

Statscan researches Canada's freshwater supply and demand

The *Human Activity and the Environment* publications bring together a collection of environmental statistics from many sources, and paint a statistical portrait of Canada's environment. Special emphasis is given to the relationship of human activity to air, water, soil, plants and animals.

For "Freshwater supply and demand in Canada" new research done within Statistics Canada is incorporated with information from other sources, including other federal government departments, international bodies and scientific journals.

Water supply

Canada's average annual renewable freshwater supply, or water yield, is 3,472 km³. To put this into perspective, this amounts to almost as much water as there is in Lake Huron, which contains 3,540 km³.

This abundance in water yield is distributed unequally across the country. With an average annual water yield per unit area of 1.54 m³/m², the Pacific Coastal drainage region has the highest. It is followed by the Newfoundland and Labrador and the Maritime Coastal drainage regions, which have average annual yields per unit area of 0.86 m³/m² and 0.85 m³/m² respectively. Drainage regions in the Prairies and north of the Prairies produce the least water, with yields between 0.02 and 0.07 m³/m².

The southern part of Canada, where 98% of the population is located, is responsible for 38% of the water yield or 22,661 m³ of renewable freshwater per capita. In the North, water yield per capita is 185 times greater, or 4,193,014 m³.

Average annual water yield per unit area for the Prairies is 0.05 m³/m², less than that for either Australia or South Africa. This is equivalent to 12% of the yield of the Great Lakes drainage region, 6% of the yield of the Maritime Coastal drainage region and only 3% of the Pacific Coastal drainage region.

Brazil, which has the highest total water yield of any country in the world, provides 43,756 m³ of water per person per year, 40% of the almost 110,000 m³



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that is annually available per person in Canada. While total water yield is comparable between the United States and Canada, the amount of renewable freshwater per American is only 9.1% of that per Canadian, because the United States has a much larger population.

Trends in water supply

From 1971 to 2004, water yield in Southern Canada decreased an average of 3.5 km³ per year, which is equivalent to an overall loss of 8.5% of the water yield over this time period. This is almost as much as the 3.8 km³ of water that is supplied to the residential population of Canada in a year.

For most of the country the bulk of the water yield is produced in April, May and June, as snow, ice melt, and precipitation increases. In the North, this peak occurs in late spring and early summer. In the South, water yield is highest in the spring. As spring turns into summer, yield declines and demand for water related to human activity increases.

Water use

In 2005, an estimated 42 km³ of water were withdrawn from the environment and used in household and economic activities in Canada. About 14% of this water flowed through the public utility water system, while about 86% was ex-

tracted from the environment, directly by the end user.

More than 90% of the water that was withdrawn went to support economic activity, and about 9% was used directly by the residential sector. The residential sector used 56% of the water that was supplied by the public utility water system. Thermal-electric power generation was the sector that used the most water overall, by a considerable margin.

It is estimated that 25% of Canadians rely on groundwater as a source of drinking water. This varies depending on the region of the country: the population in the Saint John–St. Croix, New Brunswick, drainage region is the most reliant on groundwater, whereas the population in the South Saskatchewan drainage region is the least.

The agricultural sector was responsible for 4.6% (almost 2 km³) of total water withdrawals in 2005. Most of this water was used to irrigate crops, with 16% going to support livestock production. In 2005, precipitation that supported crop growth was roughly twice the volume of water that was withdrawn annually by all sectors of the economy.

Canada is one of the largest producers of hydro-electricity in the world, and the volume of water involved is many times larger than all other uses combined. In 2005, hydro-electric generation in Canada made use of approximately 3 trillion m³ of water - more than 100 times the volume of water used by the thermal-electric power generation sector, and just over 70 times the total volume of all water used in Canada in 2005.

More water is embedded in forest products than food. When precipitation was included, the production of exported lumber, wood pulp, paper, and other forest products required seven times more water than the production of exported agricultural commodities.

In 2005, total water withdrawals in Canada amounted to 1.2% of the average annual renewable water resources.

For more information, visit www.statcan.gc.ca/start-debut-eng.html