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What's New

## Water works!

Water works for us in many ways, making our lives easier and more enjoyable. But we must take great care not to overuse and abuse this precious resource.

Water is a basic necessity of life, not only for people but for every type of plant and animal as well. Water accounts for about 65% of our body weight. If we lost as little as 12% of it, we would soon die.

Water is essential not only for survival but also contributes immeasurably to the quality of our lives. Since the dawn of time, human beings have harnessed water to improve their lives. In some ways, the history of civilization is the story of how we have made water work for us in ever more

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ingenious ways. As early as 5000 B.C., our predecessors used irrigation to increase crop production. Archaeologists have found masonry sewers dating back to 2750 B.C. and water-flushed toilets dating back almost as far.

Water played – and continues to play – a special role in the growth of our nation. The fur trade, which stimulated the exploration of Canada's vast interior, was totally dependent on water for transportation. Water powered the grist mills and sawmills along small and large rivers in the Maritimes and Upper Canada, making possible the production and export of grain and lumber, two early economic staples. As Canadian industry diversified, water was put to new uses: as a coolant, a solvent, a dispersant, and a source of hydroelectric energy.

Water transportation is still the most efficient way to move bulk goods. Water is also the basis of cheap energy. It is a raw material in the manufacture of chemicals, drugs, beverages, and hundreds of other products. It is an essential part of the manufacturing processes that produce everything from airplanes to zippers. In other words, we depend on water for most of our technology, comforts and conveniences, and of course for personal hygiene and to flush away our waste products.

Many people think it makes no difference how much water we use or what we use it for. Actually, the way we use water is very important. Some uses are incompatible with others. Some uses remove water from the natural cycle for longer periods than others. Worst of all, most uses actually lower the quality of the water.

Water quality is everybody's business because ultimately we all draw from the same supply of water. Most Canadians live downstream from somebody else, not to mention the fact that the same basic supply of water, replenished over and over again through the hydrologic cycle, has been used millions of times over in the long history of the earth. We are now aware of limits to the reuse of water, when and where it is returned to nature diminished in quantity and quality. Therefore, we must learn to understand water use much better: where we use it, what to measure, what the main uses are, how they compete and interfere with each other, and how to manage the growing competition.

See also: [Water and Canadian Identity section](#)  
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**Where we use water**

The most obvious and immediate uses occur in its natural setting. They are called *instream uses*. Fish live in it, as do some birds and animals, at least part of the time. Hydroelectric power generation, shipping, and water-based recreation are other examples of human instream uses.

These instream uses are not always harmless. For example, oil leaking from outboard motors and freighters can cause pollution. Large reservoirs needed for hydroelectric power generation remove water by evaporation and completely change the river regime for downstream users.

The greatest number and variety of water uses occur on the land. These are called *withdrawal uses*. This term is appropriate because the water is withdrawn from its source (a river, lake or groundwater supply), piped or channelled to many different locations and users, and then is collected again for return to a lake, river or into the ground. Household and industrial uses, thermal and nuclear power generation, irrigation and livestock watering all fall into this category.

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Most withdrawal uses "consume" some of the water, meaning less is returned to the source than was taken out. Furthermore, the water which is put back into its natural setting is often degraded. For example, water leaving our houses contains human and household wastes. The same is true of water used in many industrial processes. Often this liquid waste is only partially treated, if at all, before it is returned to nature.

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**Withdrawal use**

Withdrawal use is directly measurable as quantities of intake, discharge, and consumption. *Water intake* is the amount withdrawn from the source for a particular activity over a specific period of time. This measure is important because it represents the demand imposed by that particular use on the water source at a given location. Usually, however, most of the water taken out is returned at or near the source. This is called *water discharge*.

*Water consumption* is the difference between water intake and water discharge. Consumption removes water from a river system and makes it unavailable for further use downstream. The irrigation of crops is by far the largest consumptive use, followed by evaporation in large open water reservoirs and cooling ponds. However, because evaporation is difficult to measure, it is seldom recognized as water consumption.

In the global hydrologic cycle, water is never actually lost. For example, the water evaporated from industrial cooling towers or an irrigated field simply returns to the atmosphere, later to fall again as precipitation somewhere else on earth.

We determine how efficiently we use water in a particular process or economic sector with the help of two additional measurements: *gross water use* and the amount of water that is recirculated. Gross water use represents the total amount of water used during a process. This would normally be equal to the water intake, except that more and more users (especially industries) reuse the same water one or more times. In such cases, the gross water use could be equal to several times the water intake. The difference between gross water use and water intake is the amount recirculated, which can be expressed as a *recycling rate*. This is the number of times that the water is recirculated and indicates how efficient a particular water use is.

In 1996, five main withdrawal uses are estimated to have accounted for a gross water use in Canada of 64 421 million cubic metres (MCM), made up of intake (44 611 MCM) and recirculation (19 810 MCM in industrial uses). About 10% of the intake was consumed (mostly industrial uses and agriculture), while the rest was discharged back to receiving waters. 🇨🇦

The main withdrawal uses are:

- [Thermal power generation](#)
- [Manufacturing](#)
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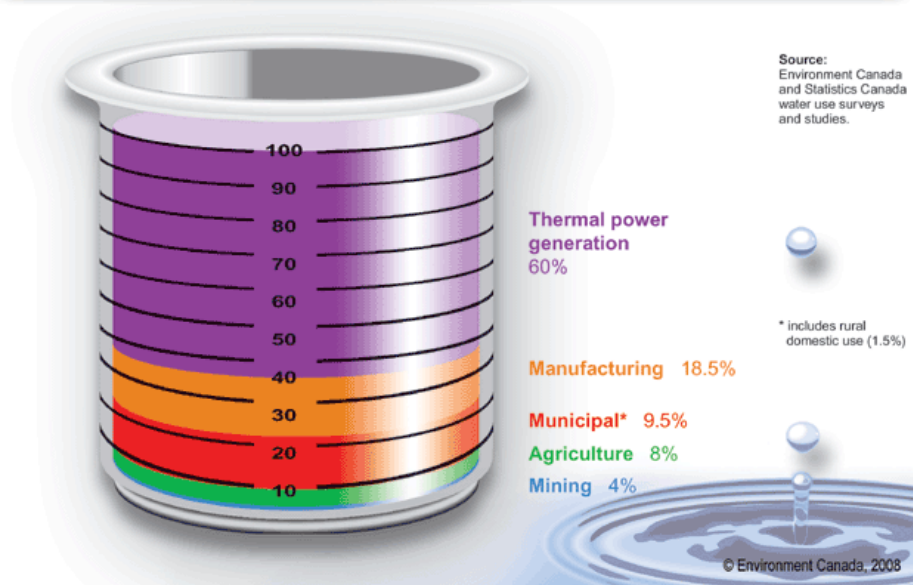
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## The five main water users in Canada, 2005 (gross water use)



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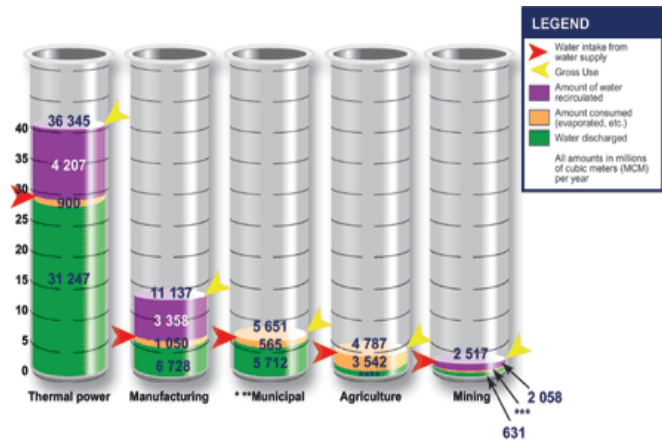
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## Water use in Canada, 1996

This figure illustrates the importance of the main water uses in Canada.



The diagram shows how:

- We use water in many different ways and quantities.
- Some uses require much more water than others. For example,

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electrical power generation (excluding hydroelectric power, which is an instream use) withdraws almost five times as much water as all manufacturing uses, and over 80% more than the four other uses combined.

- Some uses are more efficient than others. The manufacturing sector, for example, has a gross use of over twice the water intake, thanks to recirculation. The mining industry actually reuses its water more than twice, on average.
- Some uses consume more water than others. Agricultural uses, for example, return very little of the intake water to its source. In southern Alberta and Saskatchewan, agricultural withdrawals are highest for irrigation where water supplies are lowest.

Region	Thermal	Manufacturing	Mining	Agriculture <sup>a</sup>	Municipal <sup>a</sup>	Rural <sup>a</sup>	Total
Atlantic	x	537.7	x	20.6	286.9	190.7	1 035.9
Quebec	x	1 833.1	24.2	113.2	1 555.0	250.3	3 775.9
Ontario	26 647.9	3 486.8	42.7	174.1	1 536.4	176.3	32 064.2
Prairies	x	675.2	x	3 592.4	660.0	123.5	5 041.1
BC and North	x	1 246.1	62.1	886.2	753.6	125.5	3 073.5
National Total**	32 137.5	7 778.9	488.9	4 786.6	4 784.5	666.3	50 812.7
% of Total	63.25%	15.31%	0.90%	9.42%	9.42%	1.70%	100%
Rounded %	63%	15%	1%	9%	9%	2%	99%

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Thermal power generation

This industrial sector, which includes both conventional and nuclear power generating plants, withdrew 64% of the total water intake in 1996. Next to fuels, water is the most important resource used in large-scale thermal power production. Production of one kilowatt-hour of electricity requires 140 litres of water for fossil fuel plants and 205 litres for nuclear power plants. Some of the water is converted to the steam which drives the generator producing the electricity. Most of the water, however, is used for condenser cooling.

Why is so much cooling necessary? Because today's processes can only convert 40% of the fuel's energy into usable electricity. The rest is wasted. This shows the double cost of inefficient energy use: first, in the wasted energy, and then in the water required to cool the wasted heat to the temperature where it can be released safely into the environment. This requires a continuous flow of cooling water circulating through the condenser. All the cooling water is therefore returned to the environment much warmer. However, the temperature can be reduced using cooling towers and other such devices.

See also: [Industrial Water Use Survey](#)   
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## Industrial use

Water is the lifeblood of industry. It is used as a raw material, a coolant, a solvent, a transport agent, and as a source of energy. An automobile coming off the assembly line, for example, will have used at least 120 000 litres of water – 80 000 to produce its tonne of steel and 40 000 more for the actual fabrication process. Many thousands more litres of water are involved in the manufacture of its plastic, glass, fabric components. Manufacturing accounted for 14% of water withdrawals in 1996. Paper and allied products, primary metals, and chemicals were the three main industrial users.

See also: [Industrial Water Use, 1996 survey report](#)

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## Municipal use

Can you imagine a city without water? We use it for drinking, cooking, and for other household needs. In 2001, Canadians, on average, used 335 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. Where would this water go without a sewerage system? These residential, commercial, and public uses, and the water lost from reservoirs and pipes amounted to about 10% of all withdrawals in Canada in 1996. This figure does not include rural areas where water use is not measured. If rural domestic uses were included, this figure would rise to about 12%.

See also: [Water Efficiency/Conservation section and Water use data](#)

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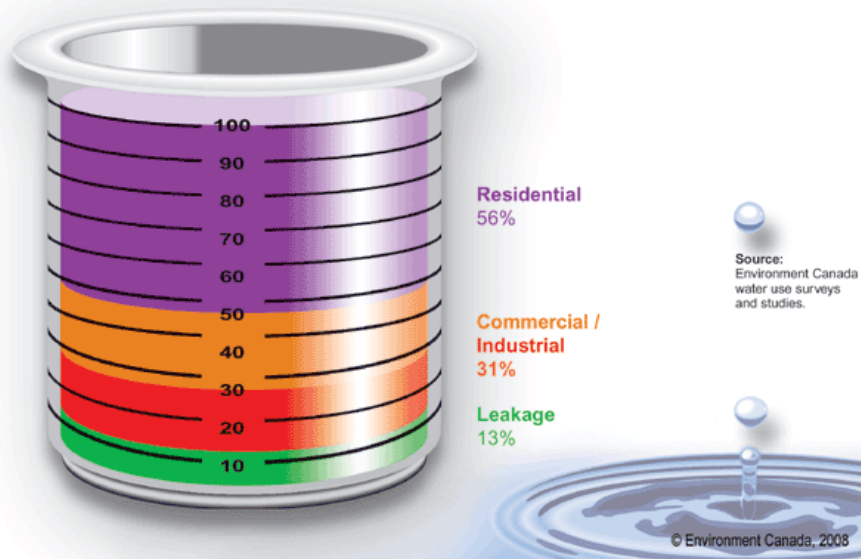
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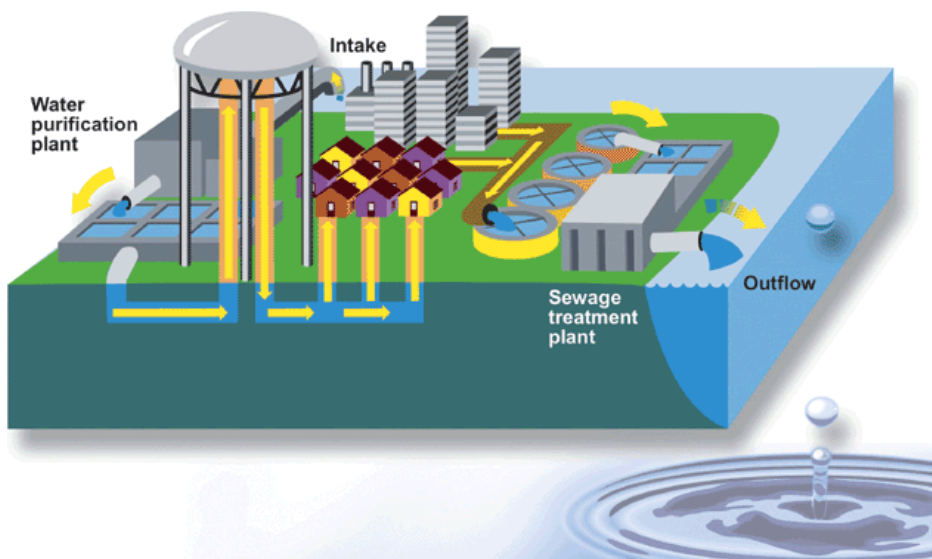
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## Municipal water use by sector, 2004



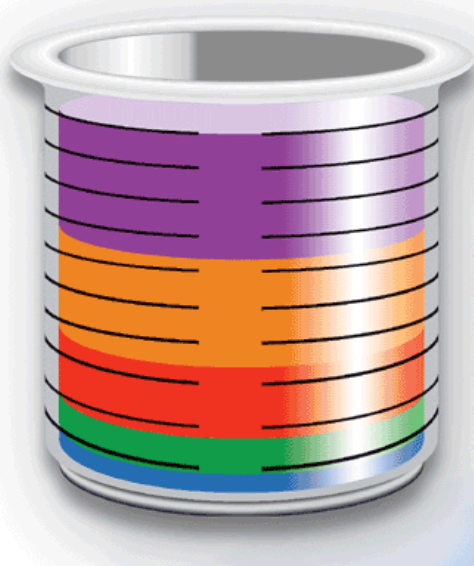
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## Municipal water supply and sewage treatment



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## Water use in the home



**Showers and baths**  
35%

**Toilet flushing**  
30%

**Laundry**  
20%

**Kitchen and drinking**  
10%

**Cleaning**  
5%



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<a href="#">Banff</a> (Town)	7 135
<a href="#">Barrhead</a> (Town)	4 213
<a href="#">Beaumont</a> (Town)	7 006
<a href="#">Beaverlodge</a> (Town)	2 110
<a href="#">Big Lakes</a> (Municipal District)	5 845
<a href="#">Blackfalds</a> (Town)	3 042
<a href="#">Brooks</a> (Town)	11 604
<a href="#">Calgary</a> (City)	878 866
<a href="#">Camrose</a> (City)	14 854
<a href="#">Canmore</a> (Town)	10 792
<a href="#">Clairmont</a> (Hamlet)	5 830
<a href="#">Coaldale</a> (Town)	6 008
<a href="#">Cochrane</a> (Town)	5 690
<a href="#">Cold Lake</a> (City)	11 520
<a href="#">Crowsnest Pass</a> (Town)	6 262
<a href="#">Devon</a> (Town)	4 969
<a href="#">Drumheller</a> (Town)	7 785
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<a href="#">Fort Macleod</a> (Town)	2 990

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<a href="#">Innisfail (Town)</a>	6 928
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<a href="#">Lloydminster (City) PDF</a>	13 148
<a href="#">Medicine Hat (City)</a>	51 249
<a href="#">Nanton (Town)</a>	1 841
<a href="#">New Norway (Village)</a>	292
<a href="#">Nobleford (Village)</a>	615
<a href="#">Onoway (Village)</a>	847
<a href="#">Red Deer (City)</a>	67 707
<a href="#">Red Deer (County)</a>	18 639
<a href="#">Redwater (Town) PDF</a>	2 172
<a href="#">Sexsmith (Town)</a>	1 653
<a href="#">Spruce Grove (City)</a>	15 983
<a href="#">St. Albert (City)</a>	53 081
<a href="#">Stony Plain (Town) PDF</a>	9 589
<a href="#">Sturgeon County (Municipal District)</a>	18 067
<a href="#">Sundre (Town)</a>	2 267
<a href="#">Taber (Town)</a>	7 671
<a href="#">Three Hills (Town)</a>	2 902
<a href="#">Vermilion (Town)</a>	3 948
<a href="#">Wetaskiwin (County)</a>	10 695
<a href="#">Whitecourt (Town)</a>	8 334

#### British Columbia

Location	Population
<a href="#">Abbotsford (City)</a>	115 463
<a href="#">Anmore (Village)</a>	1 344
<a href="#">Ashcroft (Village)</a>	1 788
<a href="#">Campbell River (City)</a>	28 456
<a href="#">Capital Regional District (Census Division)</a>	325 754
<a href="#">Chilliwack (City)</a>	62 927
<a href="#">Coldstream (District)</a>	9 106
<a href="#">Coquitlam (City)</a>	112 890
<a href="#">Cowichan Valley (Regional District)</a>	71 998
<a href="#">Dawson Creek (City) PDF</a>	10 754
<a href="#">Delta (Corporation)</a>	96 950
<a href="#">East Kootenay (Regional District)</a>	56 291
<a href="#">Fraser Valley (Regional District)</a>	237 550
<a href="#">Grand Forks (City)</a>	4 054
<a href="#">Kelowna (City)</a>	96 288
<a href="#">Kimberley (City)</a>	6 484
<a href="#">Ladysmith (Town)</a>	6 587
<a href="#">Mission (District)</a>	31 272
<a href="#">Nanaimo (City)</a>	73 000
<a href="#">Nanaimo (Regional District)</a>	127 016
<a href="#">New Westminster (City)</a>	54 656
<a href="#">North Cowichan (Municipality)</a>	26 148
<a href="#">North Saanich (District Municipality)</a>	10 436
<a href="#">North Vancouver (City)</a>	44 303
<a href="#">Oak Bay (District)</a>	17 798
<a href="#">Parksville (City)</a>	10 323
<a href="#">Port Alberni (City)</a>	17 743

<a href="#">Port Coquitlam</a> (City)	51 257
<a href="#">Port Edward</a> (District)	659
<a href="#">Port Hardy</a> (District) <b>PDF</b>	4 574
<a href="#">Port Moody</a> (City)	23 816
<a href="#">Prince George</a> (City)	72 406
<a href="#">Revelstoke</a> (City)	7 500
<a href="#">Richmond</a> (City)	164 345
<a href="#">Saanich</a> (District) <b>PDF</b>	103 654
<a href="#">Salmo</a> (Village) <b>PDF</b>	1 120
<a href="#">Sidney</a> (Town)	10 929
<a href="#">Sunshine Coast</a> (Regional District) <b>PDF</b>	25 599
<a href="#">Surrey</a> (City)	347 825
<a href="#">Telkwa</a> (Village) <b>PDF</b>	1 371
<a href="#">Trail</a> (City)	7 575
<a href="#">Vancouver</a> (City)	545 671
<a href="#">Vernon</a> (City)	33 494
<a href="#">Victoria</a> (City)	74 125
<a href="#">West Vancouver</a> (District)	41 421

## Manitoba

Location	Population
<a href="#">Birtle</a> (Town)	715
<a href="#">Brandon</a> (City) <b>PDF</b>	39 716
<a href="#">Dauphin</a> (City)	8 085
<a href="#">Morden</a> (Town) <b>PDF</b>	6 142
<a href="#">Morris</a> (Town)	1 673
<a href="#">Neepawa</a> (Town)	3 325
<a href="#">Pinawa</a> (Local Government District)	1 500
<a href="#">Portage la Prairie</a> (City)	12 976
<a href="#">Rosburn</a> (Town)	568
<a href="#">Swan River</a> (Town)	4 032
<a href="#">Winnipeg</a> (City)	619 544

## New Brunswick

Location	Population
<a href="#">Grand Bay-Westfield</a> (Town)	4 949
<a href="#">Grand Falls</a> (Town)	5 858
<a href="#">Moncton</a> (City)	61 046
<a href="#">New Maryland</a> (Village)	4 284
<a href="#">Rothesay</a> (Town)	11 505
<a href="#">Sackville</a> (Town)	5 361
<a href="#">Saint John</a> (City)	69 661

## Newfoundland and Labrador

Location	Population
<a href="#">Conception Bay South</a> (Town) <b>PDF</b>	19 772
<a href="#">Corner Brook</a> (City) <b>PDF</b>	20 103
<a href="#">St. John's</a> (City)	99 182

## Northwest Territories

Location	Population
<a href="#">Fort Simpson</a> (Village)	1 163
<a href="#">Fort Smith</a> (Town) <b>PDF</b>	2 185
<a href="#">Norman Wells</a> (Town) <b>PDF</b>	666
<a href="#">Yellowknife</a> (City) <b>PDF</b>	16 541

## Nova Scotia

Location	Population
<a href="#">Bridgewater</a> (Town)	7 621
<a href="#">Cape Breton</a> (Regional Municipality)	105 968
<a href="#">Halifax</a> (Regional Municipality)	359 111
<a href="#">Lunenburg</a> (Town)	2 568
<a href="#">Port Hawkesbury</a> (Town)	3 701
<a href="#">Windsor</a> (Town)	3 778

## Ontario

Location	Population
<a href="#">Aurora</a> (Town) - commercial	40 167
<a href="#">Aurora</a> (Town) - residential	40 167
<a href="#">Amprior</a> (Town)	7 192
<a href="#">Aylmer</a> (Town) <b>PDF</b>	7 126
<a href="#">Barrie</a> (City)	103 710
<a href="#">Bonnechere Valley</a> (Township) <b>PDF</b>	3 951
<a href="#">Brant</a> (County)	118 485
<a href="#">Brantford</a> (City)	86 417
<a href="#">Brighton</a> (Town)	9 449
<a href="#">Cambridge</a> (City)	110 372
<a href="#">Casselman</a> (Village) <b>PDF</b>	2 910
<a href="#">Chatham-Kent</a> (Municipality)	107 709
<a href="#">Clarence-Rockland</a> (City) <b>PDF</b>	19 612
<a href="#">Cobourg</a> (Town)	17 172
<a href="#">Durham</a> (Region)	506 901
<a href="#">Dryden</a> (City)	8 198
<a href="#">Erin</a> (Town)	11 052
<a href="#">Espanola</a> (Town) <b>PDF</b>	5 449
<a href="#">Fort Erie</a> (Town) <b>PDF</b>	28 143
<a href="#">Fort Frances</a> (Town)	8 315
<a href="#">Grimsby</a> (Town)	21 297
<a href="#">Haldimand</a> (County) <b>PDF</b>	5 846
<a href="#">Halton</a> (Regional Municipality) <b>PDF</b>	375 229
<a href="#">Hamilton</a> (City)	490 268
<a href="#">Kawartha Lakes</a> (City)	69 179
<a href="#">Hamilton</a> (Township)	10 785
<a href="#">Killaloe, Hagarty and Richards</a> (Township) <b>PDF</b>	2 492
<a href="#">King</a> (Township) <b>PDF</b>	18 533
<a href="#">Kingston</a> (City)	114 195
<a href="#">Kingsville</a> (Town)	19 619
<a href="#">Kirkland Lake</a> (Town)	8 616
<a href="#">Kitchener</a> (City)	190 399
<a href="#">Lakeshore</a> (Town) <b>PDF</b>	28 746
<a href="#">LaSalle</a> (Town)	25 285
<a href="#">Laurentian Hills</a> (Town) <b>PDF</b>	2 750
<a href="#">Leamington</a> (Municipality)	46 757
<a href="#">London</a> (City) <b>PDF</b>	336 539
<a href="#">Madawaska Valley</a> (Township) <b>PDF</b>	4 406
<a href="#">Markham</a> (Town)	208 615
<a href="#">McDougall</a> (Township) <b>PDF</b>	2 608
<a href="#">Nairn and Hyman</a> (Township)	420
<a href="#">New Tecumseth</a> (Town)	26 141
<a href="#">Newmarket</a> (Town)	65 788
<a href="#">Niagara</a> (Regional Municipality)	410 574
<a href="#">Niagara Falls</a> (City)	78 815

<a href="#">Niagara-on-the-Lake</a> (Town)	13 839
<a href="#">Nipigon</a> (Township)	1 964
<a href="#">North Bay</a> (City)	52 771
<a href="#">North Dundas</a> (Township)	11 014
<a href="#">North Middlesex</a> (Township)	6 901
<a href="#">Oakville</a> (Town)	144 738
<a href="#">Orangeville</a> (Town) <b>PDF</b>	25 248
<a href="#">Orillia</a> (City)	29 121
<a href="#">Oshawa</a> (City)	139 051
<a href="#">Ottawa</a> (City)	774 072
<a href="#">Parry Sound</a> (Town) <b>PDF</b>	6 124
<a href="#">Peel</a> (Region)	988 948
<a href="#">Penetanguishene</a> (Town)	8 316
<a href="#">Perth</a> (Town)	6 003
<a href="#">Petawawa</a> (Town)	14 398
<a href="#">Peterborough</a> (City)	71 446
<a href="#">Port Colborne</a> (City)	18 450
<a href="#">Quinte West</a> (City)	41 409
<a href="#">Richmond Hill</a> (Town)	132 030
<a href="#">Sarnia</a> (City) <b>PDF</b>	70 876
<a href="#">Sault Ste. Marie</a> (City)	74 566
<a href="#">Smith-Ennismore-Lakefield</a> (Township)	16 414
<a href="#">Smiths Falls</a> (Town)	9 140
<a href="#">South Bruce</a> (Township)	6 063
<a href="#">South Huron</a> (Town)	10 019
<a href="#">Southwest Middlesex</a> (Township)	6 144
<a href="#">St. Catharines</a> (City)	129 170
<a href="#">St. Clair</a> (Township) <b>PDF</b>	14 659
<a href="#">St. Thomas</a> (City)	33 236
<a href="#">Stratford</a> (City)	29 676
<a href="#">Strathroy-Caradoc</a> (Township)	19 114
<a href="#">Sudbury</a> (City) <b>PDF</b>	155 219
<a href="#">Thames Centre</a> (Township)	12 473
<a href="#">Thorold</a> (City)	18 048
<a href="#">Thunder Bay</a> (City) <b>PDF</b>	109 016
<a href="#">Toronto</a> (City)	2 481 494
<a href="#">Trent Hills</a> (Municipality)	
<a href="#">Vaughan</a> (City)	182 022
<a href="#">Wasaga Beach</a> (Town)	12 419
<a href="#">Waterloo</a> (City)	86 543
<a href="#">Waterloo</a> (Region)	438 515
<a href="#">Wellington North</a> (Township)	11 305
<a href="#">West Grey</a> (Township)	11 741
<a href="#">Whitewater Region</a> (Township)	6 520
<a href="#">York</a> (Region)	729 254

Prince Edward Island

Location	Population
<a href="#">Kensington</a> (Town)	1 385

Quebec

Location	Population
<a href="#">Montreal</a> (City)	1 039 534

Saskatchewan

Location	Population
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<a href="#">Assiniboia</a> (Town)	2 483
<a href="#">Canora</a> (Town)	2 200
<a href="#">Davidson</a> (Town)	1 035
<a href="#">Duck Lake</a> (Town)	624
<a href="#">Hudson Bay</a> (Town)	1 783
<a href="#">Humboldt</a> (City)	5 161
<a href="#">Kipling</a> (Town)	1 037
<a href="#">Langham</a> (Town)	1 145
<a href="#">Leader</a> (Town) PDF	914
<a href="#">Martensville</a> (Town) PDF	4 365
<a href="#">Meadow Lake</a> (Town) PDF	4 582
<a href="#">Melfort</a> (City) PDF	5 559
<a href="#">Melville</a> (City)	4 453
<a href="#">Moose Jaw</a> (City)	32 131
<a href="#">North Battleford</a> (City) PDF	13 692
<a href="#">Porcupine Plain</a> (Town) PDF	820
<a href="#">Preeceville</a> (Town)	1 074
<a href="#">Prince Albert</a> (City)	34 291
<a href="#">Redvers</a> (Town)	917
<a href="#">Regina</a> (City)	178 225
<a href="#">Saskatoon</a> (City)	196 811
<a href="#">Swift Current</a> (City) PDF	14 821
<a href="#">Weyburn</a> (City)	9 534
<a href="#">Whitewood</a> (Town)	947

Source of population statistics: [Statistics Canada, 2001 Community Profiles](#).

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**Agriculture**

Farmers depend on water for livestock and crop production. Agriculture was the fourth largest water user in 1996, accounting for 9% of total withdrawals. Water is withdrawn mainly for irrigation (85%) and livestock watering (15%). Irrigation is needed mainly in the drier parts of Canada, such as the southern regions of Alberta, British Columbia, Saskatchewan, and Manitoba. Irrigation is also used in Ontario and the Maritimes for frost control. Since so much of the water intake evaporates, only a small fraction is returned to its source. This is a highly consumptive use.

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### Mining

This category includes metal mining, non-metal mining, and the extraction of coal. Water is used by the mining industry to separate ore from the rock, to cool drills, to wash the ore during production, and to carry away unwanted material.

Although the mining industry had a gross use almost as great as agriculture, mining accounted for only 1% of all water withdrawals in 1996. This was the smallest withdrawal use, but mining recirculates its water intake to a greater extent than any other sector.

See also: [Industrial Water Use Survey](#)

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### Instream use

Unlike withdrawal uses, instream uses cannot be measured quantitatively because the water is not removed from its natural environment. Instead, instream uses are described by certain characteristics of the water or by the benefits they provide to us and the ecosystem.

Flow rates and water levels are very important factors for instream uses. When these conditions are changed by a dam, for example, it is easy for conflicts to arise. The most common conflict is between hydroelectric development and other uses with respect of aquatic life, wildlife, water supply and water transportation. Storage of the spring freshet (a high river flow caused by rapidly melting snow) removes the natural variability of

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streamflows on which many life processes depend, in particular, the highly productive ecosystems of deltas, estuaries and wetlands. To make the best use of our water, all needs must be carefully assessed and taken into account.

The main instream uses are:

- [Hydroelectric power generation](#)
- [Water transport](#)
- [Freshwater fisheries](#)
- [Wildlife](#)
- [Recreation](#)
- [Waste disposal](#)

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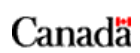
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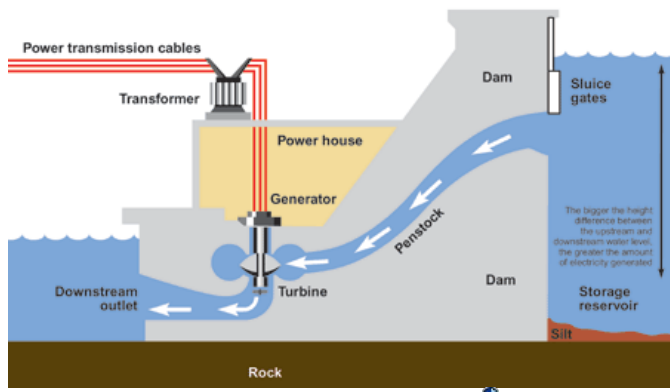
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**Hydroelectric power generation**

This water use is the principal source of electricity in Canada today. Billions of dollars have been invested in its development. With large undeveloped hydroelectric sites still available in Quebec, Newfoundland, Manitoba, British Columbia, and the territories, this form of energy development will retain its prominent position for years to come. However, the environmental and human effects to be avoided or mitigated in such large projects make them increasingly difficult and costly to plan and build.

**Water: A powerful source of energy**

Hydroelectric energy is produced by the force of falling water. The capacity to produce this energy is dependent on both the available flow and the height from which it falls. Building up behind a high dam, water accumulates potential energy. This is transformed into mechanical energy when the water rushes down the sluice and strikes the rotary blades of turbine. The turbine's rotation spins electromagnets which generate current in stationary coils of wire. Finally, the current is put through a transformer where the voltage is increased for long distance transmission over power lines. In Canada, hydroelectric plants satisfy 62% of electricity demands.



See also: [Industrial Water Use Survey](#)  
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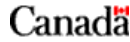
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## Water transport

Inland waterways in Canada have historically played a major role in getting Canadian goods and raw materials to market. Some traditional uses, such as log driving, have now disappeared. However, water transport is still the most economical means of moving the bulky raw materials which are our main exports: wheat, pulp, lumber, and minerals. The main transportation waterways are the St. Lawrence River, which allows passage of ocean-going ships from the Atlantic Ocean deep into the heart of North America, nearly as far as the prairie wheat fields; the Mackenzie River, which is a vital northern transportation link; and the lower Fraser River on the Pacific Coast. Cargo in the hundreds of millions of tonnes is transported along these routes each year. Reliable and predictable lake and river levels are very important for this use.

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## Freshwater fisheries

Blessed with hundreds of thousands of freshwater lakes and rivers, Canada provides some of the most spectacular sport fishing in the world. In 1995, over 4.2 million Canadians and visiting anglers took advantage of this fact, spending \$7.4 billion in the process. In 1997, the freshwater fishing industry contributed \$71 million to the GDP and employed 3 500 people. Moreover, coastal rivers provide spawning grounds for salmon and other fish populations which support major saltwater fisheries.

See also: [Survey on the Importance of Nature to Canadians](#)

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**Wildlife**

Many wildlife species live in, on, or near the water and require access to it throughout their lives. Other species may not use water as their primary habitat, but it is nonetheless essential to their well-being.

Watching, photographing and studying wildlife are all popular forms of recreation for Canadians. About 19% of Canadians aged 15 years and over participated in these activities as the main or as a secondary reason for their nature-related trip, according to a 1996 survey, and spent about \$1.3 billion that year on them. In 1996, hunting attracted over one in twenty Canadians and accounted for about \$800 million of wildlife-related spending. An additional \$320 million was spent in 1996 on residential wildlife-related activities. The majority of Canadians believe that it is important to maintain abundant wildlife and to protect declining or endangered wildlife.

See also: [Survey on the Importance of Nature to Canadians](#)

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**Recreation**

**Importance of water for tourism and recreation in Canada**

Water contributes to the quality of our lives. Activities such as swimming, beach activity, boating, canoeing, and fishing allow us to experience the beauty of our lakes and rivers. More than a third of adult Canadians

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(8.5 million people) take part in these activities on 89 million trips or outings during the year. The presence of water also enhances activities like camping, sightseeing and photographing nature. A significant portion of the \$12 billion that nature-based tourism and recreation contribute to the Canadian GDP results from activities that depend on clean and abundant water. For example, nearly \$2 billion results from expenditures on recreational fishing alone.

Number of participants, days and trips for water-based activities in Canada in 1996

Water-based activities *	
Participation	8 532 000
% of pop 15+	36.3%
Total days	134 520 000
Total trips	89 423 000
- Same-day	59 239 000
- Overnight	30 184 000

\* Water-based activities include swimming/beach activity, canoeing/kayaking/sailing, power boating and recreational fishing.

Number and percentage of Canadians participating in water-based activities in 1996, by province or territory of residence: 

Source: Survey on the Importance of Nature to Canadians in 1996, special tabulations.

See also: [Survey on the Importance of Nature to Canadians](#)

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Waste disposal

It has long been convenient to use lakes, rivers, and oceans as receiving bodies for human and industrial wastes. While water is capable of diluting and "digesting" society's wastes to some degree, there are limits to what even the largest body of water can absorb. The extent to which instream processes can absorb contaminants depends on factors such as the nature of the contaminant, how much of it there is compared to the volume of water, how long the contaminant stays in the water, the temperature of the water, the rate of flow. Many of our waterways are now overloaded with wastes. This problem can best be resolved by increased regulation and/or monitoring.

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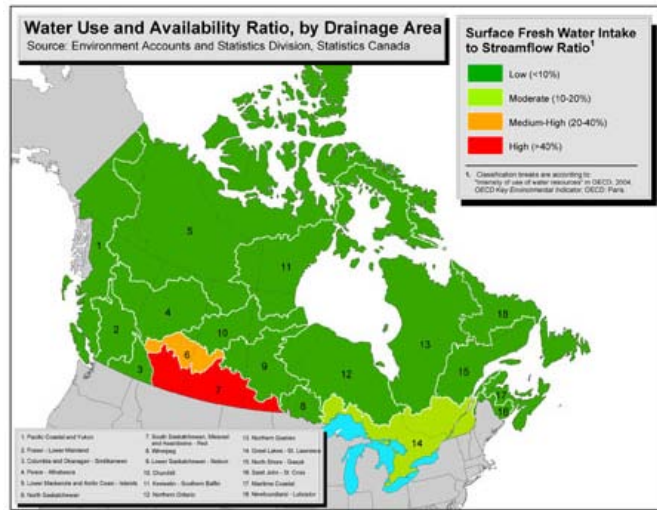
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## Water use and availability ratio

The water use to availability ratio map identifies what proportion of renewable fresh water is used by Canadians within each of Canada's major drainage basins.



A stressed watershed is defined by the Organisation for Economic Co-operation and Development (OECD) as a watershed in which greater than 40% of the available renewable water within the watershed is used by humanity for industrial, agricultural, or personal uses. According to the OECD, at least 60% of renewable flows are required to maintain a healthy, functioning ecosystem. However, ecosystem water requirements are poorly understood and vary depending on the ecosystem.

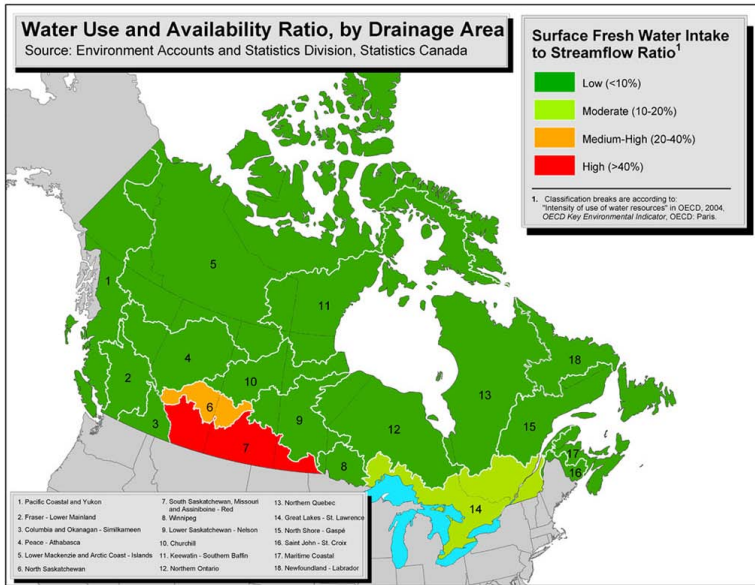
While Canada appears to have lots of fresh water (7% of the world's renewable freshwater, 25% of its global wetlands), this water is not always available where needed. With 85% of the population living along the southern border with the United States (most of the country's fresh water drains to the north) and Canada being the second highest per capita water user in the OECD, it is not surprising that those drainage basins with higher freshwater use to availability ratios are also located in southern Canada.

The drainage area of greatest concern (exceeding the OECD's 40% threshold) is the South Saskatchewan, Missouri and Assiniboine-Red area. This area is of particular concern, as flows in the South Saskatchewan are already fully allocated and predictions of glacial retreat and reduced winter snow coverage due to global warming may significantly impact a river system that relies on glacial and snow melt for most of its summer flows.

Data on streamflow and surface freshwater intake (by drainage area), is also available for download. | [Excel](#) |

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Source: *Environmental Diagnostic*, Policy Research Directorate, Environment Canada, 2004.

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## Water quality is everybody's problem

How water recovers from pollution and the limits to what nature can do by itself are discussed in detail in Freshwater Series No. A-3, "[Clean Water – Life Depends on It!](#)" An understanding of how water is used helps us to predict and anticipate shortages of clean water even where there seems to be sufficient quantities. Using water entails the responsibility to clean it up after its use, and before it passes on to the next user downstream. We must do unto others what we would have them do unto us.

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## We take our water for granted

Because we undervalue this precious resource, we tend to overuse it and, in fact, abuse it. The apparent abundance of water is deceptive, and the capacity of our lakes and rivers – and even of the oceans – to purify the wastes we dump into them is much more limited than we once thought it was. There is a price for it: billions and billions of dollars to clean up or prevent pollution. It is becoming abundantly clear that water is not a free good. Sooner or later it presents us with a bill: the price of neglect. In many cases we pay less than the actual cost of processing and delivery. For example, irrigation water charges only recover about 10% of the actual costs of the service. The same is true, to a less extreme extent, for water costs to householders.

Our overuse of water begins at home. Compared to other countries, we pay very little to have water delivered to our kitchen and bathroom faucets.

Nevertheless, we use more water per person than most other countries.

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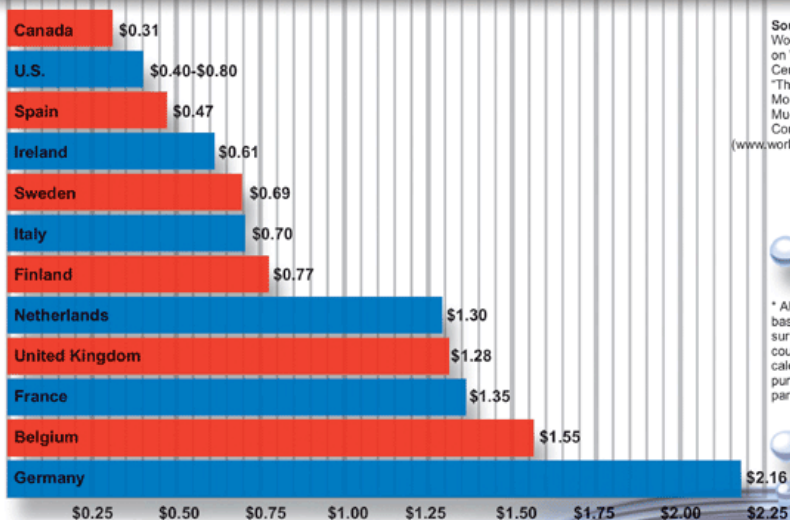
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## Typical municipal water prices in Canada and other countries (per cubic metre)

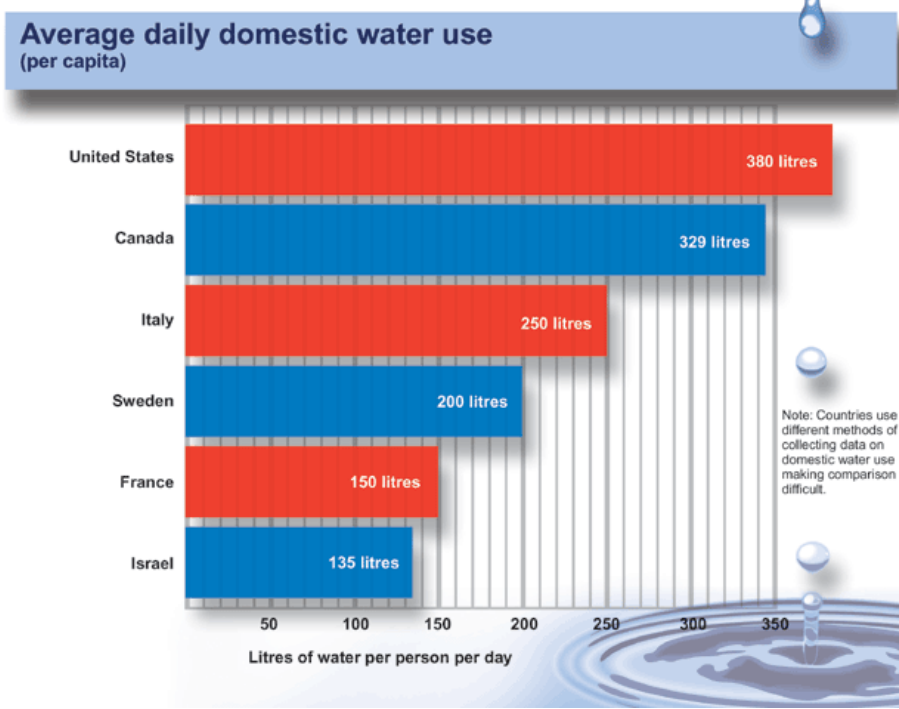


**Source:**  
 World Commission on Water for the 21st Century, 1999.  
 "The Poor Pay Much More for Water... Use Much Less – Often Contaminated."  
 (www.worldwatercouncil.org)

\* All amounts are based on a 1998 survey of OECD countries and are calculated using a purchasing power parity (PPP) method.

The World Water Commission assembled its data from a wide variety of sources, including its own research, World Bank reports, UN data, private sector surveys, non-governmental organizations, and other Internet sources. The findings are preliminary rather than definitive, but do show trends.

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### What is a fair price?

Consider for a moment the great contribution water makes to our quality of life – indeed to life itself. Most of us rely on municipal water service, and our health depends on the quality of the water supplied. Most Canadians have been putting this service inadvertently at serious risk by not paying a sufficient price for its provision. According to the National Round Table on the Environment and Economy, unmet water and wastewater infrastructure needs in Canada were \$38-49 billion in 1996, and capital costs for the following 20 years will be in the order of \$70-90 billion.

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There is one clear way to deal with this problem. We need to pay realistic rates for water service which are sufficient to cover their true cost. In other words, we should pay a fair price that will recover the full cost of water delivered to the tap, one that is based on actual quantity used. Those who use more water should pay more and those who use less should pay less. Experience has shown that one important result will be users recognize the real value of this resource, and will use it more efficiently and wisely.

The price Canadians pay for water varies significantly across the country. Analysis of the 1999 Municipal Water Pricing Survey prepared in 2001 indicates that the average domestic water user (assuming 25 000 litres per month) pays \$1.14 for 1000 litres. This value has increased substantially in recent years from about 82 cents per 1000 litres in 1991, and nationally, now includes a waste treatment component of about 39%. Correcting the problem of the undervalued water resource would involve minimal change. However, in some cases, economically rational pricing would also require an increase in water metering, which in turn would reduce demand enough to postpone the need for new facilities for years, with significant savings for each year of postponement.

Even with the price, water would still be the best bargain going, compared with other liquids we consume – and which, unlike water, are not delivered at our taps year-round. Bottled water, for example, is in great demand at \$1 500 for 1000 litres, or 1000 times the price for the same volume of high quality tap water! Just compare the price of tap water with the typical cost of some other beverages. 🇨🇦

In 2001, the average Canadian daily domestic use of fresh water was

335 litres per person. At least half of this amount is unnecessary and wasteful. Common causes of waste at home are leaking faucets, faulty plumbing, and over-use of water for watering the lawn and washing the car. Much of this waste would be reduced if we had to pay a fair price for water. As our usage becomes more efficient, we would not only produce less wastewater, we could also afford better treatment for it. In fact, wastewater usually becomes easier to treat if it is less diluted at the treatment plant, as there is less water to be removed from the sludge. The result would be multiple savings and a better environment.

The same principle applies to industrial, agricultural, and commercial users. If major industries with their own water supplies were also charged for the amount they withdraw from their source of water, reuse would increase and a more efficient use of water would result. In fact, recycling has been called an automatic solution to the water quality problem. The cleaner the discharge required by regulations, the easier and more economical it is to reuse that same water instead of pumping in fresh supplies. Realistic pricing of water for large-volume agricultural uses such as irrigation would tend to lead to greater efficiency in its use, and therefore to conservation.

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**Typical prices for popular beverages**  
 (\$/1000 litres)

Beverage	Cost *
Tap water **	1.26
Cola	850.00
Milk	985.00
Bottled water/Mineral water	1 500.00
Beer	2 500.00
Wine	9 000.00
Whiskey, gin...	26 700.00

\* All amounts are in Canadian dollars.

\*\* Only tap water includes automatic delivery to the user. This figure also includes the cost of waste treatment.



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**Water use in the future**

As time goes on, more and more water users will compete for what remains of the same finite supply. This implies increases in water efficiency and conservation and doing even more to restore its quality after use. Nor is

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conservation restricted to only the uses of water: energy conservation, a desirable goal in itself, also contributes to water conservation. The reason is that reduced energy consumption lessens the need for electric power generation, which outranks all other water uses many times.

Paying for the accumulated deterioration of water supply and sewerage systems, and making up for the years of indifference and neglect our water resources have suffered is very much a part of the challenge to conserve water for our own use and for that of future generations. But if we do not learn from our past mistakes now, we will add to an already large environmental mortgage.

We must learn to use only what we need, and need what we use. In the words of one conservation slogan: "Let's keep it on tap for the future."

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**Did you know?**

- In 2001, Canadians used an average of 335 litres of water each day.
- A mere 10% of our home water supply is used in the kitchen and as drinking water.
- About 65% of indoor home water use occurs in our bathrooms. Toilets are the single greatest water user.
- Indoor water use peaks twice a day year-round, in the mornings and evenings.
- The biggest peaks during the year occur in the summer, when about half to three quarters of all municipally treated water is sprayed onto lawns.
- As a community grows, the water use grows even faster because the diversity of water uses increases with size.
- 1000 litres = 1 cubic metre (m<sup>3</sup>)

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## Water use data

[Municipal](#) | [Industrial](#) |

Environment Canada has a water use database which includes information on all major water users obtained from national surveys on:

### Municipal water use

The first set of data is from a federal and provincial inventory of municipal water works and water treatment facilities published in 1975. It was updated by Environment Canada with 1986, 1989, 1991, 1994, 1996, 1999 and 2001 surveys.

Two sets of summary data, reported by community, are available for download. The definitions of the column headings are contained in a *Data Description*, which can also be downloaded.

2001 Summary Data: [Excel](#) |

Data description: [HTML](#) | [PDF](#) |

1983-1999 Summary Data: [Excel](#) |

Data description: [HTML](#) | [PDF](#) |

A summary report, entitled [Municipal water use, 2001 statistics](#) has also been released.

### Municipal water pricing

The municipal water pricing database was developed from the Municipal Water and Wastewater Survey. The database is designed to provide easy access to municipal data on water and wastewater pricing from over 1200 Canadian municipalities. These municipalities have populations of at least 1000.

Two sets of summary data, reported by community, are available for download. The definitions of the column headings are contained in a *Data Description*, which can also be downloaded.

Data description: [HTML](#) | [PDF](#) |

2001 Summary Data: [Excel](#) |

Summary tables, updating those in *Municipal Water Pricing, 1991-1999*, and a description of the methodology, are also available. [HTML](#) | [PDF](#) |

1991, 1994, 1996 and 1999 Summary Data: [Excel](#) |

A detailed [report on municipal water pricing](#) was released, based on the pricing data collected in the 1999 survey and data from the previous three surveys.

### Industrial water use

There have been five use surveys (1976, 1981, 1986, 1991 and 1996). They were conducted subject to the federal Statistics Act under an agreement between Statistics Canada and Environment Canada.

The 1996 Industrial Water Survey gathered information on the volume of water use, end uses, water treatment and cost of water in Canada for industrial users. It was mailed out to about 6100 industrial establishments from four sectors: manufacturing, mineral extraction, thermal power, and hydro power.

A detailed [report on industrial water use](#) has been released, based on the data collected in the 1996 survey. It makes very general comparisons with the results of the previous two surveys – that conducted in 1991 and to a lesser extent that conducted in 1986.

To download a file: Hold your right mouse button on the file you wish to download. When the menu appears, choose "Save Target As..." or "Save link as...". Choose a suitable directory and file name (if necessary). Click OK and your file should be downloaded. Open the file in an appropriate software (e.g., Microsoft Excel).

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