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# 2011 Municipal Water Use Report

**Municipal Water Use 2009 Statistics**

Canada 

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## Introduction

Municipal water supply provides water to the homes and business places of a majority of Canadians, as well as those industrial and agricultural operations that are connected to a municipal water distribution system.

Access to sufficient quantities of clean drinking water and sanitary sewage collection is essential to the health and economic vitality of our communities. Every year, substantial investments are required to maintain and expand our water and sewer systems and treatment plants. Meanwhile, policies and programs must continue to be developed and revised to ensure adequate protection of our water resources from overexploitation and pollution. To safeguard the resource and maintain the high standard of service our communities require, policy makers and resource managers must make well-informed decisions based on a thorough understanding of the environmental, social and economic systems that shape how communities use water.

Environment Canada's Municipal Water and Wastewater Survey (MWWS) contributes to Canada's goal of promoting the wise and efficient management and use of water by providing a principal source of information on municipal water use and pricing in Canada. This survey—along with its predecessor, the Municipal Water Use and Pricing Survey (MUD/MUP)—has been conducted every two or three years by Environment Canada since 1983. The resulting data is geocoded and can be analyzed in several ways, such as by survey year, province/territory and size of municipal population.

This municipal water use report includes updates (2009 data) of statistics that were published in similar reports for 2006 and 2004 data. This report summarizes some of the most important findings concerning water use, metering, population served by water and wastewater services, water sources, and wastewater treatment categories. Some comparison to past values is also included. A companion report will focus on the pricing of municipal water and wastewater services, as well as water conservation measures.

For the complete set of statistics produced from the 2009 cycle of the MWWS, please refer to the MWWS Summary Tables (2009 Statistics) that are available online.<sup>1</sup>

An explanation of the terminology used in this report can be found in the glossary found at the end of the document.

## Methodology

The 2009 MWWS collected data on municipal water use and pricing for the 2009 calendar year.

### *Survey sample*

The survey was sent out to all municipalities with a population greater than 1000 and to a sample of those under 1000, except municipalities on Federal Lands and First Nations.

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<sup>1</sup> The water use reports, pricing reports, survey questionnaire, municipality-level water use and pricing databases, and variable description documents are available from the Water section of Environment Canada's website ([www.ec.gc.ca/eau-water](http://www.ec.gc.ca/eau-water)). To find the MWWS survey page, click on "Water Research" in the left-hand column.

The sample of municipalities with less than 1000 residents increased to 1000 municipalities in the 2009 survey, representing 43% of the total Canadian population living in municipalities below 1000 population. The 2006 MWWS sample included only 630 municipalities with less than 1000 residents, while the 2004 MWWS sample included 616 such municipalities (no municipalities below 1000 population were included in the 2001 or previous samples). In spite of this change, the data is still comparable to previous survey cycles, as any effect on the aggregate statistics is negligible due to the very small overall population of responding municipalities in this size group.

The 2009 survey sample contained a total of 2779 municipalities, compared to the 2006 sample of 2409 municipalities. Forty municipalities that were included in the 2006 sample were merged into existing or new municipalities or districts in the 2009 sample. An additional 410 municipalities were added to the 2009 sample, including 400 additional municipalities with population below 1000 (as mentioned above), and another 10 municipalities that crossed the 1000 population threshold and were therefore automatically included in the survey sample.

The population estimates used for each municipality are based on Statistics Canada's population estimates for census subdivisions on July 1, 2009.

#### *Response rate and representativeness*

The response rate to the survey varies by question; please refer to the "Responding Population" column in each table to find the exact responding population for each statistic.

Initial survey responses were supplemented with call-backs to large municipalities and Internet searches for readily available information. Some missing records were imputed from data collected in 2006, after adjusting for changes in the population in the intervening years. In the 2009 Municipal Water and Wastewater summary database, the source of each record (2009 survey or imputed from 2006) is indicated; therefore the non-imputed totals or averages can be obtained, if desired.

In 2009 the survey collected information on one or more key statistics from 1488 municipalities (with a population of 27.0 million). Imputing from 2006 for non-response where possible brought these values up to 1688 municipalities, representing 30.0 million Canadians.

The data reported here has been compiled directly from values collected through the 2009 MWWS. No statistical techniques or extrapolation has been used to render the information representative of the entire Canadian population. When interpreting the survey results, the reader should always refer to the responding population, which is indicated for each statistic presented in this report.

#### *Changes since 2006*

The MWWS underwent revisions and modifications since the 2006 survey cycle. Changes made to the survey questionnaire and to the method of data analysis have allowed greater clarity and precision in survey results. However, in some cases these changes have affected the comparability of the 2009 results with previous cycles' data. Throughout this report, we have mentioned the 2006 results for comparison but have also indicated wherever the results are not directly comparable due to methodology changes.

## Survey highlights

### *Most Canadians are served piped water and water treatment*

In 2009, 1590 municipalities—representing 28.9 million Canadians—provided information on the number of people in their jurisdiction who obtained water from a public-serving water distribution system (i.e., piped water), from private wells and through water haulage (i.e., trucked water). Of this population, a large majority (88.9%) is served by a water distribution system, with 10.5% on private wells and 0.6% receiving trucked water.

The 2009 MWWS surveyed a sample of 1000 municipalities with population below 1000 people, out of a total of 3317 municipalities of that size that exist in Canada. Since many small municipalities do not have water systems at all, it is likely that the total percent of Canadians on private wells and water haulage is somewhat higher than that reported here.

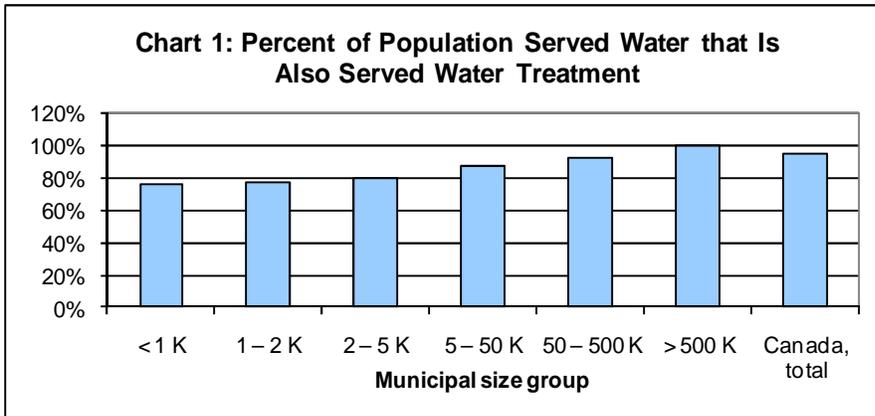
**Table 1: Residential Water Services, by Province/Territory and Municipal Population**

	Number of Responding Municipalities	Responding Population	Population Served Water Distribution	Percent of the Population that Is Served Water Distribution	Percent of the Population that Is on Private Wells	Percent of the Population that Is on Water Haulage
Newfoundland and Labrador	55	363 817	343 621	94.4%	5.6%	0.0%
Prince Edward Island	10	63 805	55 179	86.5%	13.5%	0.0%
Nova Scotia	31	791 167	473 853	59.9%	39.5%	0.6%
New Brunswick	65	409 857	319 245	77.9%	22.1%	0.0%
Quebec	579	6 601 881	5 943 173	90.0%	10.0%	0.0%
Ontario	247	12 297 845	11 023 461	89.6%	10.1%	0.2%
Manitoba	102	1 002 380	888 553	88.6%	10.1%	1.2%
Saskatchewan	192	497 027	452 920	91.1%	7.7%	1.2%
Alberta	183	3 492 769	3 125 871	89.5%	8.6%	1.9%
British Columbia	112	3 308 751	3 018 321	91.2%	7.9%	0.9%
Territories	14	55 391	42 605	76.9%	3.8%	19.3%
<b>Municipal Population</b>						
Under 1 000	475	253 299	127 178	50.2%	47.3%	2.5%
1 001–2 000	318	461 438	254 205	55.1%	42.9%	2.0%
2 001–5 000	302	995 347	660 568	66.4%	32.6%	1.1%
5 001–50 000	418	5 922 662	4 269 995	72.1%	26.1%	1.8%
50 001–500 000	67	9 944 049	9 281 803	93.3%	6.5%	0.2%
More than 500 000	10	11 307 895	11 093 052	98.1%	1.8%	0.1%
<b>Total, 2009</b>	<b>1 590</b>	<b>28 884 690</b>	<b>25 686 801</b>	<b>88.9%</b>	<b>10.5%</b>	<b>0.6%</b>
<b>Total, 2006</b>	<b>1 314</b>	<b>28 177 339</b>	<b>25 472 314</b>	<b>90.4%*</b>		

Source – 2009 MWWS. Aggregated to municipal level and imputed for non-response using 2006 MWWS. Sustainable Water Management Division, Environment Canada.

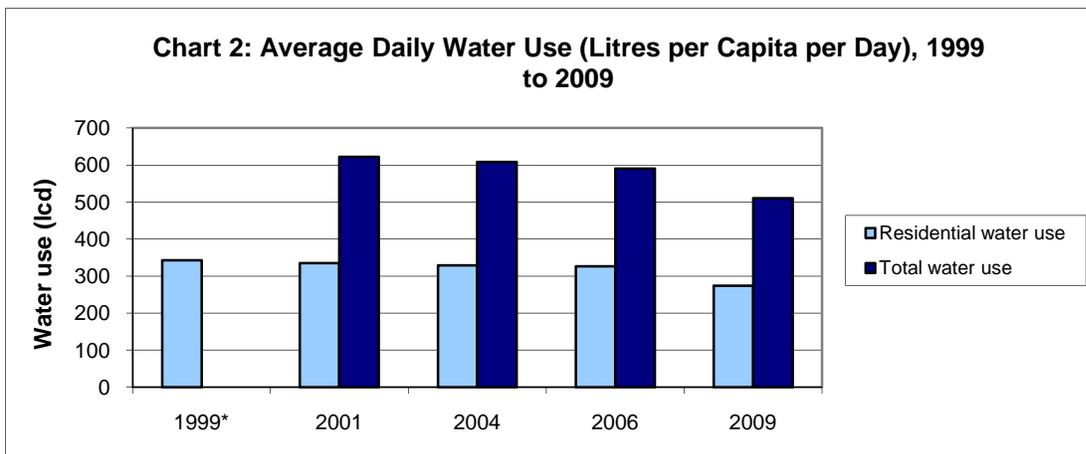
\* The values for 2009 are not directly comparable with the results from 2006 due to a change in the way the data was analyzed. The 2009 results are based on the entire municipal population, while the 2006 results are based only on the population in municipalities that have water distribution systems.

Of the population served piped water, 94.0% are also served water treatment. Smaller municipalities are more likely not to have treated water. The proportion of the population served water that is also served water treatment varies from 75.3% in municipalities under 1 000 population to 99.6% in municipalities of over 500 000 people.



***Both total and residential water use per capita have decreased since 2006***

Both total<sup>2</sup> and residential water use per capita showed a more significant drop over 2006 to 2009 than between previous survey cycles. The 2009 average residential water use per person was 274 litres per capita per day (Lcd), a 53 Lcd drop from 2006. Total water use per person dropped by 79 Lcd, from 591 Lcd in 2006 to 510 Lcd in 2009.



\* Data on total water use per capita is not available for 1999.

These results suggest a possible trend towards more sustainable use of water resources in the municipal sector. Canadians have consistently ranked among the world's highest users of water, with per capita water use well above that of European and many other industrialized nations.<sup>3</sup> High

<sup>2</sup> Total water use per capita is the total volume of water delivered to the water distribution system, divided by the residential population served water. Total water use includes all end-uses of municipal-supplied water (residential, commercial, industries and agricultural operations that obtain their water from a municipal water supply) and water losses.

<sup>3</sup> OECD Factbook, 2008.

water use can contribute to a wide variety of environmental and economic problems, including water shortages; the drawdown of aquifers in areas served by groundwater; increased temperature and concentration of pollutants in water bodies; costly expansion of water and wastewater infrastructure; and increased energy consumption for pumping and treating water and wastewater.

The encouraging results from 2009 must nevertheless be understood within the context of climatic factors that may have affected municipal water use in that year. For Canada overall, temperature was below the 1971–2000 normal—and below 2006 temperatures—from May through July 2009, and was only very slightly above normal in August. Meanwhile, rainfall was higher than both the 2006 level and the 1971–2000 normal in July and August 2009. The lower temperatures in June and July and higher rainfall in July and August could have contributed to the lower per capita water use in 2009 compared to 2006, particularly in the residential sector where lawn watering constitutes an important end-use of water in the summer months.

Total and residential per capita water use dropped in all municipal size groups and provinces/territories except for Saskatchewan and New Brunswick (P.E.I. also showed a very slight increase of 2 Lcd in total water use). The greatest drop in total water use per capita was seen in communities of less than 50 000 people, while it was in communities of 2 000 to 50 000 people that residential water use decreased most significantly. In spite of this, the results show that larger communities continue to have relatively lower per capita water use. Total per capita water use was 497 Lcd (251 Lcd residential) in municipalities with a population of 500 000 or more and 756 (426 Lcd residential) in municipalities with less than 1 000 people.

Per capita water use also varies across the provinces and territories. Of the provinces, Manitoba, Alberta and Ontario have the lowest total water use per capita, while P.E.I., Manitoba and Alberta have the lowest residential water use per capita.

#### **Box 1: MWWS results and responding population**

The MWWS is a voluntary survey and, therefore, response rates vary slightly from cycle to cycle. These changes can have an impact on the survey results. However, as the response rate is close to 100% for large communities (50 000 people or more) and most of the statistics are weighted by population, the impact of the changes in responding population on results at the national level is slight.

While the exact causes of the drop in total and residential water use per capita between the 2006 and 2009 survey cycles would require further study to determine, it is certain that it is not simply the results of different response rates in the two survey years.

For total water use per capita, approximately 75% of the 2009 data set (by population) was composed of municipalities that responded in both 2006 and 2009. For residential water use per capita, 62% of the data set (by population) was composed of municipalities that responded in both 2006 and 2009. A significant drop in total and residential water use per capita is observed even when looking only at municipalities that responded in both 2006 and 2009.

**Table 2: Total and Residential per Capita Water Use, by Province/Territory and Municipal Population**

	Number of Responding Municipalities	Responding Population	Total Water Use per Capita (litres per capita per day)	Number of Responding Municipalities	Responding Population	Residential* Water Use per Capita (litres per capita per day)
<b>Newfoundland &amp; Labrador</b>	24	278 549	804	22	189 235	395
<b>P.E.I.</b>	4	52 582	505	4	52 582	189
<b>Nova Scotia</b>	18	436 981	512	17	436 120	292
<b>New Brunswick</b>	30	267 352	821	27	263 986	394
<b>Quebec</b>	272	5 465 132	706	225	4 393 874	386
<b>Ontario</b>	165	10 470 997	409	159	10 401 245	225
<b>Manitoba</b>	54	847 025	355	49	842 461	199
<b>Saskatchewan</b>	80	609 177	518	75	607 131	238
<b>Alberta</b>	124	2 837 712	395	115	2 756 461	209
<b>British Columbia</b>	87	2 766 835	606	86	2 764 564	353
<b>Territories</b>	6	39 448	599	6	39 448	391
<b>Municipal Population</b>						
<b>Under 1000</b>	154	74 099	756	136	65 249	426
<b>1001-2000</b>	142	159 338	528	120	135 276	371
<b>2001-5000</b>	172	446 134	712	157	410 304	385
<b>5001-50 000</b>	322	3 586 411	570	302	3 384 172	313
<b>50 001-500 000</b>	64	8 747 123	489	60	7 816 692	280
<b>More than 500 000</b>	10	11 058 686	497	10	10 935 416	251
<b>Total, 2009</b>	864	24 071 791	510	785	22 747 109	274
<b>Total, 2006</b>	1 082	25 183 363	591**	1 043	25 074 414	327**

Source - 2009 Municipal Water and Wastewater Survey. Aggregated to municipal level and imputed for non-response using 2006 MWWS. Sustainable Water Management Division, Environment Canada.

\* Includes single-family and multi-family

\*\* The drop in water use per capita from 2006 to 2009 was sharper than between previous survey cycles. This drop may have been caused by a wide variety of factors, including climatic variables, socioeconomic variables, higher rates of metering and increased water and sewer prices, among others. Changes in the survey sample can also have a limited impact on the survey results. For total water use per capita, 75% of the data set (by population) was composed of municipalities which responded in both 2006 and 2009, while for residential water use per capita, 62% of the data set (by population) was composed of municipalities which responded in both 2006 and 2009.

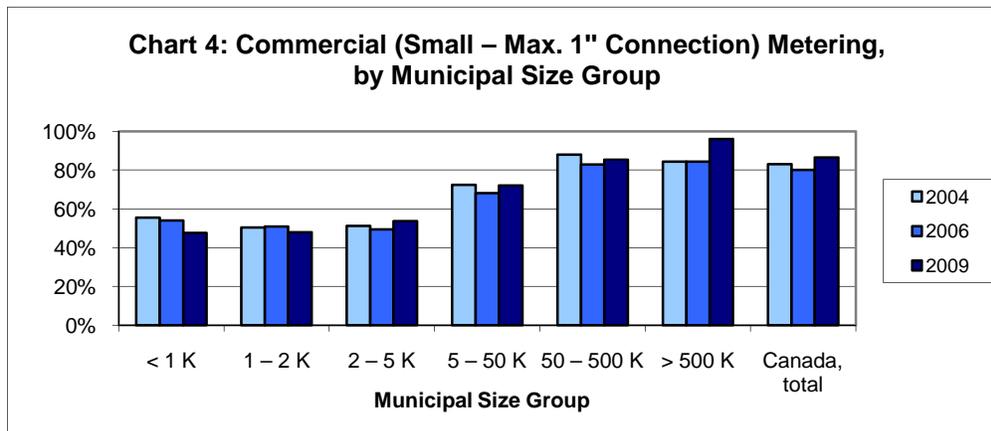
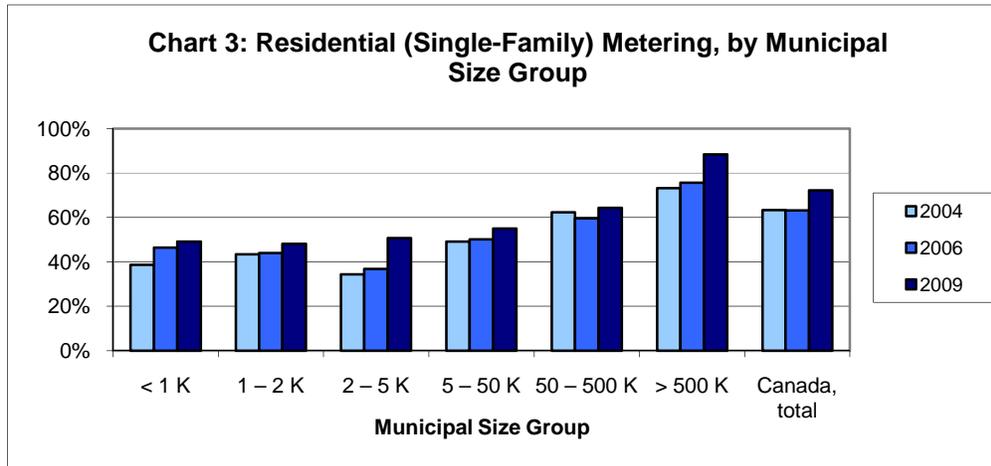
### ***Residential and commercial metering is on the rise***

Water meters allow users to be charged according to the actual volume of water used, as well as facilitating leak detection and providing water managers with valuable information on how water is used in their community. They represent an important component of any water efficiency program that involves the use of price signals to encourage water conservation.

The use of water meters in Canadian municipalities varies widely. While some communities are experimenting with state-of-the-art “smart” meters that can provide both the utility and the consumer with information on water use multiple times throughout the day, other communities do not use water meters at all. In general, however, the use of meters in both the residential and commercial sectors has increased over the past few decades. Among residences and businesses that receive municipal water supply, 72.1% of single-family residences are metered and 86.8% of commercial buildings (small offices/businesses with a maximum 1 inch or 25 mm connection) are metered.

The survey results show that, as in previous years, larger communities have higher rates of both residential and commercial metering. Almost all homes and businesses in the largest size group are metered, while roughly half of homes and businesses in communities of less than 3000 people are metered.

In general, commercial metering is more widespread than is residential metering. This trend is largely driven by a handful of provinces (Newfoundland and Labrador, P.E.I., New Brunswick, Quebec, and B.C.) where the incidence of commercial metering is much higher than residential metering.



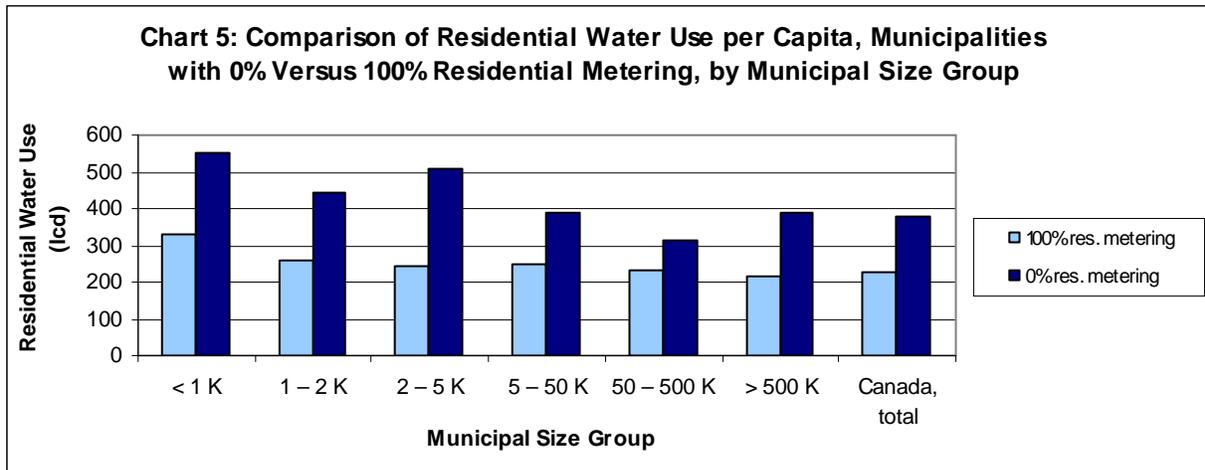
***Communities with full residential metering have lower water use than those without metering***

All MWWS surveys since 1991 have indicated households that have volume-based water rates tend to use significantly less water per person than those on flat rates or taxes. This analysis is based on a comparison of the per capita residential water use between municipalities with 0% residential metering and those with 100% residential metering. The 0% and 100% metering rates are used as a proxy for the use of flat or assessed water rates versus the use of volume-based water rates; it is assumed that metered households are subject to volume-based water charges and households without water meters are subject to flat rates or assessed water taxes.

The 2009 survey shows that in municipalities with volume-based water charges (using 100% metering as a proxy), the average residential consumption rate was 229 Lcd. In municipalities without metering and therefore no volume-based pricing, the average residential consumption rate

was 65% higher at 376 Lcd. This association between metering and lower per capita water use holds true for all provinces and size groups, although the magnitude of the difference varies.

It is important to note, however, that the difference in water use between metered and unmetered communities cannot be solely explained by the use of water meters or volume-based pricing. While there is strong evidence to suggest that volume-based pricing is associated with lower municipal water use, water use can also be affected by a wide variety of other factors, including location, climate and socio-economic variables.



***Across Canada, 13.3% of water is lost from distribution systems before reaching consumers***

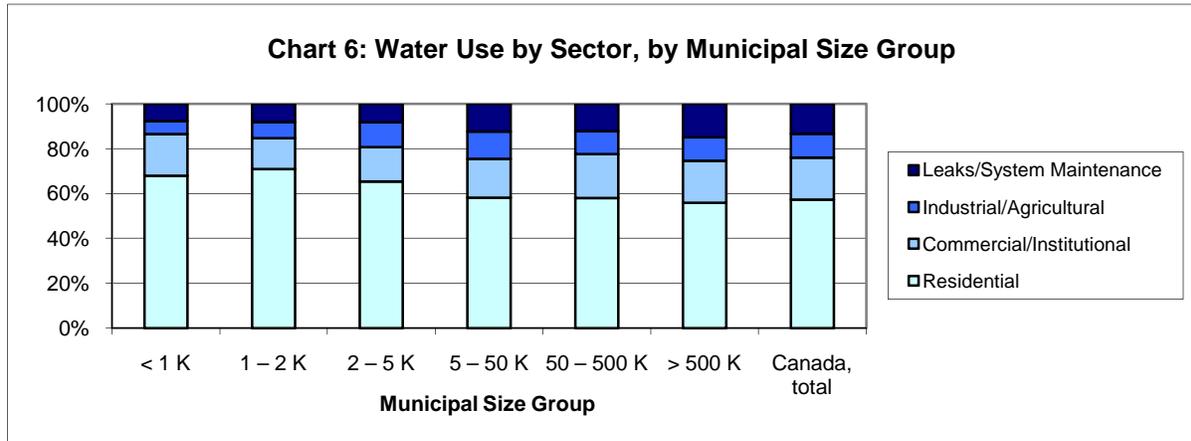
The 2009 results show a very similar distribution of water use by sector as previous survey cycles. The residential sector continues to account for the bulk of municipal water use (57.4% in 2009). The commercial/institutional sector (including water use by the municipality) follows with 18.7% of total water use. Leaks and system flushing/maintenance account for 13.3%, and the remaining 10.6% of water is used by industries and agricultural operations that are connected to the municipal water supply.

Leakage and system flushing/maintenance rose very slightly from 12.8% in 2006 to 13.3% in 2009. This small change could be due to any of a number of factors, including more accurate measurement, higher system pressure due to lower water use, or aging infrastructure leading to increased main breaks and leaks.

More water is lost through leaks and system maintenance in larger municipalities than in small communities, with the percentage in large cities of over 500 000 people (14.9%) almost twice that of the smallest communities of under 1 000 people (7.6%). Between provinces, the percent of water lost through leaks and system maintenance varies from a low of 7.5% in Newfoundland and Labrador to a high of 22.1% in Quebec. Water losses are related to a number of issues, including the condition of distribution infrastructure and level of pressure maintained in the distribution system.

The proportion of water used by the residential, commercial and industrial sectors also varies considerably by municipality size. Smaller communities tend to have less commercial and industrial water use, and so the residential sector accounts for a greater percent of water use than in larger

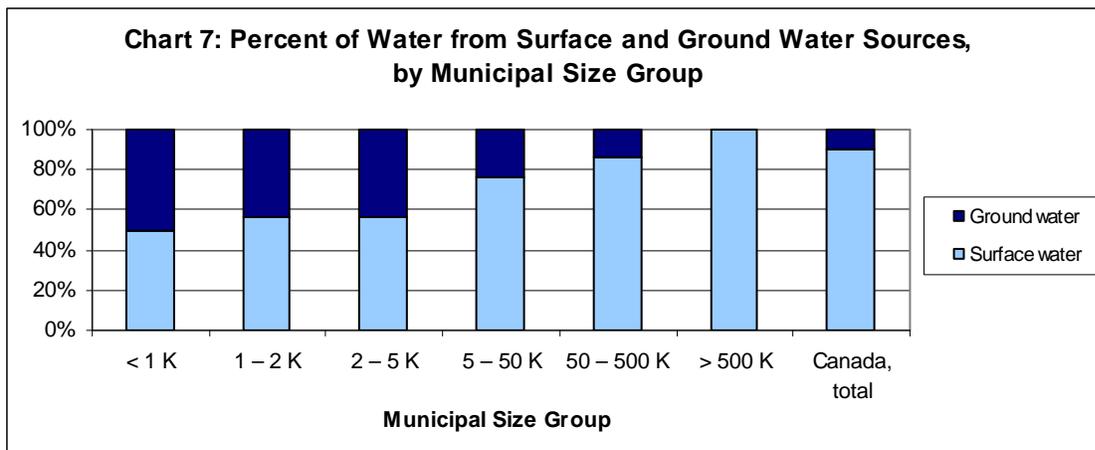
communities. Residential water use in municipalities of under 2 000 people is around 70%, while this sector only accounts for 56% of water use in municipalities of over 500 000 people.

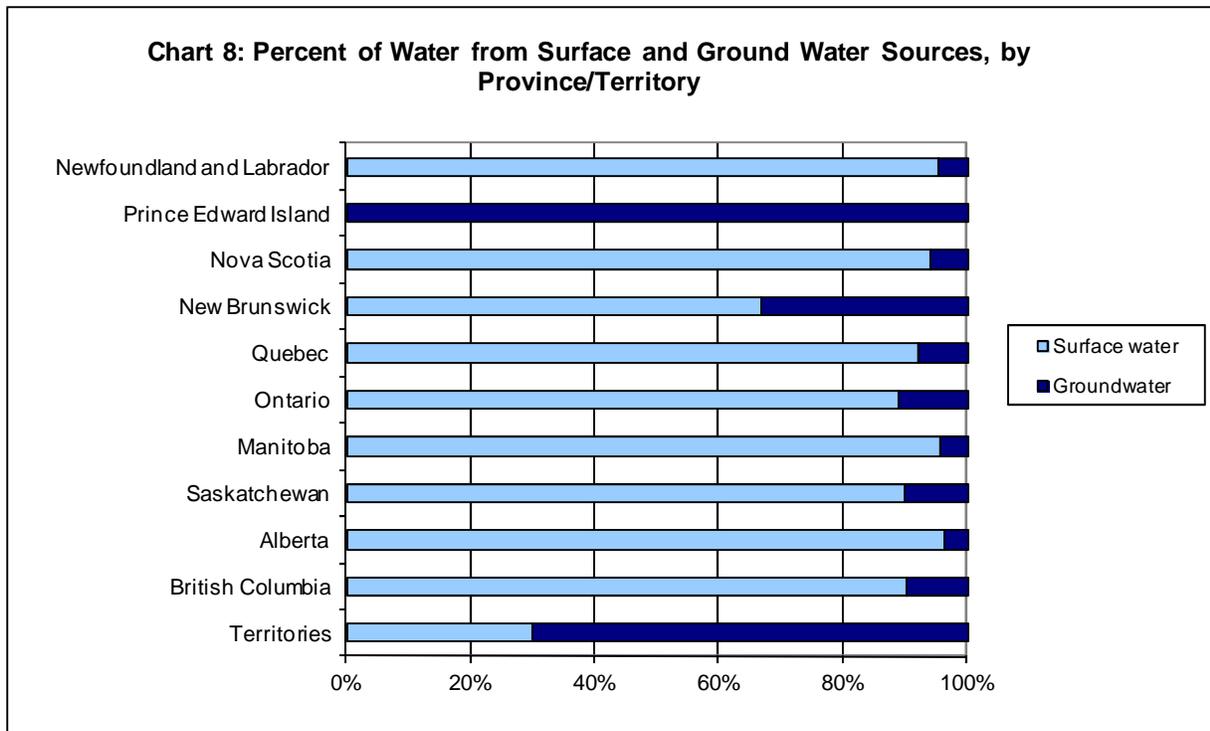


***Most of the water used in municipalities continues to come from surface water sources***

For Canada overall, surface water sources provide the vast majority of water used in Canadian municipalities. In 2009, 90.2% of water in distribution systems came from surface water sources such as lakes and rivers, compared to only 9.8% of water that comes from groundwater sources. Nationally, the ratio of water extracted from surface and groundwater sources has remained remarkably stable over the past decade. As illustrated by Chart 7, most large municipalities obtain almost all of their water from surface water sources, while small municipalities rely more heavily on groundwater sources.

Significant regional variations in the percent of water obtained from surface versus groundwater sources are also observed. All responding municipalities in P.E.I., which has few surface rivers and lakes, indicated that they obtained their drinking water from groundwater sources. New Brunswick and the territories also rely on groundwater for a significant proportion of their drinking water.





***Problems with water availability continue to exist in Canada***

Of the 738 municipalities (total responding population of 21.1 million people) that submitted information on water supply problems, 86 (12.1% of the total responding population) indicated that they experienced a water supply problem from January 1, 2007, to December 31, 2009.<sup>4</sup> This information provides only a high-level assessment of water supply problems in Canadian municipalities, as the detailed causes of the problems are not identified. Water supply problems can include, but are not limited to, insufficient water resources, broken water mains, washouts due to floods, and planned or unplanned plant closures.

The MWWS also collects high-level data on water quality problems. Of the 746 municipalities (total responding population of 20.4 million people) that submitted information on water quality problems, 206 (33% of the total responding population) indicated that they experienced a water quality problem between January 1, 2007, and December 31, 2009. Water quality problems can include, but are not limited to, aesthetic (taste or odour), chemical, microbiological and radiological problems.

In some cases, water supply problems can lead to water quality problems. Broken mains or insufficient water flow, among other factors, can lead to contamination of the water supply.<sup>5</sup>

<sup>4</sup> In the MWWS Water Use Report (2006 data), it was reported that 16% of responding municipalities indicated that they experienced water supply problems sometime in 2006. No comparable statement can be made for 2009, as the 2009 questionnaire collected information for the entire period of January 1, 2007, to December 31, 2009, as a whole and not for each intervening year.

<sup>5</sup> U.S. EPA, 2006.

### ***The population served secondary wastewater treatment or better remains stable***

Data on the level of treatment received by wastewater effluent is collected for the population that is connected to a sanitary sewer system in Canadian municipalities. In 2009, 1524 municipalities accounting for 28.1 million Canadians provided information on the number of people in their jurisdiction who were connected to a sanitary sewer system or who used private septic systems or sewage haulage. Of this population, a large majority (87.1%) is served by a piped sewer network, with 12.4% using private septic systems and 0.5% served sewage haulage.

As the 2009 MWWS only surveyed a sample of municipalities with population below 1000 people, and given that many small municipalities do not have sewer systems at all, it is likely that the total percent of Canadians using private septic systems and sewage haulage is somewhat higher than that reported here.

**Table 3: Residential Wastewater Services, by Province/Territory and Municipal Population**

	Number of Responding Municipalities	Responding Population	Population Served Sewers	Percent of the Population that Is Served Sewers	Percent of the Population that Is on Private Septic Systems	Percent of the Population that Is on Sewage Haulage (Holding Tanks)
Newfoundland and Labrador	50	348 836	321 997	92.3%	7.7%	0.0%
Prince Edward Island	10	63 805	58 757	92.1%	7.9%	0.0%
Nova Scotia	31	791 001	535 846	67.7%	32.2%	0.1%
New Brunswick	63	402 541	351 319	87.3%	12.1%	0.6%
Quebec	542	6 182 520	5 385 542	87.1%	12.8%	0.1%
Ontario	241	11 948 830	10 457 340	87.5%	12.2%	0.2%
Manitoba	95	988 766	876 176	88.6%	9.2%	2.2%
Saskatchewan	187	696 621	642 644	92.3%	6.6%	1.1%
Alberta	180	3 481 798	3 104 981	89.2%	9.6%	1.2%
British Columbia	111	3 162 751	2 721 350	86.0%	13.4%	0.6%
Territories	14	55 391	42 322	76.4%	8.3%	15.3%
<b>Municipal Population</b>						
Under 1 000	453	241 181	113 995	47.3%	48.8%	3.9%
1 001–2 000	296	430 794	230 173	53.4%	44.1%	2.5%
2 001–5 000	292	971 417	598 607	61.6%	36.5%	1.8%
5 001–50 000	408	5 785 533	3 916 092	67.7%	31.2%	1.1%
50 001–500 000	65	9 560 467	8 730 643	91.3%	8.4%	0.3%
More than 500 000	10	11 133 468	10 908 761	98.0%	2.0%	0.0%
<b>Total, 2009</b>	<b>1 524</b>	<b>28 122 860</b>	<b>24 498 272</b>	<b>87.1%</b>	<b>12.4%</b>	<b>0.5%</b>
<b>Total, 2006</b>	<b>1 314</b>	<b>28 177 339</b>	<b>24 880 590</b>	<b>88.3%*</b>		

Source – 2009 MWWS. Aggregated to municipal level and imputed for non-response using 2006 MWWS. Sustainable Water Management Division, Environment Canada.  
 \* The values for 2009 are not directly comparable with the results from 2006 due to a change in the way the data was analyzed. The 2009 results are based on the entire municipal population, while the 2006 results are based only on the population in municipalities that have sewer systems.

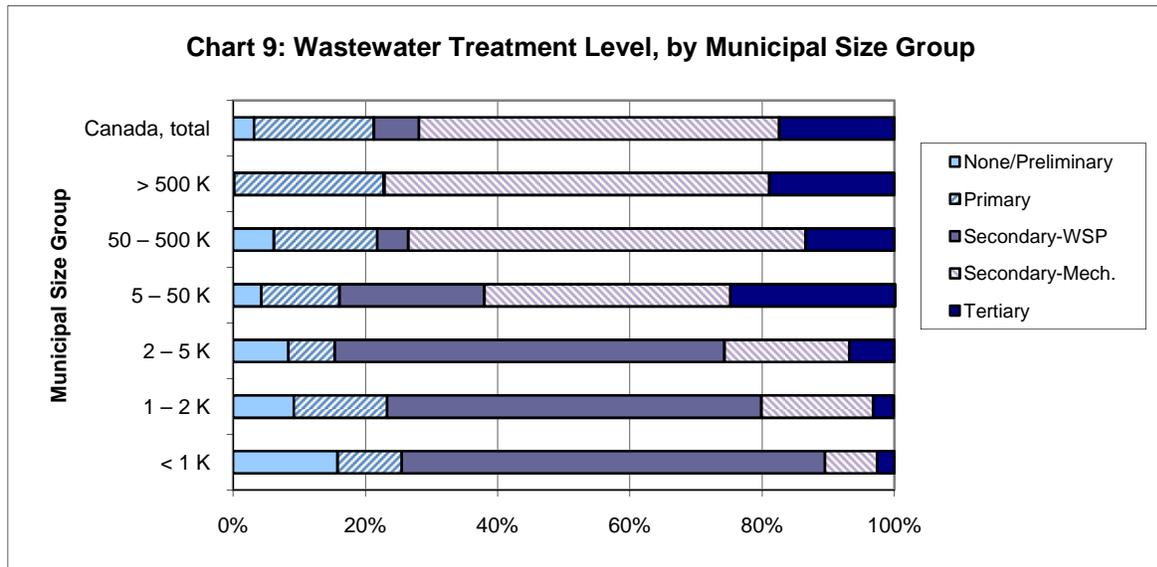
Of the population connected to sanitary sewer systems, 78.7% had their wastewater effluent treated at a secondary level or higher. Only 3.2% received no treatment or preliminary treatment only (screening, grit removal) of their wastewater, while 18.1% received primary treatment, 6.8% received secondary treatment in waste stabilization ponds (sewage lagoons), 54.5% received secondary-mechanical treatment and 17.4% received tertiary-level treatment.

The 2009 results show no significant changes since the 2006 survey cycle. The 2006 data showed 30.8% of the population receiving tertiary or advanced treatment and only 42.4% receiving secondary-mechanical treatment; however, these large differences compared to the 2009 results are

due to a change in the way data was collected and classified rather than an actual change in treatment levels. In 2006, all treatment levels involving one or more “advanced” treatment techniques (see Glossary for more detail) were classified as “advanced/tertiary” while in 2009 the survey respondent had to choose between five categories only: none/preliminary, primary, secondary-WSP, secondary-mechanical and tertiary. Therefore, the tertiary category in 2009 contains only tertiary-level wastewater treatment.

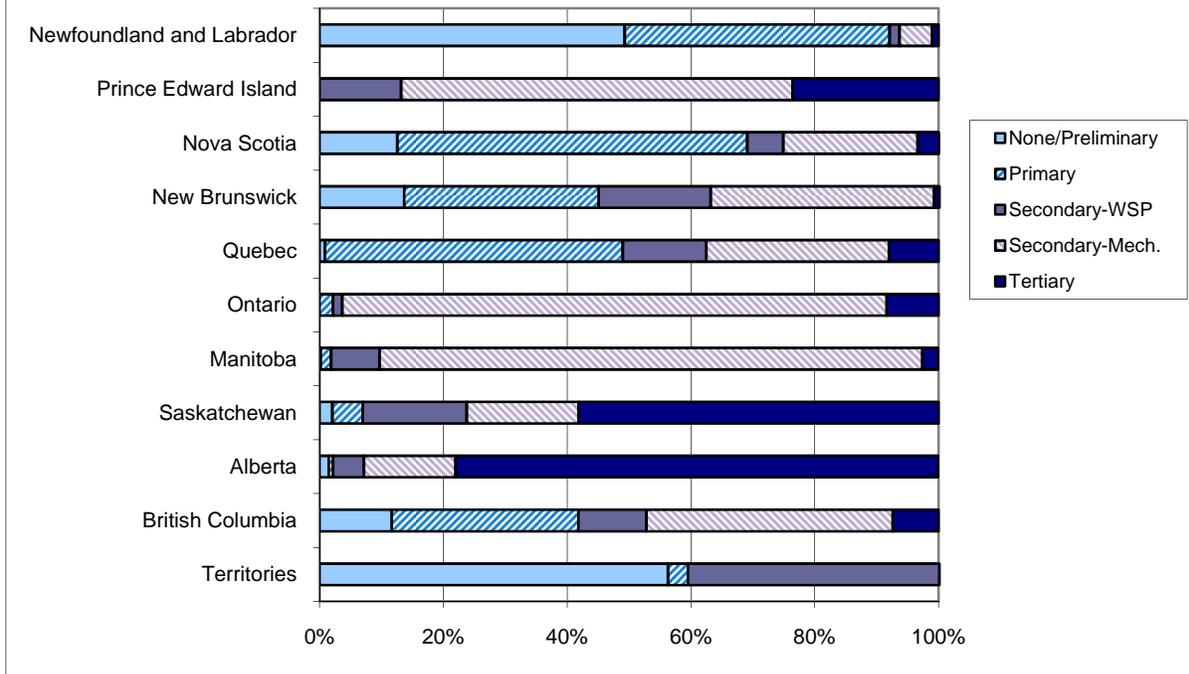
Smaller municipalities are the most likely to have a greater percent of their population served by no wastewater treatment or preliminary treatment only. These two categories represent over 9% of the population in communities of 1000 to 2000 people and around 16% of the population in communities of less than 1000 people. Similarly, these small communities have the smallest percent of population served by tertiary-level treatment.

However, even in small municipalities, the majority of the population is served by secondary-level treatment. In communities of under 5000 people, secondary treatment is most often provided by waste stabilization ponds, while in communities of greater than 5000 people, secondary-mechanical treatment is more common.



The percent of population served by each level of treatment varies widely between provinces. Newfoundland and Labrador and the three territories have significant proportions of the population that are not served by any wastewater treatment or only by preliminary treatment. Primary treatment is prominent in Newfoundland and Labrador, Nova Scotia, Quebec, and, to a lesser extent, New Brunswick and British Columbia. Ontario and Manitoba’s populations are almost entirely served by secondary-mechanical treatment, while 78% of Alberta’s population is served by tertiary-level wastewater treatment.

**Chart 10: Wastewater Treatment Level, by Province/Territory**



## Conclusions

Understanding how Canadian communities use water is a prerequisite to gauging Canada's progress toward the sustainable use of its water resources. Environment Canada's MWWS provides information that allows the public, water managers and policy-makers alike to measure and compare different aspects of water use in the municipal sector, and to make informed decisions concerning our valuable water resources and water infrastructure.

The 2009 MWWS results suggest that both residential and total municipal water use per capita is dropping in many parts of the country, indicating a shift towards more efficient use of water both in homes and in businesses. Even so, residential and total per capita water use levels nevertheless remain significantly higher than those observed in many industrialized nations. In fact, the 2009 per capita water use is higher than that recorded in all 30 of the European countries included in a comparative evaluation published by the European Federation of National Associations of Water and Wastewater Services in 2009.<sup>6</sup> Furthermore, the drop over 2006 to 2009 may be at least partly related to cooler, wetter weather in many parts of the country during 2009. Results from future MWWS survey cycles—beginning with the next survey in 2011—will help to determine whether or not this drop represents a lasting trend.

The increase in metering in both the residential and commercial sectors also suggests an effort on behalf of Canadian municipalities to send a price signal for water demand management and to better

<sup>6</sup> EUREAU, 2008.

track water use in their jurisdiction. The companion Water Pricing report (2009 statistics) will complement this Water Use report (2009 statistics) by exploring the water rates and rate types used in Canadian municipalities in 2009.

Comparing the 2009 national results to previous years reveals that population served by piped water, sewer and water treatment services, water use by sector (residential, commercial, etc.), and the volume of water extracted from surface and groundwater sources have all remained stable since 2006 and earlier. The overall percentage of water lost from leaks or used for system maintenance has also seen little change, in spite of significant efforts by some municipalities and water utilities to reduce water losses.

The vast majority of water used in Canadian homes and businesses ends up in a municipal sewer system. This water—which in municipalities that have combined sewer systems is mixed with runoff from roads and other surfaces—contains a wide variety of pollutants that can be harmful to both human and environmental health. In 2009, the Canadian Council of Ministers of the Environment endorsed the Canada-wide Strategy for the Management of Municipal Wastewater Effluent with the aim of setting out a harmonized framework to manage discharges from wastewater facilities in Canada. The Government of Canada has since proposed regulations for wastewater systems, including national standards for wastewater effluent quality that represent a secondary level of wastewater treatment or equivalent. As facilities are upgraded to meet the regulations over the coming decades, the percent of the population served by “None/Preliminary” and “Primary” wastewater treatment is expected to drop.

The next MWWS survey will collect data for the year 2011, continuing the series of Water Use and Pricing reports and data products produced by Environment Canada since the 1980s. These regularly produced data and analyses are intended to provide information that supports water management decisions in the broader context of ecosystem management, thus contributing to Canada’s goal of promoting wise and efficient management and use of water.

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## Glossary

**Geocode** – Spatially referencing statistical data by linking it to geographical information, such as longitude and latitude.

**Impute** – The process of estimating a missing value that a survey respondent failed to provide. For example, the estimate can be assumed from the subject's responses to similar surveys in previous years or calculated using various statistical methods. In this case, missing values were imputed from data submitted in 2006 only, and where applicable, where adjusted for the change in the population in the intervening years.

**Municipality** – A municipal-level jurisdiction (in an organizational and spatial sense), as defined by Statistics Canada's Census Subdivisions. In some cases, municipalities have been grouped for the purpose of the Municipal Water Use and Pricing survey.

**Municipal Water Use Database** – The municipally aggregated database created from municipal water use survey results, using imputed values where necessary.

**Population served** – The portion of the responding population receiving a particular water-related municipal service (i.e., water distribution, water treatment, wastewater collection or wastewater treatment, depending on the question).

**Proxy** – A statistical variable that is similar enough to another to be used as a substitute for it, usually because it can be more readily measured than the original.

**Responding municipality** – A municipality for which there was a response to a given question in the 2009 survey. A municipality that fails to respond to a particular survey question can still be considered a responding municipality if its response can be imputed from other available information (see "Impute").

**Responding population** – The number of people for which the responding municipality provided a response to a given survey question. For example, if a municipality provided the percent of households metered for a water system serving 20 000 people and another water system serving 5 000 people, the total responding population for residential water metering for that municipality is 25 000 people.

**Wastewater treatment levels** – Classifications of wastewater treatment types to simplify comparison of the many types of wastewater treatment technologies used, specifically:

*None/Preliminary:* The wastewater receives no treatment or preliminary treatment only. Preliminary treatment removes relatively large solids from wastewater. Some common techniques include grit removal, screening, bar racks and skimming.

*Primary:* A treatment process that allows the undissolved solids in raw sewage to settle out of suspension forming sludge. Some common techniques include primary sedimentation/clarification, plate/tube settlers and chemical precipitation/flocculation.

*Secondary-WSP (Waste Stabilization Ponds):* Treatment for the removal of most of the organic matter or to achieve significant biochemical oxygen demand and suspended solids reductions. Some common techniques include: aerated, aerobic, facultative, storage ponds and anaerobic.

*Secondary-Mechanical:* Treatment for the removal of most of the organic matter or to achieve significant biochemical oxygen demand and suspended solids reductions. Some common techniques include: conventional activated sludge, extended aeration activated sludge, pure oxygen activated sludge, other activated sludge, oxidation ditch, trickling filter, rotating biological contactor and sequencing batch reactor.

*Tertiary:* Enhanced treatment to remove constituents, such as phosphorus and nitrogen, which may not be satisfactorily reduced through conventional secondary treatment. Some common techniques include: polishing ponds, ammonia stripping or air stripping, biological nutrient removal—nitrogen and phosphorus, biological ammonia removal—nitrification only ( $\text{NH}_3 \rightarrow \text{NO}_3$ ), biological nitrogen removal—nitrification and denitrification ( $\text{NH}_3 \rightarrow \text{N}_2$ ), biological phosphorus removal, chemical precipitation (phosphorus), and filtration.

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