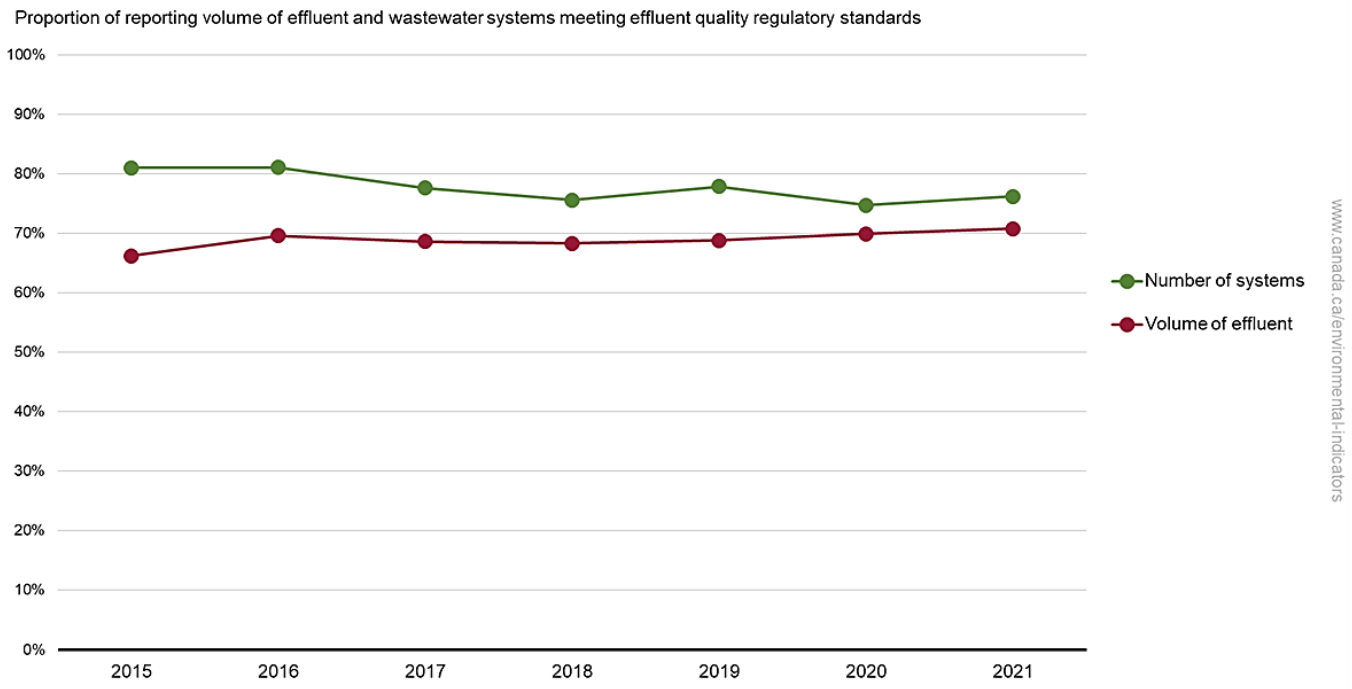
Following its treatment, the treated wastewater is reintroduced in the environment through wastewater systems (wastewater treatment plants). To protect the quality of the receiving waters, the *Wastewater Systems Effluent Regulations* (the regulations) were developed. These regulations set national effluent quality limits that are

achievable through secondary wastewater treatment. They also require effluent monitoring and reporting from the wastewater systems.[8]

Key results

- In 2021, 76.2% of the reporting municipal wastewater systems released effluents that met the regulatory quality standards, corresponding to 70.8% of the effluents volume
- Between 2015 and 2021, the proportion of reporting municipal wastewater systems meeting quality regulatory standard effluents dropped slightly, from 81.0% (1 099 out of 1 356 systems) to 76.2% (1 391 out of 1 826 systems), by contrast, the effluent volume meeting the standards increased slightly from 66.2% (3 302 million m^3 out of 4 986 million m^3) to 70.8% (3 612 million m^3 out of 5 105 million m^3)

Figure 6. Percentage of reporting municipal wastewater systems and effluent volume meeting effluent quality regulatory standards, Canada, 2015 to 2021



Data for Figure 6

Note: Only the municipal wastewater systems with a daily flow of 100 m^3 or more that submitted their monitoring reports were considered. Data were unavailable for the populations located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador.
Source: Environment and Climate Change Canada (2023) Wastewater Systems Effluent Regulations Program

The regulations were established in 2012 and came into effect in January 2015. While all new wastewater facilities are required to meet the regulations immediately, some of the existing facilities applied for and were granted extensions until 2020, 2030 or 2040 to plan and finance the upgrade of their infrastructure up to the standards. These provisions were based on criteria set out in the regulations to ensure facilities presenting the highest risks be improved first with the final objective of 100% of wastewater treatment facilities meeting regulatory standards by the end of 2040.

The transitional authorizations to upgrade the infrastructure can impact the compliance rates presented previously as some of the facilities have not yet completed the works on their systems to achieve compliance.

[8] The *Wastewater Systems Effluent Regulations* apply to wastewater systems designed to collect an average daily influent volume of 100 m^3. However, it does not apply to wastewater systems located in Nunavut, the Northwest Territories, or north of the 54th parallel in Quebec or Newfoundland and Labrador.

About the indicators

What the indicators measure

The Municipal wastewater treatment indicators measure the level of wastewater treatment provided to the Canadian population and track the compliance of the treated water discharged with the national effluent quality standards. Higher treatment levels of wastewater reduce the risk of raw wastewater pollutants entering the environment, where they pose risks to human health and the environment.

Why these indicators are important.

Municipal wastewater is one of the largest sources of pollution, by volume, to surface water in Canada.[9] Despite treatment, pollutants remain in treated wastewater discharged into surface waters. Treated wastewater may contain grit, debris, biological wastes, disease-causing bacteria, nutrients, and hundreds of chemicals such as those found in drugs and in personal care products like shampoo and cosmetics. The higher the level of treatment provided by a wastewater system, the cleaner the effluent and the lesser the impact on the effluent receiving environment.

Insufficient wastewater treatment could result in environmental, human health and economic impacts, such as oxygen depletion, beach closures and other restrictions on recreational water use, on fish and shellfish harvesting and consumption and on drinking water.

Related initiatives

These indicators support the measurement of progress towards the following 2022 to 2026 Federal Sustainable Development Strategy long-term Goal 6: Ensure clean and safer water for all Canadians.

In addition, the indicators contribute to the Sustainable Development Goals of the 2030 Agenda for Sustainable Development. They are linked to Goal 6, Clean water and sanitation, and Target 6.3, "By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally."

Related indicators

The Water quality in Canadian rivers indicators provide a measure of the ability of river water across Canada to support plants and animals.

The Metal and diamond mining effluent quality indicator summarizes the results achieved since the *Metal and Diamond Mining Effluent Regulations* came into effect in 2002.

The Pulp and paper effluent quality indicator summarizes the degree of compliance achieved since 1985 under the *Pulp and Paper Effluent Regulations*.

Data sources and methods

Data sources

Data derived from Environment and Climate Change Canada's Effluent Regulatory Reporting Information System (ERRIS), as reported under the *Wastewater Systems Effluent Regulations* (the regulations), were used for all indicators, with the exception of the indicator on the international comparison of population served by municipal wastewater systems.

- Statistics Canada's Municipal Wastewater Systems in Canada statistical program used ERRIS reports to produce the data on the population served and the wastewater volumes discharged by treatment level
- Environment and Climate Change Canada's Wastewater Program calculated the effluent quality compliance data from ERRIS reports

[9] Government of Canada (2012) *Wastewater Systems Effluent Regulations*. Retrieved on June 4, 2023.

Data for the international comparison of population served by municipal wastewater systems indicator were retrieved from the Organisation for Economic Co-operation and Development's Wastewater treatment database.

More information

Spatial coverage

The Effluent Regulatory Reporting Information System captures data from all the reporting wastewater systems that collect a daily average volume of 100 m^3 or more. Systems that service First Nations reserves, government institutions, commercial and industrial establishments, and provincial parks are not included in this report, however, are covered by the Regulations. The regulations do not apply to wastewater systems located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador.

Temporal coverage

The Municipal Wastewater Systems in Canada statistical program was published for the first time in 2019 and now includes the data for the years 2013 to 2020. It is updated annually.

The indicator on the effluent quality compliance to the standards covers the period from 2015 to 2021. Even though the *Wastewater Systems Effluent Regulations* came into force 2012, the effluent quality standards did not come into force until January 1, 2015. Therefore, there were no compliance limits for the 2013 and 2014 reporting years.

Data completeness

The Effluent Regulatory Reporting Information System lists mere than 1 500 wastewater (sewage) systems with a daily flow of 100 m^3 or more and does not include data reported through an equivalency agreement with Quebec or the Yukon. This list is established from owners of wastewater systems that report under the federal *Wastewater Systems Effluent Regulations*.

Methods

The Municipal Wastewater Systems in Canada data are presented under 5 datasets:

- Population served by municipal wastewater systems
- Population served by municipal wastewater systems by treatment category
- Wastewater volumes processed by municipal sewage systems
- Wastewater volumes discharged from municipal sewage systems by treatment category, and
- Combined sewer overflow discharge volumes

The treatment levels are categorized as none, primary, secondary, secondary with additional phosphorous removal and tertiary treatment.

For the purposes of these indicators, the population not served by municipal wastewater systems corresponds to the population that either were served by other systems with daily flows of less than 100 m^3 per day, had their own on-site wastewater system (such as septic systems) or by other facilities outside the scope of the surveys.

In 2012, the *Wastewater Systems Effluent Regulations* were established under the *Fisheries Act* and included mandatory minimum effluent quality standards that can be achieved through secondary wastewater treatment. The proportion of wastewater systems meeting the effluent quality standards corresponds to the number of reporting wastewater systems achieving compliance divided by the total of reporting wastewater systems. Wastewater systems are deemed compliant when their effluent meet the average carbonaceous biochemical oxygen demand and the average concentration of suspended solids applicable limits.

More information

Wastewater treatment categories

Wastewater treatment levels for this indicator were categorized based on the definitions used in the Municipal Wastewater Systems in Canada.[10]

Table 1. Description of wastewater treatment categories

Treatment category	Definition
No treatment	No treatment processes are applied, or only screening and/or grit removal are applied
Primary treatment	Primary treatment removes a portion of suspended solids and organic matter by physical and/or chemical processes. At least 1 of the following processes is applied: • Chemical flocculation • Primary sedimentation/clarification • Skimming
Secondary treatment	Secondary treatment removes biodegradable organic matter and suspended solids using biological treatment processes and secondary settlement. At least 1 of the following processes is applied: • Activated sludge system (with or without extended aeration) • Activated sludge system (with or without pure oxygen) • Lagoon systems (any one or combination of aerated, aerobic, anaerobic, facultative, non-aerated, non-aerated filtered) • Oxidation ditch • Rotating biological contactor • Storage ponds (polishing ponds) • Sequencing batch reactor • Trickling filter • Integrated systems that combine the above technologies • Chemical precipitation for phosphorus
Tertiary treatment	Tertiary treatment further removes residual suspended solids, nutrients and/or other contaminants using various physical, chemical, or biological processes. At least 1 of the following processes is applied in addition of secondary treatment processes: • Biofiltration • Biological ammonia removal – nitrification only • Biological nitrogen removal – nitrification and denitrification • Biological nutrient removal (nitrogen and phosphorus) • Biological phosphorus removal • Filtration • Peat filter • Integrated systems that combine the above technologies with secondary treatment technologies, or some systems that only apply tertiary technologies

The data were derived from administrative records collected by Environment and Climate Change Canada via the Effluent Regulatory Reporting Information System, as required by the *Wastewater Systems Effluent Regulations*. Those records provide information on each sewage system, including the

[10] Statistics Canada (2019) Municipal Wastewater Systems in Canada and Statistics Canada (2023) Table 38-10-0124-01 Wastewater volumes discharged from municipal sewage systems by treatment category (x 1,000,000).

volume of wastewater discharged and the treatment utilized. The population served by each sewage system was estimated using census population data. The regulations do not apply to any wastewater system located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador; therefore, no data were available for these populations.

Population served by municipal wastewater systems

The percentages of population served by municipal wastewater systems at the national and provincial and territorial levels were calculated using the population served by municipal wastewater systems by treatment category data which was developed based on the 2011 and 2016 census of population. The population for 2020 was extrapolated using the 2016 census data.

Municipal wastewater volume discharged

The volume of wastewater discharged for each treatment category, as established by the Municipal Wastewater Systems in Canada statistical program, was divided by the total volume of wastewater discharged. For the purposes of these indicators, the volumes corresponding to the combined sewer overflows were added to the total volume of wastewater and were considered as untreated water.

Municipal wastewater effluent quality

Under the regulations, wastewater systems must submit monitoring reports that indicate:

- the number of days when effluent was deposited;
- the volume of effluent deposited;
- the average carbonaceous biochemical oxygen demand and the average concentration of suspended solids.

Depending on the type of wastewater system and the volume of effluent, the reports must present the annual average, the quarterly average, or the monthly average for each of the parameters (carbonaceous biochemical oxygen demand and suspended solids).

A wastewater system is considered compliant with the regulations if it meets the following conditions:

- For wastewater systems reporting monthly averages:
    - average carbonaceous biochemical oxygen demand is <25 mg/L in at least 10 months during a calendar year
    - average concentration of suspended solids is <25 mg/L in at least 10 months during the calendar year
- For wastewater systems reporting quarterly averages:
    - average carbonaceous biochemical oxygen demand is <25 mg/L in all quarters during the calendar year
    - average concentration of suspended solids is <25 mg/L in all quarters during the calendar year
- For wastewater systems reporting annual averages:
    - average carbonaceous biochemical oxygen demand and average concentration of suspended solids is <25 mg/L

Recent changes

One (1) new sub-indicator was added to provide information on the quality of the treated water released by the wastewater systems and its compliance with the national effluent quality standards.

Caveats and limitations

The Municipal Wastewater Systems in Canada statistical program excludes communities that have their own on-site wastewater system, or that are served by other systems with daily flows of less than 100 m^3 per day or by other facilities outside the scope of the survey. The *Wastewater Systems Effluent Regulations* do not apply to any

wastewater system located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador; therefore, no data are available for these populations.

Although these indicators assume municipal wastewater treatment plants are functioning at their design level, equipment failure and weather conditions may prevent them from doing so. Severe storms can cause overflows in combined sanitary and stormwater sewer systems. During such events, the everyday treatment level is not applied, and raw sewage is released directly to surface waters.

The Municipal Wastewater Systems in Canada statistical program does not provide information on sewage treated by private septic systems or other independent/private or federal systems. Treatment levels depend on the efficiency and maintenance of the septic system. Similarly, no information is collected on the destination of hauled sewage or its treatment level.

Even though the *Wastewater Systems Effluent Regulations* came into force 2012, the effluent quality standards did not come into force until January 1, 2015. Therefore, there are no compliance limits for the 2013 and 2014 reporting years.

For more information on the Government of Canada's role in wastewater management, see Environment and Climate Change Canada's Wastewater website. For more information on national efforts to develop a harmonized regulatory framework for municipal wastewater treatment, see the Canadian Council of Ministers of the Environment's Canada-wide Strategy for the management of municipal wastewater effluent.

Resources

References

Environmental Protection Agency (2016) Learn about small wastewater systems. Retrieved on May 11, 2023.

Organisation for Economic Co-operation and Development (2023) Wastewater treatment database. Retrieved on May 11, 2023.

Statistics Canada (2023) Table 38-10-0100-01 Combined sewer overflow discharge volumes (x 1,000,000). Retrieved on May 11, 2023.

Statistics Canada (2023) Table 38-10-0124-01 Wastewater volumes discharged from municipal sewage systems by treatment category (x 1,000,000). Retrieved on May 11, 2023.

Statistics Canada (2023) Table 38-10-0125-01 Population served by municipal wastewater systems by treatment category. Retrieved on May 11, 2023.

Related information

Canada-wide Strategy for the management of municipal wastewater effluent

Wastewater management

Wastewater

Wastewater Systems Effluent Regulations

Annex

Annex A. Data tables for the figures presented in this document.

Table A.1. Data for Figure 1. Proportion of population served by municipal wastewater systems, Canada, 2013 to 2020

Year	Total population estimated	No treatment (percentage)	Primary treatment (percentage)	Secondary treatment (percentage)	Tertiary treatment (percentage)	Total (percentage)
2013	34 146 704	1.8%	13.9%	43.0%	27.3%	86.0%
2014	34 481 712	1.8%	13.7%	43.1%	27.5%	86.2%
2015	34 816 720	1.8%	13.7%	43.0%	27.6%	86.1%
2016	35 151 728	1.8%	13.7%	42.8%	27.7%	86.0%
2017	35 486 736	1.8%	13.6%	42.8%	27.8%	86.0%
2018	35 821 744	1.9%	13.6%	42.9%	27.9%	86.2%
2019	36 156 752	1.8%	13.6%	42.7%	28.0%	86.2%
2020	36 491 760	1.8%	13.6%	42.7%	28.1%	86.2%

Note: Totals may not add up due to rounding. Only the population served by municipal wastewater systems with a daily flow of 100 m^3 or more was considered. Data were unavailable for the populations located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador.
Source: Statistics Canada (2023) Table 38-10-0125-01 Population served by municipal wastewater systems by treatment category.

Table A.2. Data for Figure 2. Proportion of population served by municipal wastewater systems by province and territory, Canada, 2020

Province/ Territory	Total population estimated	No treatment (percentage)	Primary treatment (percentage)	Secondary treatment (percentage)	Tertiary treatment (percentage)	Total (percentage)
Newfoundland and Labrador	523 860	32.6%	28.3%	12.7%	1.2%	74.9%
Prince Edward Island	145 069	0.0%	0.7%	43.9%	9.7%	54.3%
Nova Scotia	925 095	4.6%	38.2%	20.3%	8.5%	71.5%
New Brunswick	743 845	0.0%	17.3%	45.3%	0.2%	62.8%
Quebec	8 373 449	0.8%	33.4%	47.3%	8.6%	90.1%
Ontario	13 687 163	0.0%	0.3%	51.0%	39.0%	90.4%
Manitoba	1 306 404	1.3%	1.3%	64.9%	13.7%	81.1%
Saskatchewan	1 124 340	0.1%	0.0%	39.8%	30.0%	70.0%
Alberta	4 235 942	0.0%	0.1%	14.4%	73.6%	88.1%
British Columbia	4 747 254	7.9%	30.8%	42.7%	9.9%	91.4%
Yukon	36 665	0.0%	0.0%	78.0%	0.0%	78.0%

Note: Totals may not add up due to rounding. Only the population served by municipal wastewater systems with a daily flow of 100 m^3 or more was considered. Data were unavailable for the populations located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador.
Source: Statistics Canada (2023) Table 38-10-0125-01 Population served by municipal wastewater systems by treatment category.

Table A.3. Data for Figure 3. Proportion of population served by municipal wastewater systems, selected countries, 2020

Country	No treatment (percentage)	Unspecified treatment (percentage)	Primary treatment (percentage)	Secondary treatment (percentage)	Tertiary treatment (percentage)	Total (percentage)
Luxembourg	0.7%	0.0%	1.0%	13.6%	84.7%	100.0%
Netherlands	0.0%	0.0%	0.0%	0.1%	99.4%	99.5%
Israel	2.2%	1.4%	4.4%	35.6%	55.6%	99.2%
Austria	0.0%	0.0%	0.0%	1.2%	94.9%	96.0%
Greece	0.0%	0.0%	0.0%	6.4%	88.3%	94.7%
South Korea	0.5%	0.0%	0.0%	0.9%	93.2%	94.5%
Australia	0.0%	0.0%	17.4%	25.4%	50.0%	92.9%
Denmark	0.0%	0.0%	0.1%	1.1%	90.8%	92.0%
Türkiye	15.3%	0.0%	12.9%	22.6%	38.5%	89.3%
Sweden	0.0%	0.0%	0.0%	3.0%	85.0%	88.0%
Belgium	3.9%	0.0%	0.0%	5.0%	78.6%	87.5%
Norway	1.5%	0.0%	25.6%	6.8%	53.4%	87.2%
Czech Republic	2.7%	0.0%	0.1%	6.5%	76.9%	86.2%
Canada	1.8%	0.0%	13.6%	42.7%	28.1%	86.2%

Note: Totals may not add up due to rounding. The countries presented in the table correspond to all the members countries for which data are available for 2020 in the Organisation for Economic Co-operation and Development's wastewater treatment database. The year 2020 was the most recent year for which data was available for Canada in the database. For Canada, only the population served by municipal wastewater systems with a daily flow of 100 m^3 or more was considered.
Source: Organisation for Economic Co-operation and Development (2023) Connection rates to wastewater treatment database. Statistics Canada (2023) Population served by municipal wastewater systems by treatment category.

Table A.4. Data for Figure 4. Proportion of municipal wastewater volume discharged by treatment category, Canada, 2013 to 2020

Year	Volume of municipal wastewater discharged (million m^3)	Combined sewer overflow (percentage)	No treatment (percentage)	Primary treatment (percentage)	Secondary treatment (percentage)	Tertiary treatment (percentage)
2013	5 980	2.4%	1.9%	25.5%	45.8%	24.4%
2014	6 064	2.9%	1.9%	25.2%	46.1%	24.0%
2015	5 716	2.9%	1.8%	24.9%	46.0%	24.3%
2016	5 834	2.3%	1.8%	25.6%	46.3%	24.0%
2017	6 115	2.9%	1.9%	25.1%	46.5%	23.6%
2018	5 950	3.2%	1.9%	25.3%	45.3%	24.3%
2019	6 162	2.2%	1.8%	24.4%	47.1%	24.5%
2020	5 910	2.0%	1.7%	24.5%	47.0%	24.8%

Note: Percentages may not add up to 100 due to rounding. Combined sewer overflows correspond to the stormwater and wastewater conveyed into a combined sewer that are discharged directly into receiving waters because they exceed the capacity of the sewer system or treatment plant. No data were available for the sewer systems located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador.
Source: Statistics Canada (2023) Table 38-10-0124-01 Wastewater volumes discharged from municipal sewage systems by treatment category (x 1,000,000) and Table 38-10-0100-01 Combined sewer overflow discharge volumes (x 1,000,000).

Table A.5. Data for Figure 5. Volume and proportion of municipal wastewater discharged by treatment category by province and territory, Canada, 2020

Province/Territory	Volume of municipal wastewater discharged (million m^3)	Combined sewer overflow (percentage)	No treatment (percentage)	Primary treatment (percentage)	Secondary treatment (percentage)	Tertiary treatment (percentage)
Newfoundland and Labrador	113.0	0.0%	37.6%	48.8%	12.9%	0.6%
Prince Edward Island	13.8	0.0%	0.0%	2.2%	74.6%	23.2%
Nova Scotia	178.0	15.5%	9.7%	40.7%	23.3%	10.8%
New Brunswick	108.9	10.1%	0.0%	18.7%	70.8%	0.4%
Quebec	2 132.3	0.0%	0.6%	48.7%	43.0%	7.7%
Ontario	1 998.1	0.5%	0.0%	0.7%	57.7%	41.1%
Manitoba	139.5	4.0%	0.1%	2.2%	77.2%	16.4%
Saskatchewan	83.1	0.0%	0.1%	0.0%	54.3%	45.6%
Alberta	436.4	2.0%	0.0%	0.0%	18.1%	79.9%
British Columbia	702.9	7.6%	4.1%	35.0%	46.3%	7.0%
Yukon	4.4	0.0%	0.0%	0.0%	100.0%	0.0%

Note: Percentages may not add up to 100 due to rounding. Combined sewer overflows correspond to the stormwater and wastewater conveyed into a combined sewer that are discharged directly into receiving waters because they exceed the capacity of the sewer system or treatment plant. No data were available for the sewer systems located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador.
Source: Statistics Canada (2023) Table 38-10-0124-01 Wastewater volumes discharged from municipal sewage systems by treatment category (x 1,000,000) and Table 38-10-0100-01 Combined sewer overflow discharge volumes (x 1,000,000).

Table A.6. Data for Figure 6. Percentage of reporting municipal wastewater systems and effluent volume meeting effluent quality regulatory standards, Canada, 2015 to 2021

Year	Number of municipal wastewater systems meeting effluent quality regulatory standards	Proportion of reporting municipal wastewater systems meeting effluent quality regulatory standards (percentage)	Volume of municipal effluent meeting quality regulatory standards (million m^3)	Proportion of volume of municipal effluent meeting quality regulatory standards (percentage)
2015	1 099	81.0%	3 302	66.2%
2016	1 122	81.1%	3 537	69.6%
2017	1 079	77.6%	3 769	68.6%
2018	1 434	75.6%	3 744	68.3%
2019	1 441	77.9%	3 747	68.8%
2020	1 409	74.7%	3 873	69.9%
2021	1 391	76.2%	3 612	70.8%

Note: Only the municipal wastewater systems with a daily flow of 100 m^3 or more that submitted their monitoring reports were considered. Data were unavailable for the populations located in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador.
Source: Environment and Climate Change Canada (2023) Wastewater Systems Effluent Regulations Program.

Additional information can be obtained at:

Environment and Climate Change Canada
Public Inquiries Centre
12th Floor Fontaine Building
200 Sacré-Coeur Blvd
Gatineau QC K1A 0H3
Telephone: 1-800-668-6767 (in Canada only) or 819-938-3860
Email: enviroinfo@ec.gc.ca