

## Domestic Water Consumption, 1999

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### Abstract

The map shows total municipal needs by province and territory. Domestic water consumption includes the quantity of water used for household purposes such as washing, food preparation, and bathing. Across Canada, nearly all of the water used by municipal water systems comes from lakes and rivers the remainder (12% of the total) comes from groundwater. Establishing and maintaining water systems is costly. There are three major costs: water supply, infrastructure maintenance, and administration. Water prices across Canada are generally low compared to other countries. Monthly bills range between \$15 and \$90, the lowest being in Quebec, Newfoundland, and British Columbia, and the highest in the Prairie Provinces and northern Canada. Although water usage rates vary across Canada, the overall per capita use is very high compared to that of other industrialized countries. Only the United States has higher rates of municipal water usage.

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Can you imagine a city without water? We use it for drinking, cooking, and for other household needs. In 1998, Canadians, on average, used 343 litres of water per person per day. Water is also needed to clean our streets, fight fires, fill public swimming pools, and water lawns and gardens. And then, where would this water go without a sewerage system? It is not surprising that some of the oldest infrastructure built by human society consisted of aqueducts and sewerage systems. Even in Canada, many cities still use parts of water systems that were built not long after the cities were first settled.

Municipal water use refers to all water supplied by a municipality for its residents, businesses and industries. Although municipal water use is a small part of water consumption in Canada (just 11% of all withdrawals for 1991), it is the most visible use for most Canadians.

### Sources of Municipal Water

Across Canada, nearly all of the water used by municipal water systems comes from lakes and rivers, the remainder (12% of the total) comes from groundwater. In many places, water is distributed through a series of pipes connected to a municipal water supply system. In smaller centres and in rural areas, it is usually obtained from wells. Water supply systems typically have intake, treatment, storage, and distribution components. Rural residents usually have individual groundwater supplies. Wells must be carefully prepared and maintained to prevent pollution.

In some remote areas, water is delivered by trucks. For example, in the far North, water may have to be trucked to homes that do not have conventional water supplies because the ground is frozen. Water is also delivered by truck in some rural areas where shallow wells tend to go dry.

Where there are piped systems in the North, the pipes are often buried well below the surface (up to 3 or 4 metres down) to get below the worst of the frost. The pipes are also insulated to prevent the water from freezing.

In permafrost areas, there is a different problem. The heat lost from even insulated underground pipes would melt the permafrost and cause the ground to cave in. Therefore, above-ground utilidors (insulated boxes) are used to carry water pipes and sewer pipes to individual residences. These pipes may also carry hot water for heating. The utilidors are heated, insulated, metal or wood-clad enclosures that are generally installed on piles or blocking.

## Cost of Water

Establishing and maintaining water systems is costly. There are three major costs:

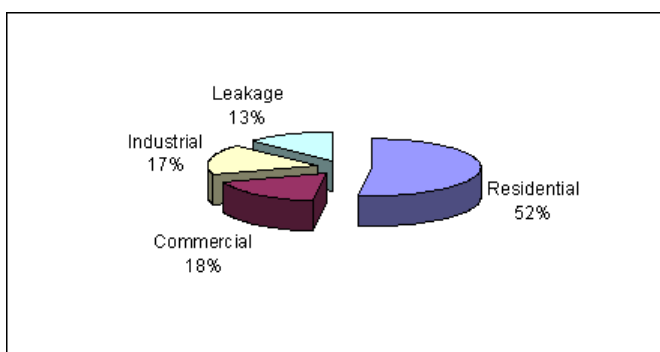
- **Water supply:** Water usually has to be pumped, stored, moved and treated to make it available in safe form for consumers. It then has to be taken away after use. At all of these stages, infrastructure is needed.
- **Infrastructure maintenance:** Maintenance includes on-going maintenance, but also periodically being upgrading and being increased in capacity.
- **Administration:** There are numerous overhead costs in running a water system.

Water prices across Canada are generally low compared to other countries. Based on 1996 data, the average household pays \$27.65 per month, and uses about 30 000 litres per month, for water delivered to the residence. Monthly bills range between \$15 and \$90, the lowest being in Quebec, Newfoundland, and British Columbia, and the highest in the Prairie provinces and northern Canada.

Although the operating costs for trucked-in water service are very high, the lower capital costs make it more economic than piped service for most northern communities. Consumption is much lower for areas with trucked service, about 200 litres per capita per day in the Northwest Territories and Nunavut.

## Patterns and Trends in Municipal Water Use

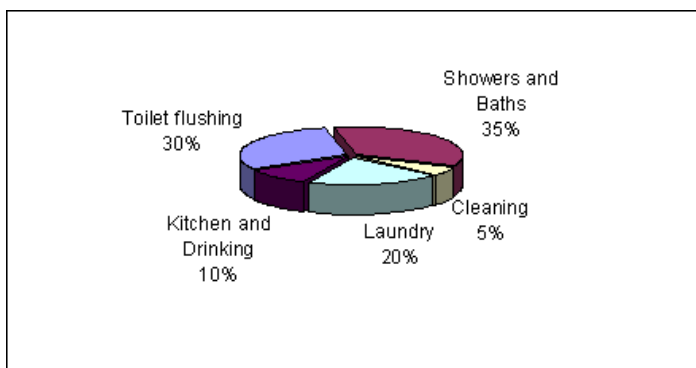
Figure 1 shows user-categories for municipal water use in Canada as a whole. The majority of consumption is done by residences. In fact, residential use is larger than shown here as the "commercial" category includes consumption by apartment buildings. Note that a disturbing 13% of water provided is lost through leakage.



**Figure 1.** Municipal Water Use by Sector, 1994

**Source:** Canada. Environment Canada. Urban Water Indicators: Municipal Water Use and Wastewater Treatment. Ottawa, 2001

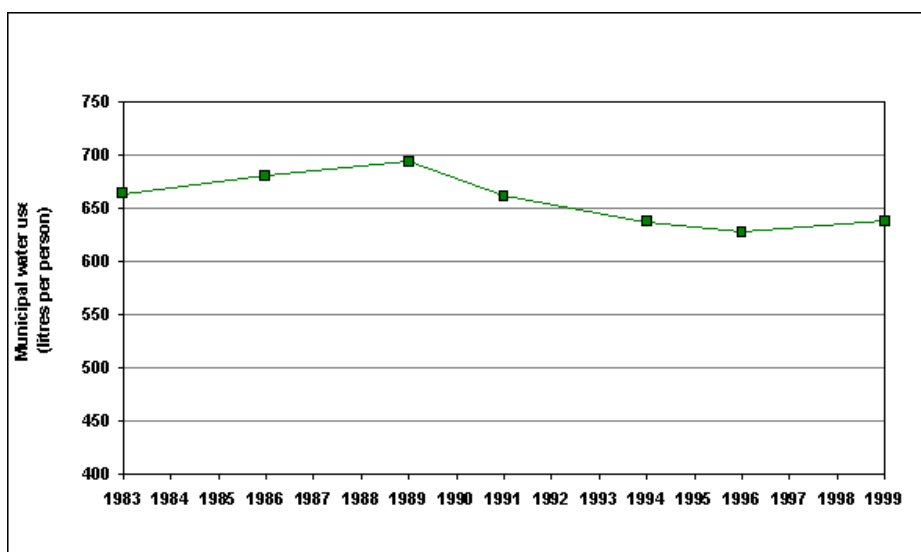
Figure 2 gives a further breakdown of the residential sector in order to show how people use water within a house. Personal washing and toilet use make up about two-thirds of the total. It is not surprising that water conservation programs have focussed on these uses, stressing new technology such as lower-capacity toilets, and water-saving shower heads.



**Figure 2.** Residential Water Use in Canada, 1999

**Source:** Canada. Environment Canada. Urban Water Indicators: Municipal Water use and Wastewater Treatment. National Environmental Indicator Series, SOE Bulletin No. 2001-1. Ottawa, 2001.

Figure 3 shows trends in municipal water use over time. The data shows results of surveys conducted periodically, at the years shown. The total water use is made up of data from municipalities that responded to the survey in a given year plus a regional estimate for municipalities that did not supply data (or were not surveyed). Details are given in the State of the Environment (SOE) Technical Supplement noted as a source.



**Figure 3.** Daily Municipal Water Use per Person, 1983 to 1999

**Source:** Canada. Environment Canada. Urban Water Indicators: Municipal Water use and Wastewater Treatment. National Environmental Indicator Series, SOE Bulletin No. 2001-1. Ottawa, 2001.

In Figure 3, the user can see that daily per capita water use in the municipal sector declined by almost 10% in the period 1989 to 1996 (from 694 litres to 628 litres). After 1996, consumption climbed slightly due in part to piped water systems replacing some groundwater-based systems. The figure was 638 litres per person per day in 1999.

Although water usage rates vary across Canada, the overall per capita use is very high compared to that in other industrialized countries. Only the United States has higher rates of municipal water usage.

### Definitions of underlined terms

**Commercial water use:** In the Municipal Water Use Database, water used by business, government, schools, hospitals and other institutions. This category also includes water used by apartment buildings, because these are normally operated by businesses. However, it is not possible to provide a good estimate of how much of total commercial water use is by apartment buildings.

**Residential water use:** In the Municipal Water Use Database, this refers to water used within homes. This class does not include apartment buildings (they are classed under Commercial Water Use).

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## Map Sources

### **Domestic water consumption (litres/day/person)**

Environment Canada. 1999. The Municipal Water Use and Pricing Survey.

### **Domestic water use change in municipalities (1991 - 1999)**

Environment Canada. 1999. The Municipal Water Use and Pricing Survey.

## References

Canada. Environment Canada. Water Works! (<http://www.ec.gc.ca/eau-water/>)

Canada. Environment Canada. 2001. Urban Water Indicators: Municipal Water Use and Wastewater Treatment. National Environmental Indicator Series, SOE Bulletin No. 2001-1. Ottawa (<http://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=32E1E173-1>).

Canada. Environment Canada. 2000. A Primer on Fresh Water: Questions and Answers. Fifth Edition. Ottawa (<http://www.ec.gc.ca/eau-water/>).

Canada. Environment Canada. 2001. Tracking Key Environmental Issues. 2001. Ottawa ([http://www.ec.gc.ca/TKEI/toc/toc\\_e.cfm](http://www.ec.gc.ca/TKEI/toc/toc_e.cfm)).

Federal-Provincial Task Force on the Importance of Nature to Canadians. 1999. The Importance of Nature to Canadians: Survey Highlights. Ottawa: Environment Canada (<http://www.ec.gc.ca/nature/highlights/highlite.html>).

Marsh, James H. (ed. in chief). 1985. The Canadian Encyclopedia. Edmonton: Hurtig.

Stanké, Alain (ed.). 2000. L'Encyclopédie Canada 2000. Montréal, Québec: Éditions internationales Alain Stanké.

## Related Web sites (1999 – 2009)

### **Federal Government**

Environment Canada. Freshwater Web Site

<http://www.ec.gc.ca/eau-water/>

This web site gives access to the nature of water, water policy and legislation, the management of water, water and culture, and informational resources and services.

Environment Canada. Freshwater Website. Municipal Water Use Database

<http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=C0788E25-E527-42CC-A136-75368C6177E6>  
The Municipal Water Use and Pricing Survey has been conducted by Environment Canada every two or three years since the early 1980s. The survey has included all municipalities in Canada with populations greater than 1000 (over 1300 municipalities on the latest survey). Questions on the survey relate to wastewater and water – use, treatment and pricing. This is a voluntary survey, but traditionally the response rate has been high, over 80%. Data collected from the 1999 survey is available on the web.

Environment Canada. Quebec Region. The St. Lawrence Centre

<http://www.universadecouvrier.gc.ca/page/index.php?l=e&p=86>

The St. Lawrence Centre studies the ecosystems of the St. Lawrence River and conduct research programs with the aim of better understanding how these ecosystems function, and maintaining knowledge of the St. Lawrence River up to date.

Environment Canada. The National Water Research Institute

<http://www.ec.gc.ca/inre-nwri/>

The National Water Research Institute (NWRI) is Canada's largest freshwater research establishment. NWRI conducts a comprehensive program of research and development in the aquatic sciences, in partnership with the Canadian and international science communities.

Fisheries and Oceans Canada. Canadian Hydrographic Service (CHS)

<http://www.dfo-mpo.gc.ca/regions/central/science/chs-shc/index-eng.htm>

The CHS is responsible for charting Canada's 243,792 kilometres of coastline (the longest of any country in the world) and 6.55 million square kilometres of continental shelf and territorial waters (the second largest in the world) and an extensive system of inland waterways.

## **Other**

University of Guelph. Canada's Aquatic Environments

<http://www.aquatic.uoguelph.ca/index.htm>

This site, at the University of Guelph, gives information on lakes, rivers, wetland regions and aquatic animals and plants.

## **Inter-agency**

International Joint Commission

<http://www.ijc.org/>

The International Joint Commission is an independent binational organization established by the Boundary Waters Treaty of 1909. Its purpose is to help prevent and resolve disputes relating to the use and quality of boundary waters and to advise Canada and the United States on related questions.