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Annual Statistics 2003

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Note of Appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued cooperation and good will.

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International Year of Freshwater Logo

On December 20, 2000 the United Nations General Assembly proclaimed the year 2003 as the International Year of Freshwater. The Year is intended to increase awareness of the importance of sustainable freshwater use, management and protection. The WaterYear2003 logo is designed to promote awareness and activities pertaining to the International Year of Freshwater. For further information see **www.wateryear2003.org**.

Symbols

The symbols described in this document apply to all data published by Statistics Canada from all origins including surveys, censuses and administrative sources, as well as straight tabulations and all estimations.

.	not available for any reference period
..	not available for a specific reference period
...	not applicable
p	preliminary
r	revised
x	suppressed to meet the confidentiality requirements of the *Statistics Act*
E	use with caution
F	too unreliable to be published

Prefixes of the Metric System

Prefix	Abbreviation	Multiplication factor
exa	E	10^{18}
peta	P	10^{15}
tera	T	10^{12}
giga	G	10^{9}
mega	M	10^{6}
kilo	k	10^{3}
hecto	h	10^{2}
deca	da	10^{1}
deci	d	10^{-1}
centi	c	10^{-2}
milli	m	10^{-3}
micro	µ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}
femto	f	10^{-15}
atto	a	10^{-18}

Abbreviations

^{o}C	degree Celsius
d	day
g	gram
GJ	gigajoule
GWh	gigawatt hour
h	hour
ha	hectare
kg	kilogram
km	kilometre
km^2	square kilometre
km^3	cubic kilometre
km/h	kilometres per hour
kt	kilotonne
kW	kilowatt
l	litre
m^3	cubic metre
mg	milligram
MJ	megajoule
mm	millimetre
Mt	megatonne
NAICS	North American Industry Classification System
NTU	nephelometric turbidity unit
µg	microgram
µs	microsecond
PJ	petajoule
ppb	parts per billion
ppm	parts per million
ppmv	parts per million by volume
s	second
S	Siemens
SIC	Standard Industrial Classification
t	tonne
TCU	true colour unit
TJ	terajoule

Equivalences

1 hectare	=	1 km^2 / 100
1 km^2	=	100 hectares
1 tonne	=	1 000 kilograms

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Preface

Human Activity and the Environment: Annual Statistics 2003 is the second annual update of the more extensive environment statistics compendium *Human Activity and the Environment 2000*. The larger publication is published every five years, but many of the statistics it presents are revised more frequently—on a biennial, annual and even quarterly basis.

The 71 data tables in this edition cover those topics for which major updates have been made available since the publication of the 2000 and 2002 editions of *Human Activity and the Environment*. These tables are organized by topic as in the compendium. A "Highlights" section briefly describes notable developments presented in the tables in relation to human activity and the environment.

This publication also includes a feature article, "Fresh Water Resources in Canada." Future editions will examine other current environmental issues of concern to Canadians and provide additional updated data.

Data for *Human Activity and the Environment* come from a variety of sources, including various divisions within Statistics Canada and other federal and provincial government departments.

Acknowledgements

Human Activity and the Environment: Annual Statistics 2003 has been prepared by the Environment Accounts and Statistics Division under the direction of Claude Simard (Director) and Robert Smith (Assistant Director). Murray Cameron served as editor and project manager and Laurie Jong was the database manager. Hélène Trépanier was the publication's technical editor. Major contributions to the statistics and analysis presented in the report have been made by

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- **Statistics Canada** (Agriculture Division; Demography Division; Input–Output Division; Labour Statistics Division; Manufacturing Construction and Energy Division; Public Institutions Division; Science, Innovation and Electronic Information Division; Transportation Division)
- **Transport Canada** (Surface and Marine Statistics and Forecasts)

How to Use this Publication

Human Activity and the Environment: Annual Statistics 2003 is a printed publication (including a CD-ROM) containing updates of a number of statistical tables found in the more detailed environmental publication *Human Activity and the Environment 2000*. Data table highlights, along with a feature article, are also included. This annual publication is intended to provide users with quick access to updated statistical tables in a format that is convenient and easy to read.

The publication's CD-ROM contains

- a reproduction of the printed publication in Adobe Acrobat format; and
- a database of the statistical tables found in the printed publication, accessible through Microsoft Excel,

Microsoft Excel Viewer (included on the CD-ROM), or other spreadsheet software packages (for example, Lotus and QuattroPro).

The CD-ROM is found in the plastic pouch attached to the inside back cover of the printed publication. Complete instructions for the computer installation of the system are also found there.

Statistical Tables Linked Electronically

To aid users in locating the electronic statistical tables, links have been established between Adobe Acrobat and Excel (or Excel Viewer).

Each table name in the Adobe Acrobat database contains a 'hot button' that can be clicked with your mouse to link directly to the data associated with that table. Simply by clicking on the table name that you are most interested in, you can automatically launch Excel (or Excel Viewer), with that particular table open for viewing.

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Fresh Water Resources in Canada

Water is a basic necessity of life—access to clean water in sufficient quantity is an integral part of our well-being. It has had a strong influence on Canada's development as a country and it remains a precious part of our natural wealth.

Historically, with lakes and rivers serving as important transportation routes for both people and goods, water has been a major influence on movement and settlement within our country. This rich water heritage is the result of a combination of several factors—our climate, our global location, and our geological and glacial past are all elements that account for our abundant water reserves and their pattern of renewal.

Canadians live in a country with a plentiful supply of fresh water. While our country's population represents just 0.5% of the global population, we have access to nearly 20% of the world's stock of fresh water and 7% of the total renewable water flow.[1,2] Table 1.1 shows how Canada's water resources compare to selected Organisation for Economic Co-operation and Development (OECD) countries. While we may have one of the largest renewable supplies of water in the world, we are also among the highest consumers in terms of per capita water use.[3]

Presently, Canadians are concerned about a number of water-related issues. These include the availability, distribution, use and quality of water, as well as the controls placed on water usage. This article examines these issues by creating a statistical portrait of Canada's fresh water resources.

1 State of the resource

1.1 Where is fresh water found?

Water is part of a dynamic system; it can be found in the atmosphere, moving across the surface of the earth in rivers and lakes; and even flowing and collecting underground. This continuous flow of water is known as the *hydrologic cycle*.

The hydrologic cycle begins when water vapour rises into the atmosphere through the evaporation of surface water and transpiration from plants. As this moist air rises, it cools and the water vapour in it condenses to form clouds. The fine droplets of water in these clouds eventually return to earth as rain, snow, fog or hail, depending on the climatic conditions. After the water falls to the ground, it may evaporate back into the atmosphere; flow into lakes, rivers or oceans; or seep into the soil.

1. Environment Canada, *Freshwater Website: Quickfacts*, www.ec.gc.ca/water/en/e_quickfacts.htm (accessed February 5, 2003).
2. United Nations, *World Population Prospects: The 2002 Revision Population Database*, esa.un.org/unpp (accessed February 24, 2003).
3. Organisation for Economic Co-operation and Development (OECD), 2001, *Environmental Indicators: Towards Sustainable Development*, Paris.

Table 1.1
Selected international water resource statistics, 1999

		Population		Water					
				Renewable[1]					
Country	Total area	Population	Population density	Renewable[1] supply	supply per capita	Total use	Total use per capita	Irrigated area as a share of agricultural area	Proportion of renewable supply used
	thousand km^2	thousands	persons/km^2	km^3	m^3	million m^3	m^3	percent	
Australia	7 713.4	18 937	2.5	352	18 587.9	24 071	1 300	5.1	6.8
Canada	9 978.9	30 509	3.1	3 315	108 656.5	44 873	1 471	1.7	1.4
Japan	377.8	126 686	335.3	421	3 323.2	89 100	710	62.9	21.2
Korea	99.3	46 617	469.4	72	1 544.5	24 800	540	60.5	34.4
Luxembourg	2.6	433	167.2	2	3 695.2	60	140	..	3.8
Mexico	1 958.2	97 586	49.8	483	4 949.5	78 402	800	23.8	16.2
Netherlands	41.5	15 812	380.8	91	5 755.1	4 425	290	57.5	4.9
Sweden	450.0	8 858	19.7	179	20 207.7	2 668	300	4.1	1.5
United States	9 363.5	272 945	29.1	2 478	9 078.8	492 260	1 870	12.0	19.9

Note:
1. Renewable water is made up of run-off and streamflow.
Sources:
Organisation for Economic Co-operation and Development (OECD), 2002, *Environmental Data Compendium*, Paris.
Organisation for Economic Co-operation and Development (OECD), 2001, *Environmental Indicators: Towards Sustainable Development*, Paris.
Statistics Canada, Environment Accounts and Statistics Division.

Less than 3% of the world's water supply is fresh. Of this amount, about two-thirds of the water takes the form of permanent snow and ice; most of the remaining third, while to some degree accessible, is located underground. Surface fresh water represents only a very small fraction of the water in the hydrologic cycle. The fact that fresh water is unevenly distributed makes it a scarce resource in some parts of the world.

Precipitation

Some 5 500 km^3 of precipitation falls on Canada every year, mainly in the form of rain and snow (Map 1.1). Air masses that carry this precipitation generally circulate from west to east.

When air masses form over the Pacific Ocean, they soak up moisture and begin releasing it as they reach the coastline. As humid air rises to cross the coastal mountain ranges, clouds form, triggering an annual precipitation of 2 500 mm and more in some coastal areas. By the time the air gets to the Prairies, virtually all of its moisture has been released, making this region one of Canada's driest (less than 500 mm of annual precipitation). The central provinces of Ontario and Quebec receive moderate precipitation, with anything from 500 mm to 1 000 mm annually. Precipitation gradually increases to 1 500 mm to 2 000 mm once the air masses move near the Maritimes.

Precipitation levels also differ from north to south—the Arctic atmosphere holds an average of 0.2% water vapour while in southern Canada, this percentage rises to 0.9%. The Territories and the northern regions of the Prairie provinces are very dry and receive less than 500 mm of precipitation annually. Figure 1.1 shows the average annual precipitation as recorded at selected weather stations.

Map 1.1
Normal precipitation, 1971 to 2000

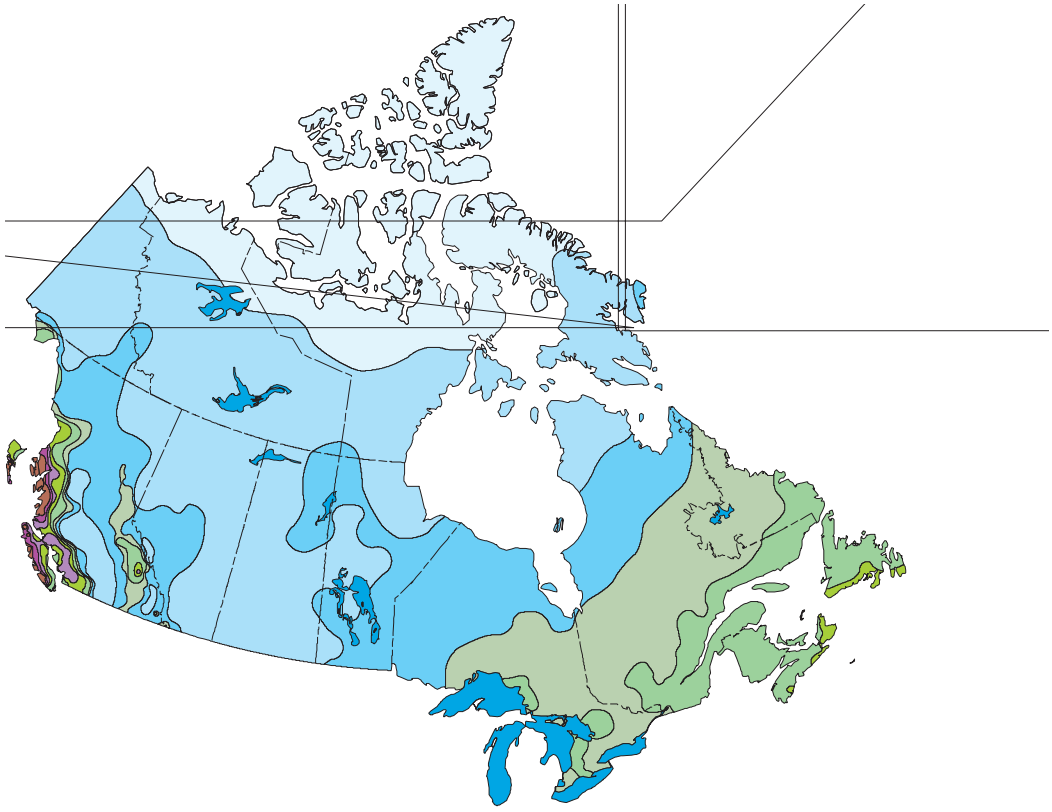
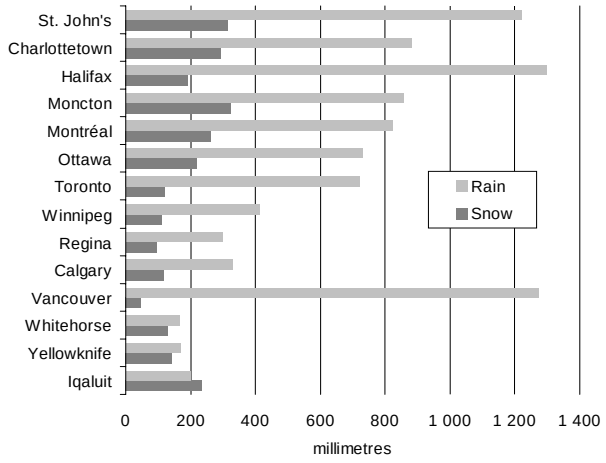


Figure 1.1
Average annual precipitation, 1971 to 2001



Source:
Environment Canada, Meteorological Service of Canada.

Table 1.2
Distribution of streamflow, water area and 2001 population, by province and territory

Province/Territory	Streamflow	Water area	Population
		percent	
Newfoundland and Labrador	8.6	5.0	1.7
Prince Edward Island	0.1	0.1	0.5
Nova Scotia	1.2	0.5	3.0
New Brunswick	1.3	0.2	2.4
Quebec	21.6	18.6	24.1
Ontario	8.9	8.8	38.0
Manitoba	2.6	10.0	3.7
Saskatchewan	1.5	7.0	3.3
Alberta	1.9	2.6	9.9
British Columbia	24.0	3.0	13.0
Yukon Territory	4.2	1.0	0.1
Northwest Territories and Nunavut	24.0	43.3	0.2
Canada	**100.0**	**100.0**	**100.0**

Sources:
Laycock, A.H.,1987, "The Amount of Canadian Water and its Distribution," in *Canadian Aquatic Resources*, no. 215 of *Canadian Bulletin of Fisheries and Aquatic Sciences*, M.C. Healey and R.R. Wallace (eds.), 13-42, Fisheries and Oceans Canada, Ottawa.
Fernandes, R., G. Pavlic, W. Chen and R. Fraser, 2001, Canada-wide 1-km water fraction, National Topographic Database, Natural Resources Canada, www.nrcan.gc.ca/ess/_portal_esst.cache/gc_ccrs_e (accessed April 29 2002).
Statistics Canada, 2001 Census of Population.

Surface water

Canada's surface water flows into five major water bodies: the Pacific Ocean, Hudson Bay, the Arctic Ocean, the Atlantic Ocean and the Gulf of Mexico [1] (see Section 1.2, **Ocean drainage and major river basins,** for more information). An estimated 12% of Canada, or 1.2 million km^2, is covered by lakes and rivers. While many provinces have a substantial amount of water in comparison with their population, only 3% of the area covered by water in Canada is located in inhabited regions.[2,3] Table 1.2 shows the distribution of streamflow, water area and population for each province and territory.

Lakes

There are over 2 million lakes in Canada. Among the largest are the Great Lakes, which are shared between the United States and Canada. Canada has 565 lakes over 100 km^2 in size, including Great Bear Lake and Great Slave Lake in the Northwest Territories and Lake Winnipeg in Manitoba. Although freshwater lakes represent only a small portion of the water in the hydrologic cycle, they represent 98% of the continental surface water that is available for use.[4]

Rivers

Rivers are fed by run-off[5] and ground water. The contribution of run-off to streamflow[6] will vary seasonally, depending on precipitation, snowmelt and, in some locations, the summer melt of glaciers. There are over 8 500 named rivers in Canada.[7]

Glaciers

Glaciers are an important fresh water resource (Text Box 1.1). While the volume of surface water in the Great Lakes is estimated to be in excess of 23 000 km^3, the volume of water contained in terrestrial glaciers in Canada is estimated to be 35 000 km^3.[8] There are over 1 000 named glaciers in Canada,[9] covering an estimated area[10] of 200 000 km^2.

1. See Map A.1 in the Annex for a complete definition of the drainage areas.
2. Here, inhabited regions are defined by Canada's population ecumene. The ecumene is defined by all blocks from the 2001 Census of Population that have a density of 0.4 person/km^2 or greater.
3. This number includes the Canadian portion of the Great Lakes water area.
4. Fisheries and Environment Canada, 1978, *Hydrological Atlas of Canada*, Plate 18, Ottawa.
5. Run-off is composed of rain and snowmelt that flow overland to rivers and streams.
6. Streamflow is the discharge that occurs in a natural channel.
7. Natural Resources Canada, 1990, Canadian Geographic Names Database.
8. Demuth, M.N., 1997, "A Discussion of 'Challenges facing surface water monitoring in Canada'," *Canadian Water Resource Journal*, 22:1, 89–92.
9. Natural Resources Canada, 1990, *op. cit*.
10. The Atlas of Canada, *Glaciers and Icefields*, www.atlas.gc.ca/maptexts/map_texts/english/freshwater_glaciers_e.html (accessed May 26, 2003).

Text Box 1.1
Glacial melt

Glaciers play an important role in the provision of fresh water. As snow accumulates and compacts, becoming glacial ice in the process, it slowly proceeds downslope under the force of gravity, eventually melting and becoming streamflow at lower elevations. Glacial streamflow, which peaks in the hot summer months, provides moisture during the driest times of the year. This phenomenon is central to the ecological and economic functioning of the Prairie provinces. If the rate of accumulation of snow is greater than the rate of melt, glaciers advance. If not, glaciers recede.

In Canada, 1 300 glaciers have lost between 25% and 75% of their mass since 1850.[1] Along the eastern slope of the Rockies, glacier cover is decreasing rapidly and total cover is now close to its lowest level in 10 000 years.[2] Most of this reduction has taken place over the last 50 years and has resulted in a decrease in glacial streamflow during the critical driest months of the year.[3]

1. Environment Canada, 2000, "Glaciers and Climate Change," *Science and Environment Bulletin*, December–January,www.ec.gc.ca/science/sandejan00/article3_e.html (accessed April 16,2003).
2. Demuth, M.N., and A. Pietroniro, 2002, *The impact of climate change on the glaciers of the Canadian Rocky Mountain eastern slopes and implications for water resource-related adaptation in the Canadian Prairies*, Phase I, Prairie Adaptation Research Co-operative (PARC) Project no. P55, Natural Resources Canada, Ottawa.
3. Environment Canada, *op. cit*.

Wetlands

Wetlands occupy a transitional position between water and land. Wetlands usually occur in poorly drained areas that foster the growth of hydrophilic vegetation[1] and support other biological activities such as large numbers of waterfowl. Wetlands store and release large quantities of water, and also contribute to the formation of peat, an energy resource.[2,3] Canada's wetlands are concentrated in the Prairie provinces and Northern Ontario and are sparsest in mountainous areas and the far north.

Ground water

Ground water circulates through loose materials such as sand and gravel or through cracks and pores in bedrock. Ground water that flows into rivers is called baseflow and is a stable source of water for many rivers.

In southern Canada, the water table lies within 20 m of the surface. Shallow aquifers[4] generally contain fresh water, while deeper aquifers tend to have greater concentrations of dissolved solids making the water in them less fit for consumption. At depths of more than 500 m, ground water can be as saline as seawater, or even more so.[5]

1.2 Ocean drainage and major river basins

A portion of the precipitation that falls to earth travels as surface run-off to streams and lakes. When this water enters the rivers and lakes that comprise the drainage system, it becomes streamflow. When combined, run-off and streamflow form the renewable water supply and the rate of renewal can be estimated from measurements of streamflow and lake levels (Text Box 1.2).

Drainage in Canada

Most of the land area of Canada drains to one of four water bodies: the Pacific, Arctic and Atlantic oceans and Hudson Bay. A small area in southern Alberta and Saskatchewan (0.3% of Canada's land area) drains into the Gulf of Mexico.

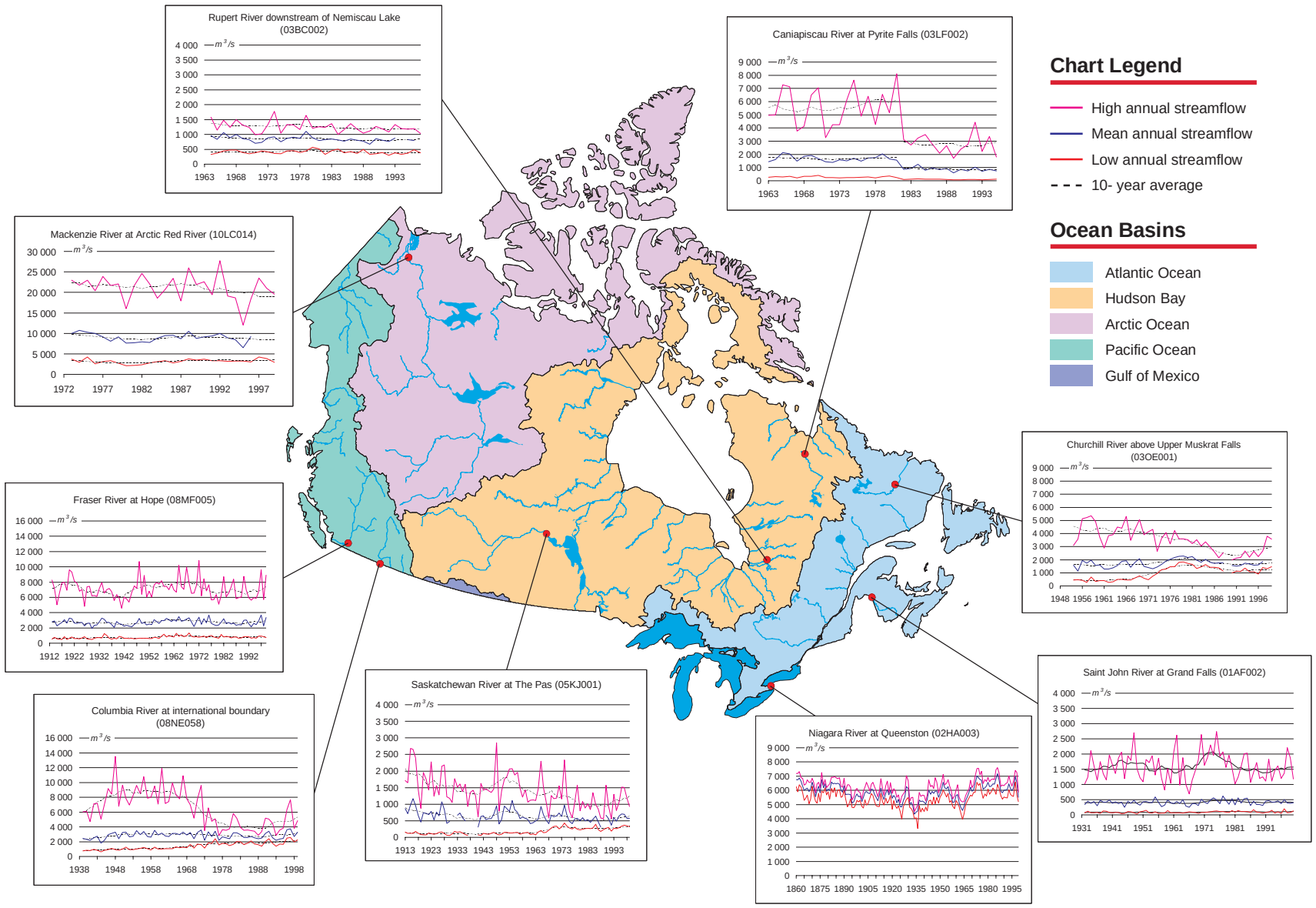
Map 1.2 shows the ocean drainage basins along with annual streamflow graphs from selected gauging stations. While these stations are all located on major rivers, the size of the rivers in terms of average streamflow ranges from the Rupert River at 846 m^3/s to the Mackenzie River at 8 968 m^3/s.[6] Overall, the graphs depict the high variability of annual streamflow and, in some cases, long-term change.

Some streamflow patterns across Canada have changed significantly because of human activity in the area. The Columbia and Churchill rivers illustrate the effects of dams on streamflow. The high-, average- and low-flow levels for these rivers have converged over time. In the case of the Caniapiscau River, its headwaters have not only been dammed, but also diverted towards the James Bay–La Grande hydro-electric complex, resulting in a decrease in flow.

1. Plants, such as algae, that grow only in water or very wet soil.
2. Peat is composed of organic residues, originating under more or less water-saturated conditions through the incomplete decomposition of plants (primarily sphagnum moss).
3. Tarnocai, C., 1980, "Canadian Wetland Registry," Proceedings of a Workshop on Canadian Wetlands, Environment Canada, Lands Directorate, Ecological Land Classification Series, no. 12, Ottawa.
4. An aquifer is a geological formation through which ground water flows and where it collects.
5. Cherry, John A., "Groundwater Occurrence and Contamination in Canada," in *Canadian Aquatic Resources,* no. 215 of *Canadian Bulletin of Fisheries and Aquatic Sciences*, M.C. Healey and R.R. Wallace (eds.), 387–424, Department of Fisheries and Oceans, Ottawa.
6. Streamflow values are drawn from mean monthly data.

Map 1.2

Annual streamflow for selected hydrometric gauging stations



Sources:

Environment Canada, 2001, *Surface Water and Sediment Data,* Hydrometric database (HYDAT) *version 99-2.00,* Water Survey of Canada, Ottawa.

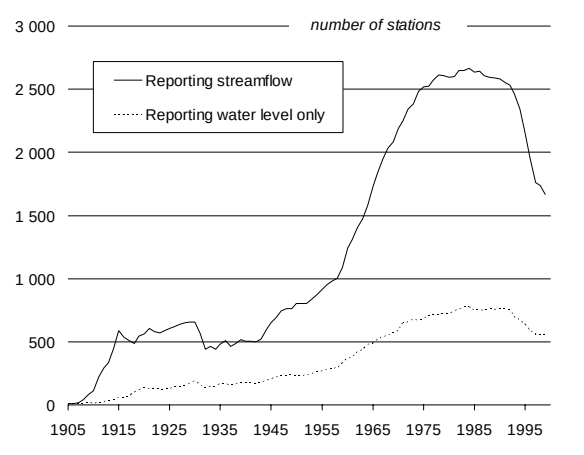
Natural Resources Canada, 2003, National Scale Frameworks Hydrology - Drainage Areas, Canada, Version 5.0, www.geogratis.cgdi.gc.ca (accessed September 16, 2003).

Text Box 1.2
Water monitoring network

Surface drainage is measured through the water monitoring network. The network is currently maintained and funded through cost-sharing agreements between the federal, provincial and territorial governments. In 1999, the number of gauging stations reporting water levels and streamflow was 1 641, while an additional 554 measured water levels only.

Stations are often established for a specific purpose, such as monitoring flood risks, measuring hydro-electric power potential, or respecting transboundary agreements. As shown in the accompanying figure, over the last 100 years the monitoring network has grown significantly, with most of the stations being added between the 1950s and the 1980s. In the 1990s, the number of gauging stations was reduced back to the level reached in the 1960s. A significant number of the discontinued stations had accumulated 20 years or more of monitoring data.[1]

Number of gauging stations reporting water data since 1905



Source:
Environment Canada, 2001, *Surface Water and Sediment Data,* Hydrometric database (HYDAT) *version 99-2.00,* Water Survey of Canada, Ottawa.

1. Yuzyk, T.R., 2001, "Hydrological Monitoring for Climate Change in Canada," Trends in Canadian Hydrological Time Series, March 8–9 workshop presentations, Environment Canada and Canadian Water Resources Association.

Pacific Ocean drainage

Almost a quarter of Canada's renewable water flows into the Pacific Ocean, draining the area west of the Rocky Mountains. This basin, representing 10% of the country's total land area, is dominated by mountain ranges and is home to 13% of the Canadian population.

The Fraser and Yukon rivers, along with the Canadian portion of the Columbia River, account for about a third of the total flow in the basin (Map 1.3 and Table 1.3). Meltwater from glaciers contributes to all three of these rivers. Watersheds in the coastal areas experience little snow accumulation so flows are primarily rainfall-driven with run-off.[1]

Hudson Bay drainage

Approximately 30% of the surface water in Canada flows into Hudson Bay from an area that represents almost 39% of the country and 17% of its population. Some 21 rivers with a discharge of more than 450 m^3/s flow into the bay, the largest of which is the Nelson River.[2]

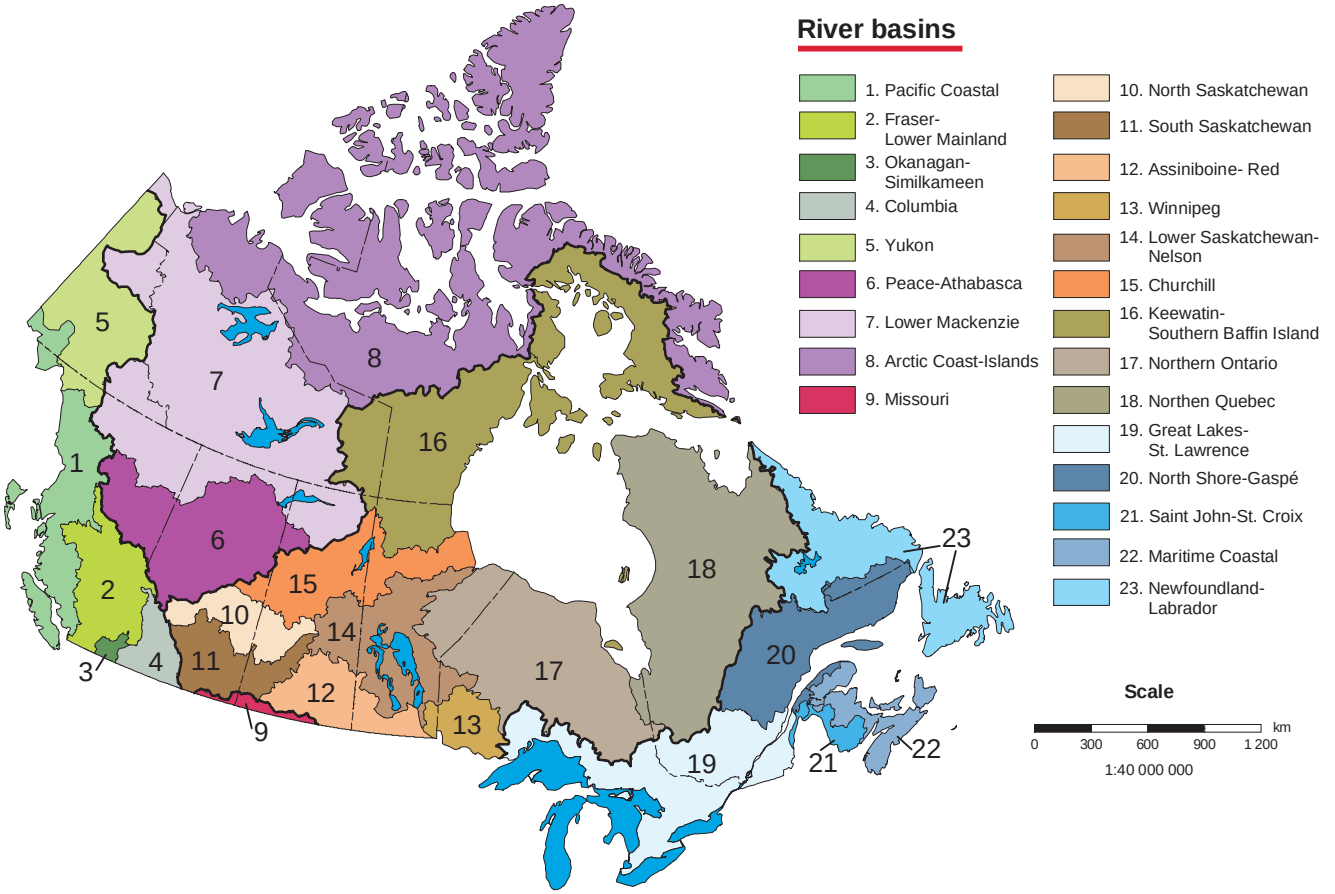
The Nelson River system comprises several river basins (numbers 10 to 14 on Map 1.3) that are characterized by endoreic drainage: this means that the water does not reach Hudson Bay but evaporates or is absorbed into the soil instead. Major endoreic drainage areas comprise about 6% of the Nelson River system. In an average year, well over 50% of Prairie streamflow will not reach the ocean.[3]

The Nelson River system is also distinct in that two of its subsystems, the North Saskatchewan and South Saskatchewan rivers, are fed by glaciers in the Rocky Mountains. Glacial meltwaters form a significant portion of streamflow to the system and discharge from the glaciers tends to occur in late summer, reducing the dominance of snowmelt on annual streamflow in the spring.

During the 1970s and 1980s, significant alterations to the Hudson Bay drainage systems were introduced when the largest water diversions in the country[4] were constructed (see also **Dams and diversions** in Section 2.1, **Water use**).

1. Fisheries and Environment Canada, 1978, *Hydrological Atlas of Canada*, Ottawa, Plate 23, Ottawa.
2. Natural Resources Canada and Environment Canada, 1992, "Canada Streamflow, Map 5.4," *National Atlas of Canada*, Fifth Edition, Ottawa.
3. Laycock, A.H., 1987, "The Amount of Canadian Water and its Distribution," in *Canadian Aquatic Resources,* no. 215 of *Canadian Bulletin of Fisheries and Aquatic Sciences*, M.C. Healey and R.R. Wallace (eds.), 13–42, Department of Fisheries and Oceans, Ottawa.
4. Rosenberg, D.M., R.A. Bodaly, R.E. Hecky and R.W. Newbury, 1987, "The Environmental Assessment of Hydro-electric Impoundments and Diversions in Canada," in *Canadian Aquatic* Resources, no. 215 of *Canadian Bulletin of Fisheries and Aquatic Sciences*, M.C. Healey and R.R. Wallace (eds.), 71–104, Department of Fisheries and Oceans, Ottawa.

Map 1.3
Major river basins



Note:
The river basin codes in this map are used in Tables 1.3 and 1.4.
Sources:
Pearse, P.H., F. Bertrand and J.W. MacLaren, 1985, *Currents of Change: Final Report of the Inquiry on Federal Water Policy*, Environment Canada, Ottawa.
Statistics Canada, Environment Accounts and Statistics Division, Spatial Environmental Information System.

Arctic Ocean drainage

Approximately 18% of Canada's renewable water drains to the Arctic Ocean in a drainage area that represents 36% of Canada's land surface, but only about 1% of its population. The Mackenzie River and its tributaries drain half (51%) of this area and account for 59% of the streamflow.[1] The Lower Mackenzie River Basin covers an area of 1.33 million km^2 (Table 1.3), an area larger than Ontario and all of the Maritime Provinces combined.

Two of the Mackenzie's main tributaries, the Peace and Athabasca rivers, originate in the Rocky Mountains and are fed in part by glacial meltwater. These rivers flow across the relatively flat boreal plains to Great Slave Lake.

Atlantic Ocean drainage

In Canada, 28% of streamflow drains to the Atlantic Ocean. This drainage area covers 15% of Canada's land and 69% of its population. Canada's largest river, the St. Lawrence, captures about a third of the streamflow.

The Great Lakes–St. Lawrence River Basin is the most populated river basin in Canada. More than half of Canada's people (59%) live here. This river basin has the highest population density as well, with more than 30 people per km^2 (Table 1.4).

The Atlantic Ocean basins east of the St. Lawrence River occupy 9% of the nation's area, contain 10% of its population and contribute nearly 21% of the country's streamflow.

1. Fisheries and Environment Canada, 1978, *Hydrological Atlas of Canada,* Plate 23, Ottawa.

Table 1.3
Water resource characteristics by major river basin[1]

Code	River basin name	Total area[2]	Water area[3]			Mean annual Streamflow[4]				Precipitation[5]		Dams	
			Total	As a share of total	Per capita	Rate	Total	Per unit area	As a share of total	Rate	Volume	Number	Generating capacity[6]
		km^2		percent	m^2	m^3/s	km^3	thousand m^3/km^2	percent	mm	km^3	units	MW
1	Pacific Coastal	334 452	15 041	4.5	10 944	16 390	516.9	1 545	15.6	1 354	451	50	1 648
2	Fraser-Lower Mainland	233 105	9 015	3.9	4 462	3 972	125.3	537	3.8	670	156	24	848
3	Okanagan-Similkameen	15 603	650	4.2	2 279	74	2.3	150	0.1	466	7	3	594
4	Columbia	87 321	2 482	2.8	15 457	2 009	63.4	726	1.9	776	68	56	5 153
5	Yukon	332 906	9 329	2.8	343 653	2 506	79.0	237	2.4	346	115	10	76
6	Peace-Athabasca	485 146	16 725	3.4	48 306	2 903	91.5	189	2.8	497	241	17	3 427
7	Lower Mackenzie	1 330 481	176 937	13.3	3 623 373	7 337	231.4	174	7.0	365	486	18	83
8	Arctic Coast-Islands	1 764 279	177 906	10.1	10 617 432	8 744	275.8	156	8.3	189	333	0	0
9	Missouri	27 097	1 129	4.2	120 359	12	0.4	14	0.0	390	11	2	13
10	North Saskatchewan	150 151	7 245	4.8	5 539	234	7.4	49	0.2	443	67	6	504
11	South Saskatchewan	177 623	6 243	3.5	3 522	239	7.5	42	0.2	419	74	21	310
12	Assiniboine-Red	190 705	9 098	4.8	6 665	50	1.6	8	0.0	450	86	3	168
13	Winnipeg	107 654	20 599	19.1	247 350	758	23.9	222	0.7	683	74	98	905
14	Lower Saskatchewan-Nelson	360 883	67 612	18.7	309 699	1 911	60.3	167	1.8	508	183	60	4 941
15	Churchill	313 572	51 858	16.5	593 728	701	22.1	70	0.7	480	151	12	119
16	Keewatin-Southern Baffin	939 568	161 438	17.2	13 416 290	5 383	169.8	181	5.1	330	310	0	0
17	Northern Ontario	691 811	55 952	8.1	391 174	5 995	189.1	273	5.7	674	466	60	1 116
18	Northern Quebec	940 194	148 986	15.8	1 426 559	16 830	530.8	565	16.0	698	656	66	15 238
19	Great Lakes-St. Lawrence	582 945	134 928	23.1	7 624	7 197	227.0	389	6.8	957	556	623	12 515
20	North Shore-Gaspé	369 094	37 363	10.1	74 117	8 159	257.3	697	7.8	994	367	129	10 785
21	Saint John-St. Croix	41 904	1 800	4.3	4 481	779	24.6	586	0.7	1 147	48	54	1 864
22	Maritime Coastal	122 056	6 728	5.5	4 469	3 628	114.4	937	3.5	1 251	153	60	411
23	Newfoundland-Labrador	380 355	55 388	14.6	107 731	9 324	294.0	773	8.9	1 030	392	90	6 693
	Canada	**9 978 904**	**1 174 452**	**11.8**	**39 139**	**105 135**	**3 315.5**	**332**	**100.0**	**545**	**5 451**	**1 462**	**67 411**

Notes:
1. These major river basins and associated flow measures are adapted from "Laycock (1987) (see full reference below). Some of these river basin aggregates have more than one outflow.
2. Area includes the Canadian portion of the Great Lakes.
3. Water area figures are calculated from the Canada-wide 1-km water fraction derived from National Topographic Database maps.
4. Basins at the US-Canada border exclude inflow from U.S. portion of basin region.
5. Precipitation has been estimated from an Inverse Distance Weighted (IDW) interpolation of the 1971 to 2000 normals.
6. The generating capacity refers to the maximum power capability from hydro plants. The survey coverage for those plants is limited to those utilities and companies which have at least one plant with a total generating capacity of over 500 KW.

Sources:
Environment Canada, 2003, *Canadian Climate Normals, 1971 to 2000*, Meteorological Service of Canada, www.msc-smc.ec.gc.ca/climate/climate_normals/index_e.cfm (accessed February 21, 2003).
Pearse, P.H., F. Bertrand and J.W. MacLaren, 1985, *Currents of Change: Final Report of the Inquiry on Federal Water Policy*, Environment Canada, Ottawa.
Fernandes, R., G. Pavlic, W. Chen and R. Fraser, 2001, Canada-wide 1-km water fraction, National Topographic Database, Natural Resources Canada, www.nrcan.gc.ca/ess/_portal_esst.cache/gc_ccrs_e (accessed April 29, 2002).
Laycock, A.H., 1987, "The Amount of Canadian Water and its Distribution," in *Canadian Aquatic Resources*, no. 215 of *Canadian Bulletin of Fisheries and Aquatic Sciences*, M.C. Healey and R.R. Wallace (eds.), 13-42, Fisheries and Oceans Canada, Ottawa.
Natural Resources Canada, GeoAccess Division, 2003, 1:1 Million Digital Drainage Area Framework, version 4.8b.
Statistics Canada, 2001 Census of Population.
Statistics Canada, 2000, *Electric Power Generating Stations*, Catalogue no. 57-206-XIB.

1.3 The Great Lakes

The five Great Lakes, which rank among the 15 largest lakes in the world, contain 22 634 km^3 of fresh water[1] (Table 1.5). The entire drainage basin covers an area of 766 000 km^2, including eight states and two provinces. Water travelling from the western side of Lake Superior to the Gulf of St. Lawrence flows through 3 790 km of lakes, rivers, channels, locks and canals; this water highway stretches from Duluth, Minnesota to Anticosti Island, Quebec.

The Great Lakes have contributed significantly to the history and growth of Canada and the United States. The St. Lawrence Seaway, officially opened in 1959, transports materials on ships from the 'heartland' of North America to ports all over the world. Major industries along the lakes include steel, paper, chemicals and motor vehicles. Major cargo includes grain, iron ore, coal, steel, machinery and consumer goods. On average, 50 million tonnes of cargo are shipped annually through the seaway.[2]

Lake levels

The water levels in the five lakes are influenced by the precipitation, snowmelt, evaporation and evapo-transpiration occurring in each basin. In spring and summer, the water levels increase because of spring snowmelt and precipitation, whereas the fall and winter levels decrease as

1. United States Environmental Protection Agency, *The Great Lakes: An Environmental Atlas and Resource Book*, *Great Lakes Factsheet no. 1*, www.epa.gov/glnpo/atlas/gl-fact1.html (accessed June 11, 2003).

2. Great Canadian Rivers, *The St. Lawrence Seaway: Economic Engine of the Northeast,* www.greatcanadianrivers.com/rivers/stlawer/economy-home.html (accessed October 8, 2002).

Table 1.4
Population characteristics by major river basin,[1] 1971 to 2001

Code	River basin name	Total population[4] 1971	Total population[4] 2001	Population as a share of total 2001	Population change 1971 to 2001	Population density in 2001 By total area[2]	Population density in 2001 By water area[3]	Mean annual streamflow per capita
		persons		percent		persons/km^2		thousand m^3/person
1	Pacific Coastal	916 210	1 374 422	4.58	50.0	4.1	91.4	376
2	Fraser - Lower Mainland	967 851	2 020 656	6.73	108.8	8.7	224.1	62
3	Okanagan - Similkameen	120 553	285 145	0.95	136.5	18.3	438.7	8
4	Columbia	131 462	160 605	0.54	22.2	1.8	64.7	394
5	Yukon	17 204	27 148	0.09	57.8	0.1	2.9	2 911
6	Peace - Athabasca	206 564	346 234	1.15	67.6	0.7	20.7	264
7	Lower Mackenzie	34 182	48 832	0.16	42.9	0.0	0.3	4 738
8	Arctic Coast - Islands	7 690	16 756	0.06	117.9	0.0	0.1	16 457
9	Missouri	14 349	9 378	0.03	-34.6	0.3	8.3	40
10	North Saskatchewan	844 730	1 307 959	4.36	54.8	8.7	180.5	6
11	South Saskatchewan	948 446	1 772 288	5.91	86.9	10.0	283.9	4
12	Assiniboine - Red	1 250 804	1 365 079	4.55	9.1	7.2	150.0	1
13	Winnipeg	84 685	83 277	0.28	-1.7	0.8	4.0	287
14	Lower Saskatchewan - Nelson	237 276	218 315	0.73	-8.0	0.6	3.2	276
15	Churchill	61 711	87 343	0.29	41.5	0.3	1.7	253
16	Keewatin - Southern Baffin	6 271	12 033	0.04	91.9	0.0	0.1	14 107
17	Northern Ontario	149 112	143 036	0.48	-4.1	0.2	2.6	1 322
18	Northern Quebec	87 805	104 437	0.35	18.9	0.1	0.7	5 082
19	Great Lakes - St. Lawrence	12 759 943	17 698 641	58.98	38.7	30.4	131.2	13
20	North Shore - Gaspé	503 796	504 113	1.68	0.1	1.4	13.5	510
21	Saint John - St. Croix	365 294	401 681	1.34	10.0	9.6	223.2	61
22	Maritime Coastal	1 329 135	1 505 585	5.02	13.3	12.3	223.8	76
23	Newfoundland - Labrador	523 238	514 131	1.71	-1.7	1.4	9.3	572
	Canada	**21 568 311**	**30 007 094**	**100.00**	**39.1**	**3.0**	**25.5**	**110**

Notes:
1. These major river basins and associated flow measures are adapted from "Laycock (1987) (see full reference below). Some of these river basin aggregates have more than one outflow.
2. Area includes the Canadian portion of the Great Lakes.
3. Water area figures are calculated from the Canada-wide 1-km water fraction derived from National Topographic Database maps.
4. Numbers based on the 2001 Census of population of Statistics Canada.

Sources:
Environment Canada, 2003, *Canadian Climate Normals, 1971 to 2000*, Meteorological Service of Canada, www.msc-smc.ec.gc.ca/climate/climate_normals/index_e.cfm (accessed February 21, 2003).
Pearse, P.H., F. Bertrand and J.W. MacLaren, 1985, *Currents of Change: Final Report of the Inquiry on Federal Water Policy*, Environment Canada, Ottawa.
Fernandes, R., G. Pavlic, W. Chen and R. Fraser, 2001, Canada-wide 1-km water fraction, National Topographic Database, Natural Resources Canada, www.nrcan.gc.ca/ess/_portal_esst.cache/gc_ccrs_e (accessed April 29, 2002).
Laycock, A.H., 1987, "The Amount of Canadian Water and its Distribution," in *Canadian Aquatic Resources*, no. 215 of *Canadian Bulletin of Fisheries and Aquatic Sciences*, M.C. Healey and R.R. Wallace (eds.), 13-42, Fisheries and Oceans Canada, Ottawa.
Natural Resources Canada, GeoAccess Division, 2003, 1:1 Million Digital Drainage Area Framework, version 4.8b.
Statistics Canada, Censuses of Population 1971 and 2001.

Table 1.5
Profile of the Great Lakes

Lake	Lake size Length	Lake size Width	Lake size Shoreline	Lake area Surface water	Lake area Total basin	Lake depth Average	Lake depth Maximum	Lake volume	Lake retention	Dominant land use/cover
	km			km^2		m		km^3	years	
Ontario	311	85	1 146	18 960	82 990	86	244	1 640	6	Agriculture and forest
Erie	388	92	1 402	25 700	103 700	19	64	484	3	Agriculture
Huron	332	245	6 157	59 600	193 700	59	229	3 540	22	Forest
Michigan	494	190	2 633	57 800	175 800	85	282	4 920	99	Agriculture and forest
Superior	563	257	4 385	82 100	209 800	147	406	12 100	191	Agriculture

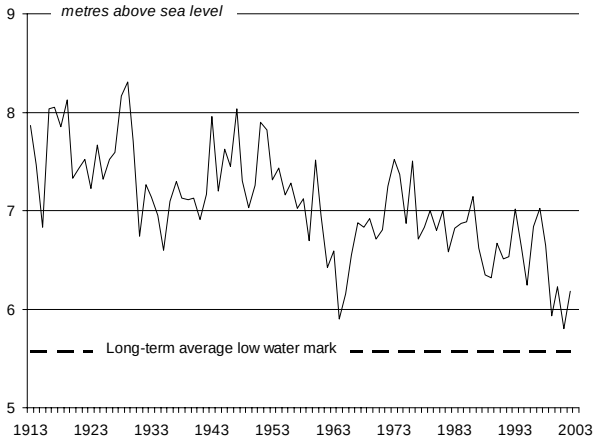
Source:
United States Environmental Protection Agency, *The Great Lakes: An Environmental Atlas and Resource Book, Great Lakes Factsheet no. 1*, www.epa.gov/glnpo/atlas/gl-fact1.html (accessed June 11, 2003).

warmer water evaporates into the cooler air. Ice cover in the latter part of winter prevents evaporation to some extent. During cold winters, all the lakes ice up in bays near the shoreline; some of the lakes freeze over entirely.

Fluctuating water levels are a normal occurrence in the Great Lakes. However, over the last decade, the region has experienced six warmer-than-average years with increased evaporation and evapotranspiration rates. Ice cover that would usually slow evaporation in winter has not occurred to its normal extent or duration and has not taken place in the typical locations. More importantly, declines in snowfall have reduced peak water levels in the system. Over the past five years, winter precipitation in the northern lake areas (Superior, Michigan, Huron) has been below average.[1]

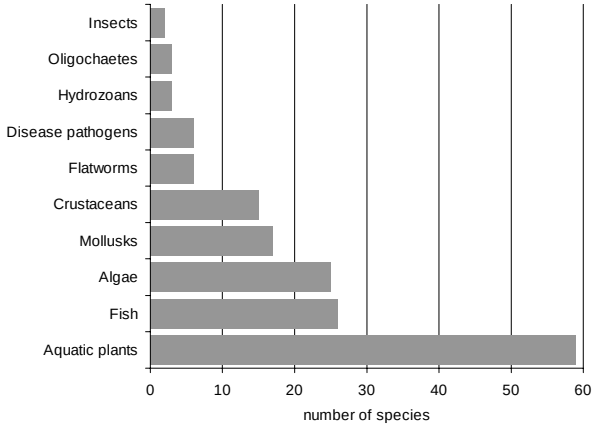
1. Montaigne, F., 2002, "Water Pressure", *National Geographic*, September, 202:3, 2–33.

Figure 1.2
St. Lawrence Seaway annual average water level at the Port of Montréal, 1913 to 2002



Note:
The long-term average low water mark represents a reference level based on the history of low water levels between 1915 and 1985.
Sources:
Fisheries and Oceans Canada, 2002, Daily water level data for Montréal Harbour Jetty No. 1 gauging station (15520), Marine Environmental Data Services (MEDS) data bank, Ottawa.
Statistics Canada, Environment Accounts and Statistics Division.

Figure 1.3
Types of introduced aquatic species established in the Great Lakes



Sources:
Edsall, T.A., E. Mills and J.H. Leach, *Exotic Species in the Great lakes*, biology.usgs.gov/s+t/noframe/x185.htm (accessed March 5, 2003).
Ricciardi, A., 2001, "Facilitative interactions among aquatic invaders: Is an 'invasional meltdown' occurring in the Great Lakes?," *Canadian Journal of Fisheries and Aquatic Science*, 58: 2513–2525.

The navigability of the St. Lawrence Seaway has been threatened in recent years. Figure 1.2 illustrates the variability of water levels at Jetty No. 1 in the Port of Montréal. In the early part of last century, water levels averaged 2 m above the long-term average low-water mark. By the end of the century, this margin had declined to under 1 m.

Port activities can be affected when water levels become too low since ships have to carry lighter loads to ensure safe passage. Low-water levels can also affect recreational activities, water purification and the production of hydro-electric power. On the environmental side, aquatic life may be threatened directly or indirectly from effects such as increased temperature.

Exotic species

Since the early 1800s, more than 160 species of fish, invertebrates, fish pathogens, plants and algae have been either accidentally or deliberately introduced to the Great Lakes (Figure 1.3). These exotic species are not native to the Great Lakes ecosystem and have travelled from their natural habitat with the aid of some form of human activity—usually through the disposal of ballast water from ships.

The greatest number of introductions occurred after the opening of the St. Lawrence Seaway, an event which highlights the impacts of increased shipping in the Great Lakes.[1] Some of the species introduced into a new river or lake system enhance the diversity of a habitat, but those that threaten the existence of indigenous species are termed invasive. Two of the most notorious species introduced to the Great Lakes include the sea lamprey and the zebra mussel.

Great Lakes management

The border between the United States and Canada crosses some of the largest lakes in the world. The first attempt to manage the Great Lakes between both countries began in 1905 with the International Waterways Commission. This commission was created to advise both countries on water flows and levels. It was soon recognized that a greater authority was required in order to consider a much broader set of issues, thus the Boundary Waters Treaty was passed in 1909. This treaty paved the way for the inception of the International Joint Commission (see Section 3.1, **Government response,** for more details), which was used to help resolve conflicts between both countries over water use in the Great Lakes.

1. Mills, E.L., J.H. Leach, J.T. Carlton and C.L. Secor, 1993, "Exotic species in the Great Lakes: A history of biotic crises and anthropogenic introductions," *Journal of Great Lakes Research,* 19: 1–54.

2 Demands on our water

Water is a common and indispensable ingredient in our daily lives. From generating our electrical power to growing our food, water has many purposes.

This section looks at the demands that are made on water in Canada—the uses we have for water, the pressures that we place on this resource, as well as how we maintain water so that it can be used safely.

2.1 Water use

Canada has one of the largest supplies of fresh water in the world. However, this supply is not limitless and it must be shared among many users.

Main withdrawal uses of water

Water to be used in human activities can either be used *instream* or withdrawn from its source. Examples of instream water use include hydro-electric power generation, transportation and recreation.

When water is withdrawn, some or all of it is eventually returned to the original source, often within a short timeframe. The quantity of water originally withdrawn is referred to as *intake*, and the water returned to the source is known as *discharge*. The difference between intake and discharge (the amount of water actually used up in the process) represents *consumption*. In some industrial applications, the withdrawn water is used more than once, a procedure referred to as *recirculation*.

As shown in Table 2.1, in 1996, the three leading water-users in Canada consisted of the electric power and other utilities industry, the agriculture industry, and the personal and government sectors.

Electric power and other utilities

This industry includes nuclear and fossil fuel power-generating stations. These stations draw large quantities of water, usually from surface water bodies, to aid in the cooling process. While the industry withdrew 63% of all water used in 1996, it recirculated at least 40% of this water. Nonetheless, water use in this industry has been on the rise since 1981 (Table 2.1).

Agriculture

In 1996, the agriculture industry used about 9% of all water withdrawn in Canada and consumed over 74% of that amount (Table 2.1). From 1981 to 1996, water withdrawn for agricultural purposes had been steadily increasing. Most withdrawn water was used for irrigation, but 5% was used for livestock purposes (Table 2.2).

The three most western provinces (British Columbia, Alberta and Saskatchewan) are the most intense agricultural water-users, withdrawing over 90% of the total water volume used on farms in Canada in 1996 (Table 2.2). A high water demand makes these provinces vulnerable to changes in water availability (Text Box 2.1).

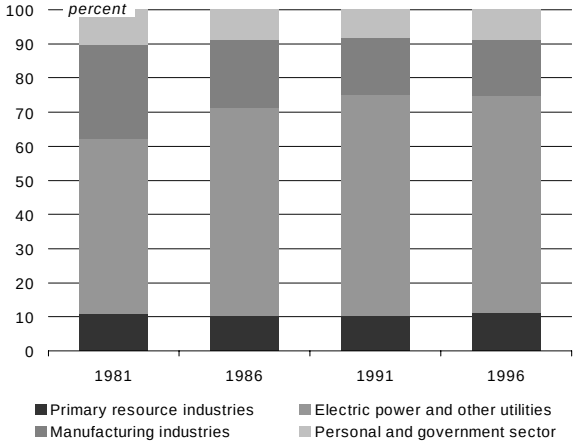
Personal and government

These sectors are composed of various organizations and service providers such as hospitals, recreation centres, educational institutions, government services and households. Water used in this category comprised almost 9% of the total water withdrawals in Canada in 1996 (Table 2.1). The majority of this water was delivered through municipal water systems and, as shown in Text Box 2.2, water metering has a direct relationship on the amount of water used.

Manufacturing

Combined, the manufacturing industries in Canada accounted for 14% of all water withdrawals in 1996. The portion of total water withdrawals in this sector, as well as the volume of water taken, has been declining since 1981 (see Figure 2.1 and Table 2.1). In some cases, industries (like the pulp, paper and paperboard mills industry) have become more efficient water users by increasing their water recirculation.

Figure 2.1
Share of water intake, 1981 to 1996



Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table 2.1
Major withdrawal uses of water, 1981, 1986, 1991 and 1996

Sector/Industry	Year	Total intake[1]	Change from previous period	Recirculation[2]	Change from previous period	Gross water use[3]	Change from previous period	Total discharge[4]	Change from previous period	Consumption[5]	Change from previous period
		Quantity		Quantity		Quantity		Quantity		Quantity	
		million m^3	percent	million m^3	percent	million m^3	percent	million m^3	percent	million m^3	percent
Business sector											
Primary resource industries											
Agriculture	1981	3 125	…	0	…	3 125	…	713	…	2 412	…
	1986	3 559	13.9	0	…	3 559	13.9	807	13.2	2 752	14.1
	1991	3 991	12.1	0	…	3 991	12.1	902	11.8	3 089	12.2
	1996	4 098	2.7	0	…	4 098	2.7	1 062	17.7	3 036	-1.7
Mining	1981	624	…	1 742	…	2 366	…	621	…	3	…
	1986	544	-12.8	1 159	-33.5	1 703	-28.0	542	-12.7	2	-33.3
	1991	489	-10.1	1 221	5.3	1 710	0.4	489	-9.8	1	-50.0
	1996	681	39.3	1 196	-2.0	1 878	9.8	672	37.4	9	800.0
Other primary resource industries	1981	251	…	1 050	…	1 302	…	188	…	63	…
	1986	180	-28.3	873	-16.9	1 054	-19.0	118	-37.2	62	-1.6
	1991	183	1.7	735	-15.8	918	-12.9	111	-5.9	71	14.5
	1996	231	26.2	1 013	37.8	1 244	35.5	138	24.3	92	29.6
Manufacturing industries											
Paper and allied products	1981	3 170	…	4 612	…	7 782	…	2 989	…	181	…
	1986	3 082	-2.8	3 121	-32.3	6 203	-20.3	2 876	-3.8	206	13.8
	1991	2 943	-4.5	2 206	-29.3	5 149	-17.0	2 758	-4.1	185	-10.2
	1996	2 505	-14.9	3 141	42.4	5 646	9.7	2 277	-17.4	228	23.2
Primary metal	1981	2 074	…	1 325	…	3 399	…	2 003	…	71	…
	1986	2 057	-0.8	1 945	46.8	4 002	17.7	2 014	0.5	43	-39.4
	1991	1 610	-21.7	1 689	-13.2	3 298	-17.6	1 518	-24.6	92	114.0
	1996	1 428	-11.3	1 416	-16.2	2 845	-13.7	1 308	-13.8	120	30.4
Chemical and chemical products	1981	3 188	…	1 285	…	4 473	…	2 963	…	225	…
	1986	1 694	-46.9	1 494	16.3	3 189	-28.7	1 630	-45.0	64	-71.6
	1991	1 326	-21.7	979	-34.5	2 305	-27.7	1 231	-24.5	95	48.4
	1996	1 182	-10.9	1 357	38.6	2 539	10.2	1 083	-12.0	99	4.2
Other manufacturing industries	1981	1 721	…	2 286	…	4 007	…	1 588	…	133	…
	1986	1 548	-10.1	1 880	-17.8	3 427	-14.5	1 422	-10.5	126	-5.3
	1991	1 532	-1.0	1 808	-3.8	3 340	-2.5	1 357	-4.6	175	38.9
	1996	1 282	-16.3	1 067	-41.0	2 349	-29.7	1 131	-16.7	151	-13.7
Electric power and other utilities	1981	18 166	…	1 868	…	20 034	…	18 084	…	82	…
	1986	24 963	37.4	3 776	102.1	28 740	43.5	24 702	36.6	261	218.3
	1991	28 288	13.3	3 374	-10.6	31 662	10.2	28 183	14.1	105	-59.8
	1996	28 664	1.3	11 617	244.3	40 281	27.2	28 183	0.0	481	358.1
Other industries	1981	638	…	0	…	638	…	575	…	63	…
	1986	736	15.4	0	…	736	15.4	660	14.8	76	20.6
	1991	816	10.9	0	…	816	10.9	737	11.7	79	3.9
	1996	880	7.8	0	…	880	7.8	796	8.0	84	6.3
Subtotal, business sector	1981	32 957	…	14 168	…	47 126	…	29 724	…	3 233	…
	1986	38 363	16.4	14 248	0.6	52 613	11.6	34 771	17.0	3 592	11.1
	1991	41 178	7.3	12 012	-15.7	53 189	1.1	37 286	7.2	3 892	8.4
	1996	40 951	-0.6	20 807	73.2	61 760	16.1	36 650	-1.7	4 300	10.5
Personal and government sectors	1981	3 760	…	0	…	3 760	…	3 363	…	397	…
	1986	3 719	-1.1	0	…	3 719	-1.1	3 338	-0.7	381	-4.0
	1991	3 802	2.2	0	…	3 802	2.2	3 374	1.1	428	12.4
	1996	3 922	3.2	0	…	3 922	3.2	3 482	3.2	440	2.8
Total, whole economy	1981	36 717	…	14 169	…	50 886	…	33 087	…	3 630	…
	1986	42 083	14.6	14 248	0.6	56 330	10.7	38 109	15.2	3 973	9.4
	1991	44 979	6.9	12 012	-15.7	56 991	1.2	40 659	6.7	4 320	8.7
	1996	44 873	-0.2	20 807	73.2	65 682	15.2	40 132	-1.3	4 740	9.7

Notes:
Figures may not add up to totals due to rounding.
1. The quantity of water withdrawn from a water source.
2. The amount of water used more than once in an industrial application.
3. Gross water use equals total water intake plus recirculation.
4. The quantity of water returned to the water source.
5. Consumption is that part of water intake that is evaporated, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the local hydrologic environment.

Source:
Statistics Canada, Environment Accounts and Statistics Division.

Text Box 2.1

The 2001 and 2002 Prairie drought

Dry weather prevailed over large areas of the Prairie provinces during 2001 and 2002. As shown on the accompanying map, in 2002, drought-stricken areas[1] covered over three-quarters of the Prairies (including the north-eastern area of British Columbia). This lack of moisture had numerous impacts—the most pronounced being an insufficient amount of water for agricultural production.

The accompanying table shows that the yield of spring wheat, barley and canola declined significantly in 2002 compared with the average yields from the period of 1991 to 2000 (non-drought years). During that same period, crop insurance payments were up fourfold in Alberta alone.

Livestock production was also adversely affected by the drought. Livestock producers in Alberta saw the greatest impact, with cattle inventories falling by 605 000 head, or 10.4%, from January 2002 to January 2003.[2] Declining feed supplies and increased cost of feed due to drought conditions forced many producers to reduce their herd size.

As a result of the drought, many Prairie dugouts, potholes and sloughs dried up. In September 2002, 80% of Prairie farms were located in regions where dugouts were half empty, while 20% reported them to be completely dry.[3]

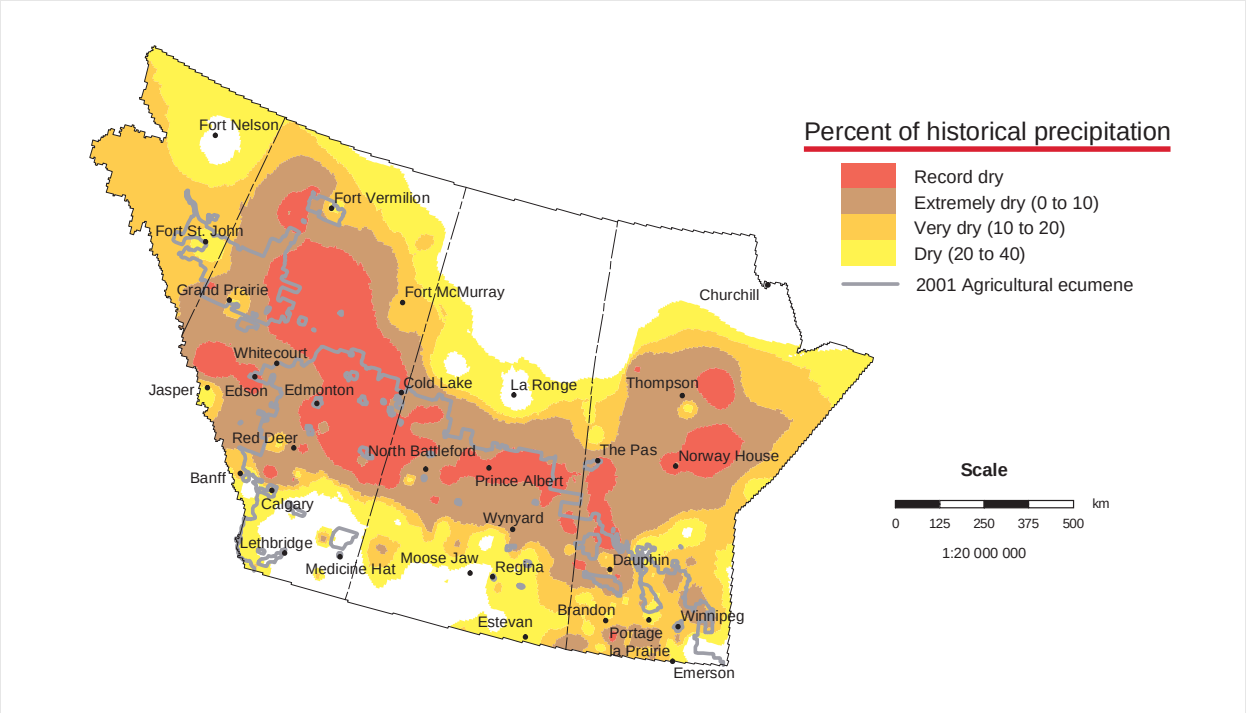
Crop yield and insurance payment, 2002 variation from 1991 to 2000 average, Prairie provinces

Province	Spring wheat	Barley	Canola	Crop insurance payment
	percent			
Alberta	-29.4	-26.8	-13.0	399.1
Saskatchewan	-32.0	-34.1	-21.4	224.1
Manitoba	2.6	-7.6	3.9	69.9

Source:
Statistics Canada, CANSIM II, tables 001-0010 and 002-0002.

1. A drought-stricken area is defined as an area with below average precipitation.
2. Statistics Canada, 2003, *Livestock Statistics: Fourth Quarter 2002,* Catalogue no. 23-603-XIE, Ottawa.
3. Agriculture and Agri-Food Canada, *The 2002 Prairie Drought Summary – December 2002*, www.agr.gc.ca/pfra/drought, (accessed July 15, 2003).

Precipitation below historical averages, 2002



Note:
Precipitation between September 1, 2001 and August 6, 2002, compared with historical averages.
Source:
Agriculture and Agri-Food Canada, Prairie Farm Rehabilitation Administration.
Statistics Canada, Environment Accounts and Statistics Division.

Table 2.2
Water use in the agriculture industry by province, 1996

Province	Livestock watering	Irrigation	Total
	thousands m^3		
Newfoundland and Labrador	483	144	627
Prince Edward Island	1 904	1 715	3 618
Nova Scotia	3 199	2 272	5 471
New Brunswick	2 369	1 443	3 812
Quebec	45 001	58 394	103 395
Ontario	59 233	114 000	173 233
Manitoba	23 843	24 670	48 513
Saskatchewan	39 890	271 370	311 260
Alberta	61 468	2 609 000	2 670 468
British Columbia	14 682	763 110	777 791
Canada	**252 071**	**3 846 117**	**4 098 188**

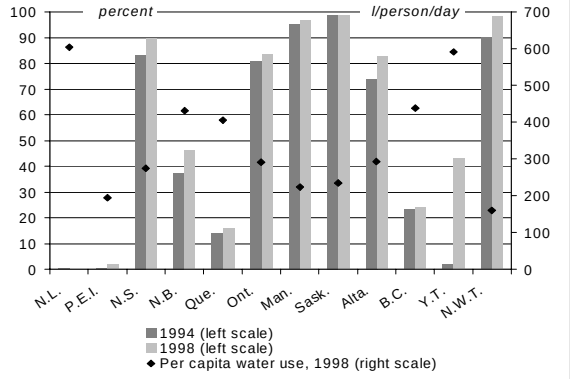
Note:
There is no significant agricultural activity in the Territories.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Text Box 2.2
Water metering

In 1994, the National Action Plan to Encourage Municipal Water Use Efficiency[1] was approved by the Canadian Council of Ministers of the Environment. Part of the plan included promoting the introduction of mandatory water metering on all new construction and moving towards universal metering.

Since the introduction of the plan, every province and territory in the country has increased the number of its residents connected to water meters (see the accompanying figure). The Yukon Territory has led the metering growth, particularly in Whitehorse, where metering increased from 1% to over 40% between 1994 and 1998. Those Canadians who are served with water meters tend to use less water than those who are charged a flat rate.

Population with water metering and per capita water use, 1994 and 1998



Note:
Northwest Territories include Nunavut.
Source:
Statistics Canada, Environment Accounts and Statistics Division, special compilation using data from Environment Canada, Municipal Water Use Database.

1. Environment Canada, *National Action Plan to Encourage Municipal Water Use Efficiency,* www.ec.gc.ca/water/en/info/pubs/action/e_action.htm (accessed April 16, 2003).

Dams and diversions

The first large dam in Canada (the Jones Falls Masonry Dam on the Rideau Canal in Ontario) was completed in 1832.[1] The development of commercial hydro-electric power in the early 1900s resulted in the most rapid growth of these massive structures.[2] In 2000, the electricity produced from these dams represented 61% of all electricity generated in Canada (Table 2.3). In recent years, the creation of tailing ponds[3] has become an important new reason for building large dams (Map 2.1).

In Canada, there are 54 interbasin water diversions,[4] created mainly for the purpose of hydro-electric power generation (Table 2.4). The main environmental concern associated with large dams and diversions is their impact on ecosystems and biodiversity. Current research indicates that these complex environmental impacts are mostly negative.[5] The storage or diversion of water alters the timing and distribution of streamflow, which in turn, alters the physical, biological and chemical composition of the water. Also, the reduction of the downstream flow has a significant effect on biodiversity and the landscape.

2.2 Threats to water

The numerous activities for which water is used can often result in harmful impacts on the quality and availability of water. These impacts include pollution from a variety of sources (e.g., industrial discharge and agricultural and urban run-off), as well as changes imposed on the landscape (from dams and urban areas). Even nature itself can be a source of stress on water as evidenced by the recent western drought (Text Box 2.1).

1. Large dams are defined by the International Commission on Large Dams as dams higher than 15 metres, as well as dams between 10 and 15 metres in height, provided that one of the following conditions is met: a) the length of the crest is greater than 500 metres; b) the reservoir capacity is greater than 1 million m^3; c) the maximum discharge is greater than 2 000 m^3 per second; d) if the dam has had especially difficult foundation problems, or; e) if the dam involved unusual design features.
2. Canadian National Committee, International Commission on Large Dams, 1984, *Register of Dams in Canada*.
3. Tailing ponds are disposal sites for tainted water from mining operations.
4. A interbasin diversion is the withdrawal of water, more or less continuously, over all or part of a year, by ditch, canal or pipeline, from its basin of origin for use in another drainage basin.
5. World Commission on Dams, prepared by G. Bergkamp, M. McCartney, P. Dugan, J. McNeely and M. Acreman, 2000, "Dams, Ecosystem Functions and Environmental Restoration," *World Commission on Dams Thematic Review, Environmental Issues 2.1*, Cape Town.

Table 2.3
Hydro-electric power generation by province and territory, 1994 and 2000

Province/Territory	1994 Hydro	1994 Total electric power	1994 Hydro as share of total	2000 Hydro	2000 Total electric power	2000 Hydro as share of total
	gigawatt hours		percent	gigawatt hours		percent
Newfoundland and Labrador	37 606.7	38 482.6	97.7	42 312.6	43 598.1	97.1
Prince Edward Island	.	40.0	.	.	48.1	.
Nova Scotia	1 020.4	9 767.4	10.4	924.4	11 624.9	8.0
New Brunswick	2 772.2	15 891.2	17.4	3 293.1	19 295.0	17.1
Quebec	157 850.7	163 600.7	96.5	173 006.0	179 757.4	96.2
Ontario	39 080.7	152 429.2	25.6	37 906.7	153 221.2	24.7
Manitoba	28 146.2	28 443.4	99.0	31 535.7	32 500.1	97.0
Saskatchewan	3 392.5	15 478.1	21.9	3 046.3	17 487.8	17.4
Alberta	1 806.3	52 361.3	3.4	1 756.3	58 534.6	3.0
British Columbia	54 304.1	62 070.4	87.5	60 208.3	68 683.5	87.7
Yukon Territory	266.1	299.3	88.9	260.7	297.8	87.5
Northwest Territories	188.2	578.1	32.6	298.7[1]	765.5[1]	39.0[1]
Canada	**326 434.1**	**539 441.7**	**60.5**	**354 548.8**	**585 814.0**	**60.5**

Notes:
Figures may not add up to totals due to rounding.
1. Includes Nunavut
Sources:
Statistics Canada, *Electric Power Annual Statistics*, Catalogue no. 57-202, Ottawa, various issues.
Statistics Canada, *Quarterly Report on Energy Supply-Demand in Canada*, Catalogue no. 57-003, Ottawa, various issues.

Table 2.4
Interbasin water diversions[1, 2] by province and territory

Province/Territory	Diversions	Average annual flow	Major use
	number	m^3 per second	
Newfoundland and Labrador	5	725	hydro
Prince Edward Island	0	0	...
Nova Scotia	4	18	hydro
New Brunswick	2	2	municipal
Quebec	6	1 854[3]	hydro
Ontario	9	564	hydro
Manitoba	5	779[4]	hydro
Saskatchewan	5	30	hydro
Alberta	9	117	irrigation
British Columbia	9	361	hydro
Yukon Territory	0	0	...
Northwest Territories	0	0	...
Nunavut	0	0	...
Canada	**54**	**4 450**	**hydro**

Notes:
1. Mean annual diverted flow is not less than a rate of 1 m^3 per second.
2. Diverted flows do not return to the stream of origin, or parent stream, within 25 kilometres from the point of withdrawal.
3. Excludes Beauharnois Canal flows from the St. Lawrence River.
4. Excludes floodway flows of short duration (Portage Diversion, Winnipeg Floodway, Seine Diversion).
Source:
Day, J.C. and F. Quinn, 1992, *Water Diversion and Export: Learning from Canadian Experience*, Department of Geography, University of Waterloo, Waterloo.

Urban areas

Not only does the population of an urban area use a lot of water, but so too does any industry that locates there. Treating sewage adequately before releasing it continues to be a challenge for many cities. Urban areas also affect the hydrologic cycle. Buildings, roads and parking lots create an impervious cover across the landscape that prevents the retention of water and increases run-off. Although some precipitation will infiltrate the soil in cities, what does not soak into the ground travels along these impervious surfaces until it eventually reaches a ditch, sewer, stream, wetland, river or lake.[1]

By preventing water from soaking into the ground, impervious surfaces reduce the amount of moisture available for the evapotranspiration process. As a consequence, water that would otherwise return to the local atmosphere is instead diverted towards surface water bodies. By interfering with the percolation of the water table, urban areas also interfere with the recharge of ground water.

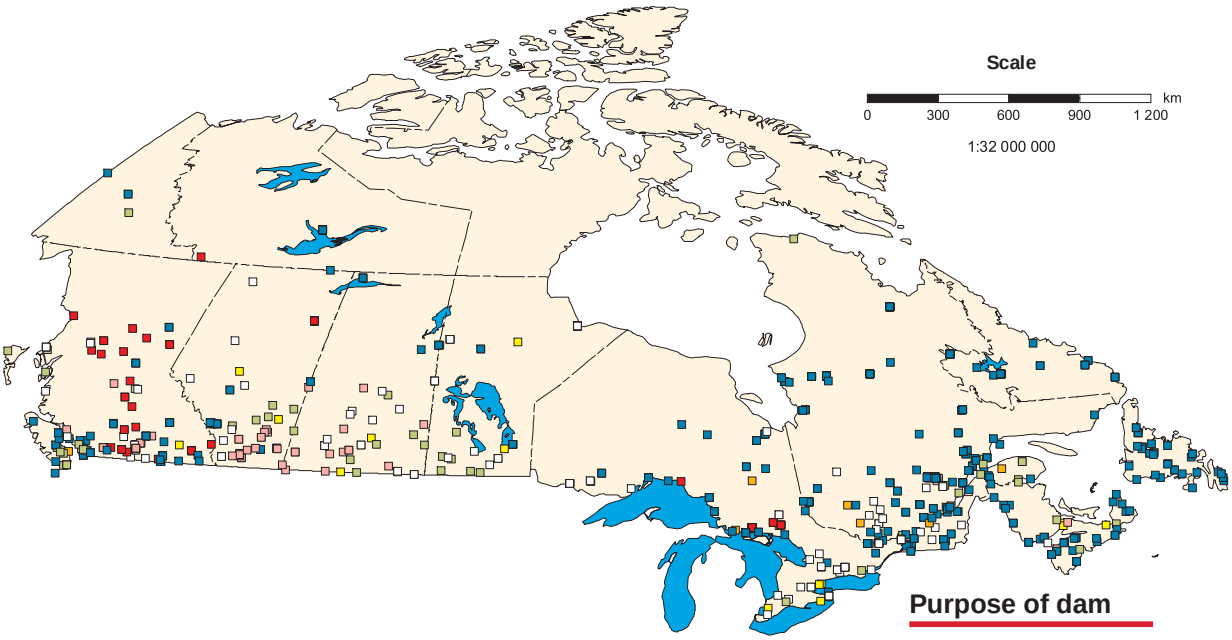
Stormwater

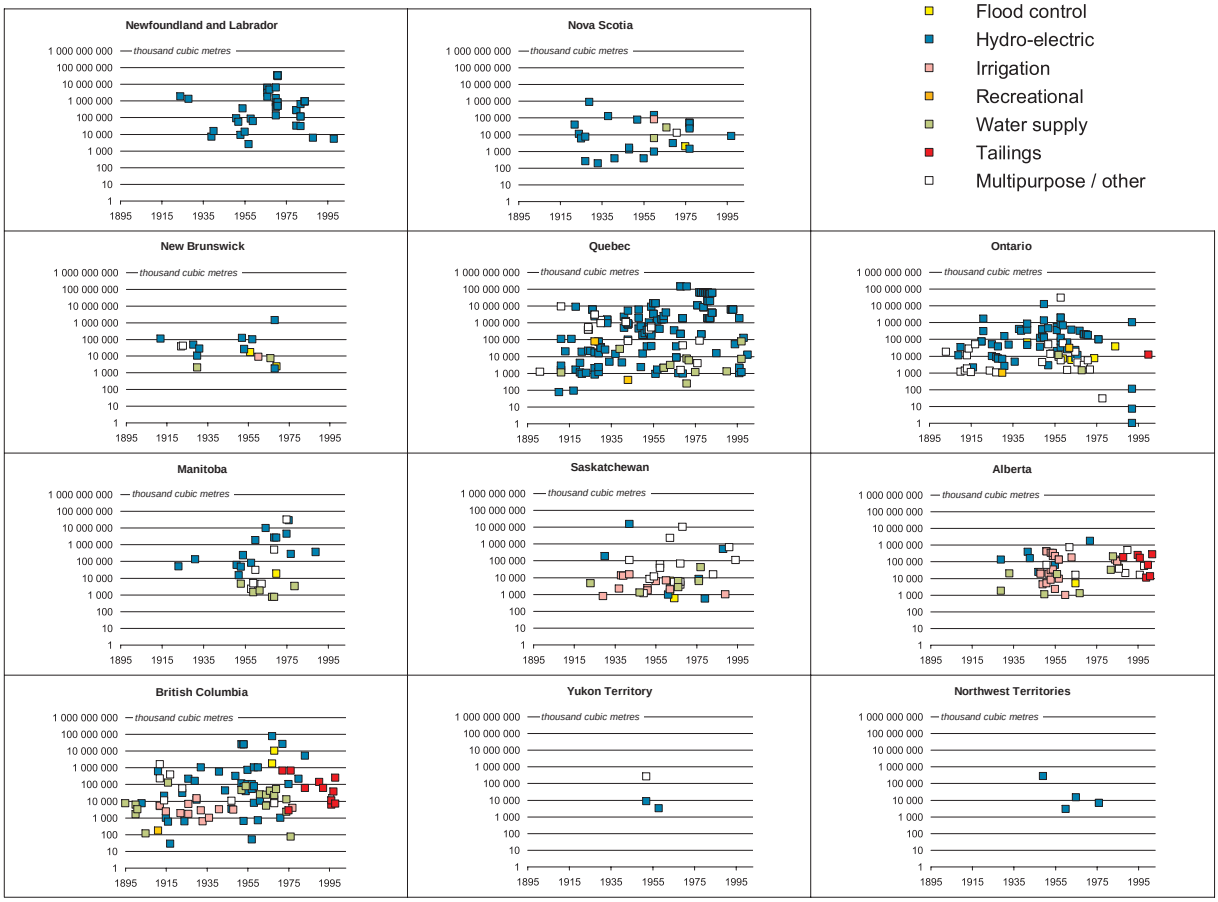
Run-off that is generated in urban areas can either flow directly to water bodies or be captured and channelled by stormwater systems. Since it can contain various contaminants[2], untreated stormwater changes the quality of freshwater resources.[3,4] Studies have shown that untreated

1. United States Environmental Protection Agency, 2002, *National Management Measures to Control Nonpoint Source Pollution from Urban Areas* (draft), Washington.
2. Stormwater can contain suspended solids, sediments and grit; nutrients, including various forms of phosphorus, and nitrogen; toxic metals, including copper, lead and zinc; hydrocarbons, including oil and grease and polycyclic aromatic hydrocarbons; trace organic contaminants, including pesticides, herbicides and industrial chemicals; and fecal bacteria.
3. Marsalek, J., M. Diamond, S. Kok and W.E. Watt, 2001, "Urban Runoff," in *Threats to Sources of Drinking Water and Aquatic Ecosystem Health in Canada*, Environment Canada, National Water Research Institute, NWRI Scientific Assessment Report Series No. 1, 47–50.
4. Makepeace, D.K., D.W. Smith and S.J. Stanley, 1995, "Urban Stormwater Quality: Summary of Contaminant Data," *Critical Reviews in Environmental Science and Technology*, 25:2, 93–139.

Map 2.1

Large dams by gross capacity of reservoir, year of completion and by province and territory





Notes:
There are no large dams in Nunavut and Prince Edward Island. The gross capacity of reservoirs is not available for all dams.
The location of dams is approximate and in many cases multiple dams have the same map location.

Sources:
Canadian Dam Association, 2003, *Dams in Canada*.
Statistics Canada, Environment Accounts and Statistics Division.
Natural Resources Canada, Canadian Geographical Names Database.

stormwater from highways can produce significant toxic impacts on receiving streams.[1,2]

In some urban areas, stormwater is treated at the local wastewater treatment plant along with wastewater from households, industries, commercial activities and institutions. Together, stormwater and wastewater constitute municipal wastewater.

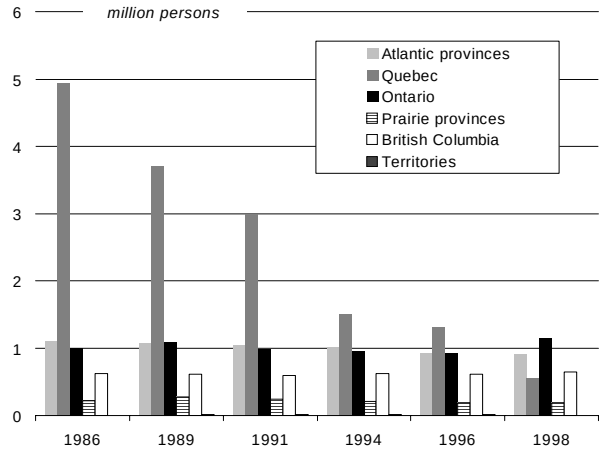
Municipal wastewater

The degree to which wastewater affects the quality of the water body it is discharged into depends on the level of treatment it receives prior to discharge. In the worst cases, wastewater is released directly into the receiving water body without any treatment. As shown in Table 2.5, the number of Canadians living in municipalities[3] where connections to sewer systems existed but wastewater received no form of treatment fell to 3% in 1998. Much of the increase in water treatment during this period involved tertiary treatment.[4] Only 28% of people served by sewers in 1983 received tertiary wastewater treatment. This number increased to 40% in 1998.

There is also a portion of the Canadian population living in larger municipalities (3.46 million persons) whose homes are not connected to wastewater treatment plants (Figure 2.2). These people use septic tanks or haulage methods to deal with their wastewater. Additionally, there are 4.88 million persons who live in smaller municipalities[5] and survey data indicate that 56.7% of these smaller municipalities have no public wastewater treatment systems.[6] Therefore, in 1998, close to 7 million people, or almost one quarter of the Canadian population, relied on septic or alternative wastewater treatment systems.

1. Environment Canada, *Aquatic Toxicity of Stormwater Discharges Fact Sheet*, Great Lakes 2000 Cleanup Fund Program on Municipal Wastewater Treatment and Urban Nonpoint Source Pollution Control, Burlington.
2. Marsalek, J., Q. Rochfort, B., Brownlee, T. Mayer and M. Servos, 1999, "An Exploratory Study of Urban Runoff Toxicity," *Water Science and Technology*, 39:12, 33–39.
3. The Municipal Water Use Database currently contains data from all municipalities in Canada with a population greater than 1 000.
4. Wastewater treatment facilities provide three levels of water treatment: *primary treatment* removes insoluble matter only; *secondary treatment* removes biological impurities from water treated at the primary level; and *tertiary treatment* removes nutrients and chemical contaminants remaining after the secondary treatment.
5. Municipalities in Canada with a population less than 1 000 people are not currently covered by the Municipal Water Use Survey.

Figure 2.2
Population not connected to water treatment plants by region, selected years



Note:
The data used to produce this figure comes from the Municipal Water Use Database, which contains data from all municipalities in Canada with a population greater than 1 000.
Source:
Statistics Canada, Environment Accounts and Statistics Division, special compilation using data from Environment Canada, Municipal Water Use Database.

Wastewater treatment infrastructure

Canadian wastewater treatment facilities are aging and growing populations add stress to these facilities. In 1997, the Canadian Water and Wastewater Association estimated that $5.4 billion in additional investment would be required annually between 1997 and 2012 to modernize and improve all water and wastewater treatment plants, as well as extend central water supply and wastewater collection systems to all residents of municipalities.[7]

6. Canadian Water and Wastewater Association (CWWA), 2001, *National Survey of Wastewater Treatment Plants*, National Pollutant Release Inventory (NPRI), Environment Canada, Ottawa.
7. Canadian Water and Wastewater Association (CWWA), 1997, *Municipal Water and Wastewater Infrastructure: Investment Needs 1997 to 2012*, Ottawa.

Table 2.5
Municipal wastewater treatment level for population served by sewers, selected years

Treatment level	1983		1986		1989		1991		1994		1996		1998	
	persons	percent	persons	percent	persons	percent	persons	percent	persons	percent	persons	percent	persons	percent
None[1]	5 174 430	28	5 192 590	28	3 762 244	19	2 990 242	15	1 567 246	7	1 305 051	6	735 030	3
Primary	2 897 952	16	2 814 707	15	3 950 312	20	4 185 995	20	4 899 708	23	4 929 070	22	4 286 078	19
Waste stabilization pond[2]	1 122 353	6	1 117 996	6	1 335 835	7	1 390 556	7	1 614 319	8	1 845 634	8	2 117 774	9
Secondary	3 995 769	22	3 756 664	20	4 208 962	22	4 397 878	21	4 890 794	23	4 821 279	22	6 431 700	28
Tertiary	5 046 070	28	5 819 450	31	6 245 464	32	7 519 081	37	8 185 984	39	9 115 884	41	9 073 640	40
Total	**18 236 574**	**100**	**18 701 407**	**100**	**19 502 817**	**100**	**20 483 752**	**100**	**21 158 051**	**100**	**22 016 918**	**100**	**22 644 222**	**100**

Notes:
1. None is calculated residually by subtracting total population with any form of wastewater treatment from population served by sewers.
2. Waste stabilization ponds, or sewage lagoons, are simple wastewater treatment systems capable of delivering treatment equivalent to that of a secondary wastewater treatment facility.
Source:
Statistics Canada, Environment Accounts and Statistics Division, special compilation using data from Environment Canada, Municipal Water Use Database.

Table 2.6
Efficiency of wastewater treatment processes and total releases to the environment, selected parameters, 2000

Chemical	Average influent	Average effluent	Proportion removed by treatment	Total releases by wastewater treatment plants[1]
	µg/l		percent	tonnes
Aluminum	2.6	0.6	76.92	.
Ammonia[2]	44.1	15.0	65.90	22 512.89
Cadmium (and its compounds)	<0.1	<0.1	.	0.04
Chloride	431.5	296.6	32.26	.
Chromium (and its compounds)	<0	<0.1	.	6.02
Copper (and its compounds)	0.2	0.1	50.00	55.99
Lead (and its compounds)	<0	<0.1	.	2.68
Manganese (and its compounds)	0.1	0.1	.	87.43
Mercury (and its compounds)	0.4	0.1	75.00	0.42
Oils and Grease	91.5	9.0	90.16	16 766.45
Zinc (and its compounds)	0.2	0.2	.	85.80

Notes:
1. Quantities captured by the National Pollutants Release Inventory Database.
2. Refers to the total of both ammonia (NH_3) and ammonium ion (NH_4^+) in solution.
Sources:
Canadian Water and Wastewater Association, 2001, *National Survey of Wastewater Treatment Plants*, Ottawa.
Environment Canada, 2001, National Pollutant Release Inventory Database, www.ec.gc.ca/pdb/npri (accessed June 12, 2003).

Table 2.7
Top releases of chemicals to water, 2001

Chemical	Releases
	tonnes
Ammonia (total)[1]	26 106
Nitrate ion in solution at pH >= 6.0	22 450
Manganese (and its compounds)	1 157
Methanol	697
Zinc (and its compounds)	308

Note:
1. Refers to the total of both ammonia (NH_3) and ammonium ion (NH_4^+) in solution.
Source:
Environment Canada, 2001, National Pollutant Release Inventory Database, www.ec.gc.ca/pdb/npri (accessed June 12, 2003).

Wastewater treatment plant effluents and sewer overflow remain two of the largest sources of water pollution by volume.[1] Table 2.6 provides a list of the main substances that are discharged from wastewater treatment plants.

Industrial activities

Each day, industries discharge hundreds of different substances into rivers and lakes. The impact of these discharges depends primarily on the nature of the substances and the quantities released. For example, one drop of oil can make up to 25 litres of water unfit for drinking, while one gram of polychlorinated biphenyl (PCB) can make up to one billion litres of water unsuitable for aquatic life.[2] In 1996, 42% of water discharged by the manufacturing sector was untreated.[3]

1. Environment Canada, 2001, *The State of Municipal Wastewater Effluents in Canada*, Ottawa.
2. Environment Canada, 1992, *Clean Water: Life Depends on it!*, Environmental Citizenship, Freshwater Series A-3, Ottawa.
3. Environment Canada, 2002, *Industrial Water Use 1996,* Ottawa.

Table 2.8
Water bodies receiving over 500 tonnes of pollutants, 2001

Water body	Total release	Dominant release	Share of total release
	tonnes		percent
Fraser River	9 168	Ammonia[1]	49.2
Lake Ontario	8 877	Ammonia[1]	41.6
Bow River	8 264	Nitrate ion	90.8
Ottawa River	3 066	Ammonia[1]	76.6
North Saskatchewan River	2 953	Nitrate ion	61.3
Red River	2 766	Ammonia[1]	72.7
Hamilton Harbour	1 516	Ammonia[1]	70.6
South Saskatchewan River	1 275	Nitrate ion	62.4
St. Lawrence River	1 086	Nitrate ion	43.6
Saint John River	984	Methanol	28.6
Frank Lake	818	Nitrate ion	70.3
Detroit River	679	Ammonia[1]	83.8
Kelly Lake	619	Nickel (and its compounds)	29.6
Neroutsos Inlet	526	Nitrate ion	64.4

Notes:
The information in this table is not intended to be an assessment of environmental impact or water quality.
The totals do not include releases to tributaries of the named rivers.
1. Refers to the total of both ammonia (NH_3) and ammonium ion (NH_4^+) in solution.
Source:
Environment Canada, Pollution Data Branch, National Pollutant Release Inventory Database, www.ec.gc.ca/pdb/npri/npri_dat_rep_e.cfm (accessed March 25, 2003).

The National Pollutant Release Inventory (NPRI) records the quantities of approximately 200 pollutants released into the Canadian environment. In 2001, 2 617 industrial facilities reported chemical releases. Pollutant releases into water represented 14.2% (51 603 tonnes) of the total pollutant releases documented in the NPRI.[4] The top releases to water by weight are shown in Table 2.7. Ammonia and nitrogen represented over 94% of the total releases to water. Other substances, such as mercury, although released in smaller amounts, have significant

4. Environment Canada, Pollution Data Branch, National Pollutant Release Inventory Database, www.ec.gc.ca/pdb/npri/ (accessed June 12, 2003).

Text Box 2.3
Mercury in water

Mercury is a serious environmental contaminant. A variety of adverse impacts on human health and the environment have been documented.[1] Mercury is a leading cause of impairment of estuaries and lakes.[2] It accumulates in the environment and is highly toxic. Although it occurs naturally in the environment, its presence has been magnified by human activity.

Mercury is carried into ecosystems by both air and water. It is not readily absorbed by organisms, but when bacteria convert it into *methylmercury* (a process called *methylation*) it not only becomes easier to absorb but more toxic. Newly flooded reservoirs and acidic water bodies stimulate the formation of methylmercury (CH_3Hg), leading to mercury levels in excess of natural background concentrations.

Methylmercury can be absorbed directly from water, food and air. It both bio-accumulates and biomagnifies in aquatic ecosystems and stores itself in the liver, kidneys and muscle of affected organisms. Chronic exposure leads to brain and kidney damage. The main risk of human exposure to mercury is by way of infected fish, shellfish and game. Although many industrialized countries have substantially reduced mercury releases in recent decades, these reductions are not yet reflected in the air, soil, water or fish.[3] Mercury levels in the Canadian environment are still on the rise.[4]

The main sources of mercury in Canada are metal mining and smelting, waste incineration and coal-fired power plants.[5]

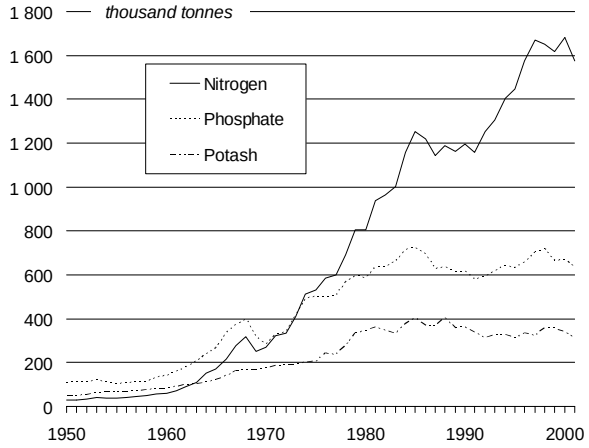
1. United Nations Environment Programme, 2002, *Global Mercury Assessment*, Geneva.
2. Brigham, M.E., D.P. Krabbenhoft and P.A. Hamilton, 2002, *Mercury in Stream Ecosystems—New Studies Initiated by the U.S. Geological Survey,* United States Geological Survey, water.usgs.gov/pubs/fs/fs-016-03/index.html (accessed April 10, 2003).
3. United State Environmental Protection Agency, 2003, *Mercury*, www.epa/gov/mercury/information.htm#reports (accessed April 10, 2003).
4. Collaborative Mercury Research Network, www.unites.uqam.ca/comern/index.html (accessed April 10, 2003).
5. Environment Canada, National Pollution Release Inventory Database, www.ec.gc.ca/pdb/npri/npri_mercury_e.cfm (accessed June 13, 2003).

affects on aquatic ecosystems and human health (Text Box 2.3). Table 2.8 lists the names of the water bodies that received the most reported pollutants from industrial sources in 2001.

Agricultural activities

Over the past several decades, Canadian crop and livestock outputs have grown considerably. New technologies involving mechanization, genetics, nutrient science and irrigation have helped foster these agricultural increases. However, the use of new, highly productive technologies has not come without some environmental costs.

Figure 2.3
Nutrient content of fertilizers sold in Canada, 1950 to 2000



Source:
Korol, M. and G. Rattray, 1999, *Canadian Fertilizer Consumption, Shipments and Trade, 1997–1998,* Agri-Food and Agriculture Canada, Ottawa.

Agricultural drainage

Well-designed drainage systems improve crop yields by allowing for longer growing seasons and by offering farmers greater choice in their crop selection. However, surface drainage systems may increase soil erosion, while subsurface systems may contribute to loading the ground water with nutrients and pesticides.[1]

Commercial fertilizers

One of the most important agricultural additives is manufactured fertilizer nutrients.[2] The most serious potential impact of fertilizers on water quality is the introduction of dissolved nutrients into surface water bodies and ground water. For the most part, this occurs only during periods of intense rainfall. Under ideal conditions and at optimum application rates, fertilizers have minimal water quality impacts and are consumed almost entirely by the target crop.

The quantity of nutrients applied as fertilizer to cropland has increased steadily as more concentrated and more easily applied fertilizer products have been developed. Figure 2.3

1. Coote, D.R. and L.J. Gregorich (eds.), 2000, *The Health of Our Water: Toward Sustainable Agriculture in Canada,* Agriculture and Agri-Food Canada, Ottawa.
2. Refers only to the macronutrients nitrogen, phosphate and potash.

Table 2.9
Agricultural pesticide expenditures and application rates by ecozone, 1970 and 1995

Ecozone[1]	Total agricultural pesticide expenditures			Agricultural pesticide applied per km^2 of cultivated land		
	1970	1995	Change 1970 to 1995	1970	1995	Change 1970 to 1995
	1990 dollars		percent	1990 dollars		percent
Boreal Shield	2 607 889	7 660 443	193.7	298	1 098	268.4
Atlantic Maritime	13 100 429	33 109 343	152.7	1 080	3 545	228.3
Mixed Wood Plains	88 433 803	211 800 054	139.5	1 692	4 408	160.5
Boreal Plains	12 700 961	130 895 084	930.6	174	1 512	768.6
Prairie	47 033 763	540 946 447	1 050.1	169	1 807	966.3
Montane Cordillera	5 639 076	8 236 737	46.1	2 190	6 581	200.5
Pacific Maritime	3 489 107	8 639 126	147.6	2 076	2 290	10.3
Canada	**173 005 028**	**941 287 234**	**444.1**	**404**	**2 067**	**411.3**

Notes:
Figures may not add up to totals due to rounding.
Farm input price indices were used to obtain 1990 constant dollar expenditures.
1. Limited to those with agricultural activity.
Sources:
Statistics Canada, Environmental Accounts and Statistics Division, and Agriculture Division.

shows the increase in nutrient content of fertilizer sold from 1950 to 2000. During this period, the nitrogen content in fertilizer was the component that increased the most.

Livestock manure

Typically, livestock manure production is not a pollution problem on traditional mixed farms where nutrients are cycled between crop and livestock. However, on some of today's much larger farms, the production of manure can exceed the farm's ability to use this manure. Excess manure, if unused, can pollute surface water bodies and ground water, ultimately affecting the health of any humans, livestock, wildlife and aquatic life reliant on that water. When manure is stored properly and applied to fields in appropriate quantities, it has a limited impact on water quality.

Agricultural pesticides

In an effort to maintain crop yield and quality, agricultural pesticides are applied to prevent insects, weeds and diseases from destroying crops. When the proper pesticide is applied correctly under favourable environmental conditions, the negative impacts on water quality are minimized.

Close to $1 billion was spent on agricultural pesticides in 1995 (Table 2.9). Put another way, for every square kilometre of land cultivated, $2 067 was spent on agricultural pesticides. Between 1970 and 1995, agricultural pesticide expenditures increased by 411%.

2.3 Water quality

As shown in Section 2.2, human activities can impact the quality of water and render it unfit for consumption or aquatic life (Text Box 2.4). To reduce the risk of harm to humans, animal life and aquatic ecosystems, guidelines have been established regarding the maximum allowable concentrations of various pollutants in water (see **Water quality guidelines** in Section 3.1, **Government response**). Table 2.10 shows that the maximum recommended concentrations are generally stricter for water destined for drinking and freshwater aquatic life than the recommendations for irrigation and livestock consumption.

Water quality classes

Water quality can be described by its intended use—we tend to think of water in terms of being pure enough to drink or clean enough to swim in. However, water quality specifically refers to the characteristics of the water, which includes whatever is diluted or suspended in it. Measurements of water quality can be classified according to specific physical, biological, radiological and chemical parameters.

Physical parameters

The physical qualities of water refer to its taste, odour, colour and turbidity, among others. These parameters can refer to aesthetic values, as well as health concerns. Table 2.11 shows measurements of selected physical parameters for raw water entering treatment facilities in various municipalities.

Text Box 2.4
Common human impacts on water quality

Eutrophication

Eutrophication is a process of enriching a water body with nutrients[1] that leads to excessive plant growth. When these plants die, the decomposition robs the surrounding water of dissolved oxygen, making the water unsuitable for other forms of aquatic life. In particular, agricultural fertilizers and municipal wastewater can greatly enhance the natural nutrient loadings entering a water body. Phosphorus is the key nutrient in the growth of freshwater aquatic plants.

Fecal coliforms

Fecal coliforms are bacteria from the intestinal tracts of warm-blooded animals. The bacteria's presence in a water body is evidence of the presence of feces. Any contact with these bacteria is risky.

Nitrate contamination

The nitrate ion (NO_3^-) is relatively non-toxic by itself, but under certain conditions (such as an infant's intestinal tract) can be converted to the nitrite ion (NO_2^{2-}), which is toxic. Nitrite modifies the hemoglobin in blood so that it can no longer carry oxygen, effectively causing suffocation from the inside. Most documented cases of *methemoglobinemia* (blue baby syndrome) that have been traced to contaminated drinking water have involved nitrogen levels (from nitrate) of more than 40 milligrams per litre—over four times the current safe limit.[2] Sources of nitrate in water include agricultural fertilizers and septic systems as well as improper storage of manure.

Sedimentation

Sedimentation is the process whereby particles suspended in a water body settle to the bottom and accumulate in layers. It is a natural process that can be accelerated by human activities such as forestry, agriculture and construction. An example of the impact of excessive sedimentation is the smothering of feeding and spawning grounds of fish.

1. Any substance required by organisms for normal growth and maintenance.
2. Reynolds, W.D. *et al.*, 1995, "Agrochemical Entry into Groundwater," *The Health of Our Soils: Toward Sustainable Agriculture in Canada*, D.F. Acton and L.J. Gregorich (eds.), 97–109, Centre for Land and Biological Resources Research, Agriculture and Agri-Food Canada, Catalogue no. A53-1906/1995E, Ottawa.

Microbiological parameters

Biological contamination caused by bacteria, viruses and protozoa is the most common contributor to health hazards associated with drinking water in Canada (Text Box 2.5).[1] The presence of parasites, bacteria or algal toxins is also of concern for other uses, such as recreation and agriculture.

1. Health Canada, 1997, *Health and Environment*, Ottawa.

Table 2.10
Maximum recommended concentrations of various pollutants by use

Pollutant	Use/Recommended concentration			
	Drinking water[1]	Freshwater aquatic life	Irrigation water	Livestock water
	milligrams per litre			
Aluminum	…[2]	0.005-0.1	5	5
Arsenic	0.025	0.005	0.1	0.025
Barium	1	…	…	…
Benzene	0.005	0.37	...	...
Benzo(a)pyrene	0.00001	0.000015	...	...
Berylium	…	…	0.1	0.1
Cadmium	0.005	0.000017	0.0051	0.08
Calcium	…	…	…	1000
Chloride	250	…	100-700	…
Chloroform	0.1	0.0018	...	0.1
Chromium	0.05	0.001[4]	0.008[4]	0.05[4]
Cobalt	…	…	0.05	1
Copper	1	0.002-0.004	0.2-1.0	0.5-5.0
DDT	…	…	...	...
Dissolved oxygen	…	5.5-9.5	...	...
Iron	0.3	0.3	5	…
Lead	0.01	0.001-0.007	0.2	0.1
Manganese	0.05	…	0.2	…
Mercury	0.001	0.0001	...	0.003
Methylene chloride	0.05	0.0981	...	0.05
Nitrate	45.0[3]	...	...	…
Nitrite	…	0.06	...	10
Pentachlorophenol	0.06	0.0005	...	…
Selenium	0.01	0.001	0.02	0.05
Silver	…	0.0001	…	…
Total dissolved solids	500	...	500-3 500	3 000
Trichloroethylene	0.05	0.021	...	0.05
Zinc	5.0	0.03	1.0-5.0	50

Notes:
1. These figures refer to recommended concentrations for treated water as it emerges from the tap.
2. Scheduled for development. See Canadian Council of Ministers of the Environment, *Current Priorities*, www.ccme.ca/initiatives/water.html?category_id=41 (accessed August 12, 2003)
3. Equivalent to 10 milligrams per litre as nitrogen.
4. Hexavalent chromium (Cr(VI)).

Source:
Canadian Council of Ministers of the Environment, 1999 (updated 2002), *Canadian Environmental Quality Guidelines*, Winnipeg.

Radiological parameters

Water can be contaminated with *radionuclides*[2] from a variety of natural and man-made sources. Generally in Canada, the dose of natural and man-made radionuclides ingested with water is highest in the Great Lakes, even though it remains far below drinking-water quality guidelines. However, substantially higher levels have been found in some private wells across Canada.[3]

2. A radionuclide is a radioactive nuclide. A nuclide is a particular type of atom, characterized by the mass, the charge and the energy content of its nucleus (Sax, N. Irving and Richard J. Lewis, Sr. (revisers), 1987, *Hawley's Condensed Chemical DIctionary,* 11th Edition, Van Nostrand Reinhold Publishers, New York).
3. Health Canada, 1997, *Health and Environment*, Ottawa.

Table 2.11
Selected physical parameters of untreated water[1] by municipality, 2001

Parameter	units	Calgary	Halifax	Ottawa	Regina	Toronto[2]	Victoria	Yellowknife
Alkalinity, total	mg/l	184.5	<1	45.3	218.0	94.0	17.6	21.1
Colour	TCU	20.0	8.4	49.3	80.0	2.0	11.0	20.0
Conductivity	µS/cm	472.0	37.0	99.0	749.0	315.0	47.0	70.4
Dissolved oxygen [3]	mg/l	7.6	.	7.4	3.7	9.0	8.0	.
Hardness, total	mg/l	247.6	4.8	48.0	280.0	126.0	20.3	21.2
Suspended solids, total	mg/l	55.0	.	10.3	45.6	.	2.7	151.0
Dissolved solids, total	mg/l	310.8	27.0	119.6	601.0	.	32.0	74.0
Turbidity	NTU	31.5	0.4	29.2	19.2	5.5	1.9	29.0

Notes:
The data represent maximum values.
For municipalities with multiple waterworks, the highest maximum value was retained.
1. Water to be used for the preparation of potable water.
2. Data for Toronto were measured at the F.J. Horgan Filtration Plant.
3. Minimum value
Sources:
The City of Calgary, *2001 Water Quality Report*, www.calgary.ca (accessed June 17, 2003).
Halifax Regional Water Commission, *2001 Water Quality Report*, Halifax.
The City of Ottawa, *Drinking Water Quality Report for City of Ottawa*, ottawa.ca/city_services/water/wq_reports/27_2_1_en.shtml (accessed July 2, 2003).
The City of Regina, Buffalo Pound Water Administration Board, *Annual Report - 2001*, Regina.
The City of Toronto, Source Water Quality Database.
Capital Regional District, *2001 Annual Overview of Greater Victoria's Drinking Water Quality*, Victoria.

Text Box 2.5
Microbiological contamination

Public health authorities issue advisories warning Canadians to boil their water in order to protect against disease that may result from the microbiological contamination of the water supply. Boil water advisories are also issued as a preventive measure, when authorities have reasons to believe disinfection may have been compromised. Criteria for issuing boil water advisories include conditions such as: deterioration in source water quality; equipment malfunction during treatment and distribution; situations where drinking water is or may be responsible for an outbreak of illness.[1]

In 1998, there were 3 100 boil water advisory days in municipalities across Canada, compared to 2 492 in 1993, an increase of 24%.[2] In 1999, there were 65 First Nations and Inuit communities under a boil water advisory, each community for a varying length of time—on average,183 days per affected community. Over one-quarter of these communities were under a boil water advisory from six months to a year, whereas less than a quarter had the problem solved in less than a week.[3]

Recently, waterborne pathogens have had dramatic impacts in both Walkerton, Ontario (2000)[4] and North Battleford, Saskatchewan (2001).[5] In fact, from 1974 to 1996, there were over 200 outbreaks of infectious diseases associated with drinking water reported in Canada.[6] Estimates suggest that water pathogens are responsible for about 90 000 cases of illness and 90 deaths a year in Canada.[7]

1. Health Canada, *Guidance for Issuing and Rescinding Boil Water Advisories*, www.hc-sc.gc.ca/hecs-sesc/water/pdf/boil_water_advsories.pdf (accessed August 28, 2003).
2. Statistics Canada, Environment Accounts and Statistics Division, special compilation using data from Environment Canada, Municipal Water Use Database.
3. Communities from the three territories and from the province of Ontario, as well as 15 communities with outstanding boil water advisories, are excluded from these figures (Health Canada, 2003, *Statistical Profile on the Health of First Nations in Canada*, First Nations and Inuit Health Branch, Health Information and Analysis Division, Ottawa).
4. Ministry of the Attorney General, 2002, *Part One of the Walkerton Commission of Enquiry*, Toronto.
5. The North Battleford Water Enquiry, 2003, *Report of the Commission of Inquiry*, www.northbattlefordwaterinquiry.ca/final/default.htm (accessed March 27, 2003).
6. Edge, T., J.M. Byrne, R. Johnson, W. Robertson and R. Stevenson, 2001, "Waterborne Pathogens," *Threats to Sources of Drinking Water and Aquatic Ecosystem Health in Canada*, 1–4, National Water Research Institute (NWRI) Scientific Assessment Report Series no. 1, National Water Research Institute, Environment Canada, Burlington.
7. *Ibid*.

Chemical parameters

The chemical substances found in our waters can be traced back to natural, agricultural, industrial and urban sources. Metallic elements such as zinc, copper, selenium, mercury, cadmium, lead, arsenic and silver, and other substances such as phosphates and pesticides, will typically degrade water quality. Table 2.12 lists a selected set of chemical parameters measured in raw water upon entering drinking-water treatment facilities in various municipalities.

Drinking water

Most Canadians obtain their drinking water from municipal water treatment plants. However, a large portion of the population relies on private wells, whereas a small group relies on alternative water systems.

Table 2.12
Selected chemical parameters of untreated water[1] by municipality, 2001

Parameter	Guideline[2]	Calgary	Halifax	Ottawa	Regina	Toronto[3]	Victoria	Yellowknife
				µg/l				
Aluminum	5-100	266.9	120.0	364.0	1 020.0	18.4	14.0	1 230.0
Arsenic	5	2.2	>2	0.9	4.5	0.0	0.0	3.7
Barium	...	93.6	.	29.6	0.1	0.0	3.8	162.0
Beryllium	...	.	.	<0.05	<1.0	0.0	0.0	<50
Cadmium	0.017	<1	.	0.1	<1.0	0.0	0.0	9.1
Calcium	...	69 820.8	1 100.0	11 200.0	66 000.0	35 000.0	5 110.0	5 750.0
Chloride	...	9 260.4	6 300.0	7 500.0	15 200.0	25 000.0	2 580.0	2 300.0
Chromium	1.0	10.9	.	1.1	<1.0	0.0	<6	4.0
Cobalt	...[4]	<1	.	0.1	<1.0	0.0	<6	0.9
Copper	2-4	57.1	<2	114.5	<1.0	8.3	<6	8.0
Iron	300	434.6	30.0	380.0	<0.02	9.4	46.0	1 280.0
Lead	1-7	<1	<2	0.6	2.0	0.0	0.0	4.6
Manganese	...[4]	30.1	62.0	28.0	420.0	0.0	11.0	35.5
Mercury	0.1	0.1	0.0	<0.5	<0.05	0.0	0.0	.
Selenium	1	2.0	.	<0.2	1.0	0.0	<60	0.4
Silver	0.1	<1	.	<0.05	<1.0	0.0	<10	0.1
Zinc	30	7.9	5.0	4.4	33.0	0.0	<2	28.4

Notes:
The data represents maximum values.
For municipalities with multiple waterworks, highest maximum value was retained.
1. Water to be used for the preparation of potable water.
2. Canadian Water Quality Guideline for the Protection of Aquatic Life.
3. Data for Toronto were measured at the F.J. Horgan Filtration Plant.
4. Scheduled for development.
Sources:
The City of Calgary, *2001 Water Quality Report*, www.calgary.ca (accessed June 17, 2003).
Halifax Regional Water Commission, *2001 Water Quality Report*, Halifax.
The City of Ottawa, *Drinking Water Quality Report for City of Ottawa*, ottawa.ca/city_services/water/wq_reports/27_2_1_en.shtml (accessed July 2, 2003).
The City of Regina, Buffalo Pound Water Administration Board, *Annual Report - 2001*, Regina.
The City of Toronto, Source Water Quality Database.
Capital Regional District, *2001 Annual Overview of Greater Victoria's Drinking Water Quality*, Victoria.
Government of the Northwest Territories, *Public Works and Services*, aurora.gov.nt.ca/waterq/waterq_main_menu.asp (accessed August 12, 2003).

Table 2.13
Selected physical parameters of treated water by municipality, 2001

Parameter	units	Calgary	Edmonton	Halifax	Ottawa	Regina	Toronto	Victoria
Alkalinity, total	mg/l	180.0	142.0	27.0	43.0	182.0	93.0	16.1
Colour	TCU	2.5	2.0	3.0	10.0	<5	1.0	11.0
Conductivity	µS/cm	504.0	408.0	102.0	173.0	762.0	343.0	48.9
Dissolved oxygen	mg/l	.	.	.	15.1	8.2	14.0	.
Hardness, total	mg/l	247.6	199.0	36.2	78.0	279.0	126.0	19.8
Suspended solids, total	mg/l	.	.	.	.	0.6	.	5.0
Dissolved solids, total	mg/l	307.6	259.0	85.0	92.0	.	203.0	30.0
Turbidity	NTU	0.3	0.3	0.4	1.1	0.1	.	2.6

Notes:
The data represent maximum values.
For municipalities with multiple waterworks, highest maximum value was retained.
Sources:
The City of Calgary, *2001 Water Quality Report*, www.calgary.ca (accessed June 17, 2003).
Halifax Regional Water Commission, *2001 Water Quality Report*, Halifax.
The City of Ottawa, *Drinking Water Quality Report for City of Ottawa*, ottawa.ca/city_services/water/wq_reports/27_2_1_en.shtml (accessed July 2, 2003).
The City of Regina, Buffalo Pound Water Administration Board, *Annual Report - 2001*, Regina.
Toronto Works and Emergency Services, *Water Quality, Quarterly Report*, Water and Wastewater Services, Toronto.
Capital Regional District, *2001 Annual Overview of Greater Victoria's Drinking Water Quality*, Victoria.

Municipal supply

There are approximately 4 000 municipal water treatment facilities in Canada. The majority of these facilities are owned and operated by municipal governments.[1] However, most Canadians obtain their drinking water from a handful of large municipal facilities.

Table 2.13 gives, by municipality, the values of selected physical parameters measuring the quality of treated water, while Table 2.14 lists the values of the selected chemical parameters used. Text Box 2.6 lists some of the water quality issues faced by water treatment facilities.

Ground water

Ground water is essential for many Canadians. Despite this reliance, ground water is not well understood—indeed,

1. Federation of Canadian Municipalities, 2001, *A Better Quality of Life Through Sustainable Community Development: Priorities and Investment Plan* (draft for discussion), Federal Budget Submission, Ottawa.

Table 2.14
Selected chemical parameters of treated water by municipality, 2001

Parameter	Guideline[1]	Calgary	Edmonton	Halifax	Ottawa	Regina	Toronto	Victoria
				µg/l				
Aluminum	...[2]	97.7	320.0	120.0	170.0	144.0	264.0	<60
Arsenic	25	<1	<2	<0.1	0.4	3.1	0.0	<60
Barium	1000	0.0	90.0	.	24.5	67.0	30.0	3.8
Beryllium	...	.	.	.	<0.05	<1.0	0.0	0.0
Cadmium	5	<1	<1	.	0.1	<1.0	0.0	<6
Calcium	...	69 832.2	54 000.0	14 300.0	21 100.0	66 000.0	38 000.0	5 600.0
Chloride	250 000[3]	9 573.4	8 300.0	8 200.0	9 900.0	19 000.0	38 000.0	3 280.0
Chromium	50	11.2	<1	.	1.0	<1.0	0.0	<6
Cobalt	...	<1	.	.	0.1	<1.0	0.0	<6
Copper	1 000[3]	2.0	<3	<0.1	173.0	8.0	23.0	7.9
Iron	300[3]	<100	<3	30.0	29.0	30.0	9.0	52.0
Lead	10	<1	<0.5	<0.1	0.6	<1.0	0.0	0.0
Manganese	50[3]	3.8	3.0	32.0	13.0	10.0	0.0	10.5
Mercury	1	0.1	<0.1	<0.05	<0.5	<0.05	0.0	0.0
Selenium	10	2.2	<.003	.	<0.2	<1.0	0.0	<60
Silver	...	<1	.	.	<0.05	<1.0	0.0	<10
Zinc	5 000[3]	11.3	<5	5.0	6.0	7.0	64.0	5.0

Notes:
The data represent maximum values.
For municipalities with multiple waterworks, highest maximum value was retained.
1. Maximum acceptable concentration, Guidelines for Canadian Drinking Water Quality.
2. Scheduled for development. See Canadian Council of Ministers of the Environment, *Current Priorities*, www.ccme.ca/initiatives/water.html?category_id=41 (accessed August 12, 2003)
3. Aesthetic objective.

Sources:
The City of Calgary, *2001 Water Quality Report*, www.calgary.ca (accessed June 17, 2003).
Halifax Regional Water Commission, *2001 Water Quality Report*, Halifax.
The City of Ottawa, *Drinking Water Quality Report for City of Ottawa*, ottawa.ca/city_services/water/wq_reports/27_2_1_en.shtml (accessed July 2, 2003).
The City of Regina, Buffalo Pound Water Administration Board, *Annual Report - 2001*, Regina.
Toronto Works and Emergency Services, *Water Quality, Quarterly Report*, Water and Wastewater Services, Toronto.
Capital Regional District, *2001 Annual Overview of Greater Victoria's Drinking Water Quality*, Victoria.

Text Box 2.6
Water quality issues

Some of the water quality issues that were reported by the managers of water treatment facilities in larger municipalities were alkalinity, hardness or turbidity that resulted from silting in the water supply following spring floods or a heavy rain. Also reported were issues of microbiological pollution such as algae blooms, bacterial growth, coliforms, viruses and spores. Issues of chemical pollution were also mentioned, especially the presence of higher than recommended levels of ammonia, iron, manganese, detergents, oil, trichloroethylene and others.[1]

Excessive water demands also caused problems, mostly in periods of low flow. In fact, about a quarter of large municipalities reported water shortages from 1994 to 1999, as a result of drought, infrastructure problems or increasing consumption demands.[2]

1. Statistics Canada, Environment Accounts and Statistics Division, special compilation using data from Environment Canada, Municipal Water Use Database.
2. Environment Canada, 2003, *Environmental Signals: Canada's National Environmental Indicators Series 2003*, Ottawa.

Canada currently does not have a comprehensive national-scale inventory of its ground water resources.[1]

As shown in Table 2.15, in 1996 close to 9 million people relied on ground water resources for their drinking water. Many of these people lived in small municipalities or in rural areas where the water distribution systems were fed totally or partially by ground water—it often being the only reliable source of water available.

Ground water sources generally provide water that is safe to drink. This is especially true if the well field is protected from pollutants. Aquifers that are close to the surface are more prone to contamination by pollution, which partially explains the poor water quality that is characteristic of many shallow wells in Canada.[2] In southern Canada, ground water generally lies within 20 metres of the surface.[3]

1. Geological Survey of Canada, *Canadian Framework for Collaboration on Groundwater*, www.cgq-qgc.ca/cqsi/template/doc/STRATEGY-DRAFT17.pdf (accessed August 14, 2003).
2. Fairchild G.L., D.A.J. Barry, M.J. Goss, A.S. Hamill, P. Lafrance, P.H. Milburn, R.R. Simard and B.J. Zebart, 2000, "Groundwater Quality," *The Health of Our Water: Toward Sustainable Agriculture in Canada*, D.R. Coote and L.J. Gregorich (eds.), 61–73, Research Planning and Coordination Directorate, Research Branch, Agriculture and Agri-Food Canada, Ottawa.
3. Cherry, John A. 1987, "Groundwater Occurrence and Contamination in Canada," *Canadian Aquatic Resources*, no. 215 of *Canadian Bulletin of Fisheries and Aquatic Sciences,* M.C. Healey and R.R. Wallace (eds.), 387–424, Department of Fisheries and Oceans, Ottawa.

Table 2.15
Ground water use in Canada, 1996

Province/Territory	Population reliant on ground water[1]		Municipal water systems reliant on ground water[2]	
	number	percent	number	percent
Newfoundland and Labrador	189 921	33.9	19	23.5
Prince Edward Island	136 188	100.0	5	100.0
Nova Scotia	426 433	45.8	15	41.7
New Brunswick	501 075	66.5	40	72.7
Quebec	2 013 340	27.7	142	36.7
Ontario	3 166 662	28.5	132	42.7
Manitoba	342 601	30.2	22	50.0
Saskatchewan	435 941	42.8	44	65.7
Alberta	641 350	23.1	36	29.0
British Columbia	1 105 803	28.5	63	45.3
Yukon Territory	15 294	47.9	4	100.0
Northwest Territories[3]	18 971	28.1	0	0,0
Canada	**8 993 579**	**30.3**	**522**	**41.2**

Notes:
1. It is assumed the population not covered by the Municipal Water Use Database is rural and that 90% of this population is ground water reliant (except in Prince Edward Island, where 100% of the population is known to be ground water reliant).
2. Includes population and municipal water systems that are reliant on ground water only, as well as those that are reliant on ground water and surface water.
3. Includes Nunavut.

Sources:
Statistics Canada, Environment Accounts and Statistics Division, special compilation using data from Environment Canada, Municipal Water Use Database.
Statistics Canada, 1996, *Quarterly Estimates of the Population of Canada, the Provinces and the Territories*, 11:3, Catalogue no. 91-001, Ottawa.

Nitrates and bacteria are the most common well-water contaminants in Canada. Up to 40% of all rural wells contain these contaminants at levels that exceed the drinking-water quality guidelines.[1] Pesticides, on the other hand, exceed acceptable concentrations in only 0.1% of rural wells.[2] As discussed in Text Box 2.7, landfills can also pose a potential threat to ground water quality.

People who rely on private wells generally have a higher risk of exposure to ground water contaminants than those who rely on municipal wells.[3] In 2001, of those Canadian farmers who relied on their own well resources, 64% did not have their domestic water supply tested regularly, whereas only 16% did so once a year.[4]

Catchment and dugouts

Over 100 000 Canadians have either a dugout or a catchment system as their principal source of water.[5,6] Water quality in these systems varies according to the quality of the precipitation, the type of system and the method used for storing the water. The water quality in dugouts tends to be lower than catchment systems since dugouts are mainly located on or adjacent to farmland and are therefore susceptible to pesticide and fertilizer run-off.

1. Van Der Kamp, G. and G. Grove, 2001, *Well Water Quality in Canada: An Overview*, Safe Water Drinking Foundation, www.safewater.org/ conferences/proceedings/van%20der%20Kamp.htm (accessed January 1, 2003).
2. *Ibid.*
3. Health Canada, 1997, *Health and Environment*, Ottawa.
4. Statistics Canada, Farm Environmental Management Survey 2001.
5. Health and Welfare Canada, 1991, *Shallow Wells and Precipitation Catchments Used to Supply Drinking Water in Canada,* Ottawa.
6. The main catchment systems are rooftops, where precipitation is channelled toward a water reservoir.

Table 2.16
Net supply and per capita apparent consumption of bottled water, 1995 to 2000

Year	Net supply	Apparent consumption
	kilolitres	litres per capita
1995	527	18.0
1996	582	19.6
1997	643	21.4
1998	703	23.2
1999	.	25.2
2000	850	27.6

Source:
Statistics Canada, CANSIM II, tables 002-0010 and 002-0011.

Water from dugouts is also prone to taste and odour problems.[7]

Bottled water

All bottled water sold in Canada is regulated under the *Food and Drug Act.* This act not only applies to mineral and spring water, but also to distilled water and water bottled from municipal water supplies.[8] Recently, 55% of Canadian bottled water suppliers were assessed for compliance with regulations governing production, packaging, storage, sanitation and quality control procedures. Overall results indicated that there were no major health risks related to the bottled water industry in Canada. However, 11% of the manufacturers required follow-up action to ensure that the appropriate control measures were being followed. And

7. Cessna, A., 2001, *Herbicides in Prairie Farm Dugouts,* Safe Drinking Water Foundation, www.safewater.org/conferences/proceedings/cessna.htm (accessed January 1, 2003).
8. Canadian Food Inspection Agency, 2002, *2000–2001 Annual Report*, Ottawa.

Text Box 2.7

Landfills

As water seeps through the waste contained in a landfill, it can pick up numerous toxic substances along its journey. This is called *landfill leachate*. Modern landfills are designed with technologies that prevent the seepage of leachate into the ground water by way of landfill liners, and collect and drain away any leachate that does reach the liner.

In 2000, less than half of the active landfills in Canada contained some type of landfill liner. As shown in the accompanying table, these lined landfills accepted 77% of the waste disposed that year. This reflects the trend toward large, regional landfills that have been better engineered than their predecessors. This pattern is even more pronounced when looking at Canadian landfills with leachate capture systems. Only 18% of active landfills had a leachate collection system, but these facilities handled 75% of the waste disposed.

Liner and landfill leachate collection system by number of landfill sites and waste disposed by province and territory, 2000

	Tonnage as a percentage of total waste				Landfill sites as a percentage of total number of sites			
Province/Territory	Liner[1]	No liner or unknown	Leachate collection system[2]	No leachate collection system or unknown	Liner[1]	No liner or unknown	Leachate collection system[2]	No leachate collection system or unknown
	percent							
Newfoundland and Labrador	5	95	x	x	30	70	x	x
Prince Edward Island	x	x	x	x	x	x	x	x
Nova Scotia	69	31	71	29	43	56	43	57
New Brunswick	x	x	x	x	x	x	x	x
Quebec[3]	67	33	80	20	48	53	43	57
Ontario	85	15	87	13	41	59	20	80
Manitoba	41	59	83	17	42	58	24	76
Saskatchewan	60	40	x	x	54	46	x	x
Alberta	90	10	62	38	71	30	18	82
British Columbia	85	25	67	33	33	68	11	89
Yukon Territory, Northwest Territories and Nunavut	x	x	x	x	x	x	x	x
Canada	**77**	**23**	**75**	**25**	**46**	**54**	**18**	**82**

Notes:
Figures may not add up to totals due to rounding.
1. Presence of a liner that has been integrated into the landfill to prevent leachate from escaping into the environment. Examples of types of liners include clay, artificial membranes or combinations of the two materials.
2. Presence of a collection and control system that has been integrated into the landfill to capture and collect leachate in order to prevent it from escaping into the environment.
3. Figures are derived from the results of surveys conducted by the province.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

because of slightly elevated bacterial counts, 2% of the samples required further corrective action.[1]

As shown in Table 2.16, from 1995 to 2000, the supply of bottled water increased 61% while the per capita consumption increased 54% over the same period.

1. Canadian Food Inspection Agency, 2002, "Bottled water—Is it a safety concern?," *Frontline: Safeguarding Canada's Food, Animals and Plants*, Ottawa.

3 Response and participation

Legislation is one of the strongest actions a government can take to promote responsible and sustainable resource use by individuals and businesses. Governments and businesses in Canada are actively engaged in initiatives to monitor and improve water use and quality. Various programs are in place to encourage compliance with these initiatives, particularly the reduction of the negative effects of human activities on our water resources.[1] In fact, many businesses have taken steps to reduce their negative impacts on the environment, which has created a demand for products and services that address their needs.

3.1 Government response

Although water (including drinking water) is not specifically mentioned in Canada's Constitution, it has historically been considered a natural resource and as such, falls under the responsibility of the provinces. In many cases, municipalities share the responsibility for water management, particularly for municipal water supply and wastewater treatment. The responsibilities of the federal government cover navigable waters and commercial fisheries, as well as national and international boundary waters and those on First Nations' lands and in the northern territories.

1. Government of Canada, 2003, *Water and Canada: Preserving a Legacy for People and the Environment*, Ottawa.

Text Box 3.1
International Joint Commission

What it is and how it works – Canada and the United States created the International Joint Commission (IJC) as part of the 1909 Boundary Waters Treaty. The IJC was established as a way to manage the shared waterways along the Canada–United States border. The Commission assists both the Canadian and U.S. governments in resolving problems in these shared waters.

The IJC is administered by six Commissioners (appointed by both the Canadian and U.S. governments). These impartial Commissioners must follow the principles established by the Treaty as they try to prevent or resolve disputes.

To help carry out its responsibilities, the IJC has set up more than 20 boards, made up of experts from both Canada and the United States.

Source:
International Joint Commission, www.ijc.org (accessed February 25, 2003).

With respect to international boundary waters, the oldest and most important agreement between Canada and the United States is the Boundary Waters Treaty of 1909. Basic principles for the use, obstruction and diversion of boundary and transboundary waters have been established by the Treaty and administered by the International Joint Commission (Text Box 3.1). Table 3.1 lists all the federal and provincial legislation involving water resources, including any treaties and agreements signed between Canada and the United States. Text Box 3.2 lists a selection of other Canadian water management agreements.

Table 3.1
International, federal, provincial and territorial environmental legislation, treaties and agreements on water

Jurisdiction	Legislation
Canada-United States	Boundary Water Treaty; Lake of the Woods Convention and Protocol; Rainy Lake Convention; Niagara River Water Diversion Treaty; Columbia River Treaty and Protocol; Skagit River Treaty; St. Lawrence Seaway Project; Great Lakes Water Quality Agreement; Water Supply and Flood Control in the Souris River Basin
Federal	Canada Water Act; Fisheries Act; Territorial Lands Act; Arctic Waters Pollution Prevention Act; Canadian Environmental Protection Act; Navigable Waters Protection Act; Canada Shipping Act; Coastal Fisheries Protection Act and Regulations; International Boundary Waters Treaty Act; International River Improvements Act; Railway Act; Yukon Waters Act; Northwest Territories Waters Act; Nunavut Waters and Nunavut Surface Rights Tribunal Act
Newfoundland and Labrador	Aquaculture Act; Waters Protection Act; Well Drilling Act
Prince Edward Island	Municipalities Act; Water and Sewerage Act
Nova Scotia	Environment Act; Water Resources Agreement Act; Irish Moss Act; Parks Development Act; Towns Act; Aquaculture Act
New Brunswick	Irish Moss Act; Pesticides Control Act; Aquaculture Act; Clean Water Act; Drainage of Farmlands Act
Quebec	Environmental Quality Act; Water Courses Act; Commercial Fisheries and Aquaculture Act; Mining Act
Ontario	Drainage Act; Public Utilities Act; Environmental Protection Act; Ontario Water Resources Act; Tile Drainage Act; Water Taking and Transfer Regulation
Manitoba	Water Supply Commission Act; Water Rights Act and Regulations; Water Resources Administration Act; Water Power Act
Saskatchewan	Water Resources Management Act; Water Appeal Board Act; Ground Water Conservation Act; Water Corporation Act; Drainage Act
Alberta	Clean Water Act; Water Act; Water Resources Commission Act; Drainage Districts Act and Regulations; Environmental Protection and Enhancement Act; Hydro and Electric Energy Act
British Columbia	Water Act and Regulation; Water Protection Act; Water Utility Act; Drainage Ditch and Dyke Act; Dyke Maintenance Act; Dyking Authority Act; Fisheries Act; Health Act; Libby Dam Reservoir Act; Riverbank Protection Act; Flood Relief Act and Regulations
Yukon Territory	Environment Act; Municipal Act; Freshwater Fisheries Agreement Act
Northwest Territories	Water Resources Agreement Act; Freshwater Fish Marketing Act; Environmental Protection Act
Nunavut	Water Resources Agreement Act; Freshwater Fish Marketing Act; Environmental Protection Act; Environmental Rights Act; Territorial Parks Act

Sources:
IHS Micromedia, 1999, *Canadian Environmental Directory 1999 to 2000*, Ninth Edition, Toronto.
Environment Canada, www.ec.gc.ca/water/en/policy/intw/e_can-us.htm (accessed February 27, 2003).
Government of Nunavut, www.nunavutcourtofjustice.ca/library/consolacts.htm (accessed April 27, 2003).

Text Box 3.2
Other Canadian water management agreements

St. Lawrence Vision 2000 (Saint-Laurent Vision 2000)[1] – This agreement was launched in 1988 in order to protect the health of St. Lawrence River ecosystems, safeguard human health and involve riverside communities. Three phases were planned, of which Phase III is currently under way (1998 to 2003).

Canada–Ontario Agreement respecting the Great Lakes ecosystem[2] – This agreement provides the framework for co-ordination and co-operation of federal and provincial governments in restoring and protecting the Great Lakes basin; re-signed in spring 2002.

Great Lakes 2001 to 2006[3] – This agreement involves the co-operation of eight federal government departments, the province of Ontario and the United States to ensure that past and present environmental problems are addressed and future problems prevented.

1. Saint-Laurent Vision 2000, www.slv2000.qc.ca/index_a.htm (accessed February 18, 2003).
2. Environment Canada, *The Canadian–Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA),* www.on.ec.gc.ca/coa/intro_e.html (accessed February 18, 2003).
3. Environment Canada, *Our Great Lakes,* www.on.ec.gc.ca/water/greatlakes/intro-e.html (accessed February 18, 2003).

Federal Water Policy

Implemented in 1987, the Federal Water Policy[1] stresses that government and individuals must both do their part to manage water resources wisely. The main objective of the policy is to encourage people to use fresh water in an efficient and equitable manner, consistent with the social, economic and environmental needs of present and future generations.

Water quality monitoring

In contrast with water *quantity* monitoring, which has a history of successful collaborative and data-sharing agreements between various level of governments, water *quality* monitoring remains largely the responsibility of provincial and territorial governments. As a result, water quality monitoring in Canada varies in coverage and consistency.

In response to public concerns, monitoring programs often target specific problems in particular locations, although some provinces have established province-wide monitoring programs. Federal and provincial governments sponsor regional and local monitoring, usually through local health departments. Many monitoring programs are now undertaking partnerships with universities, municipalities, industries, farm organizations, public interest groups and government agencies in order to share costs and make better use of the results.[2]

1. Environment Canada, *Federal Water Policy*, www.ec.gc.ca/water/en/info/pubs/fedpol/e_fedpol.htm (accessed February 25, 2003).

Text Box 3.3
Canadian Council of Ministers of the Environment

The Canadian Council of Ministers of the Environment (CCME) works to promote effective intergovernmental co-operation and co-ordinated approaches to interjurisdictional issues such as air pollution, toxic chemicals and source water quality. CCME members collectively establish nationally consistent environmental standards, strategies and objectives so as to achieve a high level of environmental quality across the country. While the CCME proposes change, it does not impose its suggestions on its members because it has no authority to implement or enforce legislation. Each jurisdiction individually decides whether to adopt CCME proposals.

The Council comprises environment ministers from the federal, provincial and territorial governments. These 14 ministers normally meet at least once a year to discuss national environmental priorities and determine what work will be carried out under the auspices of the CCME.

Source:
Canadian Council of Ministers of the Environment, www.ccme.ca/about/whatwedo.html (accessed April 29, 2003).

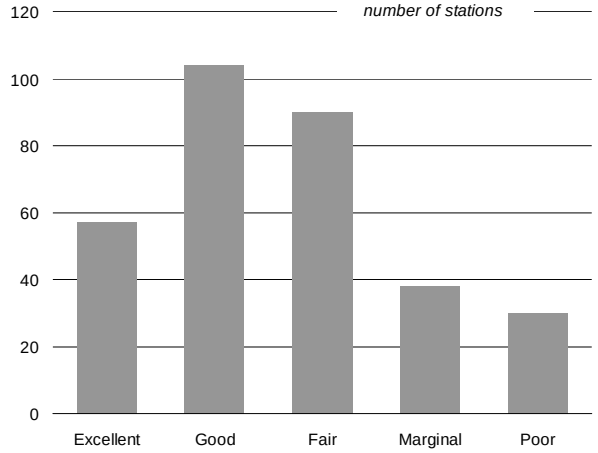
Water quality guidelines

Since 1984, federal, provincial and territorial authorities have been developing and publishing water quality guidelines through the Canadian Council of Ministers of the Environment (Text Box 3.3). These guidelines provide technical and scientific information on selected substances found in water. They also contain recommendations to protect and enhance major water uses.

Within the Canadian Council of Ministers of the Environment (CCME), the Water Quality Task Group has developed the Water Quality Index (WQI). This index provides a way for Canadian jurisdictions to report water quality information on a comparable basis.[3] Over the years, the index has been applied to a number of water quality monitoring stations across the country (preliminary results are shown in Figure 3.1).

2. Environment Canada, 2003, *Organisation for Economic Co-operation and Development (OECD) Environmental Performance Review of Canada: Country Memorandum*, unpublished report, Ottawa.
3. Canadian Council of Ministers of the Environment, www.ccme.ca/initiatives/water.html (accessed April 30, 2003).

Figure 3.1
Freshwater quality indicator by quality class



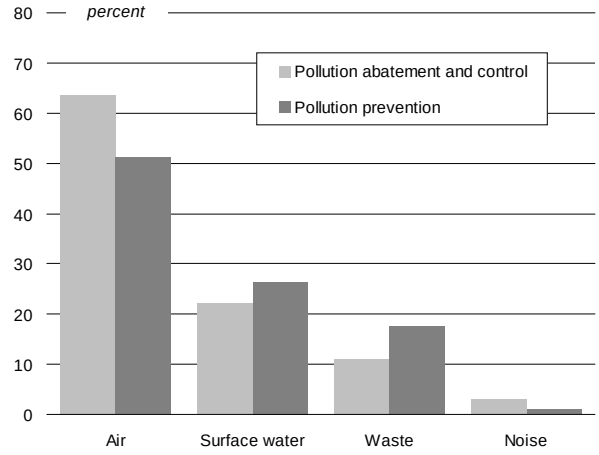
Notes:
Data were taken over the period 1990 to 2002.
These Water Quality Index (WQI) results are preliminary and should not be regarded as a benchmark or starting point for future trends. Rather, this pilot study provides a first approximation for a national picture of ambient fresh water quality in Canada. Improvements in consistency of application and representation will be sought in the near future.
The WQI values have been calculated by each province and territory (except Quebec) using the methodology developed and endorsed by the Canadian Council of Ministers of the Environment (CCME) in September 2001. According to the CCME user's manual,[1] the specific variables, objectives and time periods used in the index are not specified by the methodology and, because of differences in local conditions, monitoring programs and water quality issues, they vary from one jurisdiction to another. In this regard, it is expected that the variables and objectives chosen to calculate the index provide relevant information about a particular site.
In Quebec, water quality was evaluated using an index other than the CCME WQI: *L'indice de la qualité bactériologique et physico-chimique*. The results between the two indexes have a reasonable degree of comparability. The premise is that the evaluation of water quality in one jurisdiction by water quality experts familiar with the local conditions should be comparable with a similar evaluation by experts in another jurisdiction, even though the index tools may have some variation.
The national portrayal of the WQI results includes information from all provinces and territories except Nunavut and the Yukon, for which suitable data were unavailable at this time. The water bodies included in the WQI calculations do not provide uniform coverage across Canada, but rather tend to be concentrated in the more populated areas of the country where the potential threats to water quality are generally greatest. The coverage and the density of sites are also higher in some provinces than in others.
1. Canadian Council of Ministers of the Environment, 2001, Canadian Water Quality Guidelines for the Protection of Aquatic Life: CCME Water Quality Index 1.0, User's Manual.
Source:
Produced by Environment Canada based on the index values or water quality data supplied by the provinces and territories under the auspices of the Water Quality Task Group of the Canadian Council of Ministers of the Environment. Environment Canada, National Round Table on the Environment and the Economy, 2003, *Environment and Sustainable Development Indicators for Canada*, Ottawa.

3.2 Business response

Since 1994, Statistics Canada has collected information on how much money businesses[1] in Canada spend on environmental protection. The business sector directly affects environmental protection spending by purchasing goods or services that prevent or control pollution, and indirectly affects it by purchasing goods or services that are energy-efficient.

1. The Survey of Environmental Protection Expenditures collects information from 16 industry groups in primary and manufacturing industry sectors. Environmental protection expenditures include all capital and operating expenditures incurred by businesses in order to comply with or anticipate Canadian and international environmental regulations, conventions or voluntary agreements.

Figure 3.2
Capital expenditures on pollution abatement and control and pollution prevention by environmental medium, 2000



Source:
Statistics Canada, Environment Accounts and Statistics Division.

Business investment in protecting the environment

Between 1994 and 1998, businesses shifted environmental protection expenditures from water-related protection to air-related protection. This shift from water to air was caused mainly by a decrease in spending by the pulp, paper and paperboard mills industry during its compliance period with the new water-emissions regulations that were enforced in the mid-1990s.[2] In 2000, capital expenditures for both pollution prevention methods and pollution abatement and control projects were highest for air emissions, followed by surface water emissions, on-site solid waste, and noise (Figure 3.2).[3]

In 2000, businesses spent $274.5 million on water-related pollution prevention technologies, which utilize re-use, recirculation and recycling techniques to make water processing more efficient.[4] Water-related end-of-pipe

2. Statistics Canada, 2001, *Environment Protection Expenditures in the Business Sector, 1998*, Catalogue no. 16F0006XIE, Ottawa.
3. Statistics Canada, 2003, *Environment Protection Expenditures in the Business Sector, 2000*, Catalogue no. 16F0006XIE, Ottawa.
4. Pollution prevention can be described as technologies, equipment or processes that reduce or eliminate pollution at the source instead of at the end of the pipe or the stack. Examples of these methods include the installation of more efficient processes that consume less energy or fewer inputs; redesign or reformulation of the production process to reduce pollution or emissions; and re-use, recirculation or on-site recycling of materials (does not include materials sent for off-site recycling).

pollution abatement and control[1] expenditures by businesses amounted to $194.8 million.

Pollution abatement and control expenditures on water emissions by industry

As shown in Table 3.2, in 2000, the three industries that made up close to 60% of all pollution abatement and control capital expenditures were the pulp, paper and paperboard mills industry (24%), the food industry (17%) and the mining industry (17%). The food industry dedicated just over 72% of all its environmental capital expenditures to protecting surface water, followed by the pulp, paper and paperboard industry (55%) and the mining industry (50%). Overall, about 22% of all pollution abatement and control capital expenditures by all industries were specifically dedicated to surface-water emissions (Table 3.2).

Pollution prevention capital expenditures on water emissions by industry

In 2000, the three industries that spent the most on pollution prevention dedicated almost 50% of all these expenditures to protect surface waters (Table 3.3): the transportation equipment industry (23%), the pulp, paper and paperboard mills industry (15%), and the chemicals industry (12%). The chemicals industry dedicated almost 48% of all its capital expenditures to surface-water protection, followed by the transportation equipment industry with 33% and the pulp, paper and paperboard mills industry with 30%. Overall, nearly 26% of all pollution prevention capital expenditures were dedicated to surface-water emissions (Table 3.3).

3.3 Industrial development

Better awareness of environmental pollution and increased public concern has led many Canadian businesses to adopt environmentally friendly processes that limit the impact their operations have on the environment. In turn, this has given rise to a new breed of businesses that produce goods and services such as wastewater treatment and water re-use systems, which help prevent, reduce or remediate environmental degradation. Collectively, these businesses form Canada's environment industry.[2]

1. Pollution abatement and control (end-of-pipe processes) are equipment and processes that treat pollution and wastes *after* they have been created. Examples of these methods include scrubbers at the end of emission stacks; biological and chemical systems for treating water (such as water treatment plants); and filtration systems, cyclones or other barrier systems. These end-of-pipe processes are not an integral part of production; their sole purpose is to abate or to control undesirable substances resulting from normal production.

2. The environment industry is composed of establishments operating in a variety of industries that produce environmental goods and services. Thus, this industry is not classified as one specific industry under Statistics Canada's official classification of industries. For more details on the definition of the environment industry, refer to Statistics Canada, 2002, *Environment Industry Survey: Business Sector, 2000,* Catalogue no. 16F0008XIE, Ottawa.

Table 3.2
Distribution of capital expenditures on pollution abatement and control (end-of-pipe), by medium and by industry, 2000

Industry	Air	Surface water	On-site contained solid and liquid waste	Noise, radiation and vibration	**Total**
			million dollars		
Logging	0.1	0.0	0.0	0.0	**0.1**
Oil and gas extraction	x	x	x	x	**244.8**
Mining	x	32.5	29.2	x	**65.0**
Electric power generation, transmission and distribution	15.9	18.2	x	x	**56.0**
Natural gas distribution	x	0.0	x	0.0	**0.5**
Food	7.0	32.9	5.0	0.6	**45.5**
Beverage and tobacco products	x	x	x	x	**0.9**
Wood products	43.7	0.5	6.8	0.3	**51.2**
Pulp, paper and paperboard mills	24.0	47.0	14.7	0.2	**85.8**
Petroleum and coal products	93.3	19.2	5.2	1.4	**119.1**
Chemicals	35.0	14.4	6.0	5.3	**60.6**
Non-metallic mineral products	72.6	4.7	0.2	8.0	**85.5**
Primary metals	22.0	9.8	4.9	0.3	**37.1**
Fabricated metal products	x	1.2	2.0	x	**5.7**
Transportation equipment	6.2	6.8	0.5	0.2	**13.7**
Pipeline transportation	x	x	0.6	x	**9.9**
Total	**560.4**	**194.8**	**98.2**	**27.9**	**881.4**

Notes:
Figures may not add up to totals due to rounding.
The table includes reported capital expenditure shares only.
This table excludes capital expenditures on the 'Environmental monitoring' category.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table 3.3
Distribution of capital expenditures on pollution prevention by medium and by industry, 2000

Industry	Air	Surface water	On-site contained solid and liquid waste	Noise, radiation and vibration	Other	**Total**
			million dollars			
Logging	x	0.5	0.4	0.0	x	**1.2**
Oil and gas extraction	62.0	29.5	17.5	3.2	2.5	**114.8**
Mining	21.5	23.8	21.8	x	x	**67.4**
Electric power generation, transmission and distribution	52.6	20.7	3.9	x	x	**78.1**
Natural gas distribution	x	x	x	x	x	**0.6**
Food	14.5	8.2	2.4	1.0	1.8	**27.8**
Beverage and tobacco products	0.1	0.8	1.4	0.0	0.2	**2.5**
Wood products	16.4	3.2	40.4	0.2	2.9	**63.0**
Pulp, paper and paperboard mills	65.7	42.5	21.0	0.0	11.3	**140.4**
Petroleum and coal products	x	x	x	0.4	2.3	**90.3**
Chemicals	x	32.3	13.8	x	x	**67.5**
Non-metallic mineral products	9.1	1.9	1.3	0.5	0.3	**13.2**
Primary metals	23.8	9.6	25.6	1.1	3.5	**63.6**
Fabricated metal products	3.2	1.2	0.4	0.3	2.8	**7.9**
Transportation equipment	108.8	62.2	8.2	0.0	8.7	**187.9**
Pipeline transportation	7.5	7.9	x	x	x	**17.4**
Total	**482.8**	**248.6**	**164.8**	**8.4**	**39.1**	**943.7**

Notes:
Figures may not add up to totals due to rounding.
This table includes reported capital expenditure shares only.
This table excludes capital expenditures on the 'Environmental monitoring' category.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Water-related environmental goods and services

As shown in Table 3.4, revenues derived from the sale of environmental goods and services for the whole environment industry reached $14.4 billion in 2000. Of this total, Canadian businesses earned $1.4 billion from water-related environmental goods and services (see Text Box 3.4 for definitions). This represents nearly 10% of the total revenues generated by the Canadian environment industry in 2000.[1]

Of this total, water-related environmental goods (systems and equipment) generated $976.2 million in revenues. The types of water-related environmental goods were as diverse as the businesses that produced and sold them. Almost one-quarter of these revenues could be attributed to the machinery manufacturing industry (which produced water-disinfection systems, water-clarification systems, membrane-filtration technologies, wastewater-treatment systems for industrial processes and effective storage systems for potable water and wastewater). Another quarter was attributed to the wholesale trade industry (which sold water treatment chemicals, pipes, tubes, construction machinery and equipment, and other industrial machinery equipment and supplies needed to build sewage-treatment plants and water-supply infrastructures). As a group, the manufacturing industries accounted for nearly 64% of all revenue generated by water-related environmental goods.

1. Statistics Canada, 2002, *Environment Industry Survey: Business Sector, 2000,* Catalogue no. 16F0008XIE, Ottawa.

Text Box 3.4
Water-related environmental goods and services

Water-related environmental goods

Water supply and conservation goods include equipment or technology used for fresh water supply and delivery; water purification equipment; and water-handling equipment parts.

Wastewater management and sewage treatment goods include chemical recovery systems; aeration systems; biological recovery systems; gravity sediment systems; oil–water separation systems; wastewater re-use equipment; wastewater treatment chemicals; water pollution control equipment; and screens, strainers, clarifiers, filters and filter media.

Water-related environmental services

Water supply and conservation services include services related to water purification, water delivery and water handling systems, including maintenance, repair, related consulting engineering and analytical services.

Wastewater management and sewage treatment services include operation of water treatment facilities; storm water management; water and wastewater system assessment, planning and design management; and related consulting engineering and analytical services.

Source:
Statistics Canada, 2002, *Environment Industry Survey: Business Sector, 2000,* Catalogue no. 16F0008XIE, Ottawa.

Table 3.4
Water-related environmental goods and services revenues,[1] by industry group, 2000

Industry group[2]	Goods	Services	Total environmental revenues[3]
	million dollars		
Agriculture, forestry, fishing and hunting	x	x	8
Mining and oil and gas extraction	x	x	28
Utilities	5	x	30
Construction	24	26	1 536
Chemical manufacturing	90	1	223
Plastic and rubber products manufacturing	98	0	221
Non-metallic mineral product manufacturing	62	x	130
Primary metal manufacturing	66	0	78
Fabricated metal product manufacturing	80	0	198
Machinery manufacturing	219	12	594
Computer and electronic product manufacturing	6	0	107
Electrical equipment, appliance and component manufacturing	0	0	158
Rest of manufacturing sector	x	x	306
Wholesale trade	232	17	4 332
Retail trade	x	0	43
Finance and insurance services	-	x	27
Legal services	x	x	109
Architectural and landscape architectural services	0	x	9
Engineering services	10	299	1 957
Surveying and mapping (including geophysical) services	0	x	30
Testing laboratories	0	5	168
Computer systems design and related services	x	x	23
Management, scientific and technical consulting services	12	32	585
Scientific research and development services	x	1	55
All other professional, scientific and technical services	x	0	84
Management of companies and enterprises	0	x	65
Administrative and support services	x	5	98
Waste management and remediation services	x	7	3 020
Other services	x	12	136
Canada	**976**	**432**	**14 360**

Notes:
1. Water-related goods and services include systems and equipment and services related to water supply and conservation, wastewater management and sewage treatment.
2. Industry groups are based on the North American Industry Classification System (NAICS).
3. Total environmental revenues include revenues from the production of environmental goods, the provision of environmental services, and the undertaking of environment-related construction activities.

Source:
Statistics Canada, Environment Accounts and Statistics Division.

The environment industry derived an additional $432.1 million in revenues from water-related environmental services (Table 3.4) including water supply and conservation, and wastewater management and sewage treatment. Such services were provided mostly by the engineering services industry, which accounted for nearly 69% of all revenues generated by water-related environmental services. This is not surprising, considering that firms in the engineering services industry provide a wide range of services, from environmental assessment, through design and system start-up, to final commissioning.

Text Box 3.5
Selected sustainable development technologies related to water

Smart water treatment – New membrane technologies and biological treatments will be able to purify water by removing organic compounds. This type of technology could lead to community- or home-based water treatment units.

Advanced sensors – Sensors are used to monitor water quality, as well as global changes in the climate, ozone layer, marine environment and varied ecosystems. Global information systems could aid in precision farming by helping to maximize output.

Source:
Organisation for Economic Co-operation and Development (OECD), 1999, "Technology and Sustainable Development," *Science Technology Industry (STI) Review*, 25, Paris.

New technologies

Research and development efforts made by both governments and businesses have resulted in the introduction of technologies that address various water issues and concerns. Examples of new sustainable development technologies that are aimed at water are listed in Text Box 3.5. Other water-related technologies, products and services include ultra-violet disinfection; anaerobic treatment; ion exchange; wet-air oxidation; biosolids treatment; water information systems and software; and wetland technologies for natural ecosystem remediation. The National Water Research Institute has also developed some advanced technologies for the remediation of ground water and sediment as well as a number of other technologies.[1]

In partnership with industry, governments also play a key role in the development of clean technologies. An example of environmental technology partnerships in Canada is the Technology Partnerships Canada fund.[2] One of the programs this fund supports is the development of environmental technologies. The types of technology research sponsored by this fund include both water and wastewater treatment.

1. Environment Canada, National Water Research Institute, *Research Topics* www.nwri.ca/research/topics-e.html (accessed August 7, 2003).
2. Technology Partnerships Canada, www.tpc.ic.gc.ca (accessed April 2, 2003).


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Table Highlights and Annual Statistics

Table Highlights

Climate

- The weather in the Prairies was the number one weather story for 2002. Other top stories included a record drought on the Pacific Coast, back-to-back hurricanes in the Atlantic provinces and smoke from Quebec forest fires that travelled all the way to Washington, D.C.

Population

- By 2001, Canada's population had passed the 31-million mark, an almost six-fold increase since 1901. From 1901 to 2001 both Alberta and British Columbia's shares of the total Canadian population increased—from 1.%3 to 9.8% for Alberta and 3.3% to 13.2% for British Columbia. Over this same period Ontario's share of the population fell from 41% to 38% while Quebec's share fell from 31% to 24%.

Economy

- In 1961, resource-based industries dominated Canada's exports, representing two-thirds of goods and services sent abroad. By 1999, however, this group of industries represented less than one-third of the value of exports; the transportation equipment industry became the largest single contributor to Canadian international trade, representing 26% of exports and 23% of imports.

Fish

- From 1990 to 2001, the tonnage of fish caught in all Canadian fisheries decreased by 37%, whereas the value of the catch rose by 43%. The increased value may be attributed to the rising value of shellfish, which grew 209% over the same period.
- The value of total aquaculture production increased 329% from 1989 to 2001. Mussel production experienced the largest growth (635%), while salmon fisheries increased 359%.

Forests

- Since 1978, exports of forest products have increased almost four-fold, reaching $33.7 billion in 2002.

Transportation

- In 2001, there were 220 000 more road motor vehicles registered in Canada than in 2000. Over the same period, the number of off-road, construction and farm vehicles declined by over 450 000.

Energy

- From 1981 to 2000, thermal-electric power stations in Canada more than doubled their use of sub-bituminous coal, lignite and natural gas.

Waste

- In 2000, the waste management industry in Canada handled 7.5 million tonnes of materials for recycling or reuse. The majority of this material was generated by two provinces, Quebec (37%) and Ontario (32%).

Air

- From 1990 to 2000, the total greenhouse gas emissions increased by almost 20%. The largest increases in emissions were associated with heavy-duty gasoline trucks (86%), pipelines (64%) and light-duty gasoline trucks (68%). Electricity and steam generation remained the largest emitter of greenhouse gases in 2000.

Protected Areas

- From 1989 to 2003, Canada's total protected land area increased from 29 million hectares to 82 million hectares.

Environmental Legislation

- In 2001-2002, the total number of activities conducted to enforce the *Canadian Environmental Protection Act* reached an 11-year high of 2 241 enforcement activities. Inspections (1 628), warnings (517) and prosecutions (27) all recorded 11-year highs.

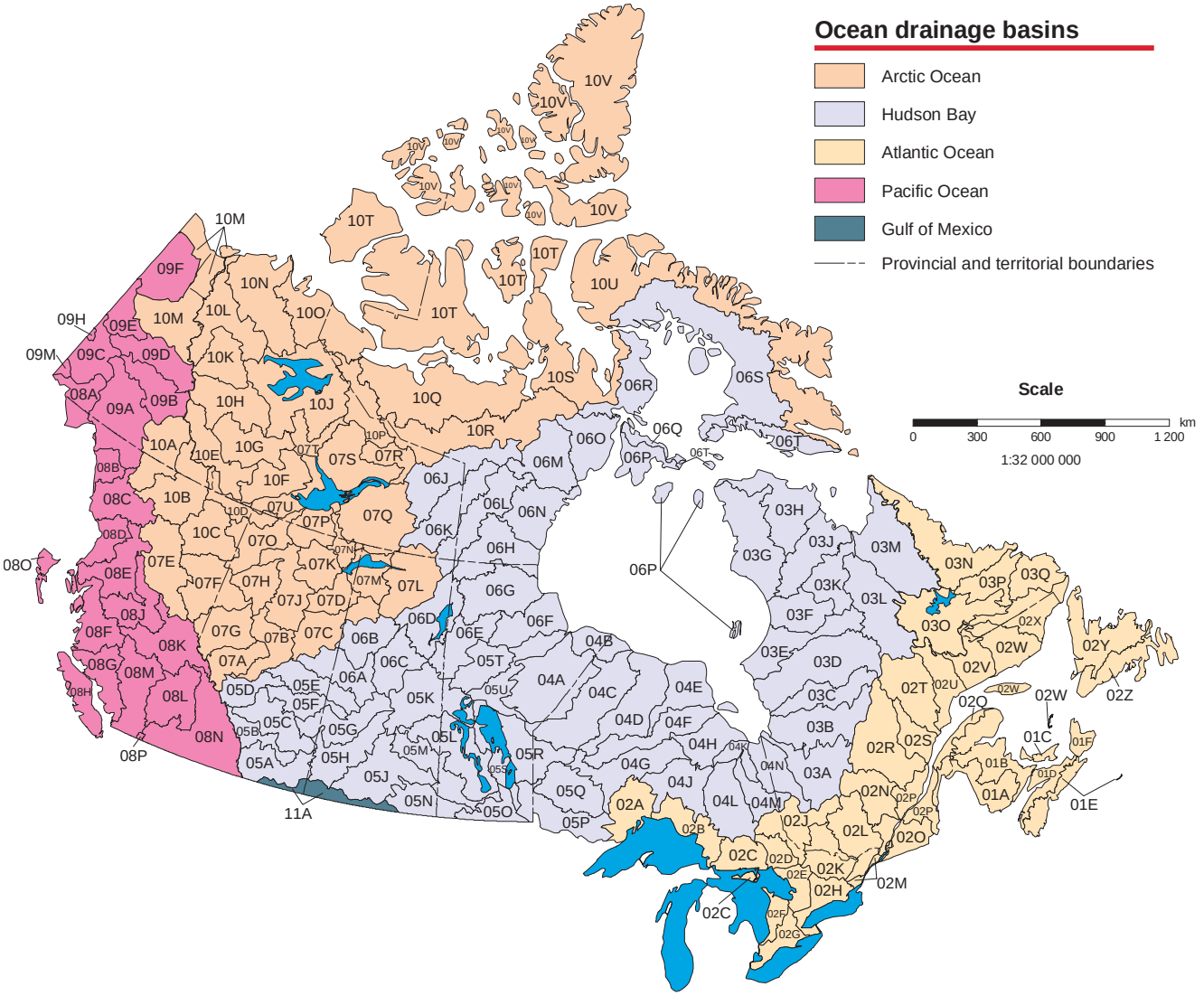
Environmental Protection Expenditures

- In 2000, Canadian industries spent over $3 billion on environmental protection—this marked the first time since 1995 that expenditures had surpassed the $3 billion mark.

Annual statistics

Physiography

Map A.1
Sub-drainage areas by ocean basin



Source:
Natural Resources Canada, 2003, National Scale Frameworks Hydrology - Drainage Areas, Canada, Version 5.0, www.geogratis.cgdi.gc.ca (accessed September 16, 2003).
Statistics Canada, Environment Accounts and Statistics Division, Spatial Environmental Information System.

Table A.1
Sub-drainage area names and areas by ocean basin

Sub-drainage area code	Ocean basin and sub-drainage area	Area[2] (km^2)	Sub-drainage area code	Ocean basin and sub-drainage area	Area[2] (km^2)
	Arctic Ocean		04K	Moose (Ont.)	17 949
07A	Upper Athabasca	34 856	04L	Missinaibi-Mattagami	60 593
07B	Central Athabasca - Upper	40 496	04M	Abitibi	29 291
07C	Central Athabasca - Lower	57 030	04N	Harricanaw - Coast	43 509
07D	Lower Athabasca	29 745	05A	Upper South Saskatchewan	46 466
07E	Williston Lake	72 362	05B	Bow	25 572
07F	Upper Peace	67 824	05C	Red Deer	50 316
07G	Smoky	51 508	05D	Upper North Saskatchewan	27 983
07H	Central Peace - Upper	35 412	05E	Central North Saskatchewan	42 275
07J	Central Peace - Lower	59 401	05F	Battle	30 241
07K	Lower Peace	36 510	05G	Lower North Saskatchewan	49 652
07L	Fond-du-Lac	70 650	05H	Lower South Saskatchewan	55 268
07M	Lake Athabasca - Shores	32 017	05J	Qu'Appelle	74 589
07N	Slave	17 057	05K	Saskatchewan	81 194
07O	Hay	51 405	05L	Lake Winnipegosis and Lake Manitoba	82 719
07P	Southern Great Slave Lake	33 916	05M	Assiniboine	51 259
07Q	Great Slave Lake - East Arm South Shore	96 331	05N	Souris	39 413
07R	Lockhart	27 124	05O	Red	25 444
07S	Northeastern Great Slave Lake	68 826	05P	Winnipeg	55 104
07T	Marian	24 262	05Q	English	52 550
07U	Western Great Slave Lake	30 955	05R	Eastern Lake Winnipeg	56 277
10A	Upper Liard	61 858	05S	Western Lake Winnipeg	24 650
10B	Central Liard	72 031	05T	Grass and Burntwood	42 390
10C	Fort Nelson	54 771	05U	Nelson	49 119
10D	Central Liard - Petitot	30 563	06A	Beaver (Alta.-Sask.)	49 940
10E	Lower Liard	55 571	06B	Upper Churchill (Man.)	44 288
10F	Upper Mackenzie - Mills Lake	51 042	06C	Central Churchill (Man.) - Upper	45 892
10G	Upper Mackenzie - Camsell Bend	57 858	06D	Reindeer	67 357
10H	Central Mackenzie - Blackwater Lake	67 210	06E	Central Churchill (Man.) - Lower	51 295
10J	Great Bear	158 140	06F	Lower Churchill (Man.)	54 799
10K	Central Mackenzie - The Ramparts	46 736	06G	Seal - Coast	75 970
10L	Lower Mackenzie	77 259	06H	Western Hudson Bay - Southern	73 301
10M	Peel and Southwestern Beaufort Sea	106 934	06J	Thelon	85 479
10N	Southern Beaufort Sea	99 387	06K	Dubawnt	68 911
10O	Amundsen Gulf	91 070	06L	Kazan	70 690
10P	Coppermine	50 741	06M	Chesterfield Inlet	67 783
10Q	Coronation Gulf - Queen Maud Gulf	174 677	06N	Western Hudson Bay - Central	63 743
10R	Back	135 956	06O	Western Hudson Bay - Northern	54 523
10S	Gulf of Boothia	114 748	06P	Hudson Bay - Southampton Island	48 764
10T	Southern Arctic Islands	373 194	06Q	Foxe Basin - Southampton Island	13 285
10U	Baffin Island - Arctic Drainage	299 813	06R	Foxe Basin - Melville Peninsula	59 726
10V	Northern Arctic Islands	424 817	06S	Foxe Basin - Baffin Island	211 083
	Lakes[1]	37 968	06T	Hudson Strait - Baffin and Southampton Islands	46 469
	Arctic Ocean total	**3 580 030**		Lakes[1]	24 534
				Hudson Bay total	**3 872 318**
	Hudson Bay				
03A	Nottaway - Coast	67 938		**Atlantic Ocean**	
03B	Broadback and Rupert	77 195	01A	Saint John and Southern Bay of Fundy (N.B.)	41 904
03C	Eastmain	45 930	01B	Gulf of St. Lawrence and Northern Bay of Fundy (N.B.)	60 778
03D	La Grande - Coast	112 203	01C	Prince Edward Island	5 943
03E	Grande rivière de la Baleine - Coast	62 752	01D	Bay of Fundy and Gulf of St. Lawrence (N.S.)	21 547
03F	Eastern Hudson Bay	46 383	01E	Southeastern Atlantic Ocean (N.S.)	23 132
03G	Northeastern Hudson Bay	100 054	01F	Cape Breton Island	10 685
03H	Western Ungava Bay	78 164	02A	Northwestern Lake Superior	43 729
03J	Aux Feuilles - Coast	63 722	02B	Northeastern Lake Superior	39 679
03K	Koksoak	45 542	02C	Northern Lake Huron	34 670
03L	Caniapiscau	90 094	02D	Wanipitai and French (Ont.)	19 225
03M	Eastern Ungava Bay	106 707	02E	Eastern Georgian Bay	21 958
04A	Hayes (Man.)	109 482	02F	Eastern Lake Huron	14 775
04B	Southwestern Hudson Bay	28 384	02G	Northern Lake Erie	22 621
04C	Severn	99 533	02H	Lake Ontario and Niagara Peninsula	28 734
04D	Winisk - Coast	79 224	02J	Upper Ottawa	50 786
04E	Ekwan - Coast	50 484	02K	Central Ottawa	40 678
04F	Attawapiskat - Coast	57 243	02L	Lower Ottawa	54 839
04G	Upper Albany	64 914	02M	Upper St. Lawrence	5 108
04H	Lower Albany - Coast	42 345	02N	Saint-Maurice	42 249
04J	Kenogami	52 370	02O	Central St. Lawrence	34 567

Table A.1
Sub-drainage area names and areas by ocean basin (continued)

Sub-drainage area code	Ocean basin and sub-drainage area	Area[2] (km^2)	Sub-drainage area code	Ocean basin and sub-drainage area	Area[2] (km^2)
02P	Lower St. Lawrence	37 161	08G	Southern coastal waters of B.C.	41 986
02Q	Northern Gaspé Peninsula	13 383	08H	Vancouver Island	34 882
02R	Saguenay	88 072	08J	Nechako	47 332
02S	Betsiamites - Coast	27 473	08K	Upper Fraser	67 088
02T	Manicouagan and aux Outardes	65 221	08L	Thompson	55 777
02U	Moisie and St. Lawrence Estuary	39 589	08M	Lower Fraser	61 880
02V	Gulf of St. Lawrence - Romaine	36 416	08N	Columbia - U.S.A.	102 925
02W	Gulf of St. Lawrence - Natashquan	53 841	08O	Queen Charlotte Islands	10 049
02X	Petit Mécatina and Strait of Belle Isle	50 320	08P	Skagit	1 027
02Y	Northern Newfoundland	66 102	09A	Headwaters Yukon	94 018
02Z	Southern Newfoundland	44 492	09B	Pelly	50 485
03N	Northern Labrador	92 911	09C	Upper Yukon	44 206
03O	Churchill (N.L.)	95 003	09D	Stewart	51 360
03P	Central Labrador	35 682	09E	Central Yukon	29 820
03Q	Southern Labrador	37 889	09F	Porcupine	61 566
	Lakes[1]	92 194	09H	Tanana	1 470
	Atlantic Ocean total	**1 493 352**	09M	Copper	4 112
				Pacific Ocean total	**1 003 385**
	Pacific Ocean				
08A	Alsek	31 192		**Gulf of Mexico**	
08B	Northern coastal waters of B.C.	22 767	11A	Missouri	27 097
08C	Stikine - Coast	49 997		**Gulf of Mexico total**	**27 097**
08D	Nass - Coast	29 036			
08E	Skeena - Coast	55 751		**Canada total**	**9 976 182**
08F	Central coastal waters of B.C.	54 658			

Notes:
1. 'Lakes' in this table refer to those internal lakes shown on Map A.1 as well as the Canadian portion of the Great Lakes.
2. Areas were calculated using an Albers Equal Area (NAD83) projection.

Sources:
Natural Resources Canada, 2003, National Scale Frameworks Hydrology - Drainage Areas, Canada, Version 5.0, www.geogratis.cgdi.gc.ca (accessed September 16, 2003).
Statistics Canada, Environment Accounts and Statistics Division, Spatial Environmental Information System.

Climate

Table A.2
Top 10 Canadian weather stories of 2002

Rank	Event	Location	Date
1	Prairie Plagues (growing season worst ever)	Western Canada	spring to fall
2	Winter 2001/02 Cancelled (eighth warmest winter in over half a century)	Canada	winter
3	A Lazy, Hazy Summer (record-breaking smog)	Canada	summer
4	Prairie Rain Gushers - too much too soon (record rain after three years of drought)	Prairies	June
5	Icy Spring Shatters Record (fifth coldest spring ever)	Canada	spring
6	Sizzling Summer in the Cities (record warmth with little rain)	Canada	summer
7	Wet' Coast Drought (dry season worked overtime)	British Columbia	June to early December
8	Four Hurricanes in Four Weeks (September was an especially explosive month)	Atlantic Canada	September
9	Quebec Smoke Crosses Borders (lightning-triggered forest fires are the source)	Eastern Canada	July
10	Canadian Weather Fit for A Pope and A Queen (dignitaries experienced our ever changing weather)	Canada	July and October

Source:
Environment Canada, *Environment Canada's Top Weather Stories for 2002*, Meteorological Service of Canada, www.msc.ec.gc.ca/media/top10/2002_e.html (accessed January 14, 2003).

Table A.3
Annual regional temperature departures: trends and extremes, 1948 to 2002

		Extreme years					
		Coldest		Warmest		Annual 2002[1]	
Climate region	Trend[2]	Year on record	Departure[3]	Year on record	Departure[3]	Rank[4]	Departure[3]
	°C		°C		°C		°C
Atlantic Canada	0.0	1972	-1.4	1999	2.0	20	0.2
Great Lakes/St. Lawrence Lowlands	0.5	1978	-1.0	1998	2.3	8	1.1
Northeastern Forest	0.5	1972	-1.9	1998	2.1	25	0.2
Northwestern Forest	1.6	1950	-2.1	1987	3.0	28	0.2
Prairies	1.3	1950	-2.1	1987	3.1	33	0.1
South British Columbia Mountains	1.3	1955	-1.8	1998	2.0	22	0.5
Pacific Coast	1.1	1955	-1.2	1958	1.6	16	0.5
North British Columbia Mountains/Yukon Territory	1.9	1972	-2.1	1981	2.8	8	1.5
Mackenzie District	2.0	1982	-1.5	1998	3.9	17	0.9
Arctic Tundra	1.2	1972	-2.4	1998	3.3	11	1.0
Arctic Mountains and Fiords	0.5	1972	-1.9	1981	2.2	6	1.1
Canada	**1.1**	**1972**	**-1.8**	**1998**	**2.5**	**13**	**0.6**

Notes:
1. The 2002 data are preliminary.
2. Average change in temperature over the period of record.
3. Difference from the normal temperature.
4. The rank is calculated on series data arranged in descending order, from warmest to coolest values. The ranks are based on a 55-year period, 1948 to 2002.

Source:
Environment Canada, 2003, *Climate Trends and Variations Bulletin for Canada, Annual 2002*, Meteorological Service of Canada, Climate Research Branch, Ottawa.

Population

Table A.4
Total population by province and territory, 1901 to 2001, selected years

	Total population											Change	
Province/Territory	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001	1901 to 1951	1951 to 2001
	thousands											percent	
Newfoundland and Labrador	…	…	…	…	…	361.4	457.9	530.9	574.8	579.5	533.8	…	48
Prince Edward Island	103.3	93.7	88.6	88.0	95.0	98.4	104.6	112.6	123.7	130.3	138.9	-5	41
Nova Scotia	459.6	492.3	523.8	512.8	578.0	642.6	737.0	797.3	854.6	915.1	942.9	40	47
New Brunswick	331.1	351.9	387.9	408.2	457.4	515.7	597.9	642.5	706.3	745.5	756.0	56	47
Quebec	1 648.9	2 005.8	2 360.5	2 874.7	3 331.9	4 055.7	5 259.2	6 137.4	6 547.7	7 064.7	7 417.7	146	83
Ontario	2 182.9	2 527.3	2 933.7	3 431.7	3 787.7	4 597.5	6 236.1	7 849.0	8 811.3	10 427.6	11 894.9	111	159
Manitoba	255.2	461.4	610.1	700.1	729.7	776.5	921.7	998.9	1 036.4	1 109.6	1 149.1	204	48
Saskatchewan	91.3	492.4	757.5	921.8	896.0	831.7	925.2	932.0	975.9	1 002.7	1 017.1	811	22
Alberta	73.0	374.3	588.5	731.6	796.2	939.5	1 332.0	1 665.7	2 294.2	2 592.6	3 059.1	1 187	226
British Columbia	178.7	392.5	524.6	694.3	817.8	1 165.2	1 629.1	2 240.5	2 823.9	3 373.4	4 101.6	552	252
Yukon Territory	27.2	8.5	4.1	4.2	5.0	9.1	14.6	19.0	23.9	28.9	30.2	-67	232
Northwest Territories	20.1[1]	6.5[1]	8.1[1]	9.3[1]	12.0[1]	16.0[1]	23.0[1]	36.4[1]	47.6[1]	38.7	41.2	-20	158
Nunavut	…	…	…	…	…	…	…	…	…	22.2	28.1	…	…
Canada	**5 371.3**	**7 206.6**	**8 787.8**	**10 376.7**	**11 506.7**	**14 009.4**	**18 238.3**	**21 962.1**	**24 820.4**	**28 030.9**	**31 110.6**	**161**	**122**

Notes:
Figures may not add up to totals due to rounding.
1. Includes Nunavut.

Sources:
Statistics Canada, 1983, *Historical Statistics of Canada, Second Edition*, F.H. Leacy (ed.), Catalogue no. 11-516-XPE, Ottawa.
Statistics Canada, CANSIM II, tables 051-0001 and 051-0024.

Table A.5
Population by provincial and territorial ecozone, 1981, 1991 and 2001

Provincial/Territorial ecozone	Area 1981 - 1999	Area 1999 - 2001	Population 1981	Population 1991	Population 2001	Change 1981 - 2001	Change 1991 - 2001	Density 1981	Density 1991	Density 2001	Change 1981 - 2001	Change 1991 - 2001
	km^2		persons					persons per km^2			percent	
Newfoundland and Labrador												
Arctic Cordillera	17 318	17 318	0	0	0	0	0	0.000	0.000	0.000	0.0	0.0
Boreal Shield	139 813	139 813	563 063	563 897	508 197	-54 866	-55 700	4.027	4.033	3.635	-10.8	-11.0
Taiga Shield	194 228	194 228	4 618	4 577	4 733	115	156	0.024	0.024	0.024	2.4	3.3
Total	**351 359**	**351 359**	**567 681**	**568 474**	**512 930**	**-54 751**	**-55 544**	**1.616**	**1.618**	**1.460**	**-10.7**	**-10.8**
Prince Edward Island												
Atlantic Maritime	5 402	5 402	122 506	129 765	135 294	12 788	5 529	22.679	24.023	25.047	9.5	4.1
Total	**5 402**	**5 402**	**122 506**	**129 765**	**135 294**	**12 788**	**5 529**	**22.679**	**24.023**	**25.047**	**9.5**	**4.1**
Nova Scotia												
Atlantic Maritime	50 633	50 633	847 442	899 942	908 007	60 565	8 065	16.737	17.774	17.933	6.7	0.9
Total	**50 633**	**50 633**	**847 442**	**899 942**	**908 007**	**60 565**	**8 065**	**16.737**	**17.774**	**17.933**	**6.7**	**0.9**
New Brunswick												
Atlantic Maritime	70 602	70 602	696 403	723 900	729 498	33 095	5 598	9.864	10.253	10.333	4.5	0.8
Total	**70 602**	**70 602**	**696 403**	**723 900**	**729 498**	**33 095**	**5 598**	**9.864**	**10.253**	**10.333**	**4.5**	**0.8**
Quebec												
Arctic Cordillera	12 360	12 360	0	0	0	0	0	0.000	0.000	0.000	0.0	0.0
Atlantic Maritime	65 380	65 380	762 384	758 879	764 886	2 502	6 007	11.661	11.607	11.699	0.3	0.8
Boreal Shield	573 556	573 556	1 159 520	1 227 015	1 292 746	133 226	65 731	2.022	2.139	2.254	10.3	5.1
Hudson Plains	34 724	34 724	1 342	1 788	2 312	970	524	0.039	0.051	0.067	42.0	22.7
Mixed Wood Plains	27 220	27 220	4 501 391	4 894 723	5 160 906	659 515	266 183	165.373	179.823	189.602	12.8	5.2
Northern Arctic	33 599	33 599	932	1 461	1 842	910	381	0.028	0.043	0.055	49.4	20.7
Southern Arctic	123 968	123 968	2 156	3 257	4 017	1 861	760	0.017	0.026	0.032	46.3	18.9
Taiga Shield	437 194	437 194	10 678	8 840	10 770	92	1 930	0.024	0.020	0.025	0.9	17.9
Total	**1 308 002**	**1 308 002**	**6 438 403**	**6 895 963**	**7 237 479**	**799 076**	**341 516**	**4.922**	**5.272**	**5.533**	**11.0**	**4.7**
Ontario												
Boreal Shield	559 603	559 603	933 099	952 438	933 908	809	-18 530	1.667	1.702	1.669	0.1	-2.0
Hudson Plains	254 963	254 963	5 447	5 789	5 214	-233	-575	0.021	0.023	0.020	-4.5	-11.0
Mixed Wood Plains	79 798	79 798	7 686 561	9 126 658	10 470 924	2 784 363	1 344 266	96.326	114.372	131.218	26.6	12.8
Total	**894 364**	**894 364**	**8 625 107**	**10 084 885**	**11 410 046**	**2 784 939**	**1 325 161**	**9.644**	**11.276**	**12.758**	**24.4**	**11.6**
Manitoba												
Boreal Plains	83 667	83 667	104 579	110 298	116 672	12 093	6 374	1.250	1.318	1.394	10.4	5.5
Boreal Shield	216 334	216 334	65 707	68 052	72 277	6 570	4 225	0.304	0.315	0.334	9.1	5.8
Hudson Plains	66 685	66 685	2 171	2 361	2 004	-167	-357	0.033	0.035	0.030	-8.3	-17.8
Prairies	64 234	64 234	852 832	910 069	927 172	74 340	17 103	13.277	14.168	14.434	8.0	1.8
Southern Arctic	1 142	1 142	0	0	0	0	0	0.000	0.000	0.000	0.0	0.0
Taiga Shield	109 048	109 048	952	1 162	1 458	506	296	0.009	0.011	0.013	34.7	20.3
Total	**541 110**	**541 110**	**1 026 241**	**1 091 942**	**1 119 583**	**93 342**	**27 641**	**1.897**	**2.018**	**2.069**	**8.3**	**2.5**
Saskatchewan												
Boreal Plains	163 274	163 274	161 945	158 821	160 484	-1 461	1 663	0.992	0.973	0.983	-0.9	1.0
Boreal Shield	147 484	147 484	9 955	12 086	14 680	4 725	2 594	0.067	0.082	0.100	32.2	17.7
Prairies	229 248	229 248	792 946	816 283	801 806	8 860	-14 477	3.459	3.561	3.498	1.1	-1.8
Taiga Shield	37 460	37 460	3 467	1 738	1 963	-1 504	225	0.093	0.046	0.052	-76.6	11.5
Total	**577 467**	**577 467**	**968 313**	**988 928**	**978 933**	**10 620**	**-9 995**	**1.677**	**1.713**	**1.695**	**1.1**	**-1.0**
Alberta												
Boreal Plains	367 431	367 431	354 030	387 592	438 155	84 125	50 563	0.964	1.055	1.192	19.2	11.5
Boreal Shield	4 159	4 159	0	4	0	0	-4	0.000	0.001	0.000	0.0	0.0
Montane Cordillera	46 336	46 336	27 961	31 481	39 813	11 852	8 332	0.603	0.679	0.859	29.8	20.9
Prairies	149 676	149 676	1 853 716	2 123 916	2 493 591	639 875	369 675	12.385	14.190	16.660	25.7	14.8
Taiga Plains	60 663	60 663	2 017	2 560	2 938	921	378	0.033	0.042	0.048	31.3	12.9
Taiga Shield	7 932	7 932	0	0	310	310	310	0.000	0.000	0.039	100.0	100.0
Total	**636 199**	**636 199**	**2 237 724**	**2 545 553**	**2 974 807**	**737 083**	**429 254**	**3.517**	**4.001**	**4.676**	**24.8**	**14.4**
British Columbia												
Boreal Cordillera	188 728	188 728	3 598	3 351	2 396	-1 202	-955	0.019	0.018	0.013	-50.2	-39.9
Boreal Plains	39 073	39 073	48 582	49 126	53 174	4 592	4 048	1.243	1.257	1.361	8.6	7.6
Montane Cordillera	428 417	428 417	673 053	720 713	819 321	146 268	98 608	1.571	1.682	1.912	17.9	12.0
Pacific Maritime	192 107	192 107	2 014 790	2 503 960	3 027 206	1 012 416	523 246	10.488	13.034	15.758	33.4	17.3
Taiga Plains	66 853	66 853	4 444	4 911	5 641	1 197	730	0.066	0.073	0.084	21.2	12.9
Total	**915 178**	**915 178**	**2 744 467**	**3 282 061**	**3 907 738**	**1 163 271**	**625 677**	**2.999**	**3.586**	**4.270**	**29.8**	**16.0**
Yukon Territory												
Boreal Cordillera	266 546	266 546	22 909	27 488	28 294	5 385	806	0.086	0.103	0.106	19.0	2.8
Pacific Maritime	4 093	4 093	0	0	0	0	0	0.000	0.000	0.000	0.0	0.0
Southern Arctic	4 496	4 496	1	0	0	-1	0	0.000	0.000	0.000	0.0	0.0
Taiga Cordillera	180 170	180 170	243	309	370	127	61	0.001	0.002	0.002	34.3	16.5
Taiga Plains	18 110	18 110	0	0	10	10	10	0.000	0.000	0.001	100.0	100.0
Total	**473 415**	**473 415**	**23 153**	**27 797**	**28 674**	**5 521**	**877**	**0.049**	**0.059**	**0.061**	**19.3**	**3.1**

Table A.5
Population by provincial and territorial ecozone, 1981, 1991 and 2001 (continued)

Provincial/Territorial ecozone	Area 1981 - 1999	Area 1999 - 2001	Population 1981	Population 1991	Population 2001	Change 1981 - 2001	Change 1991 - 2001	Density 1981	Density 1991	Density 2001	Change 1981 - 2001	Change 1991 - 2001
	km^2		persons					persons per km^2			percent	
Northwest Territories												
Arctic Cordillera	205 053	0	821	1 047	…	…	…	0.004	0.005	…	…	…
Boreal Cordillera	4 589	4 589	0	0	0	0	0	0.000	0.000	0.000	0.0	0.0
Boreal Plains	15 218	15 218	4 639	3 008	2 720	-1 919	-288	0.305	0.198	0.179	-70.6	-10.6
Hudson Plains	3 174	0	0	0	…	…	…	0.000	0.000	…	…	…
Northern Arctic	1 337 719	198 761	10 940	14 867	512	-10 428	-14 355	0.008	0.075	0.003	-217.5	-2 803.7
Southern Arctic	572 936	158 124	5 980	7 057	3 109	-2 871	-3 948	0.010	0.045	0.020	46.9	-127.0
Taiga Cordillera	84 043	84 043	320	0	0	-320	0	0.004	0.000	0.000	0.0	0.0
Taiga Plains	423 737	423 737	11 897	13 958	12 137	240	-1 821	0.028	0.033	0.029	2.0	-15.0
Taiga Shield	336 641	257 638	11 144	17 712	18 882	7 738	1 170	0.033	0.069	0.073	54.8	6.2
Total	**2 983 143**	**1 142 110**	**45 741**	**57 649**	**37 360**	**-8 381**	**-20 289**	**0.015**	**0.050**	**0.033**	**53.1**	**-54.3**
Nunavut												
Arctic Cordillera	…	205 053	…	…	1 304	…	…	…	…	0.006	…	…
Hudson Plains	…	3 174	…	…	0	…	…	…	…	0.000	…	…
Northern Arctic	…	1 138 957	…	…	18 097	…	…	…	…	0.016	…	…
Southern Arctic	…	414 811	…	…	7 344	…	…	…	…	0.018	…	…
Taiga Shield	…	79 003	…	…	0	…	…	…	…	0.000	…	…
Total	**…**	**1 841 032**	**…**	**…**	**26 745**	**…**	**…**	**…**	**…**	**0.015**	**…**	**…**
Canada	**8 806 839**	**8 806 839**	**24 343 181**	**27 296 859**	**30 007 094**	**5 663 913**	**2 710 235**	**2.764**	**3.099**	**3.407**	**18.9**	**9.0**

Notes:
The area figures are for land area only and are calculated by taking the total ecozone area and subtracting the surface water area in the ecozone derived from the 1 km water fraction digital coverage.
The total area of Canada excluding the Great Lakes is 9 886 215 km^2. Including the Great Lakes the total area of Canada is 9 976 182 km^2.
As Nunavut was created on April 1, 1999, population data is not available for 1981 and 1991. Population for 1981 and 1991 for Nunavut is included in the Northwest Territories data.
The population figures presented here are not adjusted for net undercoverage and non-permanent residents.
Sources:
Statistics Canada, Environment Accounts and Statistics Division, Spatial Environmental Information System and Censuses of Population, 1981, 1991 and 2001.
Agriculture and Agri-Food Canada, and Environment Canada, 2003, Framework Data - National Resolution - Ecological Units, www.geoconnections.org/CGDI.cfm/fuseaction/dataFrameworkData.ecoUnits/gcs.cfm (accessed May 13, 2003).
Fernandes, R., G. Pavlic, W. Chen and R. Fraser, 2001, Canada-wide 1-km water fraction, National Topographic Database, Natural Resources Canada, www.nrcan.gc.ca/ess/_portal_esst.cache/gc_ccrs_e (accessed April 29, 2002).

Table A.6
Population by ecozone and ecoprovince, 1981 and 2001

Ecozone/Ecoprovince	Area	Population 1981	Population 2001	Change 1981 - 2001	Density 1981	Density 2001
	km^2	persons			persons per 100 km^2	
Arctic Cordillera						
Northern Arctic Cordillera	112 430	0	0	0	0.00	0.00
Southern Arctic Cordillera	122 279	821	1 304	483	0.67	1.07
Total	**234 708**	**821**	**1 304**	**483**	**0.35**	**0.56**
Northern Arctic						
Sverdrup Islands	63 348	0	0	0	0.00	0.00
Ellesmere Basin	124 648	0	5	5	0.00	0.00
Victoria Lowlands	382 588	2 005	3 066	1 061	0.52	0.80
Parry Channel Plateaux	130 323	1 483	2 106	623	1.14	1.62
Boothia-Foxe Shield	478 805	7 211	12 774	5 563	1.51	2.67
Baffin Uplands	122 810	34	0	-34	0.03	0.00
Foxe-Boothia Lowlands	68 819	1 139	2 500	1 361	1.66	3.63
Total	**1 371 340**	**11 872**	**20 451**	**8 579**	**0.87**	**1.49**
Southern Arctic						
Amundsen Lowlands	262 926	2 540	4 326	1 786	0.97	1.65
Keewatin Lowlands	313 049	3 058	5 443	2 385	0.98	1.74
Ungava-Belcher	126 566	2 539	4 701	2 162	2.01	3.71
Total	**702 542**	**8 137**	**14 470**	**6 333**	**1.16**	**2.06**
Taiga Plains						
Mackenzie Foothills	85 156	647	607	-40	0.76	0.71
Great Bear Lowlands	269 957	6 020	4 982	-1 038	2.23	1.85
Hay-Slave Lowlands	214 250	11 691	15 137	3 446	5.46	7.07
Total	**569 363**	**18 358**	**20 726**	**2 368**	**3.22**	**3.64**
Taiga Shield						
Western Taiga Shield	490 731	15 563	22 613	7 050	3.17	4.61
Eastern Taiga Shield	321 825	6 892	6 648	-244	2.14	2.07
Labrador Uplands	211 672	4 618	4 733	115	2.18	2.24
Whale River Lowland	98 275	3 786	4 122	336	3.85	4.19
Total	**1 122 504**	**30 859**	**38 116**	**7 257**	**2.75**	**3.40**

Table A.6
Population by ecozone and ecoprovince, 1981 and 2001 (continued)

Ecozone/Ecoprovince	Area	Population			Density	
		1981	2001	Change 1981 - 2001	1981	2001
	km^2	persons			persons per 100 km^2	
Boreal Shield						
Western Boreal Shield	438 739	60 654	71 659	11 005	13.82	16.33
Mid-Boreal Shield	440 442	301 613	283 136	-18 477	68.48	64.28
Eastern Boreal Shield	317 556	426 136	392 145	-33 991	134.19	123.49
Newfoundland	96 473	536 363	484 907	-51 456	555.97	502.64
Lake of the Woods	60 351	202 653	202 364	-289	335.79	335.31
Southern Boreal Shield	287 387	1 203 925	1 387 597	183 672	418.92	482.83
Total	**1 640 949**	**2 731 344**	**2 821 808**	**90 464**	**166.45**	**103.31**
Atlantic Maritime						
Appalachian-Acadian Highlands	92 949	842 903	844 157	1 254	906.84	908.19
Northumberland Lowlands	33 656	557 598	599 817	42 219	1 656.76	1 782.20
Fundy Uplands	65 412	1 028 234	1 093 711	65 477	1 571.94	1 672.04
Total	**192 017**	**2 428 735**	**2 537 685**	**108 950**	**1 264.86**	**1 321.60**
Mixed Wood Plains						
Great Lakes-St. Lawrence Lowlands	83 865	7 145 287	8 836 444	1 691 157	8 519.98	10 536.51
Huron-Erie Plains	23 152	5 042 665	6 795 386	1 752 721	21 780.31	29 350.67
Total	**107 017**	**12 187 952**	**15 631 830**	**3 443 878**	**11 388.75**	**14 606.81**
Boreal Plains						
Boreal Foothills	120 285	56 740	69 995	13 255	47.17	58.19
Central Boreal Plains	458 741	521 492	591 309	69 817	113.68	128.90
Eastern Boreal Plains	89 638	95 543	109 901	14 358	106.59	122.61
Total	**668 664**	**673 775**	**771 205**	**97 430**	**100.76**	**115.34**
Prairies						
Eastern Prairies	28 874	721 392	802 257	80 865	2 498.44	2 778.50
Parkland Prairies	168 179	1 511 998	1 876 572	364 574	899.04	1 115.82
Central Grassland	246 105	1 266 104	1 543 740	277 636	514.46	627.27
Total	**443 159**	**3 499 494**	**4 222 569**	**723 075**	**789.67**	**952.83**
Taiga Cordillera						
Northern Yukon Mountains	26 767	0	0	0	0.00	0.00
Old Crow-Eagle Plains	18 969	243	299	56	1.28	1.58
Ogilvie Mountains	59 675	0	0	0	0.00	0.00
Mackenzie-Selwyn Mountains	158 802	320	71	-249	0.20	0.04
Total	**264 213**	**563**	**370**	**-193**	**0.21**	**0.14**
Boreal Cordillera						
Wrangel Mountains	24 127	27	28	1	0.11	0.12
Northern Boreal Cordillera	232 748	21 820	26 410	4 590	9.37	11.35
Southern Boreal Cordillera	164 994	3 654	2 448	-1 206	2.21	1.48
Western Boreal Cordillera	37 995	1 006	1 804	798	2.65	4.75
Total	**459 864**	**26 507**	**30 690**	**4 183**	**5.76**	**6.67**
Pacific Maritime						
Georgia Depression	17 710	1 894 751	2 893 596	998 845	10 698.74	16 338.73
Southern Coastal Mountains	148 009	117 663	132 610	14 947	79.50	89.60
Northern Coastal Mountains	30 481	2 376	1 000	-1 376	7.80	3.28
Total	**196 200**	**2 014 790**	**3 027 206**	**1 012 416**	**1 026.91**	**1 542.92**
Montane Cordillera						
Northern Montane Cordillera	136 239	115 931	124 453	8 522	85.09	91.35
Central Montane Cordillera	101 895	68 153	75 574	7 421	66.89	74.17
Southern Montane Cordillera	57 467	326 478	456 138	129 660	568.11	793.74
Columbia Montane Cordillera	179 151	190 452	202 969	12 517	106.31	113.29
Total	**474 753**	**701 014**	**859 134**	**158 120**	**147.66**	**180.96**
Hudson Plains						
Hudson Bay Coastal Plains	60 406	1 809	1 557	-252	2.99	2.58
Hudson- James Lowlands	299 140	7 151	7 973	822	2.39	2.67
Total	**359 546**	**8 960**	**9 530**	**570**	**2.49**	**2.65**
Canada Total	**8 806 839**	**24 343 181**	**30 007 094**	**5 663 913**	**276.41**	**340.72**

Notes:
The area figures are for land area only and are calculated by taking the total ecozone area and subtracting the surface water area in the ecozone derived from the 1 km water fraction digital coverage.
The total area of Canada excluding the Great Lakes is 9 886 215 km^2. Including the Canadian portion of the Great Lakes the total area of Canada is 9 976 182 km^2.
The population figures presented here are not adjusted for net undercoverage and non-permanent residents.
Sources:
Statistics Canada, Environment Accounts and Statistics Division, Spatial Environmental Information System and Censuses of Population, 1981 and 2001.
Agriculture and Agri-Food Canada, and Environment Canada, 2003, Framework Data - National Resolution - Ecological Units, www.geoconnections.org/CGDI.cfm/fuseaction/dataFrameworkData.ecoUnits/gcs.cfm (accessed May 13, 2003).
Fernandes, R., G. Pavlic, W. Chen and R. Fraser, 2001, Canada-wide 1-km water fraction, National Topographic Database, Natural Resources Canada, www.nrcan.gc.ca/ess/_portal_esst.cache/gc_ccrs_e (accessed April 29, 2002).

Table A.7
Rural and urban population by provincial and territorial sub-drainage area, 1981, 1991 and 2001

Province/Territory and sub-drainage area	Total population			Rural population			Urban population			Urban population as a percentage of total		
	1981	1991	2001	1981	1991	2001	1981	1991	2001	1981	1991	2001
	persons									percent		
Canada	**24 343 181**	**27 296 859**	**30 007 094**	**5 907 254**	**6 389 985**	**6 098 883**	**18 435 927**	**20 906 874**	**23 908 211**	**75.7**	**76.6**	**79.7**
Newfoundland and Labrador												
Petit Mécatina and Strait of Belle Isle	2 459	2 181	1 996	2 459	2 181	1 996	0	0	0	0.0	0.0	0.0
Northern Newfoundland	217 670	208 475	178 576	108 398	114 128	95 175	109 272	94 347	83 401	50.2	45.3	46.7
Southern Newfoundland	318 693	329 620	306 490	115 106	136 495	110 091	203 587	193 125	196 399	63.9	58.6	64.1
Northern Labrador	2 173	2 650	2 897	2 173	2 650	2 897	0	0	0	0.0	0.0	0.0
Churchill (Nfld.)	19 707	17 075	13 966	941	1 763	744	18 766	15 312	13 222	95.2	89.7	94.7
Central Labrador	4 314	5 511	6 288	3 041	3 844	3 114	1 273	1 667	3 174	29.5	30.2	50.5
Southern Labrador	2 665	2 962	2 717	2 665	2 962	2 717	0	0	0	0.0	0.0	0.0
Total	**567 681**	**568 474**	**512 930**	**234 783**	**264 023**	**216 734**	**332 898**	**304 451**	**296 196**	**58.6**	**53.6**	**57.7**
Prince Edward Island												
Prince Edward Island	122 506	129 765	135 294	77 991	77 952	74 619	44 515	51 813	60 675	36.3	39.9	44.8
Total	**122 506**	**129 765**	**135 294**	**77 991**	**77 952**	**74 619**	**44 515**	**51 813**	**60 675**	**36.3**	**39.9**	**44.8**
Nova Scotia												
Bay of Fundy and Gulf of St. Lawrence (N.S.)	290 513	315 814	316 125	181 909	198 959	193 198	108 604	116 855	122 927	37.4	37.0	38.9
Southeastern Atlantic Ocean (N.S.)	386 841	422 442	444 428	131 472	150 451	148 173	255 369	271 991	296 255	66.0	64.4	66.7
Cape Breton Island	170 088	161 686	147 454	67 219	69 024	59 627	102 869	92 662	87 827	60.5	57.3	59.6
Total	**847 442**	**899 942**	**908 007**	**380 600**	**418 434**	**400 998**	**466 842**	**481 508**	**507 009**	**55.1**	**53.5**	**55.8**
New Brunswick												
Saint John and Southern Bay of Fundy (N.B.)	345 581	363 107	368 440	149 479	174 257	167 403	196 102	188 850	201 037	56.7	52.0	54.6
Gulf of St. Lawrence and Northern Bay of Fundy (N.B.)	350 822	360 793	361 058	193 704	204 429	194 193	157 118	156 364	166 865	44.8	43.3	46.2
Total	**696 403**	**723 900**	**729 498**	**343 183**	**378 686**	**361 596**	**353 220**	**345 214**	**367 902**	**50.7**	**47.7**	**50.4**
Quebec												
Saint John and Southern Bay of Fundy (N.B.)	38 940	36 463	35 468	31 329	29 647	27 868	7 611	6 816	7 600	19.5	18.7	21.4
Gulf of St. Lawrence and Northern Bay of Fundy (N.B.)	100 914	93 776	86 339	65 463	68 616	58 108	35 451	25 160	28 231	35.1	26.8	32.7
Upper Ottawa	57 888	61 617	58 469	28 135	30 517	30 225	29 753	31 100	28 244	51.4	50.5	48.3
Central Ottawa	43 263	49 196	52 498	15 950	17 126	16 823	27 313	32 070	35 675	63.1	65.2	68.0
Lower Ottawa	364 220	419 520	483 061	133 440	156 820	177 074	230 780	262 700	305 987	63.4	62.6	63.3
Upper St. Lawrence	70 180	73 043	79 071	22 676	24 127	20 999	47 504	48 916	58 072	67.7	67.0	73.4
Saint-Maurice	131 619	126 960	126 415	21 778	25 202	20 271	109 841	101 758	106 144	83.5	80.1	84.0
Central St. Lawrence	3 895 362	4 253 609	4 516 239	533 625	587 749	525 820	3 361 737	3 665 860	3 990 419	86.3	86.2	88.4
Lower St. Lawrence	1 052 259	1 118 660	1 155 135	325 544	343 054	309 200	726 715	775 606	845 935	69.1	69.3	73.2
Northern Gaspé Peninsula	140 055	132 853	129 521	69 063	64 602	59 021	70 992	68 251	70 500	50.7	51.4	54.4
Saguenay	287 272	287 217	279 079	89 640	90 657	79 165	197 632	196 560	199 914	68.8	68.4	71.6
Betsiamites - Coast	16 203	15 158	14 583	10 638	10 050	7 437	5 565	5 108	7 146	34.3	33.7	49.0
Manicouagan and aux Outardes	23 659	20 236	19 667	4 349	4 078	5 090	19 310	16 158	14 577	81.6	79.8	74.1
Moisie and St. Lawrence Estuary	61 199	53 056	49 334	11 994	7 939	6 758	49 205	45 117	42 576	80.4	85.0	86.3
Gulf of St. Lawrence - Romaine	2 065	2 148	1 802	2 065	2 148	1 802	0	0	0	0.0	0.0	0.0
Gulf of St. Lawrence - Natashquan	20 757	19 965	19 631	16 050	15 234	15 054	4 707	4 731	4 577	22.7	23.7	23.3
Petit Mécatina and Strait of Belle Isle	4 110	4 723	3 712	4 110	4 723	3 712	0	0	0	0.0	0.0	0.0
Nottaway - Coast	32 308	27 009	25 339	6 774	5 870	6 549	25 534	21 139	18 790	79.0	78.3	74.2
Broadback and Rupert	2 959	3 381	4 867	2 959	3 381	3 053	0	0	1 814	0.0	0.0	37.3
Eastmain	328	444	613	328	444	613	0	0	0	0.0	0.0	0.0
La Grande - Coast	5 410	4 213	4 967	5 410	4 213	1 500	0	0	3 467	0.0	0.0	69.8
Grande rivière de la Baleine - Coast	1 067	1 113	1 333	1 067	1 113	1 333	0	0	0	0.0	0.0	0.0
Eastern Hudson Bay	0	284	348	0	284	348	0	0	0	0.0	0.0	0.0
Northeastern Hudson Bay	1 662	2 510	3 053	1 662	2 510	3 053	0	0	0	0.0	0.0	0.0
Western Ungava Bay	1 324	2 077	2 647	1 324	2 077	2 647	0	0	0	0.0	0.0	0.0
Aux Feuilles - Coast	179	283	387	179	283	387	0	0	0	0.0	0.0	0.0
Koksoak	805	1 405	1 932	805	1 405	1 932	0	0	0	0.0	0.0	0.0
Caniapiscau	3 170	1 144	1 252	1 173	1 144	1 252	1 997	0	0	63.0	0.0	0.0
Eastern Ungava Bay	149	529	710	149	529	710	0	0	0	0.0	0.0	0.0
Abitibi	24 628	23 758	22 324	15 680	14 801	13 701	8 948	8 957	8 623	36.3	37.7	38.6
Harricanaw - Coast	54 449	59 613	57 683	21 205	24 666	18 825	33 244	34 947	38 858	61.1	58.6	67.4
Total	**6 438 403**	**6 895 963**	**7 237 479**	**1 444 564**	**1 545 009**	**1 420 330**	**4 993 839**	**5 350 954**	**5 817 149**	**77.6**	**77.6**	**80.4**
Ontario												
Northwestern Lake Superior	133 444	136 791	132 416	20 596	26 383	29 201	112 848	110 408	103 215	84.6	80.7	77.9
Northeastern Lake Superior	55 593	51 072	46 240	13 642	13 656	14 114	41 951	37 416	32 126	75.5	73.3	69.5

Table A.7
Rural and urban population by provincial and territorial sub-drainage area, 1981, 1991 and 2001 (continued)

Province/Territory and sub-drainage area	Total population			Rural population			Urban population			Urban population as a percentage of total		
	1981	1991	2001	1981	1991	2001	1981	1991	2001	1981	1991	2001
	persons									percent		
Northern Lake Huron	263 667	266 295	253 414	50 210	49 309	48 148	213 457	216 986	205 266	81.0	81.5	81.0
Wanipitai and French (Ont.)	91 667	91 311	90 066	30 059	32 326	33 109	61 608	58 985	56 957	67.2	64.6	63.2
Eastern Georgian Bay	410 132	540 304	682 624	178 345	222 239	228 519	231 787	318 065	454 105	56.5	58.9	66.5
Eastern Lake Huron	263 421	302 160	307 409	143 474	155 685	152 782	119 947	146 475	154 627	45.5	48.5	50.3
Northern Lake Erie	1 649 123	1 838 281	2 032 283	381 437	389 840	381 715	1 267 686	1 448 441	1 650 568	76.9	78.8	81.2
Lake Ontario and Niagara Peninsula	4 560 423	5 477 416	6 368 255	404 134	535 516	439 404	4 156 289	4 941 900	5 928 851	91.1	90.2	93.1
Upper Ottawa	54 624	58 455	53 097	21 538	24 525	23 391	33 086	33 930	29 706	60.6	58.0	55.9
Central Ottawa	300 424	334 531	376 026	74 479	94 586	98 251	225 945	239 945	277 775	75.2	71.7	73.9
Lower Ottawa	493 691	624 619	709 610	123 890	135 268	151 036	369 801	489 351	558 574	74.9	78.3	78.7
Upper St. Lawrence	152 764	173 594	176 848	58 399	69 670	72 128	94 365	103 924	104 720	61.8	59.9	59.2
Severn	4 291	3 590	5 763	4 291	3 590	5 763	0	0	0	0.0	0.0	0.0
Winisk - Coast	1 572	1 946	2 615	1 572	1 946	2 615	0	0	0	0.0	0.0	0.0
Attawapiskat - Coast	1 403	1 949	1 962	1 403	1 949	669	0	0	1 293	0.0	0.0	65.9
Upper Albany	2 774	1 554	2 106	2 774	1 554	2 106	0	0	0	0.0	0.0	0.0
Lower Albany - Coast	1 202	1 199	441	1 202	1 199	441	0	0	0	0.0	0.0	0.0
Kenogami	11 043	9 062	8 144	3 808	2 753	2 860	7 235	6 309	5 284	65.5	69.6	64.9
Moose (Ont.)	2 977	2 851	2 886	1 745	1 848	936	1 232	1 003	1 950	41.4	35.2	67.6
Missinaibi-Mattagami	71 356	68 267	62 046	19 419	21 411	14 825	51 937	46 856	47 221	72.8	68.6	76.1
Abitibi	26 502	26 248	23 685	9 574	9 256	8 310	16 928	16 992	15 375	63.9	64.7	64.9
Harricanaw - Coast	1	0	0	1	0	0	0	0	0	0.0	0.0	0.0
Winnipeg	43 134	43 515	43 245	17 148	18 874	19 604	25 986	24 641	23 641	60.2	56.6	54.7
English	28 900	28 301	28 487	13 956	16 090	17 194	14 944	12 211	11 293	51.7	43.1	39.6
Eastern Lake Winnipeg	979	1 574	378	979	1 574	378	0	0	0	0.0	0.0	0.0
Total	**8 625 107**	**10 084 885**	**11 410 046**	**1 578 075**	**1 831 047**	**1 747 499**	**7 047 032**	**8 253 838**	**9 662 547**	**81.7**	**81.8**	**84.7**
Manitoba												
Hayes (Man.)	5 142	7 366	10 442	5 142	7 366	10 442	0	0	0	0.0	0.0	0.0
Southwestern Hudson Bay	0	5	0	0	5	0	0	0	0	0.0	0.0	0.0
Qu'Appelle	0	338	43	0	338	43	0	0	0	0.0	0.0	0.0
Saskatchewan	22 252	19 853	19 823	7 728	6 320	7 793	14 524	13 533	12 030	65.3	68.2	60.7
Lake Winnipegosis and Lake Manitoba	79 806	74 797	71 832	58 125	54 656	52 686	21 681	20 141	19 146	27.2	26.9	26.7
Assiniboine	297 306	282 505	279 358	49 371	49 614	48 652	247 935	232 891	230 706	83.4	82.4	82.6
Souris	20 059	16 345	15 033	16 036	12 504	11 203	4 023	3 841	3 830	20.1	23.5	25.5
Red	528 217	612 804	640 410	109 953	122 642	123 790	418 264	490 162	516 620	79.2	80.0	80.7
Winnipeg	10 696	12 649	13 024	8 690	9 770	10 435	2 006	2 879	2 589	18.8	22.8	19.9
Eastern Lake Winnipeg	4 430	3 779	4 803	4 430	3 779	4 803	0	0	0	0.0	0.0	0.0
Western Lake Winnipeg	24 662	25 456	29 318	20 650	20 205	24 616	4 012	5 251	4 702	16.3	20.6	16.0
Grass and Burntwood	18 234	19 833	17 841	2 107	3 330	3 447	16 127	16 503	14 394	88.4	83.2	80.7
Nelson	7 457	9 856	10 773	7 457	8 716	10 773	0	1 140	0	0.0	11.6	0.0
Reindeer	573	929	1 142	573	929	1 142	0	0	0	0.0	0.0	0.0
Central Churchill (Man.) - Lower	5 724	4 015	4 462	3 637	3 181	3 158	2 087	834	1 304	36.5	20.8	29.2
Lower Churchill (Man.)	1 441	1 179	963	1 441	1 179	963	0	0	0	0.0	0.0	0.0
Seal - Coast	242	233	316	242	233	316	0	0	0	0.0	0.0	0.0
Total	**1 026 241**	**1 091 942**	**1 119 583**	**295 582**	**304 767**	**314 262**	**730 659**	**787 175**	**805 321**	**71.2**	**72.1**	**71.9**
Saskatchewan												
Upper South Saskatchewan	652	451	582	652	451	582	0	0	0	0.0	0.0	0.0
Red Deer	71	4	50	71	4	50	0	0	0	0.0	0.0	0.0
Central North Saskatchewan	42 945	43 519	44 183	20 526	18 394	20 208	22 419	25 125	23 975	52.2	57.7	54.3
Battle	7 054	7 106	6 899	5 844	6 245	5 917	1 210	861	982	17.2	12.1	14.2
Lower North Saskatchewan	95 063	94 457	92 619	48 340	42 591	40 233	46 723	51 866	52 386	49.1	54.9	56.6
Lower South Saskatchewan	247 581	277 064	289 707	63 735	56 679	58 872	183 846	220 385	230 835	74.3	79.5	79.7
Qu'Appelle	323 503	330 068	317 601	101 871	91 042	78 785	221 632	239 026	238 816	68.5	72.4	75.2
Saskatchewan	48 814	45 364	44 031	31 234	30 915	29 835	17 580	14 449	14 196	36.0	31.9	32.2
Lake Winnipegosis and Lake Manitoba	18 349	15 797	14 388	14 964	12 838	11 603	3 385	2 959	2 785	18.4	18.7	19.4
Assiniboine	77 599	70 605	62 979	42 241	34 985	30 152	35 358	35 620	32 827	45.6	50.4	52.1
Souris	59 354	57 080	53 072	36 337	32 787	28 707	23 017	24 293	24 365	38.8	42.6	45.9
Beaver (Alta.-Sask.)	18 694	19 909	22 071	14 837	14 618	17 489	3 857	5 291	4 582	20.6	26.6	20.8
Upper Churchill (Man.)	6 794	7 072	8 203	5 162	7 072	8 203	1 632	0	0	24.0	0.0	0.0
Central Churchill (Man.) - Upper	6 568	8 010	10 427	6 568	5 432	7 140	0	2 578	3 287	0.0	32.2	31.5
Reindeer	881	1 567	2 017	881	1 567	2 017	0	0	0	0.0	0.0	0.0
Central Churchill (Man.) - Lower	758	770	1 092	758	770	1 092	0	0	0	0.0	0.0	0.0
Central Athabasca - Lower	17	41	24	17	41	24	0	0	0	0.0	0.0	0.0
Fond-du-Lac	856	1 701	1 946	856	1 701	1 946	0	0	0	0.0	0.0	0.0

Table A.7
Rural and urban population by provincial and territorial sub-drainage area, 1981, 1991 and 2001 (continued)

Province/Territory and sub-drainage area	Total population			Rural population			Urban population			Urban population as a percentage of total		
	1981	1991	2001	1981	1991	2001	1981	1991	2001	1981	1991	2001
	persons									percent		
Lake Athabasca - Shores	3 290	242	187	783	242	187	2 507	0	0	76.2	0.0	0.0
Missouri	9 470	8 101	6 855	9 470	7 157	6 855	0	944	0	0.0	11.7	0.0
Total	**968 313**	**988 928**	**978 933**	**405 147**	**365 531**	**349 897**	**563 166**	**623 397**	**629 036**	**58.2**	**63.0**	**64.3**
Alberta												
Upper South Saskatchewan	193 205	209 242	232 499	55 464	56 453	60 872	137 741	152 789	171 627	71.3	73.0	73.8
Bow	670 162	805 825	1 024 550	38 617	43 626	57 920	631 545	762 199	966 630	94.2	94.6	94.3
Red Deer	167 549	188 285	223 791	82 460	85 302	95 953	85 089	102 983	127 838	50.8	54.7	57.1
Upper North Saskatchewan	295 406	303 688	345 670	39 806	38 425	43 439	255 600	265 263	302 231	86.5	87.3	87.4
Central North Saskatchewan	533 508	639 621	702 226	106 973	105 091	107 360	426 535	534 530	594 866	79.9	83.6	84.7
Battle	100 597	99 182	111 186	54 552	47 646	54 468	46 045	51 536	56 718	45.8	52.0	51.0
Lower North Saskatchewan	7 438	8 167	7 229	5 793	6 391	5 249	1 645	1 776	1 980	22.1	21.7	27.4
Lower South Saskatchewan	434	391	343	434	391	343	0	0	0	0.0	0.0	0.0
Beaver (Alta.-Sask.)	27 656	32 587	35 816	13 773	15 697	18 327	13 883	16 890	17 489	50.2	51.8	48.8
Upper Athabasca	34 185	37 479	40 805	8 660	8 463	9 958	25 525	29 016	30 847	74.7	77.4	75.6
Central Athabasca - Upper	50 446	53 530	57 292	32 068	34 420	34 277	18 378	19 110	23 015	36.4	35.7	40.2
Central Athabasca - Lower	32 610	26 977	35 484	8 587	7 324	10 727	24 023	19 653	24 757	73.7	72.9	69.8
Lower Athabasca	9 088	18 115	17 310	104	513	599	8 984	17 602	16 711	98.9	97.2	96.5
Upper Peace	21 716	22 607	21 006	12 733	13 955	12 969	8 983	8 652	8 037	41.4	38.3	38.3
Smoky	61 186	65 285	78 080	25 322	23 419	25 540	35 864	41 866	52 540	58.6	64.1	67.3
Central Peace - Upper	15 180	12 550	14 607	9 669	8 371	9 587	5 511	4 179	5 020	36.3	33.3	34.4
Central Peace - Lower	10 289	14 850	19 294	8 095	12 001	14 440	2 194	2 849	4 854	21.3	19.2	25.2
Lower Peace	822	1 233	1 623	822	1 233	1 623	0	0	0	0.0	0.0	0.0
Lake Athabasca - Shores	944	1 008	1 106	944	1 008	1 106	0	0	0	0.0	0.0	0.0
Slave	27	30	21	27	30	21	0	0	0	0.0	0.0	0.0
Hay	1 874	2 536	2 383	1 874	2 536	2 383	0	0	0	0.0	0.0	0.0
Central Liard - Petitot		23	0	0	23	0	0	0	0	0.0	0.0	0.0
Missouri	3 402	2 342	2 486	3 402	2 342	2 486	0	0	0	0.0	0.0	0.0
Total	**2 237 724**	**2 545 553**	**2 974 807**	**510 179**	**514 660**	**569 647**	**1 727 545**	**2 030 893**	**2 405 160**	**77.2**	**79.8**	**80.9**
British Columbia												
Williston Lake	7 441	7 464	6 223	1 644	1 900	1 267	5 797	5 564	4 956	77.9	74.5	79.6
Upper Peace	49 542	52 099	54 428	21 725	19 506	23 228	27 817	32 593	31 200	56.1	62.6	57.3
Smoky		290	153	0	290	153	0	0	0	0.0	0.0	0.0
Hay	473	251		473	251		0	0	0	0.0	0.0	0.0
Northern Coastal Waters of B.C.		38		0	38		0	0	0	0.0	0.0	0.0
Stikine - Coast	610	875	912	610	875	912	0	0	0	0.0	0.0	0.0
Nass - Coast	3 628	2 950	2 587	3 628	2 950	2 587	0	0	0	0.0	0.0	0.0
Skeena - Coast	59 264	60 695	60 688	24 003	20 628	20 965	35 261	40 067	39 723	59.5	66.0	65.5
Central Coastal Waters of B.C.	18 242	17 226	16 280	5 780	6 433	6 047	12 462	10 793	10 233	68.3	62.7	62.9
Southern Coastal Waters of B.C.	473 827	531 144	620 090	28 796	29 050	25 311	445 031	502 094	594 779	93.9	94.5	95.9
Vancouver Island	496 692	590 844	665 695	128 239	146 691	136 674	368 453	444 153	529 021	74.2	75.2	79.5
Nechako	59 565	59 877	63 123	21 654	22 234	22 023	37 911	37 643	41 100	63.6	62.9	65.1
Upper Fraser	68 559	70 244	76 008	27 789	27 203	29 414	40 770	43 041	46 594	59.5	61.3	61.3
Thompson	143 162	149 300	172 640	64 667	60 967	65 358	78 495	88 333	107 282	54.8	59.2	62.1
Lower Fraser	1 008 559	1 347 658	1 712 430	131 958	149 007	119 605	876 601	1 198 651	1 592 825	86.9	88.9	93.0
Columbia - U.S.A.	341 572	378 996	444 638	134 482	145 593	136 686	207 090	233 403	307 952	60.6	61.6	69.3
Queen Charlotte Islands	5 621	5 316	4 935	5 621	5 316	4 935	0	0	0	0.0	0.0	0.0
Skagit	992	83	169	992	83	169	0	0	0	0.0	0.0	0.0
Headwaters Yukon	402	479	578	402	479	578	0	0	0	0.0	0.0	0.0
Upper Liard	1 691	1 435	379	1 691	1 435	379	0	0	0	0.0	0.0	0.0
Central Liard	40	137	141	40	137	141	0	0	0	0.0	0.0	0.0
Fort Nelson	4 585	4 660	5 641	861	856	1 453	3 724	3 804	4 188	81.2	81.6	74.2
Total	**2 744 467**	**3 282 061**	**3 907 738**	**605 055**	**641 922**	**597 885**	**2 139 412**	**2 640 139**	**3 309 853**	**78.0**	**80.4**	**84.7**
Yukon Territory												
Alsek	367	651	634	367	651	634	0	0	0	0.0	0.0	0.0
Headwaters Yukon	16 898	21 462	22 900	2 084	5 127	6 057	14 814	16 335	16 843	87.7	76.1	73.6
Pelly	2 152	1 772	988	2 152	1 772	988	0	0	0	0.0	0.0	0.0
Upper Yukon	396	292	247	396	292	247	0	0	0	0.0	0.0	0.0
Stewart	934	535	450	934	535	450	0	0	0	0.0	0.0	0.0
Central Yukon	916	1 487	1 679	916	1 487	1 679	0	0	0	0.0	0.0	0.0
Porcupine	243	256	299	243	256	299	0	0	0	0.0	0.0	0.0
Upper Liard	1 247	1 334	1 406	1 247	1 334	1 406	0	0	0	0.0	0.0	0.0
Peel and Southwestern Beaufort Sea	0	8	71	0	8	71	0	0	0	0.0	0.0	0.0
Total	**23 153**	**27 797**	**28 674**	**8 339**	**11 462**	**11 831**	**14 814**	**16 335**	**16 843**	**64.0**	**58.8**	**58.7**

Table A.7
Rural and urban population by provincial and territorial sub-drainage area, 1981, 1991 and 2001 (continued)

Province/Territory and sub-drainage area	Total population			Rural population			Urban population			Urban population as a percentage of total		
	1981	1991	2001	1981	1991	2001	1981	1991	2001	1981	1991	2001
	persons									percent		
Northwest Territories												
Thelon	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
Chesterfield Inlet	954	1 186	...	954	1 186	...	0	0	...	0.0	0.0	...
Western Hudson Bay - Central	2 568	3 580	...	2 568	3 580	...	0	0	...	0.0	0.0	...
Western Hudson Bay - Northern	24	0	0	24	0	0	0	0	0	0.0	0.0	0.0
Hudson Bay - Southampton Island	812	1 104	...	812	1 104	...	0	0	...	0.0	0.0	...
Foxe Basin - Melville Peninsula	1 447	1 950	...	1 447	1 950	...	0	0	...	0.0	0.0	...
Foxe Basin - Baffin Island	78	47	...	78	47	...	0	0	...	0.0	0.0	...
Hudson Strait - Baffin and Southampton Islands	1 089	1 402	...	1 089	1 402	...	0	0	...	0.0	0.0	...
Slave	2 298	2 484	2 185	0	2 484	2 185	2 298	0	0	100.0	0.0	0.0
Hay	2 957	3 518	3 561	94	849	669	2 863	2 669	2 892	96.8	75.9	81.2
Southern Great Slave Lake	2 341	717	809	480	717	809	1 861	0	0	79.5	0.0	0.0
Great Slave Lake - East Arm South Shore	253	296	248	253	296	248	0	0	0	0.0	0.0	0.0
Northeastern Great Slave Lake	10 856	17 164	18 195	1 373	5 304	2 140	9 483	11 860	16 055	87.4	69.1	88.2
Marian	268	392	453	268	392	453	0	0	0	0.0	0.0	0.0
Western Great Slave Lake	406	39	261	406	39	261	0	0	0	0.0	0.0	0.0
Lower Liard	844	570	988	844	570	988	0	0	0	0.0	0.0	0.0
Upper Mackenzie - Mills Lake	733	760	873	733	760	873	0	0	0	0.0	0.0	0.0
Upper Mackenzie - Camsell Bend	980	1 189	812	980	1 189	812	0	0	0	0.0	0.0	0.0
Central Mackenzie - Blackwater Lake	438	549	638	438	549	638	0	0	0	0.0	0.0	0.0
Great Bear	818	803	810	818	803	810	0	0	0	0.0	0.0	0.0
Central Mackenzie - The Ramparts	420	644	666	420	644	666	0	0	0	0.0	0.0	0.0
Lower Mackenzie	3 730	3 952	3 638	583	774	754	3 147	3 178	2 884	84.4	80.4	79.3
Peel and Southwestern Beaufort Sea	1 353	1 560	1 393	1 353	1 560	1 393	0	0	0	0.0	0.0	0.0
Southern Beaufort Sea	829	1 029	1 032	829	1 029	1 032	0	0	0	0.0	0.0	0.0
Amundsen Gulf	624	255	286	624	255	286	0	0	0	0.0	0.0	0.0
Coppermine	371	0	0	371	0	0	0	0	0	0.0	0.0	0.0
Coronation Gulf - Queen Maud Gulf	86	1 130	...	86	1 130	...	0	0	...	0.0	0.0	...
Back	0	0	...	0	0	...	0	0	...	0.0	0.0	...
Gulf of Boothia	688	989	...	688	989	...	0	0	...	0.0	0.0	...
Southern Arctic Islands	1 832	2 494	512	1 832	2 494	512	0	0	0	0.0	0.0	0.0
Baffin Island - Arctic Drainage	5 334	7 545	...	3 001	4 095	...	2 333	3 450	...	43.7	45.7	...
Northern Arctic Islands	310	301	...	310	301	...	0	0	...	0.0	0.0	...
Total	**45 741**	**57 649**	**37 360**	**23 756**	**36 492**	**15 529**	**21 985**	**21 157**	**21 831**	**48.1**	**36.7**	**58.4**
Nunavut												
Chesterfield Inlet	...	...	1 507	...	...	1 507	...	...	0	...	...	0.0
Western Hudson Bay - Central	...	...	4 726	...	...	2 549	...	...	2 177	...	...	46.1
Hudson Bay - Southampton Island	...	...	1 396	...	...	1 396	...	...	0	...	...	0.0
Foxe Basin - Melville Peninsula	...	...	2 507	...	...	2 507	...	...	0	...	...	0.0
Foxe Basin - Baffin Island	...	...	0	...	...	0	...	...	0	...	...	0.0
Hudson Strait - Baffin and Southampton Islands	...	...	1 581	...	...	1 581	...	...	0	...	...	0.0
Great Bear	...	...	0	...	...	0	...	...	0	...	...	0.0
Amundsen Gulf	...	...	1 212	...	...	1 212	...	...	0	...	...	0.0
Coronation Gulf - Queen Maud Gulf	...	...	10	...	...	10	...	...	0	...	...	0.0
Back	...	...	0	...	...	0	...	...	0	...	...	0.0
Gulf of Boothia	...	...	1 325	...	...	1 325	...	...	0	...	...	0.0
Southern Arctic Islands	...	...	2 269	...	...	2 269	...	...	0	...	...	0.0
Baffin Island - Arctic Drainage	...	...	9 759	...	...	3 247	...	...	6 512	...	...	66.7
Northern Arctic Islands	...	...	453	...	...	453	...	...	0	...	...	0.0
Total	**...**	**...**	**26 745**	**...**	**...**	**18 056**	**...**	**...**	**8 689**	**...**	**...**	**32.5**
Canada	**24 343 181**	**27 296 859**	**30 007 094**	**5 907 254**	**6 389 985**	**6 098 883**	**18 435 927**	**20 906 874**	**23 908 211**	**75.7**	**76.6**	**79.7**

Notes:
See Map A.1 and Table A.1 for classification codes and area figures for these sub-drainage areas.
The population figures presented here are not adjusted for net undercoverage and non-permanent residents.
Sources:
Statistics Canada, Environment Accounts and Statistics Division, Spatial Environmental Information System and Censuses of Population, 1981, 1991 and 2001.

Table A.8
Components of population growth, 1960 to 2002

Year	Population			Natural increase			Net migration		
	Total	Growth	Growth rate	Births	Deaths	Natural increase	Immigration	Emigration	Net migration
	thousands		percent	thousands			thousands		
1960	17 909	…	…	478.6	139.7	338.9	104.1	..	..
1961	18 271	362	2.0	475.7	141.0	334.7	71.7	..	..
1962	18 614	343	1.8	469.7	143.7	326.0	74.6	..	..
1963	18 964	350	1.8	465.8	147.4	318.4	93.2	..	..
1964	19 325	361	1.9	452.9	145.9	307.0	112.6	..	..
1965	19 678	353	1.8	418.6	148.9	269.7	146.8	..	..
1966	20 048	370	1.8	387.7	149.9	237.8	194.7	..	..
1967	20 412	364	1.8	370.9	150.3	220.6	222.9	..	..
1968	20 729	317	1.5	364.3	153.2	211.1	184.0	..	..
1969	21 028	299	1.4	369.7	154.5	215.2	161.5	..	..
1970	21 324	296	1.4	372.0	156.0	216.0	147.7	..	..
1971	21 962	638	2.9	362.2	157.3	204.9	121.9	..	..
1972	22 220	257	1.2	351.3	159.5	191.7	117.0	26.6	90.5
1973	22 494	274	1.2	345.8	162.6	183.2	138.5	27.7	110.8
1974	22 808	315	1.4	339.9	166.3	173.6	217.5	46.8	170.7
1975	23 142	334	1.4	353.5	168.8	184.8	209.3	40.5	168.8
1976	23 450	308	1.3	364.3	166.4	197.9	170.0	30.3	139.7
1977	23 726	277	1.2	358.3	165.7	192.5	130.9	25.1	105.9
1978	23 964	238	1.0	360.0	169.0	190.9	101.0	31.4	69.5
1979	24 202	238	1.0	362.2	165.8	196.4	84.5	30.9	53.7
1980	24 516	314	1.3	367.3	171.5	195.8	143.6	20.5	123.1
1981	24 820	304	1.2	372.1	170.5	201.6	127.0	17.8	109.2
1982	25 117	297	1.2	372.5	172.4	200.1	135.1	29.1	106.0
1983	25 367	250	1.0	373.6	176.5	197.1	101.2	31.1	70.1
1984	25 608	241	0.9	374.5	174.2	200.4	88.3	31.8	56.6
1985	25 843	235	0.9	376.3	179.1	197.2	83.7	28.1	55.6
1986	26 101	258	1.0	375.4	183.4	192.0	88.6	24.8	63.8
1987	26 450	349	1.3	373.0	182.6	190.4	130.8	22.5	108.4
1988	26 798	348	1.3	370.0	189.9	180.1	152.4	18.1	134.3
1989	27 286	488	1.8	384.0	188.4	195.6	178.2	18.4	159.7
1990	27 701	415	1.5	403.3	192.6	210.7	203.0	19.7	183.3
1991	28 031	330	1.2	402.9	192.4	210.5	219.3	22.8	196.5
1992	28 377	346	1.2	403.1	197.0	206.1	241.8	23.1	218.7
1993	28 703	327	1.1	392.2	201.8	190.4	265.4	21.7	243.7
1994	29 036	333	1.1	386.2	206.5	179.7	234.5	22.8	211.6
1995	29 354	318	1.1	382.0	209.4	172.6	220.1	24.4	195.7
1996	29 672	318	1.1	372.5	209.7	162.7	217.0	24.2	192.8
1997	29 987	315	1.1	357.3	217.2	140.1	224.9	49.0	175.9
1998	30 248	261	0.9	345.1	217.7	127.4	194.5	55.9	138.6
1999	30 509	261	0.9	338.3	217.6	120.7	173.2	59.2	114.0
2000	30 791	282	0.9	336.9	218.8	118.1	205.7	63.0	142.7
2001	31 111	320	1.0	326.3	223.8	102.5	252.4	66.8	185.6
2002	31 414	303	1.0	327.2	231.2	96.0	255.9	71.0	184.8

Note:
Population growth figures do not equal the sum of the natural increase and net migration. The balance of non-permanent residents and the number of returning Canadians, as well as a residual need to be added.
Sources:
Statistics Canada, 1992, *Report on the Demographic Situation in Canada 1992,* Catalogue no. 91-209, Ottawa.
Statistics Canada, *Quarterly Estimates,* Catalogue no. 91-002, Ottawa, various issues.
Statistics Canada, Census of Population and Demography Division.
Statistics Canada, CANSIM II, tables 051-0001 and 051-0004.

Table A.9
Net migration by province and territory, 1970 to 2002

Year	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.[1]	Nvt.[1]	**Total**[2]
	persons													
1970	-5 950	-29	-3 967	-2 373	-41 156	54 590	-7 707	-28 358	9 898	22 579	..[3]	..[3]	…	**412 559**
1971	733	-129	-755	1 798	-25 005	18 580	-7 251	-17 986	2 408	25 034	..[3]	..[3]	…	**405 299**
1972	-189	858	2 845	241	-19 891	8 227	-7 735	-17 296	6 538	24 927	575	900	…	**375 184**
1973	-2 510	478	2 107	2 841	-14 730	-5 275	-2 200	-13 261	2 698	30 537	-269	-416	…	**433 992**
1974	-618	1 386	1 576	4 192	-11 852	-22 163	-5 400	-4 835	14 810	22 655	97	152	…	**421 336**
1975	915	814	4 454	7 572	-12 340	-25 057	-4 134	6 555	23 463	-2 864	242	380	…	**385 330**
1976	-2 732	309	361	1 640	-20 801	-10 508	-3 655	3 819	34 215	-1 490	-350	-808	…	**376 970**
1977	-4 009	614	-1 277	-886	-46 536	8 596	-3 789	384	32 344	15 507	57	-1 005	…	**366 918**

Table A.9
Net migration by province and territory, 1970 to 2002 (continued)

Year	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.[1]	Nvt.[1]	**Total**[2]
							persons							
1978	-3 540	25	-109	-1 644	-33 424	415	-9 557	-3 701	31 987	20 698	-178	-972	…	**348 929**
1979	-4 217	-225	-1 840	-2 219	-30 025	-15 317	-13 806	-3 510	39 212	33 241	-447	-847	…	**370 862**
1980	-3 082	-1 082	-2 494	-4 165	-24 283	-34 919	-11 342	-4 382	46 933	40 165	-419	-930	…	**372 167**
1981	-6 238	-783	-2 465	-4 766	-22 549	-19 665	-3 621	-520	40 243	21 565	-1 376	175	…	**380 041**
1982	261	-6	1 591	2 183	-28 169	19 614	1 498	1 743	3 961	-2 019	-1 208	551	…	**322 634**
1983	-1 092	799	3 861	2 296	-19 080	32 825	950	2 501	-26 246	4 029	-808	-35	…	**285 599**
1984	-3 585	524	2 963	812	-10 943	36 691	-49	733	-30 591	3 505	-111	51	…	**273 323**
1985	-5 019	-13	-234	-1 559	-6 023	33 414	-1 755	-5 014	-9 568	-3 199	-445	-585	…	**281 275**
1986	-4 682	-493	-739	-2 897	-3 020	42 916	-3 039	-7 020	-20 293	910	179	-1 822	…	**302 352**
1987	-4 374	301	-2 183	-1 762	-7 410	40 278	-4 751	-9 043	-27 595	17 618	100	-1 179	…	**318 890**
1988	-2 154	424	71	-1 215	-7 003	14 898	-8 584	-16 338	-5 535	25 865	349	-778	…	**323 685**
1989	-2 606	-102	572	-21	-8 379	-1 205	-10 004	-18 589	3 366	37 367	-30	-369	…	**347 990**
1990	-1 137	-273	-106	1 014	-9 567	-15 117	-8 613	-15 928	11 055	38 704	-26	-6	…	**332 637**
1991	-1 084	-415	1 039	-79	-13 047	-9 978	-7 581	-9 499	5 511	34 572	478	83	…	**315 659**
1992	-2 563	232	355	-1 087	-9 785	-13 530	-6 417	-7 727	1 030	39 578	215	-220	-81	**309 680**
1993	-3 397	532	-1 143	-492	-7 426	-12 771	-5 206	-4 543	-2 355	37 595	-755	-43	4	**283 737**
1994	-6 204	694	-2 694	-505	-10 252	-4 527	-4 010	-3 958	-2 684	34 449	-245	75	-139	**286 860**
1995	-6 566	368	-1 972	-931	-10 248	-1 764	-3 344	-3 190	4 251	23 414	656	-440	-234	**286 746**
1996	-7 945	401	-1 064	-910	-15 358	-1 706	-3 738	-1 871	15 069	17 798	215	-642	-249	**284 484**
1997	-8 522	-241	-2 074	-1 812	-17 559	6 823	-6 717	-2 669	32 459	1 980	-558	-845	-265	**291 580**
1998	-7 971	-15	-1 571	-2 935	-14 512	11 466	-3 097	-1 786	40 125	-17 521	-1 114	-1 057	-12	**298 164**
1999	-3 916	212	947	-638	-11 712	18 424	-2 387	-7 146	19 692	-12 413	-601	-455	-7	**276 489**
2000	-4 884	-62	-1 393	-1 748	-11 233	23 292	-4 188	-8 301	24 397	-14 783	-654	-514	71	**290 505**
2001	-3 380	554	-2 229	-1 815	-8 375	11 388	-5 712	-8 461	25 056	-6 332	-296	-337	-61	**303 553**
2002	-2 504	773	-1 346	-424	-7 789	6 479	-4 360	-8 272	23 329	-5 337	-431	-194	76	**341 676**
Total	**-114 761**	**6 430**	**-8 913**	**-12 294**	**-539 482**	**195 414**	**-171 301**	**-217 469**	**369 183**	**508 334**	**-7 158**	**-12 132**	**-897**	**11 007 105**

Notes:
1. The Northwest Territories' counts before 1992 include Nunavut. From 1992 forward, Northwest Territories and Nunavut are shown separately.
2. Total yearly migratory movement in Canada.
3. Separate counts for the Yukon and Northwest Territories are not available for 1970 and 1971. The combined counts are 2 473 for 1970 and 2 573 for 1971.

Sources:
Statistics Canada, CANSIM II, table 051-0017.
Statistics Canada, 1998, *Annual Demographic Statistics, 1997*, Catalogue no. 91-213-XPB, Ottawa.

Economy

Table A.10
Gross domestic product by industry, 1961 to 1999, selected years

Industry[1]	1961	1966	1971	1976	1981	1986	1991	1996	1999
					percent				
Agricultural products[2]	8.6	9.1	6.6	6.5	5.9	5.5	4.8	4.6	4.1
Forest products[2]	4.8	4.3	3.5	3.6	3.7	3.5	2.7	3.9	3.7
Metal and mineral products[2]	7.2	7.3	6.2	5.4	5.1	4.1	3.4	3.6	3.6
Fuel and energy[2]	5.1	4.7	5.0	6.7	8.7	7.8	6.6	7.4	6.4
Chemicals and chemical products	2.2	2.2	1.8	1.5	1.7	1.8	1.7	2.0	1.6
Textiles, fabrics and clothing	1.9	1.8	1.5	1.3	1.2	1.0	0.8	0.7	0.7
Electrical and electronic products	1.7	2.0	1.7	1.5	1.4	1.3	1.2	1.2	1.5
Machinery and equipment	1.2	1.6	1.2	1.2	1.4	1.1	0.9	1.2	1.3
Transportation equipment	1.8	2.4	2.6	2.1	1.7	2.2	2.0	2.8	3.8
Miscellaneous goods	1.0	1.0	1.0	1.0	1.1	1.2	1.1	1.3	1.4
Construction	7.5	7.6	7.4	8.3	7.7	6.1	6.3	5.0	5.2
Transportation and communications	9.2	8.7	8.4	7.7	7.4	7.5	6.9	6.7	7.2
Distributive trades	12.0	11.4	11.6	11.4	10.4	11.2	11.0	10.4	10.6
Finance and insurance	8.3	7.9	8.6	8.1	5.0	5.8	6.1	6.7	6.7
Real estate	6.0	5.4	5.9	5.4	9.5	10.4	12.1	12.0	11.5
Business and personal services	7.8	8.2	9.1	9.7	10.4	11.3	12.8	13.1	14.8
Government services	12.9	13.8	17.1	17.9	17.0	17.1	18.5	16.4	14.7
Other services	0.7	0.6	0.7	0.7	0.8	0.9	1.1	1.2	1.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes:
1. The industry groupings in this table are a special aggregation based on the 1997 North American Industry Classification System (NAICS).
2. Includes both extraction and downstream manufacturing industries.

Sources:
Statistics Canada, Input-Output Division and Environment Accounts and Statistics Division.

Table A.11
Employment by industry, 1961 to 2001, selected years

Industry[1]	1961	1971	1981	1991	2001
	percent				
Agricultural products[2]	14.0	9.0	6.8	5.7	4.3
Forest products[2]	4.2	3.6	3.3	2.7	2.6
Metal and mineral products[2]	4.8	4.7	3.7	2.6	2.5
Fuel and energy[2]	1.2	1.2	1.6	1.5	1.4
Chemicals and chemical products	1.6	1.5	1.2	1.0	0.8
Textiles, fabrics and clothing	3.3	2.6	1.9	1.3	1.0
Electrical and electronic products	1.7	1.8	1.3	1.0	1.0
Machinery and equipment	1.1	1.2	1.3	0.9	1.0
Transportation equipment	1.6	2.0	2.7	1.6	1.7
Miscellaneous goods	1.3	1.4	1.4	1.4	1.7
Construction	9.1	8.3	7.1	6.6	6.0
Transportation and communications	8.1	7.1	6.6	6.2	7.1
Distributive trades	15.3	16.2	16.8	17.5	16.6
Finance and insurance	3.4	4.1	4.7	4.9	4.9
Real estate	0.0	0.0	0.6	0.8	0.7
Business and personal services	11.0	13.6	17.0	21.2	25.8
Government services	16.7	20.5	20.2	20.9	18.1
Other services	1.4	1.2	1.8	2.2	2.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes:
1. The industry groupings in this table are a special aggregation based on the 1997 North American Industry Classification System (NAICS).
2. Includes both extraction and downstream manufacturing industries.

Sources:
Statistics Canada, Input-Output Division and Environment Accounts and Statistics Division.

Table A.12
Composition of exports and imports, 1961 to 1999, selected years

	Exports					Imports				
Commodity[1]	1961	1971	1981	1991	1999	1961	1971	1981	1991	1999
	percent of total exports					percent of total imports				
Agricultural products[2]	17.1	10.3	10.9	7.3	6.1	12.5	8.0	7.2	6.5	5.2
Forest products[2]	21.7	13.9	12.7	11.3	11.0	4.0	3.3	2.9	3.7	3.6
Metal and mineral products[2]	24.3	17.1	16.8	12.8	8.5	12.0	10.2	11.8	8.0	8.5
Fuel and energy[2]	3.8	6.2	11.0	8.1	6.8	7.9	5.9	10.9	4.5	3.3
Chemicals and chemical products	3.1	2.5	4.2	4.9	5.9	6.1	6.0	6.0	7.2	8.8
Textiles, fabrics and clothing	1.1	1.1	1.8	1.7	2.7	6.7	5.6	4.4	5.0	4.2
Electrical and electronic products	1.0	2.2	2.4	4.1	5.6	5.6	5.6	6.3	9.3	11.5
Machinery and equipment	2.7	4.0	5.5	5.6	5.6	14.3	15.6	15.4	14.0	14.6
Transportation equipment	2.3	21.4	16.7	21.7	26.3	11.7	21.9	20.0	21.3	22.8
Miscellaneous goods	0.2	0.5	0.6	0.8	1.8	2.2	1.9	2.5	3.5	3.4
Construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transportation and communications	9.5	7.8	8.2	8.2	6.4	1.7	1.4	2.4	3.2	2.6
Distributive trades	1.9	2.7	2.4	3.5	3.6	0.1	0.4	0.2	0.2	0.2
Finance and insurance	0.9	0.8	1.2	2.4	1.9	1.3	1.9	1.9	3.4	3.2
Real estate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business and personal services	1.0	1.4	4.3	6.1	6.8	2.0	2.7	6.4	8.1	7.0
Government services	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Other services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unallocated imports and exports	9.5	7.9	1.3	1.3	0.7	11.9	9.8	1.6	1.9	1.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes:
For statistical reasons, it was impossible to allocate up to 10% of total exports and imports to the appropriate categories prior to 1981. The table therefore underestimates the trade in certain commodities before 1981.
1. The commodity groupings in this table are a special aggregation.
2. Includes both extraction and downstream manufacturing industries.

Sources:
Statistics Canada, Input-Output Division and Environment Accounts and Statistics Division.

Table A.13
Raw materials price indexes, 1981 to 2002

Commodities (1997=100)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Vegetable products	85	74	77	84	77	76	73	81	82	76	68	69	74	90	98	107	100	91	80	79	85	99
Animal and animal products	74	77	76	80	79	83	87	83	84	88	87	87	92	90	92	98	100	94	96	104	109	104
Wood	44	42	44	45	46	48	53	58	59	58	59	65	89	100	109	101	100	85	88	92	85	84
Logs and bolts	38	35	37	38	38	42	48	53	52	52	52	60	88	100	105	100	100	82	86	91	82	81
Pulpwood	66	68	69	72	73	72	75	79	84	84	87	87	90	100	125	103	100	101	99	99	102	100
Recycled paper	..	..	..	..	..	..	..	..	..	..	..	100	100	100	100	100	100	100	116	180	138	157
Ferrous materials	73	71	72	79	80	81	80	84	81	75	73	75	85	99	103	100	100	99	88	89	87	93
Iron ore	88	92	93	97	101	102	98	93	87	85	83	87	92	97	101	99	100	109	100	103	110	110
Iron and steel scrap	65	55	55	68	65	65	67	79	79	70	66	68	81	100	105	101	100	92	81	81	73	82
Non-ferrous metals	87	77	81	80	75	78	89	104	100	90	76	76	71	94	114	98	100	87	87	90	82	81
Copper and nickel concentrates	..	..	..	..	..	..	..	..	..	..	..	87	75	99	127	101	100	78	80	98	83	86
Lead concentrates	80	57	46	59	45	54	85	82	84	92	67	66	66	81	94	110	100	100	90	74	75	73
Zinc concentrates	64	58	62	76	68	66	70	91	121	109	80	83	70	76	80	79	100	82	85	89	72	64
Radio-active concentrates	222	245	219	211	204	202	198	175	121	117	101	97	116	109	131	134	100	86	85	69	72	82
Precious metals	127	105	126	108	98	110	126	115	97	94	86	86	96	113	113	113	100	101	97	97	96	109
Other non-ferrous base metals	86	78	82	90	81	83	89	108	99	80	67	67	65	96	123	100	100	93	93	104	100	96
Non-ferrous metal scrap	68	55	68	67	56	59	74	95	90	79	63	65	63	96	108	90	100	83	84	92	88	90
Non-metallic minerals	70	78	81	83	87	90	89	92	93	93	93	89	90	93	96	97	100	103	106	108	109	110
Mineral fuels	92	111	118	120	126	80	88	69	78	94	85	83	79	80	86	102	100	79	103	160	158	154
Coal (thermal)	76	84	84	90	91	91	91	81	82	82	86	91	94	96	94	100	100	96	99	96	97	98
Crude mineral oil	100	120	130	132	139	80	88	69	79	96	87	84	79	80	87	105	100	73	99	161	142	145
Natural gas	87	111	117	114	115	113	109	100	96	97	98	98	105	115	94	95	100	111	126	168	250	209
Aluminum materials	64	56	73	77	60	69	83	115	101	80	62	63	63	92	111	90	100	88	91	101	97	95
Copper materials	71	62	66	58	61	63	75	100	105	97	84	86	76	102	129	100	100	81	78	89	82	82
Metallic ores and concentrates	85	77	80	79	76	80	90	104	98	90	77	78	74	94	114	99	100	90	88	92	84	83
Other agricultural products	75	78	77	83	80	82	84	82	85	88	85	84	90	91	92	98	100	93	92	99	105	104
Fishing and trapping products	69	66	64	66	66	74	89	80	72	76	90	91	88	87	94	101	100	102	107	104	103	105
Steel foundry input indexes	81	77	77	82	83	83	84	106	107	89	86	83	82	90	101	99	100	97	95	98	93	97
Raw materials, total	**77**	**83**	**86**	**89**	**90**	**74**	**80**	**77**	**79**	**83**	**78**	**78**	**83**	**90**	**98**	**101**	**100**	**87**	**94**	**115**	**113**	**112**

Source:
Statistics Canada, CANSIM II, table 330-0006.

Research and development

Table A.14
Total research and development expenditures, selected industries, 1998 to 2002

Industry	1998[r]	1999[r]	2000[p]	2001[p]	2002[1]
	million dollars				
Agriculture, forestry, fishing and hunting	52	66	63	65	68
Mining and oil and gas extraction	144	118	142	158	155
Manufacturing					
Aerospace products and parts	1 120	1 135	899	936	893
Communications equipment	2 227	2 272	3 257	3 232	2 504
Pharmaceutical and medicine	457	551	707	706	754
Other manufacturing	2 668	2 954	3 300	3 501	3 443
Construction	27	35	36	43	46
Utilities	217	196	183	181	179
Services					
Wholesale trade	558	604	498	506	522
Computer system design and related services	515	542	624	690	709
Architectural, engineering and related services	363	406	398	526	499
Scientific research and development	248	280	324	369	384
Other services	1 079	1 068	1 018	1 058	1 088
Total	**9 675**	**10 227**	**11 449**	**11 971**	**11 244**

Note:
1. Figures are spending intentions.
Source:
Statistics Canada, 2002, *Industrial Research and Development*, Catalogue no. 88-202-XIB, Ottawa.

Table A.15
Federal government research and development expenditures by socio-economic objective, 1995/96 to 2000/01

Socio-economic objective	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
	million dollars					
Exploration and exploitation of the earth	161	186	178	179	186	207
Infrastructure and general planning of land use						
Transport	8	10	34	38	42	37
Telecommunications	64	34	33	32	24	28
Other	16	74	54	50	42	48
Pollution prevention and protection of the environment	99	96	97	98	122	143
Public health	37	76	80	87	103	116
Production, distribution and rational utilization of energy	201	273	209	170	171	187
Agricultural production and technology						
Agriculture	288	320	317	308	334	333
Fishing	51	37	30	42	43	51
Forestry	75	71	73	74	77	83
Industrial production and technology	64	104	119	123	137	165
Social structures and relationships	44	102	110	125	50	53
Exploration and exploitation of space	62	65	59	92	68	187
Non-oriented research	21	47	51	54	150	150
Other civil research	3	13	15	13	14	16
Defence	115	124	127	136	167	150
Other	289	4	3	4	4	3
Total	**1 598**	**1 636**	**1 588**	**1 627**	**1 734**	**1 957**

Note:
Non-program (indirect) costs are excluded.
Source:
Statistics Canada, 2002, *Science Statistics*, Catalogue no. 88-001-XIB, Vol. 25, No. 9, Ottawa.

Table A.16
Research and development expenditures and source of funds in the higher education sector, 2000/01

			Source of funds				
Education sector	Total expenditures	Share of total	Federal government	Provincial governments	Business[1]	Higher education	Foreign
	million dollars		percent				
Social sciences and humanities	1 245.2	21.7	15.0	9.4	10.6	64.9	0.0
Health sciences	2 069.8	36.1	20.9	8.5	22.4	47.2	1.0
Other natural sciences and engineering	2 423.0	42.2	27.8	12.1	15.5	43.4	1.2
Total	**5 738.0**	**100.0**	**22.5**	**10.2**	**16.9**	**49.4**	**0.9**

Note:
1. Includes private business and private not-for-profit organizations.
Source:
Statistics Canada, 2002, *Science Statistics*, Catalogue no. 88-001-XIB, Vol. 26, No. 6, Ottawa.

Agriculture

Table A.17
Fertilizer sold and nutrient content in Eastern and Western Canada, 1970 to 2001

	Eastern Canada[1]				Western Canada[2]			
		Nutrient content				Nutrient content		
Year	Total fertilizer sold	Nitrogen	Phosphate	Potash	Total fertilizer sold	Nitrogen	Phosphate	Potash
	tonnes							
1970	1 221 090	160 137	177 647	168 143	473 097	107 549	102 960	6 456
1971	1 260 504	170 847	179 847	175 727	654 544	152 214	146 514	8 592
1972	1 271 309	171 127	187 277	176 758	700 813	163 265	153 508	12 292
1973	1 303 150	170 370	195 189	183 547	957 631	239 344	220 074	7 146
1974	1 403 887	216 708	204 400	193 015	1 204 737	295 887	289 792	9 007
1975	1 362 279	201 884	191 270	191 338	1 314 449	329 359	310 458	15 459
1976	1 358 158	218 297	227 505	224 150	1 298 286	367 745	275 115	17 908
1977	1 455 800	217 200	226 800	218 530	1 337 381	382 380	277 886	15 711

Table A.17
Fertilizer sold and nutrient content in Eastern and Western Canada, 1970 to 2001 (continued)

	Eastern Canada[1]				Western Canada[2]			
		Nutrient content				Nutrient content		
Year	Total fertilizer sold	Nitrogen	Phosphate	Potash	Total fertilizer sold	Nitrogen	Phosphate	Potash
	tonnes							
1978	1 619 700	225 800	237 000	240 900	1 647 348	463 897	329 808	34 857
1979	1 761 500	243 300	255 500	287 600	1 909 982	561 760	339 593	45 627
1980	1 671 400	241 600	240 200	282 900	1 900 963	564 677	344 158	61 462
1981	1 703 400	286 000	235 400	299 300	2 054 939	651 821	399 747	61 823
1982	1 650 400	283 800	245 700	279 700	2 091 310	682 098	390 565	65 285
1983	1 612 500	280 900	240 500	278 100	2 229 910	721 239	421 185	56 239
1984	1 768 000	303 800	244 500	316 200	2 475 337	853 727	468 207	60 673
1985	1 809 131	341 033	247 338	331 740	2 652 692	913 378	478 941	70 097
1986	1 700 918	324 516	233 259	303 093	2 599 071	896 205	461 851	67 108
1987	1 688 393	331 068	218 621	303 121	2 374 036	813 473	407 638	66 775
1988	1 705 071	327 261	214 829	324 028	2 536 227	860 392	419 646	80 012
1989	1 570 720	307 319	206 368	280 873	2 477 505	852 847	408 001	75 269
1990	1 542 030	307 614	192 638	279 238	2 562 912	888 678	420 939	80 604
1991	1 452 413	289 956	189 193	262 784	2 469 201	867 807	389 006	75 107
1992	1 439 911	290 879	189 399	246 086	2 630 702	962 409	402 828	64 139
1993	1 388 106	283 633	184 480	243 803	2 829 868	1 022 173	431 382	83 797
1994	1 364 925	274 959	170 204	241 216	3 171 957	1 130 966	470 983	86 807
1995	1 343 062	284 352	160 105	219 055	3 223 408	1 164 004	468 645	90 844
1996	1 351 820	288 320	149 281	225 010	3 477 225	1 287 883	509 136	108 243
1997	1 294 072	271 316	153 796	213 222	3 836 135	1 399 318	549 805	108 898
1998	1 417 168	298 559	163 887	232 069	3 924 833	1 354 187	553 436	126 065
1999	1 390 207	299 522	147 757	221 746	3 791 649	1 319 586	516 665	136 732
2000	1 316 991	286 393	149 056	205 931	3 937 314	1 395 679	518 827	133 372
2001	1 340 534	276 445	146 053	192 436	3 692 902	1 301 291	486 399	124 099

Notes:
1. Eastern Canada corresponds to provinces east of Manitoba.
2. Western Canada corresponds to provinces west of Ontario.

Source:
Korol, M. and G. Rattray, 2002, *Canadian Fertilizer Consumption, Shipments and Trade, 2000/2001*, Farm Inputs Markets Unit, Farm Income Policy and Programs Directorate, Agriculture and Agri-Food Canada, Ottawa.

Table A.18
Selected field crop production, 1911 to 2002, selected years

Year	Corn for grain	Dry field peas	Dry beans	Soybeans	Sunflower seed	Fodder corn
	thousand tonnes					
1911	487 400	127 000	27 600	..	..	2 433 000
1916	159 200	60 400	11 200	..	..	1 730 000
1921	378 600	75 400	29 650	..	..	5 774 000
1926	198 500	71 750	31 500	..	..	4 073 000
1931	138 600	37 250	35 600	..	..	2 616 000
1936	155 000	33 500	23 850	..	..	2 837 000
1941	347 700	32 150	44 900	5 900	..	3 431 000
1946	279 800	55 650	37 150	29 200	5 900	3 015 000
1951	403 800	20 450	33 500	104 600	3 400	3 321 000
1956	706 500	49 400	31 200	144 250	8 000	3 129 000
1961	742 100	28 300	36 100	180 500	10 950	3 677 000
1966	1 685 600	29 750	79 800	245 300	14 850	6 026 000
1971	2 941 500	52 500	79 250	279 800	76 700	9 724 000
1976	3 759 200	43 450	90 000	250 400	24 000	14 423 410
1981	6 682 600	110 500	64 650	606 800	165 200	12 095 900
1986	5 911 700	238 900	41 800	959 800	39 900	8 293 700
1991	7 412 500	409 700	..	1 459 900	134 600	5 536 600
1996	7 541 700	1 173 000	133 000	2 169 500	54 900	5 375 400
2001	8 389 200	2 023 000	289 200	1 635 200	103 800	6 079 000
2002	9 065 300	1 365 500	407 400	2 334 900	157 400	6 355 800

Source:
Statistics Canada, CANSIM II, table 001-0010.

Table A.19
Production of major small grains, 1911 to 2002, selected years

Year	All wheat	Oats	Barley	All rye	Mixed grain
			thousand tonnes		
1911	6 293 500	5 640 100	968 700	64 325	320 550
1916	7 150 950	6 326 100	931 600	72 800	216 000
1921	8 189 050	6 574 250	1 301 250	545 503	454 500
1926	11 080 950	5 912 200	2 177 350	309 300	691 600
1931	8 745 350	5 062 650	1 466 800	134 200	804 700
1936	5 966 950	4 192 050	1 565 300	109 300	686 550
1941	8 563 850	4 719 100	2 403 400	283 300	931 300
1946	11 200 950	5 564 900	3 197 300	220 500	972 000
1951	15 068 600	7 616 250	5 343 100	446 900	1 417 250
1956	15 595 500	7 210 350	5 856 700	214 500	1 359 800
1961	7 713 950	4 378 900	2 451 700	165 400	1 251 450
1966	22 516 850	5 717 400	6 449 950	437 600	1 662 400
1971	14 411 900	5 640 550	13 099 250	556 600	2 183 700
1976	23 586 674	4 831 542	10 513 690	439 900	1 558 750
1981	24 802 200	3 188 300	13 724 150	922 900	1 458 900
1986	31 359 300	3 218 400	14 568 000	514 600	884 300
1991	31 945 600	1 793 900	11 617 300	338 700	618 100
1996	29 801 400	4 361 100	15 562 000	309 400	581 900
2001	20 567 600	2 690 700	10 845 600	227 800	446 500
2002	15 689 900	2 748 800	7 282 600	133 800	358 900

Source:
Statistics Canada, CANSIM II, table 001-0010.

Table A.20
Selected livestock populations, 1976 to 2002[1]

Year	Cattle and calves	Sheep and lambs	Pigs
		thousand head	
1976	15 063	577	5 855
1977	14 293	559	6 394
1978	13 353	587	7 374
1979	13 239	649	9 166
1980	13 382	734	10 091
1981	13 365	803	9 872
1982	13 170	812	9 703
1983	12 836	803	9 888
1984	12 582	769	10 273
1985	12 160	720	10 154
1986	11 788	695	9 891
1987	11 816	731	10 529
1988	12 153	789	11 038
1989	12 457	828	10 821
1990	12 560	874	10 146
1991	12 843	918	10 445
1992	13 025	897	10 803
1993	13 252	883	10 596
1994	13 924	826	10 728
1995	14 730	858	11 536
1996	15 051	847	11 548
1997	15 058	822	11 672
1998	14 944	892	12 357
1999	14 753	979	12 689
2000	14 968	1 105	13 401
2001	15 425	1 248	14 050
2002	15 336	1 253	14 676

Note:
1. Number on farms at July 1.
Source:
Statistics Canada, 2003, *Livestock Statistics, Fourth Quarter 2002*, Catalogue no. 23-603XIE, Ottawa.

Fish

Table A.21
Gross domestic product of fishing industries, 1997 to 2002

Year	Total GDP	Industries			Share of total GDP
		Fishing, hunting and trapping	Seafood product preparation and packaging	Total	
	million chained (1997) dollars				percent
1997	816 801	847	721	1 568	0.19
1998	848 414	821	715	1 536	0.18
1999	892 870	845	821	1 666	0.19
2000	933 713	858	860	1 718	0.18
2001	947 039	865	818	1 683	0.18
2002	977 640	950	885	1 835	0.19

Source:
Statistics Canada, CANSIM II, table 379-0017.

Table A.22
Employment in the fishing industries, 1987 to 2002

Year	Total employment	Fishing industries				Share of total employment
		Fishing	Animal aquaculture	Seafood product preparation and packaging	Total	
	thousand persons					percent
1987	12 321	34.3	2.2	32.4	68.9	0.56
1988	12 710	37.5	1.6	35.9	75.0	0.59
1989	12 986	36.8	2.1	34.0	72.9	0.56
1990	13 084	37.5	2.5	31.1	71.1	0.54
1991	12 851	40.6	3.1	29.5	73.2	0.57
1992	12 760	35.1	3.3	29.0	67.4	0.53
1993	12 858	36.0	2.8	25.4	64.2	0.50
1994	13 112	34.8	2.5	24.9	62.2	0.47
1995	13 357	28.8	2.2	22.7	53.7	0.40
1996	13 463	30.1	3.1	20.6	53.8	0.40
1997	13 774	30.0	3.8	23.2	57.0	0.41
1998	14 140	30.5	2.4	23.0	55.9	0.40
1999	14 531	29.9	3.4	25.5	58.8	0.40
2000	14 910	30.2	4.8	24.1	59.1	0.40
2001	15 077	27.9	4.2	25.2	57.3	0.38
2002	15 412	27.3	3.4	29.6	60.3	0.39

Source:
Statistics Canada, Labour Force Survey, unpublished data.

Table A.23
Exports and imports of fish and fish products,[1] 1971 to 2002

Year	Exports			Imports		
	Total	Fish, fresh, frozen, preserved and canned	Share of total exports	Total	Fish and marine animals	Share of total imports
	million dollars		percent	million dollars		percent
1971	17 782	276	1.55	15 314	60	0.39
1972	20 222	340	1.68	18 272	81	0.44
1973	25 649	484	1.89	22 726	110	0.48
1974	32 738	418	1.28	30 903	119	0.38
1975	33 616	451	1.34	33 962	134	0.39
1976	38 166	590	1.54	36 608	182	0.50
1977	44 495	795	1.79	41 523	219	0.53
1978	53 361	1 111	2.08	49 048	248	0.51
1979	65 582	1 271	1.94	61 157	310	0.51
1980	76 681	1 265	1.65	67 903	355	0.52
1981	84 432	1 494	1.77	77 140	360	0.47
1982	84 393	1 591	1.89	66 739	352	0.53
1983	90 556	1 563	1.73	73 098	418	0.57
1984	111 330	1 595	1.43	91 493	488	0.53

Table A.23
Exports and imports of fish and fish products,[1] 1971 to 2002 (continued)

Year	Exports			Imports		
	Total	Fish, fresh, frozen, preserved and canned	Share of total exports	Total	Fish and marine animals	Share of total imports
	million dollars		percent	million dollars		percent
1985	119 061	1 849	1.55	102 669	494	0.48
1986	125 172	2 580	2.06	115 195	613	0.53
1987	131 484	2 957	2.25	119 324	691	0.58
1988	143 534	2 818	1.96	132 715	679	0.51
1989	146 963	2 530	1.72	139 217	738	0.53
1990	152 056	2 817	1.85	141 000	679	0.48
1991	147 669	2 636	1.79	140 658	736	0.52
1992	163 464	2 736	1.67	154 430	777	0.50
1993	190 213	2 868	1.51	177 123	996	0.56
1994	228 167	3 259	1.43	207 873	1 126	0.54
1995	265 334	3 496	1.32	229 937	1 287	0.56
1996	280 079	3 444	1.23	237 689	1 470	0.62
1997	303 378	3 498	1.15	277 727	1 434	0.52
1998	327 162	3 665	1.12	303 399	1 636	0.54
1999	367 171	4 261	1.16	326 961	1 870	0.57
2000	425 587	4 561	1.07	363 432	1 929	0.53
2001	414 638	4 705	1.13	350 623	1 944	0.55
2002	410 687	5 115	1.25	356 109	1 936	0.54

Note:
1. Data are presented on a balance of payments basis.
Source:
Statistics Canada, CANSIM II, table 228-0003.

Table A.24
Landed catch and value, 1990 to 2001

Year	Groundfish		Pelagic fish		Shellfish		Total[1]	
	Catch	Value	Catch	Value	Catch	Value	Catch	Value
	tonnes	thousand dollars	tonnes	thousand dollars	tonnes	thousand dollars	tonnes	thousand dollars
1990	791 276	474 251	559 741	422 607	251 498	519 831	1 645 909	1 433 625
1991	791 620	499 530	429 975	292 995	251 368	583 448	1 509 032	1 394 200
1992	630 122	415 092	389 712	314 912	269 751	649 930	1 322 206	1 400 322
1993	431 413	297 818	419 620	364 165	288 999	732 220	1 164 880	1 424 056
1994	332 767	252 388	350 690	402 280	318 258	1 012 237	1 034 177	1 699 372
1995	218 652	229 018	301 952	242 071	310 369	1 275 569	860 650	1 782 957
1996[p]	277 991	230 190	311 542	265 716	313 053	1 028 868	933 178	1 565 642
1997[p]	268 690	261 374	323 866	241 734	351 931	1 090 091	985 273	1 634 285
1998[p]	287 207	292 497	327 252	159 610	372 511	1 135 795	1 019 447	1 610 678
1999[p]	300 995	332 471	302 357	143 018	399 829	1 423 569	1 039 219	1 924 589
2000[p]	227 309	311 058	294 178	167 429	434 129	1 562 164	973 890	2 061 194
2001[p]	271 835	283 597	300 795	140 848	440 695	1 607 973	1 030 666	2 056 977

Note:
1. Data do not add up because total also includes marine plants, lumpfish roe and miscellaneous other marine products.
Source:
Department of Fisheries and Oceans, Statistical Services, www.dfo-mpo.gc.ca/communic/statistics/stat_e.htm (accessed February 5, 2003).

Table A.25
Aquaculture production, 1989 to 2001

Year	Trout		Oysters		Salmon		Mussels		Total[1]	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	tonnes	thousand dollars	tonnes	thousand dollars	tonnes	thousand dollars	tonnes	thousand dollars	tonnes	thousand dollars
1989	3 888	22 655	6 489	9 015	16 276	102 018	3 391	4 148	30 263	139 137
1990	4 677	26 714	6 774	8 462	21 167	155 059	3 598	3 964	36 462	195 955
1991	4 660	24 127	6 218	6 287	29 001	220 159	4 046	4 981	44 567	257 087
1992	5 424	27 824	6 107	6 477	30 020	218 281	4 964	5 860	46 885	259 957
1993	5 670	29 637	6 528	6 773	32 523	244 957	5 175	5 802	50 375	289 274
1994	6 000	33 468	7 767	9 133	32 426	244 337	6 898	7 645	53 582	296 678
1995	5 326	26 317	7 735	9 718	42 515	286 852	8 626	9 891	66 296	342 076
1996	5 654	28 940	7 946	11 340	45 502	290 116	9 832	11 936	71 191	353 343

Table A.25
Aquaculture production, 1989 to 2001 (continued)

Year	Trout		Oysters		Salmon		Mussels		Total[1]	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	tonnes	thousand dollars	tonnes	thousand dollars	tonnes	thousand dollars	tonnes	thousand dollars	tonnes	thousand dollars
1997	6 178	31 617	6 649	13 658	60 862	323 324	11 463	13 658	87 211	387 869
1998	8 316	41 072	8 137	11 321	58 618	349 043	15 018	18 985	91 411	429 507
1999	12 583	60 801	8 785	13 278	72 890	450 084	17 397	23 244	113 228	557 904
2000	11 930	56 349	10 024	16 915	78 495	495 555	21 287	27 213	123 924	611 572
2001	11 221	51 624	10 713	16 991	105 306	468 971	21 666	30 499	152 523	597 143

Note:
1. Data do not add up because total also includes char, cod, clams and scallops.
Source:
Department of Fisheries and Oceans, Statistical Services, www.dfo-mpo.gc.ca/communic/statistics/stat_e.htm (accessed January 22, 2003).

Forests

Table A.26
Production of selected forest products, 1922 to 2000, selected years

Year	Logs and bolts	Pulpwood	Sawn lumber
	thousand m^3		
1922	19 082	11 779	..
1925	24 092	15 286	..
1930	29 142	17 942	..
1935	17 721	18 296	..
1940	32 639	26 165	..
1945	30 610	32 938	..
1950	40 112	40 296	14 512
1955	44 282	48 292	18 598
1960	51 141	42 307	18 829
1965	62 643	42 607	23 745
1970	75 645	40 553	26 401
1975	73 542[r]	37 270[r]	26 645
1980	109 952	38 909	44 597
1985	119 317[r]	40 620[r]	54 587
1990	118 950[r]	35 876[1]	54 544
1995	150 150[r]	30 926[2]	62 577
2000	165 301[r]	28 102[1]	72 958

Notes:
1. Estimated by provincial or territorial forestry agency.
2. Estimated by the Canadian Forest Service or by Statistics Canada.
Sources:
Statistics Canada, 1983, *Historical Statistics of Canada, Second Edition*, F.H. Leacy (ed.), Catalogue no. 11-516-XPE, Ottawa.
Canadian Council of Forest Ministers, National Forestry Database Program, nfdp.ccfm.org (accessed November 21, 2002).
Statistics Canada, CANSIM II, table 303-0009.

Table A.27
Gross domestic product of selected forest products industries, 1997 to 2002

Year	Industries					Industries as share of total GDP				
	Forestry and logging	Sawmills and wood preservation	Other wood product manufacturing	Pulp, paper and paperboard mills	Total	Forestry and logging	Sawmills and wood preservation	Other wood product manufacturing	Pulp, paper and paperboard mills	Total
	million chained (1997) dollars					percent				
1997	5 564	6 240	1 554	8 294	21 652	0.68	0.76	0.19	1.02	2.65
1998	5 644	6 609	1 585	7 910	21 748	0.67	0.78	0.19	0.93	2.56
1999	5 828	6 731	1 774	8 652	22 985	0.65	0.75	0.20	0.97	2.57
2000	6 046	6 795	1 882	8 866	23 589	0.65	0.73	0.20	0.95	2.53
2001	5 728	6 315	1 831	8 314	22 188	0.60	0.67	0.19	0.88	2.34
2002	5 673	6 911	2 164	8 477	23 225	0.58	0.71	0.22	0.87	2.38

Source:
Statistics Canada, CANSIM II, table 379-0017.

Table A.28
Employment in forest products industries[1] by province and territory, 1991 to 2002

Year	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T., N.W.T. and Nvt.	**Canada**
						persons						
1991	1 456	.	3 766	14 831	65 169	42 018	1 704	859	9 003	74 403	.	**218 480**
1992	1 471	.	3 634	13 226	58 030	40 131	1 490	976	8 585	69 401	.	**202 215**
1993	1 448	.	3 625	13 423	57 788	39 461	1 656	1 167	10 479	69 590	.	**204 053**
1994	1 908	.	4 651	12 804	59 943	40 031	2 235	1 358	10 144	74 324	.	**213 819**
1995	2 116	.	3 958	13 722	62 321	39 881	2 304	1 502	10 918	71 276	.	**214 688**
1996	2 004	.	4 025	13 691	63 044	39 608	2 246	1 338	12 391	73 087	.	**218 358**
1997	2 305	.	4 451	14 238	66 734	43 001	2 409	1 619	12 759	70 836	.	**225 356**
1998	1 863	.	4 511	14 725	66 508	43 347	2 743	2 017	13 518	65 663	.	**221 511**
1999	1 639	.	4 447	14 636	67 667	44 379	2 958	1 787	14 395	69 431	.	**228 248**
2000	1 730	.	4 867	16 553	72 222	45 494	3 385	1 559	13 452	72 531	.	**238 707**
2001	1 729	.	4 099	15 727	67 715	44 971	3 862	1 556	13 454	62 584	.	**222 244**
2002	1 666	.	3 586	15 238	62 761	42 638	3 716	1 407	12 766	51 248	.	**201 461**

Notes:
Data do not add up to Canada total because of unavailable data for some provinces or territories.
1. Includes the following industries: forestry and logging; pulp, paper and paperboard mills; sawmills and wood preservation; and other wood product manufacturing.
Source:
Statistics Canada, CANSIM II, table 281-0024.

Table A.29
Export of forest products, 1978 to 2002

Year	Pulpwood	Pulpwood chips	Other crude wood products	Lumber	Veneer and plywood	Wood pulp and similar pulp	Paper and paperboard	Shingles and shakes	Total	Total as share of Canadian exports
					million dollars					percent
1978	14.4	48.9	52.9	3 228.9	211.6	2 180.9	3 459.5	185.7	9 382.8	17.6
1979	15.0	53.5	77.3	3 901.2	248.0	3 083.3	3 984.5	191.6	11 554.5	17.6
1980	26.0	90.9	88.5	3 353.2	236.7	3 873.0	4 630.5	178.8	12 477.7	16.4
1981	24.7	97.7	76.7	2 989.2	221.2	3 818.7	5 216.9	169.7	12 614.7	15.1
1982	8.2	97.9	119.5	2 912.7	214.8	3 221.4	5 008.2	157.5	11 740.1	13.9
1983	11.5	89.3	173.9	3 964.5	257.0	3 048.7	4 985.8	231.1	12 761.9	14.1
1984	10.6	85.4	262.0	4 257.1	269.9	3 906.5	6 054.2	264.5	15 110.2	13.4
1985	8.4	83.2	201.7	4 594.9	246.5	3 405.5	6 700.6	257.4	15 498.1	13.0
1986	12.4	76.8	227.6	4 980.3	237.5	4 072.1	7 213.2	268.3	17 088.1	14.2
1987	21.6	73.4	368.0	5 858.6	265.9	5 473.0	7 963.1	217.4	20 241.1	16.2
1988	30.4	94.5	344.8	5 415.1	288.1	6 495.8	8 688.9	211.2	21 568.7	15.6
1989	21.5	164.7	246.6	5 516.1	286.4	6 940.3	8 249.0	214.8	21 639.3	15.6
1990	7.6	140.2	174.1	5 371.9	292.5	6 121.0	8 660.8	226.2	20 994.2	14.1
1991	3.4	112.1	162.8	5 150.7	255.6	4 937.3	8 695.7	211.3	19 528.8	13.4
1992	3.5	113.1	249.7	6 548.1	343.2	5 067.6	8 820.3	264.8	21 410.3	13.1
1993	8.4	103.4	272.4	9 451.3	412.8	4 640.8	9 442.8	267.4	24 599.3	13.1
1994	19.9	83.6	210.1	11 400.7	546.9	6 755.3	10 387.9	244.6	29 649.1	13.1
1995	35.3	93.0	209.1	10 940.5	718.5	10 933.9	14 236.2	248.8	37 415.2	14.3
1996	19.1	97.2	219.3	12 555.5	709.1	6 922.2	13 254.2	261.4	34 037.9	12.3
1997	3.5	102.2	214.3	13 041.9	788.6	6 916.5	12 626.4	288.3	33 981.8	11.4
1998	8.9	74.8	328.0	11 721.4	803.2	6 720.3	13 490.5	303.8	33 450.8	10.5
1999	2.3	57.3	464.4	13 367.8	962.1	7 474.1	14 004.3	349.2	36 681.6	10.3
2000	5.3	84.8	575.5	12 257.8	979.1	9 886.6	15 335.8	352.4	39 477.4	9.6
2001	2.8	82.0	582.0	11 679.0	985.9	7 241.8	15 613.3	400.0	36 586.9	9.1
2002	4.3	71.8	736.0	10 959.2	855.9	6 792.1	13 990.4	372.8	33 782.5	8.5

Note:
Figures may not add up to totals due to rounding.
Source:
Statistics Canada, CANSIM, table 226-0001.

Table A.30
Total annual expenditures on forest management by activity and source of funding, 1990 to 2000

Year	Silviculture		Protection (fire and pest control)		Resource access		Other management expenditures	
	Government	Industry	Government	Industry	Government	Industry	Government	Industry
	thousand dollars							
1990	551 378	173 123	411 764	40 225	59 689	505 215	529 300	177 954
1991	570 985	231 570	409 398	47 669	46 396	516 453	634 734	201 304
1992	518 151	187 129	366 219	28 878	45 784	386 565	622 547	310 488
1993	483 473	182 320	308 014	30 035	64 076	384 878	634 346	305 366
1994	408 639	182 320	387 259	30 035	85 476	384 878	515 254	305 366
1995	392 403	379 982	468 277	41 061	107 031	530 595	583 095	420 875
1996	285 877	344 920	342 384	38 318	69 312	558 172	540 262	431 497
1997	276 041	346 288	301 684	39 483	13 718	557 860	357 109	435 397
1998	219 589	..	864 617	..	64 769	..	671 379	..
1999	235 098	..	561 855	..	65 731	..	645 364	..
2000	230 771	..	447 355	..	66 750	..	555 297	..

Source:
Canadian Council of Forest Ministers, National Forestry Database Program, nfdp.ccfm.org (accessed November 27, 2002).

Table A.31
Volume of roundwood harvested by province and territory, 1980 to 2001

Year	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.[1]	**Canada**
	thousand m^3												
1980	2 795[r]	381	4 686	8 387	31 686	21 322	2 335	3 330	5 933	74 654	115	..	**155 624[r]**
1981	2 568	371[r]	4 112	7 795	34 234	22 808	1 803	3 555	6 586	60 780	124	..	**144 736[r]**
1982	2 379	357[r]	3 105	6 320	29 133	19 778	1 498	2 526	5 714	56 231	161	..	**127 202[r]**
1983	2 429	381[r]	2 596	7 442	36 288	23 736	1 520	2 612	7 344	71 443	192	..	**155 983[r]**
1984	2 889	400[r]	3 894	8 378	36 519	28 130	1 698	2 726	8 457	74 556	177	..	**167 824[r]**
1985	2 509	411[r]	3 515	7 896	35 400	28 225	1 717	3 016	8 979	76 868	186	..	**168 722[r]**
1986	2 408	424[r]	4 004	8 720	38 127	30 186	1 703	3 529	10 387	77 503	199	..	**177 190[r]**
1987	2 524	480	4 789	7 869	39 503	29 692	1 887	3 666	10 496	90 591	188	..	**191 685**
1988	2 513	476[r]	5 039	9 199	39 381	29 338	1 883	3 818	11 990	86 807	172	..	**190 616[r]**
1989	2 535	416[r]	4 772	9 281	36 192	29 642	1 848	3 685	12 293	87 414	176	..	**188 254[r]**
1990	2 876[2]	448[r]	4 639[2]	8 824[2]	30 148[2]	25 420[2]	1 563[2]	2 758[2]	11 911	73 861	82	46	**162 576[r]**
1991	2 680	452[r]	4 348	8 643	28 943[2]	23 829[3]	1 278	2 957[2]	12 926[2]	74 706	79	46	**160 887[r]**
1992	2 821[2]	510[2]	4 248[2]	9 205	31 002[2]	24 286[3]	1 598	3 081[2]	14 594[2]	78 579	162	49	**170 134[2]**
1993	3 131[2]	534[2]	4 585[2]	8 959	34 091[r]	25 432[3]	1 539	4 433[r]	14 897	78 004	193	203	**175 999[r]**
1994	2 445	519[2]	5 106[2]	9 269	38 231[r]	25 952[3]	1 786	4 468	19 790	75 093	421	181	**183 261[r]**
1995	2 983	638	5 483[2]	10 055	41 438[r]	26 260[3]	1 987	4 258	20 287	74 622[3]	357[r]	127[2]	**188 497[r]**
1996	2 742[2]	557[3]	6 012[2]	10 902[3]	38 267[r]	25 871[3]	2 148	4 126	20 037	72 252[3]	254[r]	202[2]	**183 369[r]**
1997	2 558[2]	514[r]	6 989[2]	11 253[3]	42 543[r]	26 595[3]	2 183	4 205	22 217[r]	69 298[3]	253[r]	123	**188 730[r]**
1998	2 398[2]	520	5 903[r]	11 534[2]	43 427[r]	24 126[2]	2 328	3 348	17 172[r]	65 938[2]	108[r]	142	**176 942[r]**
1999	2 720[2]	693	6 164	11 294	45 646[r]	24 814[2]	2 171	3 865	19 395[p]	76 933	..	71	**193 766[r]**
2000	2 868[2]	716[2]	6 164[2]	11 872	43 485[2]	28 118[2]	2 188	4 545	21 927[p]	78 457[r]	33	22	**200 396[r]**
2001	..	..	..	..	..	..	..	..	..	73 637	36	..	**..**

Notes:
1. Includes Nunavut.
2. Estimated by provincial or territorial forestry agency.
3. Estimated by the Canadian Forest Service or by Statistics Canada.

Source:
Canadian Council of Forest Ministers, National Forestry Database Program, nfdp.ccfm.org (accessed November 27, 2002).

Table A.32
Area burned of stocked timber-productive forest land, 1980 to 2001

Year	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.[1]	National Parks	**Canada**
	hectares													
1980	680	..	559	2 116[r]	4 902	330 825	304 049	89 237	465 441[r]	32 743	111 537	12 975	..	**1 355 074[r]**
1981	2 893	22	169	92	2 170	40 817	220 336[r]	..	944 494[r]	57 277	12 735	25 643	..	**1 306 648[r]**
1982	4 392	25	359	5 407	7 202	297	7 094	..	462 674[r]	280 676	68 127	2 536	..	**838 789[r]**
1983	107	50	92	1 129	206 952	74 663	66 962	9 478	1 215[r]	32 848	14 805	1 188	..	**409 489[r]**
1984	1 565	8	193	270	2 397	2 219	51 099	47 281	35 259	12 227	6 995	134	21 366	**181 013**
1985	40 457	4	220	1 348[r]	1 952	127	5 367	9 020	3 820	54 231	11 407	6	4 927	**132 886[r]**
1986	23 511	85	268	37 216	173 296	50 598	5 495	4 031	1 587	9 474	3 132	11	2 663	**311 367**
1987	10 622	16	312	895	27 849	5 461	84 266	129 332	24 295	22 308	1 150	10	..	**306 516**
1988	7	2	89[r]	1 778	273 066	35 994	295 930	24 187	5 149[r]	3 284	288	3	..	**639 777[r]**
1989	2 651	2	159	280	2 108 206	4 990	1 539 180	137 404	2 994[r]	11 089	70 439	..	..	**3 877 394[r]**
1990	2 601	4	477	5 198	76 825	3 200	6 728	71 198	22 143	52 575	16 704	0	25 041	**282 694**

Table A.32
Area burned of stocked timber-productive forest land, 1980 to 2001 (continued)

Year	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.[1]	National Parks	**Canada**
	hectares													
1991	9 576	23	1 022	2 732	356 234	4 971	55 266	118 850	1 357	11 249	61 227	0	1 224	**623 731**
1992	1 014	8	805	4 668	24 295	10 331	185 299	12 768	720	17 212	3 785	0	1 941	**262 846**
1993	21	6	120	534	125 211	2 116	43 400	227 208	12 894	1 376	..	0	2 999	**415 885**
1994	692	7	67	239	2 830	410	552 571	79 641	8 610	20 737	..	0	76 436	**742 240**
1995	128	14	149	395	407 299[r]	60 739	445 425	320 993	163 376	26 888	..	0	7 082	**1 432 488[r]**
1996	8 519	0	172	1 591	410 342	179 207	..	4 755[3]	430	2 670	..	0	…	**607 686[3]**
1997	153	..	184	145	147 417	16 010	..	1 110	3 046	286	..	0	339	**168 690**
1998	4 630	..	168	275	16 721	57 659	..	..	234 095	..	..	0	..	**313 548**
1999	20 779	..	1 174	1 135	88 472	72 481	..	..	52 887	..	..	0	..	**236 928**
2000	68	..	1 174[2]	269	603	613	..	..	1 902[p]	14 376[r]	..	0	..	**19 005[r]**
2001	..	..	..	..	1 274	..	..	..	74 535[p]	5 467	..	..	..	**..**

Notes:
1. Includes Nunavut.
2. Estimated by provincial or territorial forestry agency.
3. Estimated by the Canadian Forest Service or by Statistics Canada.

Source:
Canadian Council of Forest Ministers, National Forestry Database Program, nfdp.ccfm.org (accessed November 27, 2002).

Minerals

Table A.33
Gross domestic product of mining and oil and gas extraction industries, 1997 to 2002

Year	Oil and gas extraction	Coal mining	Metal ore mining	Non-metallic mineral mining and quarrying	Support activities for mining and oil and gas extraction	Total mineral industries	Share of total GDP
	million chained (1997) dollars						percent
1997	21 203	1 209	5 027	2 464	4 032	33 935	4.2
1998	21 947	1 185	5 252	2 402	3 761	34 547	4.1
1999	21 859	1 155	4 995	2 805	3 362	34 176	3.8
2000	22 735	1 094	5 218	2 934	4 871	36 852	3.9
2001	23 005	1 127	5 277	2 932	5 143	37 484	4.0
2002	23 909	990	4 971	3 225	4 139	37 234	3.8

Source:
Statistics Canada, CANSIM II, table 379-0017.

Table A.34
Employment in mining, quarrying and oil well industries by province and territory, 1991 to 2002

Year	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T., N.W.T. and Nvt.	**Canada**
	persons											
1991	.	.	.	3 390	16 654	25 261	4 226	8 328	68 206	16 052	.	**152 742**
1992	.	.	.	3 395	15 067	23 039	4 230	8 312	58 766	12 664	.	**135 330**
1993	.	.	.	3 113	13 344	23 767	3 993	8 106	54 546	10 542	.	**126 664**
1994	.	.	.	2 966	13 052	21 413	3 766	8 527	63 907	12 297	.	**135 304**
1995	.	.	.	3 544	12 311	22 786	3 442	9 992	58 743	13 061	.	**132 204**
1996	.	.	.	3 606	11 872	22 723	2 927	10 124	57 110	11 862	.	**128 240**
1997	.	.	.	3 520	14 090	22 690	3 762	10 910	63 173	12 781	.	**138 972**
1998	.	.	.	3 373	14 066	20 066	3 657	10 539	65 936	13 010	.	**138 040**
1999	.	.	.	3 637	13 908	19 618	2 854	10 254	63 813	10 665	.	**132 392**
2000	.	.	.	3 840	14 064	18 872	3 190	11 153	66 960	10 618	.	**136 269**
2001	.	.	.	3 490	11 143	18 426	2 720	11 334	73 614	10 546	.	**138 685**
2002	.	.	.	3 004	11 649	17 312	2 324	9 982	77 782	10 311	.	**139 827**

Note:
Data do not add up to Canada total because of unavailable data for some provinces or territories.

Source:
Statistics Canada, CANSIM II, table 281-0024.

Table A.35
Gross domestic product of smelting, milling and refining activities of the mineral industries, 1997 to 2002

Year	Petroleum and coal products manufacturing	Iron and steel mills and ferro-alloy manufacturing	Alumina and aluminum production and processing	Non-ferrous metal (except aluminum) production and processing	Total as share of GDP
	million chained (1997) dollars				percent
1997	1 657	3 142	2 088	1 865	1.07
1998	1 805	3 416	2 452	2 063	1.15
1999	1 700	3 540	2 600	2 130	1.12
2000	1 703	3 520	2 588	2 233	1.08
2001	1 761	3 327	2 752	2 224	1.06
2002	1 816	3 574	2 933	2 192	1.08

Source:
Statistics Canada, CANSIM II, table 379-0017.

Table A.36
Production of leading minerals by province and territory, 2001[1]

Province/Territory	Selected metallic minerals						Mineral fuels			Selected other minerals		Total production		
	Copper	Gold	Iron ore	Nickel	Silver	Zinc	Coal	Crude petroleum	Natural gas[2]	Potash	Sand and gravel	Metals	Fuels	Others
	million dollars													
Newfoundland and Labrador	0.00	20.47	768.29	0.00	0.08	0.00	0.00	1 971.36	0.00	0.00	12.13	788.84	1 971.36	42.92
Prince Edward Island	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.26	0.00	0.00	4.59
Nova Scotia	0.00	0.00	0.00	0.00	0.00	0.00	53.65	150.72	972.08	0.00	11.67	0.00	1 176.44	238.73
New Brunswick	22.24	3.52	0.00	0.00	45.88	429.14	19.78	0.00	0.00	x	10.36	562.33	19.78	207.09
Quebec	244.37	452.00	x	232.36	50.57	362.04	0.00	0.00	0.00	0.00	77.33	2 157.58	0.00	1 332.62
Ontario	450.49	1 051.99	0.00	1 117.85	28.32	104.44	0.00	61.06	69.43	0.00	390.27	3 388.07	130.49	2 116.19
Manitoba	122.69	89.75	0.00	413.13	7.21	131.18	0.00	145.66	0.00	0.00	26.86	823.88	145.66	78.14
Saskatchewan	1.86	20.25	0.00	0.00	0.15	1.68	144.95	4 286.97	1 242.69	x	44.91	699.53	5 674.61	1 601.72
Alberta	0.00	0.26	0.00	0.00	0.00	0.00	385.42	18 234.78	30 652.23	0.00	206.44	0.26	49 272.44	559.79
British Columbia	678.91	321.87	x	0.00	131.99	154.56	943.00	710.97	5 447.23	0.00	166.70	1 411.80	7 101.20	515.80
Yukon Territory	0.00	39.50	0.00	0.00	0.20	0.00	0.00	0.00	54.54	0.00	3.43	39.70	54.54	3.43
Northwest Territories	0.00	54.00	0.00	0.00	0.21	0.00	0.00	379.78	58.40	0.00	1.84	54.21	438.18	851.30
Nunavut	0.00	58.78	0.00	0.00	3.31	233.40	0.00	0.00	0.00	0.00	0.00	319.22	0.00	0.00
Canada	**1 520.57**	**2 112.40**	**1 155.19**	**1 763.34**	**267.90**	**1 416.43**	**1 546.80**	**25 941.29**	**38 496.59**	**1 581.53**	**953.18**	**10 245.40**	**65 984.68**	**7 552.31**

Notes:
Figures may not add up to totals due to rounding.
1. Preliminary data.
2. Includes natural gas by-products.
Source:
Statistics Canada, 2002, *Canada's Mineral Production, Preliminary Estimates, 2001*, Catalogue no. 26-202-XIB, Ottawa.

Table A.37
Reserves of selected major metals, 1977 to 2000

Year	Copper	Nickel	Lead	Zinc	Gold	Silver
	thousand tonnes					
1977	16 914	7 749	8 954	26 953	0.5	31
1978	16 184	7 843	8 930	26 721	0.5	31
1979	16 721	7 947	8 992	26 581	0.6	32
1980	16 714	8 348	9 637	27 742	0.8	34
1981	15 511	7 781	9 380	26 833	0.9	32
1982	16 889	7 546	9 139	26 216	0.8	31
1983	16 214	7 393	9 081	26 313	1.2	31
1984	15 530	7 191	9 180	26 000	1.2	31
1985	14 201	7 041	8 503	24 553	1.4	29
1986	12 918	6 780	7 599	22 936	1.5	26
1987	12 927	6 562	7 129	21 471	1.7	25
1988	12 485	6 286	6 811	20 710	1.8	26
1989	12 082	6 092	6 717	20 479	1.6	24
1990	11 261	5 776	5 643	17 847	1.5	20
1991	11 040	5 691	4 957	16 038	1.4	18
1992	10 755	5 605	4 328	14 584	1.3	16

Table A.37
Reserves of selected major metals, 1977 to 2000 (continued)

Year	Copper	Nickel	Lead	Zinc	Gold	Silver
			thousand tonnes			
1993	9 740	5 409	4 149	14 206	1.3	16
1994	9 533	5 334	3 861	14 514	1.5	19
1995	9 250	5 832	3 660	14 712	1.5	19
1996	9 667	5 623	3 450	13 660	1.7	19
1997	9 032	5 122	2 344	10 588	1.5	17
1998	8 402	5 683	1 845	10 159	1.4	16
1999	7 763	4 983	1 586	10 210	1.3	15
2000	7 419	4 782	1 315	8 876	1.1	14

Source:
Natural Resources Canada, *Canadian Minerals Yearbook, 2001*, www.nrcan.gc.ca/mms/cmy/index_e.html (accessed November 26, 2002).

Table A.38
Annual production[1] of non-fuel minerals, 1948 to 2001

Year	Copper	Nickel	Lead	Zinc	Iron ore	Gold	Potash	Salt	Gypsum
					thousand tonnes				
1948	218	119	152	212	1 213	0.11	0	672	2 916
1949	239	117	145	262	3 334	0.13	0	679	2 735
1950	240	112	150	284	3 271	0.14	0	779	3 325
1951	245	125	144	309	4 246	0.14	0	875	3 450
1952	234	127	153	337	4 783	0.14	0	882	3 255
1953	230	130	176	364	5 906	0.13	0	866	3 483
1954	275	146	198	342	6 679	0.14	0	880	3 584
1955	296	159	184	393	14 772	0.14	0	1 129	4 234
1956	322	162	171	384	20 274	0.14	0	1 443	4 440
1957	326	170	165	375	20 205	0.14	0	1 607	4 151
1958	313	127	169	386	14 267	0.14	0	2 155	3 596
1959	359	169	169	359	22 215	0.14	0	2 985	5 335
1960	398	195	186	369	19 550	0.14	0	3 007	4 722
1961	398	211	209	377	18 469	0.14	0	2 945	4 478
1962	415	211	195	420	24 820	0.13	0	3 301	4 836
1963	416	200	184	424	27 300	0.12	0	3 377	5 409
1964	444	207	185	611	34 857	0.12	0	3 618	5 770
1965	463	242	268	747	36 181	0.11	1 335	4 159	5 718
1966	461	203	276	872	36 914	0.10	1 979	3 746	5 421
1967	547	224	285	994	37 788	0.09	2 389	4 532	4 549
1968	575	240	309	1 052	43 040	0.09	2 576	4 413	5 378
1969	520	194	289	1 096	36 337	0.08	3 161	4 199	5 782
1970	610	278	353	1 136	47 458	0.07	3 108	4 919	5 733
1971	654	267	368	1 134	42 957	0.07	3 558	5 061	6 081
1972	720	235	335	1 129	38 736	0.06	3 495	4 902	7 349
1973	824	249	342	1 227	47 499	0.06	4 454	5 047	7 610
1974	821	269	294	1 127	46 784	0.05	5 776	5 447	7 226
1975	721	240	315	1 004	44 742	0.05	4 726	5 123	5 746
1976	731	241	256	982	55 416	0.05	5 215	5 994	6 003
1977	759	233	281	1 071	53 621	0.05	5 764	6 039	7 231
1978	659	128	320	1 067	42 931	0.05	6 344	6 452	8 074
1979	636	126	311	1 100	59 617	0.05	7 074	6 881	8 099
1980	710	188	280	920	50 224	0.05	7 225	7 226	7 285
1981	691	160	269	911	49 551	0.05	6 549	7 239	7 025
1982	613	89	272	966	33 198	0.06	5 309	7 930	5 986
1983	653	125	272	988	32 959	0.07	6 294	8 602	7 507
1984	722	174	264	1 063	39 930	0.08	7 527	10 235	7 775
1985	739	170	268	1 049	39 502	0.09	6 661	10 085	7 761
1986	699	164	334	988	36 167	0.10	6 753	10 740	8 802
1987	794	189	373	1 158	37 804	0.12	7 668	10 129	9 095
1988	758	199	351	1 370	39 934	0.13	8 154	10 687	9 513
1989	704	196	269	1 273	39 445	0.16	7 014	11 158	8 195
1990	771	195	233	1 179	35 670	0.17	7 345	11 191	7 977
1991	780	188	248	1 083	35 917	0.18	7 087	11 871	6 729
1992	762	178	340	1 196	32 137	0.16	7 040	11 088	7 293
1993	711	178	183	991	33 774	0.15	6 880	10 993	7 564
1994	591	142	168	976	36 728	0.15	8 517	12 244	8 586
1995	701	172	204	1 095	37 024	0.15	8 855	10 957	8 055
1996	653	182	242	1 163	34 709	0.16	8 120	12 248	8 201

Table A.38
Annual production[1] of non-fuel minerals, 1948 to 2001 (continued)

Year	Copper	Nickel	Lead	Zinc	Iron ore	Gold	Potash	Salt	Gypsum
	thousand tonnes								
1997	648	181	171	1 027	39 293	0.17	9 235	13 497	8 628
1998	691	198	150	992	36 847	0.16	8 884	13 034	8 307
1999	582	177	155	963	33 990	0.16	8 475	12 686	9 347
2000	622	181	143	936	35 247	0.15	9 033	12 164	8 527
2001	614	184	147	990	26 961	0.16	8 129	13 643	8 008

Note:
1. Refers to the metal content of the ore mined, with the exception of iron ore where the quantity of ore mined is the determining factor.
Source:
Statistics Canada, CANSIM II, tables 152-0001 and 152-0004.

Transportation

Table A.39
Water transport, 1988 to 2000

	Freight loaded		Freight unloaded		Net	Containerized freight		Movement	Passengers
	Domestic	International	Domestic	International	tonnage	Domestic	International	of freight	transported by ferry
Year	tonnes							tonne-km[1]	passengers
	millions								
1988	70.0	171.1	70.0	78.9	320.0	1.6	12.6	1 535 267	..
1989	62.0	159.1	62.0	80.3	301.4	1.4	12.1	1 440 267	38.7
1990	60.4	159.0	60.4	73.3	292.7	1.3	12.3	1 601 719	40.8
1991	57.9	168.0	57.9	66.1	292.0	0.8	12.2	1 696 465	40.4
1992	52.3	153.8	52.3	69.3	275.4	1.0	12.6	1 567 266	40.0
1993	50.4	152.6	50.4	71.6	274.6	0.9	13.3	1 551 651	41.2
1994	52.2	170.0	52.2	76.9	299.1	0.8	14.7	1 690 731	43.2
1995	50.4	176.5	50.4	83.2	310.1	0.8	15.6	1 809 627	42.0
1996	48.8	174.3	48.8	85.6	308.7	0.8	17.1	1 820 868	39.8
1997	46.7	187.9	46.7	94.7	329.3	1.0	18.8	2 011 434	38.2
1998	48.3	179.0	48.3	100.4	327.7	0.9	19.7	1 901 032	37.3
1999	52.2	179.6	52.2	101.6	333.4	0.9	22.5	1 912 418	39.2
2000	54.5	187.8	54.5	105.9	348.2	0.9	24.0	2 006 645	38.5

Note:
1. The movement of one tonne over a distance of one kilometre.
Sources:
Statistics Canada, *Shipping in Canada*, Catalogue no. 54-205-XPB, Ottawa, various issues.
Statistics Canada, Transportation Division.
Transport Canada, Surface and Marine Statistics and Forecasts.

Table A.40
Rail transport, 1981 to 2000

	Freight movement		Passenger movement						
Year	tonnes	tonne-km[1]	passengers	passenger-km[2]	Locomotives	Passenger cars	Freight cars	Fuel consumed[3]	Track operated[4]
	millions				number			million litres	kilometres
1981	279.9	234 374	24.3	3 278	4 154	1 405	179 105	8 190	92 413
1982	237.4	219 418	21.3	2 639	3 900	1 304	155 897	2 108	98 927
1983	249.6	225 380	21.2	2 932	3 783	1 337	149 432	2 142	99 444
1984	283.4	253 971	21.9	2 915	3 699	1 326	142 407	2 268	97 387
1985	272.0	242 121	22.9	3 040	3 509	1 286	130 185	2 264	95 670
1986	272.3	244 784	23.0	2 831	3 897	1 295	129 509	2 328	93 544
1987	285.5	267 764	23.7	2 709	3 855	926	121 679	2 317	94 184
1988	293.8	271 045	26.7	2 989	3 836	1 233	134 156	2 243	91 334
1989	280.8	249 036	31.1	3 178	3 809	1 281	128 540	2 167	89 104
1990	268.7	248 371	29.1	2 004	3 719	1 088	123 137	2 064	86 880
1991	274.1	260 537	4.3[5]	1 426	3 492	633	120 710	2 087	85 563
1992	263.4	250 607	4.2	1 439	3 466	621	118 206	2 027	85 191
1993	264.3	256 338	4.1	1 413	3 300	570	117 533	2 021	84 648
1994	295.1	288 432	4.2	1 440	3 324	549	116 510	2 154	83 851
1995	297.9	280 426	4.0	1 467	3 332	517	110 784	2 145	80 326

Table A.40
Rail transport, 1981 to 2000 (continued)

Year	Freight movement		Passenger movement		Locomotives	Passenger cars	Freight cars	Fuel consumed[3]	Track operated[4]
	tonnes	tonne-km[1]	passengers	passenger-km[2]					
	millions				number			million litres	kilometres
1996	299.5	282 482	4.0	1 513	3 293	466	109 578	2 088	77 387
1997	318.7	306 252	4.1	1 515	3 143	426	107 976	2 258	74 949
1998	320.4	298 695	4.0	1 458	3 142	430	105 676	2 129	73 360
1999	326.2	297 155	4.1	1 592	3 115	435	102 917	1 979	70 346
2000	345.4	319 382	4.2	1 571	2 956	464	102 200	1 989	72 201

Notes:
1. The movement of one tonne over a distance of one kilometre.
2. The movement of a passenger over a distance of one kilometre. Passenger-kilometres are derived by multiplying the number of passengers by the distance travelled.
3. Consumes 97% to 100% diesel fuel.
4. Data for rail lines operated between 1982 and 1996 include co-owned lines and those operated under leases, contracts and traffic rights. Figures for the period concluding in 1981 do not include lines operated under traffic rights. These figures thus do not permit comparison with subsequent years.
5. Intercity rail services responsible for the vast majority of passenger rail transportation, including the suburban train network, fell into a different Standard Industrial Classification (SIC) starting in 1991.
Source:
Statistics Canada, *Rail in Canada*, Catalogue no. 52-216-XIB, Ottawa, various issues.

Table A.41
Truck transport, 1989 to 2000

Year	Freight carried		Shipments		
			Number of	Weight per	Distance per
	tonnes	tonne-km[1]	shipments	shipment	shipment
	millions			kilograms	kilometres
1989	189.6	77 383	34.9	5 431	621
1990	174.2	77 069	30.0	5 816	647
1991	150.6	70 048	29.1	5 178	648
1992	149.5	72 276	27.6	5 410	656
1993	173.4	83 968	27.9	6 208	659
1994	195.6	101 873	30.5	6 418	641
1995	210.9	109 434	32.3	6 523	685
1996	229.0	120 459	35.2	6 509	709
1997	223.3	130 141	32.0	6 962	792
1998	233.9	137 552	33.8	6 914	776
1999	269.3	158 104	36.4	7 396	771
2000	278.4	164 720	35.6	7 830	798

Notes:
These figures pertain only to Canadian shippers. Other factors may be considered when interpreting such data, particularly changes made to the structure of the sampling base.
1. The movement of one tonne over a distance of one kilometre.
Source:
Statistics Canada, *Trucking in Canada*, Catalogue no. 53-222-XIB, Ottawa, various issues.

Table A.42
Air transport, 1988 to 1999

Year	Freight carried		Passengers	
	weight	tonne-km[1]	passengers	passenger-km[2]
	tonnes		millions	
1988	592 700	1 516	34.8	62 140
1989	604 520	1 552	35.7	65 664
1990	631 932	1 743	36.3	66 606
1991	603 392	1 565	31.3	57 953
1992	597 201	1 492	31.9	62 108
1993	625 635	1 636	31.1	60 676
1994	653 421	1 791	32.5	65 634
1995	690 875	2 034	36.0	73 492
1996	725 863	2 167	39.5	82 120
1997	813 767	2 359	43.7	91 859
1998	828 693	2 280	45.1	96 642
1999	845 997	2 378	46.7	99 585

Notes:
Figures include all Canadian airlines that transported more than 5 000 paying passengers or more than 1 000 tonnes of paid freight over each of the two calendar years preceding the year of the report. Figures exclude airlines holding permits for the sole purpose of serving the needs of a lodge operation.
1. The movement of one tonne over a distance of one kilometre.
2. The movement of a passenger over a distance of one kilometre. Passenger-kilometres are derived by multiplying the number of passengers by distance travelled.
Source:
Statistics Canada, *Canadian Civil Aviation*, Catalogue no. 51-206-XIB, Ottawa, various issues.

Table A.43
Transportation by bus and mass transit, 1980 to 2000

Year	Distance travelled				Paying passengers			Number of vehicles			
	Intercity transportation	Mass transit	Other[1]	Total	Intercity transportation	Mass transit	Total	Intercity transportation	Mass transit	Other[1]	Total
	thousand kilometres				thousands			number			
1980	203 119	656 245	421 033	1 280 397	33 282	1 307 199	1 340 481	1 805	12 670	21 761	36 236
1981	185 014	698 858	471 986	1 355 858	29 585	1 368 870	1 398 455	1 704	12 856	21 646	36 206
1982	197 838	712 436	478 011	1 388 285	31 187	1 333 121	1 364 308	1 683	13 318	22 773	37 774
1983	194 388	565 588	470 888	1 230 864	32 032	1 382 908	1 414 940	1 526	13 233	22 598	37 357
1984	182 773	691 373	483 437	1 357 583	27 834	1 413 676	1 441 510	1 558	13 212	21 679	36 449
1985	173 613	725 991	522 767	1 422 371	26 943	1 448 275	1 475 218	1 538	13 496	23 562	38 596
1986	174 717	757 748	504 128	1 436 593	22 871	1 522 160	1 545 031	1 417	13 032	24 210	38 659
1987	170 953	695 785	553 945	1 420 683	22 686	1 469 245	1 491 931	1 429	13 481	25 892	40 802
1988	157 052	749 934	541 509	1 448 495	18 262	1 514 979	1 533 241	1 308	13 379	24 345	39 032
1989	156 039	780 642	559 951	1 496 632	17 233	1 520 421	1 537 654	1 273	12 720	23 240	37 233
1990	168 159	769 326	537 705	1 475 190	16 991	1 528 400	1 545 091	1 356	13 156	22 516	37 028
1991	163 601	780 825	501 985	1 446 411	15 916	1 450 057	1 465 973	1 430	13 542	23 370	38 342
1992	148 526	754 399	604 215	1 507 140	14 872	1 432 105	1 446 977	1 388	12 956	27 688	42 032
1993	138 695	756 634	574 525	1 469 854	10 863	1 396 451	1 407 314	1 252	13 527	27 319	42 098

Table A.43
Transportation by bus and mass transit, 1980 to 2000 (continued)

	Distance travelled				Paying passengers			Number of vehicles			
Year	Intercity transportation	Mass transit	Other[1]	Total	Intercity transportation	Mass transit	Total	Intercity transportation	Mass transit	Other[1]	Total
	thousand kilometres				thousands			number			
1994	165 843	776 471	638 885	1 581 199	11 438	1 360 708	1 372 146	1 388	13 411	27 006	41 805
1995	153 776	742 260	781 348	1 677 384	11 186	1 361 062	1 372 248	1 191	13 140	29 174	43 505
1996	130 359	716 369	756 959	1 603 687	10 270	1 352 870	1 363 140	1 052	13 049	31 438	45 449
1997	117 679	749 963	733 201	1 600 843	11 358	1 382 242	1 393 600	1 125	13 077	32 044	46 246
1998	63 068	751 520	867 439	1 682 027	7 714	1 388 352	1 396 066	821	13 423	34 148	48 392
1999	47 809	805 799	880 857	1 734 465	5 618	1 442 005	1 447 623	551	14 022	33 426	47 999
2000	60 454	825 933	957 781	1 844 168	5 959	1 493 936	1 499 895	..	14 313	..	..

Notes:
Although we have no detailed data on this subject, intercity transportation by bus should, in principle, also be considered a means of shipping freight. In 1990, express package and delivery services represented 25% of the income for this sector.
In 1989, surveys on intercity bus transportation and mass transit were limited to transportation companies with incomes of at least $500 000.
In 1987 and 1988, only transportation companies with incomes of at least $250 000 were included. Before 1987, the inclusion threshold was $100 000.
1. Includes school transportation and charter bus services.
Source:
Statistics Canada, *Passenger Bus and Urban Transit Statistics,* Catalogue no. 53-215-XIB, Ottawa, various issues.

Table A.44
Motor vehicle registrations, 1999 to 2001

	Road motor vehicles							
Year	Vehicles weighing less than 4 500 kilograms	Vehicles weighing 4 500 to 14 999 kilograms	Vehicles weighing 15 000 kilograms or more	Buses	Motorcycles and mopeds	Total	Trailers	Off-road, construction and farm vehicles
	thousands							
1999	16 538	387	262	73	274	17 534	4 145	1 957
2000	16 832[r]	391[r]	270[r]	77[r]	311[r]	17 882	3 989[r]	1 756[r]
2001	17 055	387	267	74	318	18 102	4 023	1 302

Note:
In 1999, Statistics Canada implemented a revised methodology for Motor Vehicle Registration Data in Canada. These data are not comparable with motor vehicle registrations prior to 1999.
Source:
Statistics Canada, CANSIM II, table 405-0004.

Table A.45
Consumption of refined petroleum products[1] by mode of transportation, 1991 to 2001

	Mode of transportation						
Year	Rail	Air	Sea	Commercial highway[2]	Private	Other	**Total**
	thousand m^3						
1991	2 143	2 713	2 733	4 474	31 447	15	**43 525**
1992	2 241	2 868	2 711	4 657	32 067	12	**44 555**
1993	2 233	2 786	2 397	5 104	33 048	8	**45 575**
1994	2 310	3 051	2 574	5 979	34 208	30	**48 151**
1995	2 092	3 224	2 523	6 450	34 251	36	**48 575**
1996	2 046	3 736	2 480	6 690	34 849	57	**49 857**
1997	2 074	3 908	2 481	7 147	35 778	13	**51 401**
1998	1 999	4 098	2 919	7 197	36 817	24	**53 053**
1999	2 116	4 394	2 741	7 345	37 902	24	**54 522**
2000	2 169	4 447	2 801	7 175	38 101	21	**54 714**
2001	2 132	3 776	3 016	6 721	38 448	12	**54 104**

Notes:
Figures may not add up to totals due to rounding.
1. Refined petroleum products refers to diesel oils, light heating oils, residual fuel oils, aviation gasoline, fuel for gas turbines and motor fuel.
2. Includes mass transit.
Source:
Statistics Canada, CANSIM II, table 128-0003.

Wildlife

Table A.46
Pelts harvested by province and territory, 2000/01[1]

Species	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nvt.	**Canada**
	number													
Wild														
Badger	0	0	0	0	0	0	122	204	170	0	0	0	0	**496**
Bear	35	0	62	0	1 358	65	912	242	132	60	0	16	76	**2 958**
Beaver	1 780	405	3 952	10 469	62 059	66 856	21 223	28 299	19 551	3 531	421	2 000	0	**220 546**
Coyote	18	403	837	1 293	3 239	1 317	3 780	18 187	24 861	651	63	1	0	**54 650**
Ermine	2 204	7	561	659	11 305	2 468	1 505	1 433	3 100	2 290	115	126	0	**25 773**
Fisher	0	0	89	774	4 385	5 556	1 466	1 741	1 764	287	4	26	0	**16 092**
Fox	4 065	524	492	1 240	19 407	4 240	2 505	2 944	1 924	262	72	1 463	4 778	**43 916**
Lynx	191	0	0	0	1 879	1 005	454	1 661	2 028	701	603	835	0	**9 357**
Marten	3 362	0	0	1 687	35 937	35 869	33 040	4 319	6 748	18 723	4 213	5 435	4	**149 337**
Mink	3 788	318	1 277	819	6 696	6 128	3 505	2 686	828	697	58	907	0	**27 707**
Muskrat	1 252	2 879	14 321	17 064	48 634	59 786	27 099	18 691	13 464	1 396	159	2 120	0	**206 865**
Otter	880	0	448	514	3 517	5 178	2 049	1 365	446	341	21	12	0	**14 771**
Racoon	0	530	1 408	1 887	7 202	16 325	1 444	934	66	145	0	0	0	**29 941**
Skunk	0	0	4	6	93	273	0	18	29	3	0	0	0	**426**
Squirrel	1 061	22	2 555	281	5 403	2 087	2 660	4 055	40 999	4 091	365	49	0	**63 628**
Wildcat	0	0	1 168	430	0	0	8	12	25	108	0	0	0	**1 751**
Wolf	72	0	0	0	362	423	178	395	170	142	124	46	255	**2 167**
Wolverine	0	0	0	0	0	7	53	23	37	162	188	56	19	**545**
Other[2]	0	0	0	0	0	236	0	0	0	0	0	0	4 738	**4 974**
Total wild	**18 708**	**5 088**	**27 174**	**37 123**	**211 476**	**207 819**	**102 003**	**87 209**	**116 342**	**33 590**	**6 406**	**13 092**	**9 870**	**875 900**
Ranch-raised														
Fox	2 710	1 670	2 910	1 290	3 190	1 090	180	640	460	1 740	0	0	0	**15 880**
Mink	x	23 000	417 600	x	54 800	259 400	35 500	0	x	231 400	0	0	0	**1 074 500**
Total ranch-raised	**x**	**24 670**	**420 510**	**x**	**57 990**	**260 490**	**35 680**	**640**	**x**	**233 140**	**0**	**0**	**0**	**1 090 380**
Total pelts	**x**	**29 758**	**447 684**	**x**	**269 466**	**468 309**	**137 683**	**87 849**	**x**	**266 730**	**6 406**	**13 092**	**9 870**	**1 966 280**

Notes:
1. Refers to pelting season rather than calendar year.
2. Includes hair seals and other fur-bearing animals.

Source:
Statistics Canada, 2002, *Livestock Statistics, Second Quarter 2002*, Catalogue no. 23-603-XIE, Ottawa.

Table A.47
Value of pelts harvested by province and territory, 2000/01[1]

Species	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nvt.	**Canada**
	dollars													
Wild														
Badger	0	0	0	0	0	0	5 324	6 594	4 393	0	0	0	0	**16 311**
Bear	5 855	0	9 265	0	214 565	10 274	150 225	37 001	21 575	10 094	0	5 323	80 114	**544 291**
Beaver	42 756	12 253	127 096	319 549	1 685 522	1 765 667	574 507	668 093	514 582	89 864	12 209	42 554	0	**5 854 652**
Coyote	468	11 111	20 942	33 613	75 987	26 906	77 717	492 289	725 444	18 345	2 079	21	0	**1 484 922**
Ermine	10 337	22	2 771	3 369	53 812	10 514	6 848	6 920	18 042	14 954	483	471	0	**128 543**
Fisher	0	0	2 925	31 500	157 772	198 682	45 461	56 624	69 025	11 176	148	916	0	**574 229**
Fox	134 432	27 932	15 198	52 845	799 400	126 946	50 647	66 963	63 226	7 760	2 664	36 688	140 111	**1 524 812**
Lynx	12 602	0	0	0	137 486	77 636	32 992	112 394	185 461	58 365	52 461	66 853	0	**736 250**
Marten	131 387	0	0	52 725	1 301 638	1 410 010	1 442 526	156 866	288 410	773 447	210 650	279 673	157	**6 047 489**
Mink	50 949	6 107	18 938	13 081	106 399	99 396	50 402	39 701	13 389	11 354	1 160	14 066	0	**424 942**
Muskrat	2 830	14 091	62 440	65 142	152 711	240 938	84 007	53 823	39 988	2 890	588	5 450	0	**724 898**
Otter	60 870	0	40 575	47 234	304 185	427 030	188 467	115 383	52 267	37 411	1 827	1 014	0	**1 276 263**
Racoon	0	7 264	23 457	30 219	96 939	249 283	24 635	14 580	1 164	1 290	0	0	0	**448 831**
Skunk	0	0	35	49	684	2 088	0	122	287	11	0	0	0	**3 276**
Squirrel	1 645	21	4 420	289	7 402	2 671	3 697	5 812	89 788	8 959	511	57	0	**125 272**
Wildcat	0	0	72 252	26 918	0	0	581	1 008	1 875	4 328	0	0	0	**106 962**
Wolf	9 954	0	0	0	26 234	34 859	20 913	72 483	19 372	14 118	18 476	7 149	58 452	**282 010**
Wolverine	0	0	0	0	0	1 898	11 033	4 252	10 175	48 146	53 392	17 130	4 467	**150 493**
Other[2]	0	0	0	0	0	526	0	0	0	0	0	0	141 202	**141 728**
Total wild	**464 085**	**78 801**	**400 314**	**676 533**	**5 120 736**	**4 685 324**	**2 769 982**	**1 910 908**	**2 118 463**	**1 112 512**	**356 648**	**477 365**	**424 503**	**20 596 174**

Table A.47
Value of pelts harvested by province and territory, 2000/01[1] (continued)

Species	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nvt.	**Canada**
	dollars													
Ranch-raised														
Fox	132 222	81 479	141 980	62 940	155 640	53 182	8 782	31 226	22 444	84 895	0	0	0	**774 790**
Mink	x	821 992	18 811 587	x	2 205 417	10 645 102	1 615 927	0	x	9 017 297	0	0	0	**45 429 023**
Total ranch-raised	**x**	**903 471**	**18 953 567**	**x**	**2 361 057**	**10 698 284**	**1 624 709**	**31 226**	**x**	**9 102 192**	**0**	**0**	**0**	**46 203 813**
Total pelts	**x**	**982 272**	**19 353 881**	**x**	**7 481 793**	**15 383 608**	**4 394 691**	**1 942 134**	**x**	**10 214 704**	**356 648**	**477 365**	**424 503**	**66 799 987**

Notes:
1. Refers to pelting season rather than calendar year.
2. Includes hair seals and other fur-bearing animals.

Source:
Statistics Canada, 2002, *Livestock Statistics, Second Quarter 2002*, Catalogue no. 23-603-XIE, Ottawa.

Water

Table A.48
Distribution of water area and population by terrestrial ecozone, 1971 and 2001

	Area			Population					
				1971			2001		
		Water			Density			Density	
Ecozone	Total	Area	As a share of total	Total	Total area	Land area	Total	Total area	Land area
	km^2		percent	persons	persons/km^2		persons	persons/km^2	
Arctic Cordillera	244 588	9 879	4.0	843	0.00	0.00	1 304	0.01	0.01
Northern Arctic	1 521 362	150 021	9.9	9 512	0.01	0.01	20 451	0.01	0.01
Southern Arctic	852 032	149 491	17.5	5 004	0.01	0.01	14 470	0.02	0.02
Taiga Plains	657 778	88 415	13.4	14 663	0.02	0.03	20 726	0.03	0.04
Taiga Shield	1 393 226	270 723	19.4	25 208	0.02	0.02	38 116	0.03	0.03
Boreal Shield	1 883 667	242 718	12.9	2 525 261	1.34	1.54	2 821 808	1.50	1.72
Atlantic Maritime	201 310	9 293	4.6	2 275 197	11.30	11.85	2 537 685	12.61	13.22
Mixed Wood Plains	113 074	6 056	5.4	11 041 713	97.65	103.18	15 631 830	138.24	146.07
Boreal Plains	740 721	72 057	9.7	561 813	0.76	0.84	771 205	1.04	1.15
Prairie	466 592	23 434	5.0	2 915 993	6.25	6.58	4 222 569	9.05	9.53
Taiga Cordillera	267 052	2 839	1.1	216	0.00	0.00	370	0.00	0.00
Boreal Cordillera	470 809	10 945	2.3	20 613	0.04	0.04	30 690	0.07	0.07
Pacific Maritime	208 572	12 372	5.9	1 653 827	7.93	8.43	3 027 206	14.51	15.43
Montane Cordillera	489 784	15 031	3.1	508 705	1.04	1.07	859 134	1.75	1.81
Hudson Plains	375 649	16 103	4.3	9 743	0.03	0.03	9 530	0.03	0.03
Canada	**9 886 215**	**1 079 375**	**10.9**	**21 568 311**	**2.18**	**2.45**	**30 007 094**	**3.04**	**3.41**

Notes:
The area figures do not include the Great Lakes. The total area of Canada including the Great Lakes is 9 976 182 km^2.
Water area figures are derived from the Canada-wide 1-km water fraction derived from National Topographic Data Base maps. Ecozone boundaries are from the 2003 set produced by the Ecological Stratification Working Group. Spatial data were adjusted to the Geobase Level 0 shoreline and projected to an Albers Equal Area projection.
The population figures presented here are not adjusted for net undercoverage and non-permanent residents.

Sources:
Statistics Canada, Environment Accounts and Statistics Division, Spatial Environmental Information System and Censuses of Population, 1971 and 2001.
Fernandes, R., G. Pavlic, W. Chen and R. Fraser, 2001, Canada-wide 1-km water fraction, National Topographic Database, Natural Resources Canada, www.nrcan.gc.ca/ess/_portal_esst.cache/gc_ccrs_e (accessed April 29, 2002).
Agriculture and Agri-Food Canada, and Environment Canada, 2003, geoconnections.org/CGDI.cfm/fuseaction/dataFrameworkData.ecoUnits/gcs.cfm (accessed May 13, 2003).
Natural Resources Canada, 2001, GeoBase Administrative Boundaries Level 0, geogratis.cgdi.gc.ca/framework/framew_e.html (accessed April 29, 2002).

Energy

Table A.49
Basic energy indicators, 1958 to 2001

Year	Consumption[1] of primary energy	Population	Real GDP	Energy consumption per person	Energy consumption per dollar of real GDP
	petajoules	thousands	million chained (1997) dollars	gigajoules	megajoules per chained (1997) dollar
1958	2 852.5	17 120	..	166.6	..
1959	3 037.5	17 522	..	173.4	..
1960	3 133.7	17 909	..	175.0	..
1961	3 294.0	18 271	245 230	180.3	13.43
1962	3 491.3	18 614	262 382	187.6	13.31
1963	3 740.3	18 964	276 306	197.2	13.54
1964	3 926.4	19 325	294 196	203.2	13.35
1965	4 131.3	19 678	312 930	209.9	13.20
1966	4 407.9	20 048	333 724	219.9	13.21
1967	4 524.2	20 412	343 454	221.6	13.17
1968	4 877.9	20 729	360 214	235.3	13.54
1969	5 141.3	21 028	378 344	244.5	13.59
1970	5 545.5	21 324	389 809	260.1	14.23
1971	5 889.7	21 962	405 860	268.2	14.51
1972	6 411.2	22 220	427 962	288.5	14.98
1973	6 937.4	22 494	457 766	308.4	15.15
1974	7 208.9	22 808	474 663	316.1	15.19
1975	7 080.7	23 142	483 316	306.0	14.65
1976	7 183.0	23 450	508 445	306.3	14.13
1977	7 295.6	23 726	526 028	307.5	13.87
1978	7 641.3	23 964	546 825	318.9	13.97
1979	8 176.0	24 202	567 631	337.8	14.40
1980	8 214.9	24 516	579 907	335.1	14.17
1981	7 862.6	24 820	600 253	316.8	13.10
1982	7 381.5	25 117	583 089	293.9	12.66
1983	7 299.9	25 367	598 941	287.8	12.19
1984	7 737.5	25 608	633 756	302.2	12.21
1985	7 908.8	25 843	664 059	306.0	11.91
1986	7 834.4	26 101	680 144	300.2	11.52
1987	8 122.2	26 450	709 058	307.1	11.45
1988	8 660.1	26 798	744 333	323.2	11.63
1989	8 945.2	27 286	763 837	327.8	11.71
1990	9 229.9	27 701	765 311	333.2	12.06
1991	9 091.0	28 031	749 294	324.3	12.13
1992	9 176.3	28 377	755 848	323.4	12.14
1993	9 314.1	28 703	773 528	324.5	12.04
1994	9 564.3	29 036	810 695	329.4	11.80
1995	9 695.2	29 354	833 456	330.3	11.63
1996	10 097.2	29 672	846 952	340.3	11.92
1997	10 200.1	29 987	882 733	340.1	11.56
1998	10 194.9	30 248	918 910	337.0	11.09
1999	10 518.3	30 509	968 451	344.8	10.86
2000	10 831.0	30 791	1 012 334	351.8	10.70
2001	10 836.5	31 111	1 027 522	348.3	10.55

Note:
1. Defined as the amount which was available for use in the Canadian economy. Includes the use of energy resources for non-energy purposes (e.g., petrochemical feedstocks in fertilizer production). Excludes the use of wood and wastes as energy sources.
Source:
Statistics Canada, CANSIM II, tables 051-0005, 128-0002 and 380-0017.

Table A.50
Energy resource reserves, 1976 to 2000

Year	Coal[1]		Crude oil		Crude bitumen		Natural gas[2]		Uranium	
	Reserves	Reserve life	Reserves	Reserve life	Reserves	Reserve life	Reserves	Reserve life	Reserves	Reserve life
			million		million		billion			
	megatonnes	years	m^3	years	m^3	years	m^3	years	kilotonnes	years
1976	4 310.7	169.2	1 014.6	13.9	150.7	39.7	1 738.7	26.5	405	74.5
1977	4 117.0	144.3	969.1	13.3	111.2	32.7	1 790.8	24.9	415	71.7
1978	4 092.6	134.3	942.7	13.0	321.5	68.4	1 911.8	25.2	438	53.3
1979	4 021.8	121.1	903.3	11.2	353.1	47.7	1 977.6	24.1	468	71.7
1980	4 192.5	114.3	860.7	11.4	333.9	32.4	2 028.9	27.9	444	65.9
1981	4 159.9	103.8	827.8	12.4	325.0	36.5	2 085.5	27.0	340	45.3
1982	5 704.0	133.2	780.6	12.1	315.6	33.6	2 148.4	31.1	376	49.2
1983	5 981.0	133.5	792.4	11.6	310.4	17.9	2 126.6	28.7	333	48.8
1984	6 120.6	106.6	776.3	10.6	328.8	28.3	2 106.7	27.4	260	25.3
1985	6 011.8	99.5	790.5	11.2	343.4	22.3	2 080.5	24.9	263	25.2
1986	6 338.9	109.7	774.6	11.4	574.4	30.4	2 032.8	25.7	265	23.0
1987	6 583.5	107.6	753.6	10.9	572.5	28.5	1 956.0	24.6	258	19.0
1988	6 542.3	92.6	739.2	10.2	566.5	26.5	1 931.9	19.0	248	20.6
1989	6 472.6	91.8	707.8	10.3	542.2	23.4	1 957.8	19.0	249	22.6
1990	6 580.7	96.3	657.3	9.6	524.0	23.1	1 979.2	18.0	295	30.3
1991	6 545.2	92.0	614.9	9.2	501.7	22.2	1 965.8	19.9	305	37.4
1992	6 522.1	99.4	590.4	8.5	482.2	20.3	1 929.8	15.3	309	33.9
1993	6 449.4	93.4	526.5	6.7	457.6	18.6	1 860.5	13.1	313	36.0
1994	6 372.2	87.5	532.2	6.7	565.0	23.5	1 833.3	12.8	300	26.8
1995	6 293.4	83.9	553.0	7.2	574.0	20.4	1 841.5	12.3	484	47.3
1996	6 210.7	81.9	526.5	6.7	660.8	23.5	1 726.4	11.1	430	37.9
1997	6 132.0	77.9	532.2	6.7	614.0	18.7	1 620.9	10.2	419	37.7
1998	6 056.9	80.6	528.4	6.9	1 336.0	35.2	1 562.6	9.6	433	43.3
1999	5 984.4	82.6	504.0	7.0	1 891.1	52.5	1 527.2	9.1	417	41.1
2000	5 915.2	85.5	493.8	7.0	1 860.0	47.7	1 536.9	9.1	437	44.1

Notes:
1. Includes bituminous, sub-bituminous and lignite coal.
2. Includes natural gas liquids (ethane, butane, propane and pentanes plus).

Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.51
Production and consumption[1] of primary energy resources, 1958 to 2001

Year	Coal		Crude oil		Natural gas[2]		Electricity[3]		Total	
	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption
	terajoules									
1958	263 975	637 271	1 020 859	1 490 275	437 088	366 256	325 683	358 649	2 047 605	2 852 451
1959	240 377	625 320	1 144 630	1 644 153	517 304	433 488	350 028	334 498	2 252 338	3 037 459
1960	244 418	559 287	1 192 301	1 715 098	624 773	496 872	381 003	362 454	2 442 495	3 133 711
1961	234 489	547 655	1 404 934	1 802 978	774 922	579 330	373 937	363 994	2 788 282	3 293 957
1962	229 599	556 731	1 601 832	1 903 300	1 044 080	661 570	374 490	369 691	3 250 001	3 491 293
1963	239 665	598 128	1 709 818	2 049 921	1 127 634	720 897	373 937	371 316	3 451 054	3 740 263
1964	253 348	620 641	1 835 513	2 091 638	1 255 120	809 498	408 360	404 624	3 752 340	3 926 401
1965	255 521	647 683	1 955 978	2 167 589	1 356 473	894 794	421 667	421 274	3 989 639	4 131 339
1966	247 496	634 962	2 136 681	2 327 897	1 466 721	981 519	467 769	463 525	4 318 667	4 407 903
1967	247 777	629 097	2 332 727	2 371 570	1 568 068	1 044 722	478 186	478 859	4 626 758	4 524 248
1968	234 133	683 468	2 520 354	2 544 142	1 776 261	1 159 897	488 768	490 434	5 019 516	4 877 941
1969	227 407	659 869	2 746 152	2 653 888	2 047 114	1 294 439	538 818	533 133	5 559 491	5 141 328
1970	354 634	708 448	3 087 416	2 860 028	2 349 711	1 418 190	567 381	558 794	6 359 142	5 545 461
1971	405 139	673 351	3 297 078	3 118 881	2 566 442	1 518 032	593 628	579 442	6 862 288	5 889 706
1972	460 770	635 417	3 803 963	3 424 584	2 899 986	1 710 604	671 751	640 604	7 836 470	6 411 208
1973	496 434	654 390	4 385 206	3 770 655	3 108 262	1 817 662	745 212	694 703	8 735 114	6 937 409
1974	526 092	664 922	4 120 340	3 930 715	3 041 698	1 850 945	808 912	762 283	8 497 041	7 208 865
1975	633 668	657 563	3 528 342	3 805 636	3 092 605	1 873 331	770 960	744 198	8 025 575	7 080 727
1976	619 975	709 029	3 235 522	3 769 982	3 107 651	1 912 329	824 819	791 664	7 787 967	7 183 004
1977	685 448	772 789	3 240 618	4 003 822	2 977 742	1 699 212	881 594	819 730	7 785 402	7 295 553
1978	743 553	788 597	3 194 640	4 017 147	3 106 827	1 957 312	948 475	878 300	7 993 495	7 641 356
1979	811 421	876 372	3 600 201	4 327 941	3 382 338	2 059 052	1 019 185	912 675	8 813 145	8 176 040
1980	891 070	928 409	3 444 041	4 216 120	3 180 730	2 116 374	1 052 072	953 991	8 567 913	8 214 894
1981	969 542	947 942	3 093 450	3 911 507	3 080 003	2 010 520	1 114 624	992 669	8 257 619	7 862 638
1982	1 028 279	1 001 681	3 052 121	3 359 122	3 163 161	2 040 386	1 093 191	980 277	8 336 752	7 381 466
1983	1 066 011	1 048 015	3 232 271	3 201 037	2 980 532	2 027 274	1 150 257	1 020 347	8 429 071	7 296 673
1984	1 396 400	1 167 377	3 430 899	3 183 745	3 311 332	2 292 108	1 235 057	1 094 325	9 373 688	7 737 555

Table A.51
Production and consumption[1] of primary energy resources, 1958 to 2001 (continued)

Year	Coal		Crude oil		Natural gas[2]		Electricity[3]		Total	
	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption
	terajoules									
1985	1 487 132	1 122 086	3 516 525	3 085 568	3 622 687	2 532 461	1 313 821	1 168 658	9 940 165	7 908 773
1986	1 382 118	1 039 979	3 531 205	3 055 190	3 458 952	2 480 595	1 381 010	1 258 688	9 753 285	7 834 452
1987	1 393 936	1 117 744	3 690 859	3 172 058	3 766 024	2 574 349	1 416 413	1 258 110	10 267 232	8 122 261
1988	1 614 195	1 200 307	3 877 941	3 359 461	4 313 054	2 809 862	1 390 669	1 290 430	11 195 859	8 660 060
1989	1 718 400	1 197 786	3 769 304	3 423 980	4 552 627	3 025 526	1 331 644	1 297 953	11 371 975	8 945 245
1990	1 673 101	1 136 171	3 765 187	3 874 090	4 574 109	2 899 032	1 321 912	1 320 656	11 334 309	9 229 949
1991	1 747 976	1 099 786	3 765 443	3 726 587	4 805 528	2 922 760	1 408 181	1 341 838	11 727 128	9 090 971
1992	1 553 530	1 120 353	3 931 692	3 615 091	5 298 028	3 116 689	1 414 322	1 324 135	12 197 572	9 176 268
1993	1 651 313	994 715	4 116 941	3 741 690	5 832 901	3 196 872	1 479 535	1 380 835	13 080 690	9 314 112
1994	1 735 269	1 054 689	4 299 874	3 808 804	6 331 888	3 312 684	1 546 239	1 388 145	13 913 270	9 564 322
1995	1 800 811	1 056 083	4 457 769	3 801 848	6 711 568	3 434 306	1 532 656	1 402 976	14 502 804	9 695 213
1996	1 832 286	1 099 131	4 590 726	3 984 463	6 932 462	3 563 509	1 585 629	1 450 067	14 941 103	10 097 170
1997	1 897 322	1 168 601	4 842 646	4 087 294	7 012 563	3 540 975	1 531 890	1 403 258	15 284 421	10 200 128
1998	1 651 482	1 287 709	5 021 730	4 090 494	7 269 299	3 488 847	1 426 237	1 327 829	15 368 748	10 194 879
1999	1 589 310	1 278 044	4 788 758	4 167 500	7 498 476	3 695 016	1 481 669	1 377 703	15 358 213	10 518 263
2000	1 509 905	1 330 940	4 999 607	4 251 781	7 734 303	3 852 022	1 524 557	1 396 249	15 768 372	10 830 992
2001	1 532 994	1 418 768	5 024 345	4 386 527	7 838 847	3 666 510	1 447 922	1 364 659	15 844 108	10 836 464

Notes:
1. Defined as the amount which was available for use in the Canadian economy.
2. Includes natural gas liquids (ethane, butane, propane and pentanes plus).
3. Includes primary steam.

Source:
Statistics Canada, CANSIM II, table 128-0002.

Table A.52
Fuels consumed in thermal-electric power stations, 1981 to 2000

Year	Coal				Fuel oil		Natural gas	Wood
	Canadian bituminous	Imported bituminous	Canadian sub-bituminous	Lignite	Heavy	Light and diesel		
	megatonnes				million m^3		billion m^3	megatonnes
1981	4.6	8.9	11.0	5.5	1.9	0.4	2.3	0.2
1982	4.5	9.7	12.7	6.8	2.0	0.3	2.2	0.3
1983	4.9	9.5	14.0	7.9	1.3	0.3	2.0	0.2
1984	5.4	10.3	15.5	9.1	1.3	0.3	1.7	0.2
1985	5.4	7.9	16.9	9.4	1.3	0.3	1.7	0.2
1986	4.7	6.4	17.3	8.0	1.2	0.3	1.0	0.3
1987	5.8	7.9	18.5	9.7	2.0	0.3	1.4	0.3
1988	6.2	8.5	19.9	11.5	2.5	0.3	2.1	0.2
1989	6.2	8.5	19.9	10.5	3.9	0.3	3.9	0.4
1990	5.8	8.0	21.0	9.7	3.4	0.3	3.1	0.3
1991	5.5	7.5	22.1	8.9	2.9	0.3	2.3	0.3
1992	6.2	6.5	21.4	9.6	3.3	0.3	2.6	0.5
1993	5.3	4.3	23.7	9.8	2.4	0.3	4.5	0.8
1994	4.3	4.5	26.1	10.3	1.9	0.3	4.6	1.5
1995	7.9	5.1	22.6	10.6	2.1	0.3	4.9	1.5
1996	4.9	5.8	25.0	10.8	1.5	0.3	3.0	1.0
1997	4.2	7.7	25.8	11.2	2.3	0.2	4.1	..
1998	3.3	10.2	25.6	11.7	3.5	0.2	5.3	0.8
1999	3.3	10.7	24.3	11.3	2.8	0.2	5.4	1.0
2000	1.9	13.8	24.1	10.9	2.6	0.2	7.2	1.2

Sources:
Statistics Canada, Manufacturing, Construction and Energy Division, Annual Electric Power Thermal Generating Station Fuel Consumption Survey Database, 1981 to 1996.
Statistics Canada, 1999 to 2001, *Electric Power Generation, Transmission and Distribution, 1997 to 1999*, Catalogue no. 57-202-XPB, Ottawa.
Statistics Canada, 2002, *Electric Power Generation, Transmission and Distribution, 2000*, Catalogue no. 57-202-XIB, Ottawa.

Waste

Table A.53
Materials prepared for recycling by type and by province and territory, 2000[1]

Type of materials	N.L.	P.E.I.	N.S.	N.B.	Que.[2]	Ont.	Man.	Sask.	Alta.	B.C.	Y.T., N.W.T. and Nvt.	**Canada**
						tonnes						
Newsprint	x	x	21 251	5 139	..	444 301	12 163	6 967	58 809	105 465	x	**657 813**
Cardboard and boxboard	x	x	7 789	7 464	..	275 976	17 443	9 449	43 689	172 120	x	**555 059**
Mixed paper	x	x	14 400	4 243	830 000[3]	x	x	15 044	28 748	212 322	x	**1 725 472**
Glass	x	x	2 845	x	91 000	133 201	3 745	x	42 289	34 047	x	**344 353**
Ferrous metals	x	x	2 506	x	1 138 800	276 782	x	x	x	137 470	0	**1 904 616**
Copper and aluminum	x	x	172	x	..	19 110	2 293	x	x	1 856	x	**42 596**
Other metals	500	0	2 544	2 125	154 700[4]	x	x	x	11 344	38 400	x	**327 557**
Plastics	x	x	1 991	x	63 000	31 719	1 479	x	9 686	40 415	x	**171 018**
Construction and demolition	0	x	12 329	x	128 100	161 407	x	x	x	170 408	0	**501 624**
Organics	0	x	59 780	x	277 000	282 264	4 398	1 473	131 064	180 122	x	**980 787**
Other materials	x	0	19 995	x	86 600	80 236	9 517	x	47 686	35 490	x	**290 641**
Total	**43 010**	**x**	**145 602**	**114 896**	**2 769 200**	**2 371 076**	**215 671**	**268 830**	**422 595**	**1 128 115**	**x**	**7 501 536**

Notes:
Figures may not add up to totals due to rounding.
1. This information covers only those companies and local waste management organizations that reported they prepared non-hazardous material for recycling.
2. Figures are derived from the results of complementary surveys conducted by the province.
3. Includes all paper fibres.
4. Includes copper and aluminum.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Air

Table A.54
Greenhouse gas emissions summary, 1990 and 2000

Source	Carbon dioxide (CO_2)		Methane (CH_4)		Nitrous oxide (N_2O)		CO_2-equivalents[1]		Change
	1990	2000	1990	2000	1990	2000	1990	2000	1990 to 2000
	kilotonnes								percent
Fossil fuel combustion									
Fossil fuel industries	49 500	63 900	78.0	120.0	1.0	1.4	51 500	66 800	29.7
Electricity and steam generation	94 700	128 000	1.8	4.4	1.8	2.4	95 300	128 000	34.3
Mining	6 150	9 200	0.1	0.2	0.1	0.2	6 190	9 270	49.8
Manufacturing	54 100	57 500	1.7	1.9	1.2	1.3	54 500	57 900	6.2
Construction	1 860	1 070	0.0	0.0	0.1	0.0	1 880	1 080	-42.6
Transportation									
Gasoline cars	51 500	46 000	8.9	4.5	6.3	7.2	53 700	48 300	-10.1
Light-duty gasoline trucks	20 400	33 600	4.0	4.4	4.2	8.7	21 700	36 400	67.7
Heavy-duty gasoline trucks	2 990	5 570	0.4	0.8	0.4	0.8	3 140	5 850	86.3
Motorcycles	225	234	0.2	0.2	0.0	0.0	230	239	3.9
Off-road gasoline vehicles	4 860	5 110	5.6	5.8	0.1	0.1	5 010	5 270	5.2
Diesel cars	656	400	0.0	0.0	0.0	0.0	672	410	-39.0
Light-duty diesel trucks	578	133	0.0	0.0	0.0	0.0	591	136	-77.0
Heavy-duty diesel trucks	24 300	37 500	1.2	1.8	0.7	1.1	24 600	37 800	53.7
Off-road diesel vehicles	10 000	16 100	0.5	0.8	4.0	6.5	11 300	18 100	60.2
Propane and natural gas vehicles	2 160	1 060	1.7	1.7	0.0	0.0	2 210	1 100	-50.2
Domestic air transport	10 400	13 300	0.7	0.6	1.0	1.3	10 700	13 700	28.0
Domestic shipping	4 730	4 780	0.4	0.4	1.0	1.0	5 050	5 110	1.2
Rail	6 310	5 920	0.4	0.3	2.5	2.4	7 110	6 670	-6.2
Pipelines	6 700	11 000	7.0	11.0	0.2	0.3	6 900	11 300	63.8
Residential	41 300	42 500	100.0	95.0	1.7	1.7	44 000	45 000	2.3
Commercial and institutional	25 700	31 700	0.5	0.7	0.5	0.7	25 800	31 900	23.6
Other	2 400	2 550	0.0	0.0	0.1	0.1	2 420	2 570	6.2
Fugitive emissions - fossil fuels[2]									
Solid fuels (i.e., coal mining)	0	0	91.0	45.0	0.0	0.0	1 900	950	-50.0
Crude oil and natural gas	9 800	15 000	1 200.0	1 800.0	0.0	0.0	36 000	53 000	47.2
Industrial processes									
Non-metallic mineral production	8 160	9 080	0.0	0.0	0.0	0.0	8 160	9 080	11.3
Ammonia, adipic acid and nitric acid production	5 010	6 850	0.0	0.0	37.0	5.5	17 000	8 500	-50.0

Table A.54
Greenhouse gas emissions summary, 1990 and 2000 (continued)

Source	Carbon dioxide (CO_2)		Methane (CH_4)		Nitrous oxide (N_2O)		CO_2-equivalents[1]		Change
	1990	2000	1990	2000	1990	2000	1990	2000	1990 to 2000
	kilotonnes								percent
Ferrous metal production	7 590	8 510	0.0	0.0	0.0	0.0	7 590	8 510	12.1
Aluminum and magnesium production	2 640	3 890	0.0	0.0	0.0	0.0	11 000[3]	12 000[4]	9.1
Other and undifferentiated production	9 200	12 000	0.0	0.0	0.0	0.0	9 200	13 000	41.3
Solvent and other product use	0	0	0.0	0.0	1.3	1.5	400	500	25.0
Agriculture									
Enteric fermentation[5]	0	0	760.0	840.0	0.0	0.0	16 000	18 000	12.5
Manure management	0	0	220.0	240.0	12.0	14.0	8 300	9 400	13.3
Agricultural soils	7 000	-200	0.0	0.0	90.0	100.0	30 000	30 000	0.0
Land use change and forestry[6]	0	0	70.0	60.0	3.0	4.0	2 000	2 000	0.0
Waste									
Solid waste disposal on land	0	0	880.0	1 100.0	0.0	0.0	19 000	23 000	21.1
Wastewater handling	0	0	17.0	19.0	2.8	3.1	1 200	1 400	16.7
Waste incineration	250	280	0.4	0.3	0.2	0.2	320	350	9.4
Grand total	**472 000**	**571 000**	**3 500.0**	**4 400.0**	**170.0**	**170.0**	**607 000**	**726 000**	**19.6**

Notes:
Figures may not add up to totals due to rounding or varying degrees of uncertainty in individual estimates.
1. CO_2-equivalent emissions are the weighted sum of all greenhouse gas emissions. The following global warming potentials are used as the weights: CO_2 = 1; CH_4 = 21; N_2O = 310; HFCs = 140-11 700; PFCs = 6 500-9 200; SF_6 = 23 900.
2. Includes intentional and unintentional emissions from production, processing, transmission, storage and use of fuels, including those from flaring of natural gas at oil and gas production facilities.
3. 1990 CO_2-equivalent emissions for this industry include 6 000 kilotonnes of PFC emissions and 2 900 kilotonnes of SF_6 emissions.
4. 2000 CO_2-equivalent emissions for this industry include 6 000 kilotonnes of PFC emissions and 2 300 kilotonnes of SF_6 emissions.
5. Emissions from livestock digestive processes.
6. CH_4 and N_2O emissions from prescribed and other fires.
Source:
Environment Canada, 2002, *Canada's Greenhouse Gas Inventory, 1990-2000*, Ottawa.

Table A.55
Top five on-site releases to air, 1996 and 2001

Substance	Releases	Share of total
	tonnes	percent
1996		
Ammonia (total)[1]	18 198.4	18.5
Methanol	16 161.5	16.5
Xylene (mixed isomers)	6 520.6	6.6
Toluene	6 028.9	6.1
Sulphuric acid	5 650.7	5.8
2001		
Methanol	19 728.6	16.0
Hydrochloric acid	16 536.6	13.4
Ammonia (total)[1]	14 798.0	12.0
Sulphuric acid	9 320.2	7.6
Hydrogen sulphide	7 181.2	5.8

Note:
1. Refers to the total of both ammonia (NH_3) and ammonium ion (NH_4^+) in solution.
Source:
Environment Canada, Pollution Data Branch, National Pollutant Release Inventory Database, www.ec.gc.ca/pdb/npri/ (accessed April 1, 2003).

Soil

Table A.56
Top five on-site releases to land, 1996 and 2001

Substance	Releases	Share of total
	tonnes	percent
1996		
Zinc (and its compounds)	4 989.7	35.9
Ethylene glycol	3 209.8	23.1
Manganese (and its compounds)	1 910.2	13.8
Lead (and its compounds)	894.3	6.4
Asbestos (friable form)	848.2	6.1
2001		
Calcium fluoride	10 211.0	31.0
Zinc (and its compounds)	8 143.8	24.8
Manganese (and its compounds)	3 637.2	11.1
Ethylene glycol	2 044.5	6.2
Lead (and its compounds)	1 641.0	5.0

Source:
Environment Canada, Pollution Data Branch, National Pollutant Release Inventory Database, www.ec.gc.ca/pdb/npri/ (accessed April 1, 2003).

Human health

Table A.57
Melanoma incidence and mortality, 1972 to 2002

Year	Male incidence	Female incidence	Male mortality	Female mortality
	rate per 100 000			
1972	3.5	4.1	1.4	1.3
1973	4.1	5.2	1.5	1.1
1974	4.5	5.0	1.6	1.3
1975	4.7	5.1	1.7	1.2
1976	5.1	5.6	1.5	1.3
1977	5.5	6.1	1.5	1.3
1978	6.4	7.6	1.9	1.3
1979	6.8	7.1	1.7	1.2
1980	7.0	7.5	1.7	1.2
1981	7.0	7.8	2.1	1.3
1982	7.5	7.5	2.1	1.5
1983	7.6	8.0	2.3	1.5
1984	7.5	7.7	2.1	1.5
1985	8.7	9.5	2.6	1.6
1986	9.0	8.3	2.3	1.3
1987	9.6	9.3	2.0	1.5
1988	10.4	9.2	2.2	1.3
1989	9.3	8.6	2.6	1.4
1990	10.1	8.5	2.6	1.2
1991	9.1	8.8	2.6	1.4
1992	10.5	8.7	2.6	1.5
1993	10.4	9.0	2.4	1.5
1994	10.8	9.2	2.7	1.5
1995	11.3	9.4	2.8	1.6
1996	11.1	9.5	2.6	1.5
1997	11.4	9.5	2.8	1.5
1998	11.1	9.5	2.8	1.5
1999[1]	11.6	9.6	2.9	1.5
2000[1]	11.8	9.6	2.9	1.6
2001[1]	11.9	9.7	3.0	1.6
2002[1]	12.1	9.8	3.0	1.6

Note:
1. Estimated rates.
Source:
National Cancer Institute of Canada, 2002, *Canadian Cancer Statistics 2002*, Toronto, www.cancer.ca (accessed November 27, 2002).

Protected areas

Table A.58
Total area protected by province and territory, 1989 and 2003[1]

Province/Territory	1989		2003		Change in protected area as a share of total land 1989 to 2003
	Total area protected[2]	Protected area as a share of total land	Total area protected[2]	Protected area as a share of total land	
	hectares	percent	hectares	percent	
Newfoundland and Labrador	367 500	0.9	1 701 412	4.3	3.4
Prince Edward Island	6 000	1.0	14 780	2.6	1.5
Nova Scotia	138 700	2.4	465 363	8.2	5.7
New Brunswick	88 800	1.2	233 443	3.1	1.9
Quebec	622 800	0.4	5 217 586	3.5	3.1
Ontario	5 152 900	5.2	9 142 039	9.2	4.0
Manitoba	315 400	0.5	5 402 416	8.5	8.0
Saskatchewan	1 936 000	3.0	2 243 230	3.5	0.5
Alberta	5 642 000	8.7	8 009 229	12.3	3.6
British Columbia	4 958 300	5.4	12 017 617	13.0	7.6
Yukon Territory	3 218 300	6.8	5 678 119	12.0	5.2
Northwest Territories and Nunavut	6 978 550	2.0	31 752 615	9.3	7.2
Canada	**29 425 250**	**3.0**	**81 877 849**	**8.4**	**5.4**

Notes:
1. The 1989 to 2000 time frame reflects the timelines of the World Wildlife Fund Canada's *Endangered Spaces; The Wilderness Campaign that Changed the Canadian Landscape 1989-2000*. 2003 was included in *The Nature Audit: Setting Canada's Conservation Agenda for the 21st Century.*
2. Defined by World Wildlife Fund Canada as those areas that are permanently protected through legislation and that prohibit industrial uses such as logging, mining, hydro-electric development, oil and gas and other large scale developments. For the 2003 values, only those areas that contribute to ecological representation were considered.
Sources:
World Wildlife Fund Canada, 2000, *Endangered Spaces; The Wilderness Campaign that Changed the Canadian Landscape 1989-2000*, Toronto.
World Wildlife Fund Canada, 2003, *The Nature Audit: Setting Canada's Conservation Agenda for the 21st Century*, Toronto.

Species at risk

Table A.59
Species extinct and extirpated in Canada, 2002

Species	Group	Last sighting	Probable cause(s) of extinction or extirpation
Benthic Hadley Lake stickleback	fish	1999	introduced predators
Limnetic Hadley Lake stickleback	fish	1999	introduced predators
Karner blue butterfly	lepidopteran	1991	habitat alteration
Frosted elfin butterfly	lepidopteran	1988	successional change
Greater prairie chicken	bird	1987	habitat alteration
Banff longnose dace	fish	1986	introduced predators
Black-footed ferret	mammal (terrestrial)	1974	loss of food source
Dwarf wedgemussel	mollusc	1968	habitat alteration
Blue walleye	fish	1965	habitat alteration; commercial fishing
Sage grouse (British Columbia population)	bird	1960	hunting; habitat alteration
Pacific pond turtle	reptile	1959	commercial harvesting; habitat alteration
Gravel chub	fish	1958	habitat alteration
Pacific gopher snake	reptile	1957	habitat alteration
Blue-eyed Mary	plant	1954	habitat alteration
Deepwater cisco	fish	1952	commercial fishing; introduced predators
Timber rattlesnake	reptile	1941	excessive hunting
Eelgrass limpet	mollusc	1929	disease
Dawson's caribou (Queen Charlotte Islands population)	mammal (terrestrial)	1920	hunting
Paddlefish	fish	1917	habitat alteration
Tiger salamander	amphibian	1915	introduced predators
Passenger pigeon	bird	1914	hunting; habitat alteration
Island marble butterfly	lepidopteran	1908	loss of food source
Puget Oregonian snail	mollusc	1905	unknown
Pygmy short-horned lizard (British Columbia population)	reptile	1898	habitat alteration
Sea mink	mammal (marine)	1894	trapping
Illinois tick trefoil	plant	1888	habitat alteration
Grizzly bear (Prairie population)	mammal (terrestrial)	1880	habitat alteration; human intolerance
Labrador duck	bird	1875	hunting; habitat alteration

Table A.59
Species extinct and extirpated in Canada, 2002 (continued)

Species	Group	Last sighting	Probable cause(s) of extinction or extirpation
Macoun's shining moss	moss	1864	habitat loss
Atlantic walrus (northwest Atlantic population)	mammal (marine)	1850	excessive commercial hunting
Great auk	bird	1844	hunting
Incurved grizzled moss	moss	1828	unknown
Grey whale (Atlantic population)	mammal (marine)	1800	excessive hunting

Sources:
Environment Canada, 2002, *Canadian Species at Risk*, Canadian Wildlife Service, Committee on the Status of Endangered Wildlife in Canada, Ottawa.
Environment Canada, Canadian Wildlife Service.

Table A.60
Species extinct and at risk in Canada, 2002

	Status assessment					
Group	Extinct	Extirpated	Endangered	Threatened	Special concern[1]	**Total**
	number					
Mammals						
Terrestrial	1	2	9	8	17	**37**
Marine	1	2	10	7	6	**26**
Birds	3	2	21	8	22	**56**
Fish	5	2	18	20	32	**77**
Amphibians	0	1	5	5	8	**19**
Reptiles	0	4	5	11	10	**30**
Molluscs	1	2	9	1	1	**14**
Lepidopterans	0	3	4	2	2	**11**
Vascular plants	0	2	54	36	40	**132**
Lichens	0	0	2	0	4	**6**
Mosses	1	1	4	1	0	**7**
Total	**12**	**21**	**141**	**99**	**142**	**415**

Note:
1. Formerly described as 'vulnerable' from 1990 to 1999 and 'rare' prior to 1990.
Source:
Environment Canada, 2002, *Canadian Species at Risk*, Canadian Wildlife Service, Committee on the Status of Endangered Wildlife in Canada, Ottawa.

Invasive Species

Table A.61
Introduced agricultural and forestry pests and diseases in Canada[1]

Species	Place and date of discovery	Current area	Impacts/Notes
Asian long-horned beetle *Anaplophora glabripennis*	Brooklyn and Amityville, N.Y.: 1996; Chicago, Ill.: 1998; no known established populations in Canada	intercepted in warehouses in both Ontario and British Columbia	poses serious threat to Canadian hardwood forests (maple being the preferred host); expensive eradication effort (over $5 million to date in New York State alone) undertaken in Brooklyn, Amityville and Chicago after detection of established populations
Brown Spruce Longhorn Beetle *Tetropium fuscum*	likely arrived in Port of Halifax, Nova Scotia; found in Point Pleasant Park around 1990	Halifax Regional Municipality, Nova Scotia	no chemical pesticide currently registered to control the beetle; 5 309 trees are confirmed positive for removal in the Halifax Regional Municipality, 2 645 of these are in Point Pleasant Park; native to Europe and Asia
Colorado potato beetle *Lepinotarsa decemlineata*	extended its range during 1850s	across Canada	significant pest of potato crops; native to the western United States but fed on another species prior to the arrival of the potato in the 1850s; after discovering new host, quickly followed the potato path back across North America; good example of a species spread by habitat change
Dutch elm disease *Ophiostoma ulmi* and *O. novo-ulmi*	Quebec: 1944 (first discovery; introduction was probably before 1940)	present in all provinces except Newfoundland and Labrador, Alberta and British Columbia	a fungus spread by the native elm bark beetle (*Hylurogopinus rufipes*) and the European elm bark beetle (*Scolytus multistriatus*); controlled through public education campaigns, surveillance, insecticides and sanitation (removal of diseased elms)

Table A.61
Introduced agricultural and forestry pests and diseases in Canada[1] (continued)

Species	Place and date of discovery	Current area	Impacts/Notes
Emerald ash borer *Agrilus planipennis*	Michigan: May 2002; Windsor, Ontario (County of Essex): July 2002	Greater Windsor area of Ontario	kills ash trees and poses a significant threat to forest and urban areas of Canada; government is considering removing ash trees in a corridor 5 to 6 kilometres wide and stretching 30 kilometres to prevent spread from current infected area; native to Asia
European larch canker *Lachnellula willkommii*	Massachusetts: 1920s; Maritimes: 1980	New Brunswick, Nova Scotia and Prince Edward Island	primary pathogen of larch trees; native to Europe
Gypsy moth[2] *Lymantria dispar*	Massachusetts: 1869; Kingston, Ont. region: 1969 (first record of defoliation in Canada); Vancouver: 1991 (Asian genotype adults detected)	established in southern Ontario, southern Quebec, southwestern New Brunswick and southwestern Nova Scotia	defoliation of forest trees; incurs costs through both quarantine and control measures; current control efforts involve the use of insecticide sprays; release of predatory and pathogenic species (dating back to the early 1900s) may have some influence on the current population declines in eastern Canada; native to Europe and North Africa
Pine shoot beetle *Tomicus piniperda*	Ohio: 1992; Niagara region: 1993	southern Ontario	new pest of concern; damages new shoots, weakening and defoliating trees; native to Europe and Asia
Potato blight *Phytophthora infestans*	eastern seaboard of North America: circa 1840	across Canada	leads to the complete destruction of susceptible potato crops; contributed to the Irish potato famine in the 1840s; origin uncertain

Notes:
1. This table highlights only a few of the common pests and diseases.
2. This refers to the gypsy moth genotype established in North America. Egg masses of the Asian genotype have been detected on ships entering ports in British Columbia but it is not known to have established a population in the province. The Asian genotype is more invasive because, unlike the North American genotype, adult females are able to fly long distances.

Sources:
Animal and Plant Health Directorate, 1997, *Summary of Plant Quarantine Pest and Disease Situations in Canada, 1996*, Agriculture and Agri-Food Canada, Ottawa.
Humble, L. and A.J. Stewart, 1994, *Forest Pest Leaflet: Gypsy Moth*, Pacific Forestry Centre, Canadian Forest Service, Catalogue no. Fo29-6/75-1994E, Victoria.
Nealis, V.G. and S. Erb, 1993, *A Sourcebook for the Management of the Gypsy Moth*, Great Lakes Forestry Centre, Forestry Canada, Catalogue no. FO42-193/1993E, Sault Ste. Marie.
Canadian Food Inspection Agency, www.inspection.gc.ca (accessed February 27, 2003).
The Globe and Mail, "Deadly Pest Lurks in Forests", December 23, 2002.

Table A.62
Invasive aquatic and terrestrial animal species in Canada

Species	Place and date of discovery	Current area	Impacts/Notes
Aquatic species			
European green crab *Carcinus maenas*	New England: early 1800s; New Brunswick: 1950s; British Columbia: 1998	most of the shallow bays and estuaries of Nova Scotia and half of Prince Edward Island and on the west coast from San Francisco to Vancouver Island	called the 'cockroach of the sea' and has no North American predators; preys on native crabs, clams, oysters and mussels and occupies their habitat; also eats the same food as crabs, lobsters and many seabirds; carries a parasite harmful to the eider duck; native to Europe
Fishhook water flea *Cercopagis pengoi*	Lake Ontario: 1998 (via ship ballast water)	Lake Ontario, Lake Michigan and inland lakes in New York State	too early to fully understand impacts on Great Lakes ecosystem but concerns are that its high reproductive rate will lead to large populations; competition for food could result in decline of zooplankton and young fish populations; could have far-ranging effects on species further up the food chain; native to Caspian, Aral and Azov Seas
Round goby *Neogobius melanostomus* Tubenose goby *Proterorhinus marmoratus*	Ontario, St. Clair River: 1990 (via ship ballast water)	all Great Lakes, primarily Lake Erie	threat to Great Lakes fisheries via competition for habitat; voracious, aggressive and fecund fish species; round goby believed to contribute to contaminants entering food web by feeding on zebra mussels; native to Black Sea
Rudd *cardinius erythrophthalmus*	St. Lawrence River: 1990	St. Lawrence River; western Lake Ontario and eastern Lake Erie	risk to the native golden shiner (an important baitfish species); eats large amounts of aquatic vegetation around the shoreline which could degrade spawning and nursery habitats for young fish such as northern pike, muskellunge, yellow perch and alewife; native to Europe
Ruffe *Gymnocephalus cernuus*	Minnesota, Lake Superior: 1986; Thunder Bay, Kaministiquia River: 1991	western portions of lakes Superior and Huron	likely arrived in ballast water; threat to sport fisheries through competition for food and other resources; may consume trout and whitefish eggs; aggressive and fecund; practical control difficult; spread to other lakes a concern; native to Britain, northern Europe and Asia
Rusty crayfish *Orconectes rusticus*	date uncertain; used as bait by anglers	several Ontario watersheds	competes with native crayfish species for stream vegetation; affects fish that use vegetation for food and/or cover; native to Kentucky-Ohio- Tennessee region
Sea lamprey *Petromyzon marinus*	Great Lakes via Welland Canal: circa 1921	all Great Lakes	fish predators; contributed to collapse of whitefish and lake trout populations; controlled through mechanical, chemical and biological means since 1956
Spiny water flea *Bythotrephes cederstroemi*	Lake Ontario: 1982; present in all Great Lakes by 1987	throughout Great Lakes and some inland lakes	likely arrived in ballast water; competes with small fish for plankton; too large to serve as food source for small fish; native to Great Britain and northern Europe
Zebra mussel[1] *Dreissena polymorpha*	Ontario, Lake St. Clair: 1988 (thought to have arrived in ship ballast)	all Great Lakes, the St. Lawrence and Ottawa Rivers, and some inland lakes	each adult can filter about one litre of water per day, leading to decline in amount of plankton available to other species; displaces native mussels; spread by boats; clogs intake and outflow pipes of industrial, agricultural and municipal facilities; concentrates persistent pollutants in fatty tissues, serving as a vehicle for further biomagnification;[2] various mechanical and chemical means are used to reduce populations; eradication unlikely; native to the Caspian Sea
Terrestrial species			
Common starling *Sturnus vulgaris*	1890	across Canada	competes with native bird species for nesting space
House sparrow *Passer domesticus*	1850	across Canada	competes with native bird species for nesting space

Notes:
1. The quagga mussel is a related species with similar impacts. It is believed to have been introduced to the Great Lakes in the 1980s.
2. See notes on round goby in this table.

Sources:
Mosquin, T., P.G. Whiting and D.E. McAllister, 1995, *Canada's Biodiversity: The Variety of Life, Its Status, Economic Benefits, Conservation Costs and Unmet Needs*, Canadian Centre for Biodiversity, Canadian Museum of Nature, Ottawa.
Ontario Federation of Anglers and Hunters, www.invadingspecies.com, (accessed February 27, 2003).
Office of the Auditor General of Canada, *2002 Report of the Commissioner of the Environment and Sustainable Development*, www.oag-bvg.gc.ca/domino/reports.nsf/html/c20021004se05.html (accessed February 27, 2003).

Disasters

Table A.63
Canadian disasters, 1999 to 2002

Year	Event	Description	Location	Deaths
1999	accident	2 trains collided when the 11th wagon of the Ultra-train derailed and hit an oncoming train	St-Hilaire, Que.	2
1999	accident	dense fog and high speed blamed for a car accident on Hwy. 401 involving at least 40 vehicles, 33 injured	Windsor, Ont.	7
1999	accident	Via Rail train ploughed into 4 stationary freight tank cars killing 2 engineers, 60 injured	Thamesville, Ont.	2
1999	avalanche	1 skier killed and 4 others injured	Glacier National Park, B.C.	1
1999	avalanche	avalanche sweeps into school gymnasium, 25 injured	Kangiqsualujjuag, Que.	9
1999	earthquake	west of Vancouver Island, with a magnitude of 5.7 on the Richter scale	Vancouver Island, B.C.	0
1999	earthquake	5.7 on the Richter scale	McClure Strait, N.W.T.	0
1999	explosion	town completely evacuated following a series of gas explosions, 15 injured and 1 200 evacuated	Taylor, B.C.	0
1999	fire	explosions at an oil recycling plant caused a fire that blazed for 10 hours, 2 000 evacuated	Calgary, Alta.	2
1999	flood	record 1-day rainfall caused by remnants of Tropical Storm Harvey and Hurricane Gert, 90 evacuated	Maritimes	0
1999	flood	about 62 cm of snow and 122 mm of rain fell, 350 evacuated	Clearwater, Alta.	0
1999	flood	flooding of rivers in northwestern B.C. closed roads and highways, 118 evacuated	British Columbia	0
1999	flood	delivered 200 mm of pea-sized hail and an extra 70 mm of rain in less than 4 hours, 30 evacuated	White Rock, B.C.	0
1999	flood	Manitoba was threatened by the largest flood in the area since 1976	Melita, Man.	0
1999	infestation	a mysterious toxic mould forced 170 people from their homes until at least March 2000	Little Saskatchewan Indian Reserve, Man.	0
1999	storm	100 000 people were left without power by a powerful windstorm	Vancouver, B.C.	0
1999	storm	stormy weather spawned heavy rain and a tornado, 4 evacuated	Saskatchewan	0
1999	storm	heavy rains resulted in 144 mm of precipitation falling in 18 hours, 12 evacuated	Kenora, Ont.	0
1999	storm	2 powerful windstorms hit the Lower Mainland of B.C. with winds exceeding 100 km/h	Southern British Columbia	3
1999	storm	snowstorm resulted in a huge accident on Hwy 400 involving up to 150 vehicles, 30 injured	Barrie, Ont.	0
1999	storm	record snowfall of 110 cm fell in 1 day at the Terrace-Kitimat airport	Terrace, B.C.	0
1999	storm	fierce windstorm lashed southern B.C. knocking out power to at least 70 000 customers, 1 injured	Southern British Columbia	0
1999	storm	major storm dumped 78 cm of snow on Toronto and continued east to the Maritimes	Toronto, Ont. to Maritimes	2
1999	storm	11 people died shovelling heavy wet snow, 7 injured	Southern Ontario	11
1999	tornado	4 injured and 200 evacuated	Drummondville, Que.	1
1999	wild fire	6 500 ha forest fire forced 1 000 people from their homes	Badger, N.L.	0
1999	wild fire	forest fire caused the evacuation of 125 people	Burwash Landing, Y.T.	0
1999	wild fire	50 540 ha forest fire forced the evacuation of 1 075 people	Beardmore, Northern Ontario	0
1999	wild fire	forest fire destroyed 8 buildings and caused evacuation of 1 500 people	La Ronge, Sask.	0
1999	wild fire	forest fire caused the evacuation of 1 800 people	Cross Lake, Seymourville, Man.	0
2000	accident	bus carrying tourists crashed head-on with a transport truck in a tunnel on the Trans-Canada Highway, 21 injured	Rogers Pass, B.C.	6
2000	accident	oil pipeline break released approximately 1 million L of crude oil into the Pine River	Chetwynd, B.C.	0
2000	epidemic	*E-Coli* in water supply, 2 300 injured	Walkerton, Ont.	7
2000	flood	heavy rains hit Cape Breton and Victoria County for nearly 10 days, 1 injured and 800 evacuated	Sydney, N.S.	0
2000	flood	heavy rains occurred throughout July causing major problems in some areas	Southern Manitoba	0
2000	flood	more than 333 mm of rain fell in 1 day, 12 evacuated	Vanguard, Sask.	0
2000	landslide	2 mudslides slid 320 metres down a mountainside, totalling about 150 000 cubic metres of dirt, rock and trees	Passmore, B.C.	0
2000	tornado	tornado hit at 300 km/h, 140 injured and 1 000 evacuated	Pine Lake, Alta.	12
2000	storm	1 child suffered injuries in Toronto due to violent winds that gusted up to 80 km/h	Southern Ontario	0
2000	storm	intense snow storm hit the Maritimes for 6 days, 216 evacuated	Maritimes	0
2001	earthquake	5.6 on the Richter scale	Eastern Yukon Territory	0
2001	earthquake	6.2 on the Richter scale	Northwest of Graham Island, B.C.	0
2001	earthquake	140 km NW from Haines Junction, with a magnitude of 5.7 on the Richter scale	Haines Junction, Y.T.	0
2001	earthquake	5.6 on the Richter scale	Byam Martin Channel, Nvt.	0
2001	earthquake	west of Vancouver Island, with a magnitude of 6.0 on the Richter scale	Vancouver Island, B.C.	0
2001	earthquake	5.8 on the Richter scale	West coast of Moresby Island, B.C.	0
2001	flood	severe 5-day rainstorm caused flood damage to 100 homes and critical infrastructure, more than 200 mm of rain	Northeast and central B.C.	0
2001	flood	highway infrastructures, businesses and private and public properties were extensively damaged	Southern Manitoba	0
2001	flood	intense and abundant precipitation events, several landslides cut-off highways, extensive damage to property and infrastructure	Peace River area, B.C.	0
2001	hurricane	Hurricane/Tropical Storm Gabrielle caused high tides, strong winds and record-breaking precipitation	Southern coast of Newfoundland and Labrador	0
2001	storm	severe summer storm caused 8 municipalities and 2 unorganized areas to be declared disaster areas	Northwestern Ontario	0
2001	storm	11 injured and 30 evacuated as freezing rain, heavy snow and wind caused road accidents and homelessness	Quebec	0
2002	accident	Montréal's worst ever water-main break, 200 evacuated	Montréal, Que.	0
2002	fire	fire destroyed an abattoir, 500 people lost their jobs and 1 700 were evacuated	Notre-Dame-du-Lac, Que.	0
2002	flood	10 communities declared a state of emergency, 150 evacuated	Southeast Manitoba	0
2002	flood	approximately 280 mm of rain fell within a few days, 350 evacuated	Southern Alberta	0
2002	flood	high snow-pack levels, rapid melting and heavy rainfall caused severe run-off and flooding	British Columbia	0
2002	flood	state of emergency declared in 5 municipalities because of flash floods	Northwestern Ontario	0
2002	wild fire	Alberta's 2nd largest forest fire since 1961, 2 834 square km consumed, 1 350 evacuated	Northern Alberta	0
2002	wild fire	forest fire spread aided by winds gusting at 50 to 60 km/h, 147 evacuated	Montreal Lake, Sask.	0
2002	wild fire	1 945 square km forest fire caused the evacuation of 250 people	Conklin, Alta.	0
2002	wild fire	people from 130 homes had to be evacuated because of forest fire	Timmins, Ont.	0

Table A.63
Canadian disasters, 1999 to 2002 (continued)

Year	Event	Description	Location	Deaths
2002	wild fire	forest fire ignited by intense thunder and lightning storms, 630 evacuated	Nemiscau region, near James Bay, Que.	0
2002	wild fire	1 200 people evacuated due to forest fire	Sheshatshui and North West River, N.L.	0
2002	wild fire	forest fire charged by dry and hot weather, 500 evacuated	Turnor Lake, Sask.	0
2002	wild fire	forest fire caused the evacuation of approximately 600 residents and 385 workers	Peerless Lake and Trout Lake, Alta.	0
2002	wild fire	forest fire forced the evacuation of 103 people	Patuanak, Sask.	0
2002	wild fire	forest fire forced the evacuation of 506 people	Saskatchewan	0

Note:
Earthquakes documented in this table were of Richter scale magnitude 5.5 or greater. Many other earthquakes of lesser magnitude have occurred in Canada.
Sources:
Department of National Defence, Office of Critical Infrastructure Protection and Emergency Preparedness, Canadian Disaster Database, www.ocipep.gc.ca/disaster/search.asp?lang=eng (accessed March 19, 2003).
Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP), 2003, OCIPEP Canadian Disaster Database Version 4.0, Ottawa.
Geological Survey of Canada, National Earthquake Hazards Program, www.seismo.nrcan.gc.ca (accessed March 18, 2003).

Environmental legislation

Table A.64
***Canadian Environmental Protection Act* enforcement activities, 1991/92 to 2001/02[1]**

Enforcement activity	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
Inspections[2]	1 616	1 278	1 571	1 335	963	708	1 523	1 555	779	1 446	1 628
Investigations	115	96	55	64	45	33	56	77	64	20	57
Warnings	82	105	133	127	85	30	204	249	468	450	517
Directions	6	4	1	1	0	2	0	9	9	22	5
Prosecutions	17	26	3	9	13	5	8	3	26	11	27
Convictions	10	18	11	12	6	7	3	1	1	7	7
Total	**1 846**	**1 527**	**1 774**	**1 548**	**1 112**	**785**	**1 794**	**1 894**	**1 347**	**1 956**	**2 241**

Notes:
1. This date is based upon a fiscal year.
2. This number represents the number of on-site inspections (field/site inspections). It does not include off-site inspections (administrative verifications).
Source:
Environment Canada, *Canadian Environmental Protection Act* annual reports, www.ec.gc.ca/CEPARegistry/gene_info/ (accessed November 27, 2002).

Environmental protection expenditures

Table A.65
Government expenditures on pollution abatement and control (PAC) and water purification and supply, 1990/91 to 1999/00

Level of government/Activity	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
	million dollars									
All levels[1]										
Sewage collection and disposal[2]	2 001.1	1 953.3	2 051.3	2 186.1	2 297.4	2 742.2	2 547.5	2 692.8	2 433.2	2 417.6[r]
Waste collection and disposal	1 220.3	1 324.7	1 427.2	1 346.2	1 578.1	1 366.4	1 343.5	1 395.8	1 462.7	1 594.1[r]
Other pollution control activities	397.6	318.9	263.8	239.6	240.3	204.2	186.7	179.3	319.8	509.5[r]
Other environmental services	1 096.3	1 289.0	1 272.6	1 329.2	1 317.1	1 338.7	1 274.5	1 353.8	1 231.9	1 224.8[r]
Total PAC	**4 715.3**	**4 885.9**	**5 014.8**	**5 101.1**	**5 432.9**	**5 651.5**	**5 352.2**	**5 621.8**	**5 447.6**	**5 746.1[r]**
Water purification and supply	2 470.5	2 377.3	2 426.0	2 747.5	2 965.6	3 014.0	3 029.4	3 082.0	3 118.7	2 944.5[r]
PAC and water	**7 185.8**	**7 263.2**	**7 440.8**	**7 848.6**	**8 398.4**	**8 665.5**	**8 381.6**	**8 703.8**	**8 566.3**	**8 690.5[r]**
Federal										
Sewage collection and disposal	0.0	0.0	0.0	229.4	320.7	313.7	300.7	371.5	341.5	309.3
Waste collection and disposal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other pollution control activities	117.9	20.2	4.3	11.2	14.7	13.9	5.7	4.7	4.0	218.0[3]
Other environmental services	620.2	720.9	747.0	728.7	745.3	703.2	635.6	761.8	785.4	701.6
Total PAC	**738.1**	**741.1**	**751.4**	**969.4**	**1 080.8**	**1 030.7**	**942.0**	**1 138.0**	**1 130.9**	**1 228.8**
Water purification and supply	7.1	7.8	9.6	235.1	344.7	360.0	328.9	392.0	360.7	318.1
PAC and water	**745.2**	**748.9**	**761.0**	**1 204.5**	**1 425.5**	**1 390.8**	**1 270.9**	**1 529.9**	**1 491.7**	**1 546.9**
Provincial/Territorial										
Sewage collection and disposal[2]	75.3	100.9	97.8	90.6	132.8	256.3	186.8	181.4	131.2	91.2[r]
Waste collection and disposal	132.4	164.1	176.7	121.5	295.8	71.3	30.5	27.8	65.6	68.5[r]
Other pollution control activities	327.3	375.8	328.2	309.9	235.8	202.2	187.4	181.0	321.7	295.7[r]

Table A.65
Government expenditures on pollution abatement and control (PAC) and water purification and supply, 1990/91 to 1999/00 (continued)

Level of government/Activity	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
	million dollars									
Other environmental services	443.4	535.0	467.0	516.7	531.3	564.0	531.0	494.9	327.5	426.9[r]
Total PAC	**978.4**	**1 175.7**	**1 069.7**	**1 038.7**	**1 195.5**	**1 093.8**	**935.8**	**885.0**	**846.0**	**882.3[r]**
Water purification and supply	1 130.6	1 012.5	991.5	872.3	948.6	985.8	987.1	822.5	666.7	784.2[r]
PAC and water	**2 109.0**	**2 188.3**	**2 061.3**	**1 911.0**	**2 144.1**	**2 079.6**	**1 922.9**	**1 707.5**	**1 512.7**	**1 666.5[r]**
Local										
Sewage collection and disposal	2 002.0	1 954.3	2 055.8	1 950.5	2 040.7	2 419.7	2 313.6	2 394.4	2 126.5	2 125.7[p]
Waste collection and disposal	1 125.9	1 228.2	1 297.4	1 253.4	1 293.1	1 310.9	1 331.8	1 392.3	1 411.1	1 545.6[p]
Other pollution control activities and other environmental services[4]	82.3	80.9	102.6	126.8	144.2	133.0	129.4	129.8	138.1	117.3[p]
Total PAC	**3 210.2**	**3 263.4**	**3 455.7**	**3 330.7**	**3 478.0**	**3 863.6**	**3 774.8**	**3 916.5**	**3 675.8**	**3 788.6[p]**
Water purification and supply	2 078.2	2 039.6	2 105.0	2 296.8	2 479.4	2 555.7	2 524.9	2 525.9	2 575.0	2 402.4[p]
PAC and water	**5 288.5**	**5 303.0**	**5 560.8**	**5 627.5**	**5 957.4**	**6 419.3**	**6 299.7**	**6 442.3**	**6 250.8**	**6 191.0[p]**

Notes:
Fiscal year ending nearest to March 31, except for local government expenditures (calendar year).
Figures may not add up to totals due to rounding.
1. Expenditures presented for all levels of government do not equal the sum of federal, provincial/territorial and local expenditures. The data have been consolidated, which exclude intergovernmental transactions between the three levels of government and provide a more accurate account of total government revenues and expenditures.
2. May include some expenditures on water purification and supply.
3. The increase shown from 1998/99 is a result of a program restructure within the Department of Environment Canada, as described within the 1999 and 2000 Public Accounts (Vol. II, Part I).
4. Includes expenditures for other pollution control activities (such as clean-up and air pollution control) and other environmental services (such as environmental assessments).
Sources:
Statistics Canada, Public Institutions Division and Environment Accounts and Statistics Division.

Table A.66
Operating expenditures on environmental protection by industry and type of activity, 1995 to 2000, selected years

Year/Industry	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Pollution abatement and control processes (end-of-pipe), waste management and sewerage services	Pollution prevention processes	Fees, fines and licences	Other	Total
	million dollars								
1995									
Logging	3.2	10.8	21.2	44.4	8.7	0.2	8.8	2.6	99.8
Crude petroleum and natural gas	7.9	4.1	47.7	1.1	97.6	9.5	2.3	19.7	189.8
Mining	23.5	8.8	68.3	7.4	105.5	9.5	3.8	12.2	239.0
Electric power systems	8.7	19.3	25.7	x	45.0	x	x	79.8	283.6
Food	7.6	3.2	2.0	0.5	61.3	2.3	3.4	2.0	82.3
Beverage	1.1	0.5	0.9	0.0	12.7	0.2	0.8	2.0	18.3
Pulp and paper	68.9	7.5	8.0	6.1	145.0	31.3	12.3	23.3	302.5
Refined petroleum and coal products	4.4	0.6	34.7	x	58.0	x	x	3.8	102.1
Chemicals	26.6	7.7	23.4	0.7	80.3	5.7	1.4	9.8	155.4
Non-metallic mineral products	4.1	1.3	9.0	0.3	13.6	3.9	1.5	2.3	36.0
Primary metals	35.5	4.1	27.6	4.0	208.9	84.1	4.5	10.8	379.4
Pipeline transport and gas distribution systems	5.5	1.9	3.4	0.3	8.8	1.1	1.6	8.5	31.1
Operating expenditures, excluding 'other manufacturing'	**197.1**	**69.6**	**271.7**	**88.5**	**845.4**	**210.1**	**60.1**	**176.9**	**1 919.5**
Other manufacturing[1,2]	..	..	..	..	..	..	..	..	466.6
Total	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**2 386.1**
1996									
Logging	3.5	8.5	24.8	84.3	13.4	0.1	6.0	1.8	142.5
Crude petroleum and natural gas	18.2	5.1	85.2	7.6	98.2	3.6	3.8	34.3	256.0
Mining	29.5	7.4	68.6	5.6	117.2	14.9	5.3	22.8	271.3
Electric power systems	8.8	22.5	13.4	x	95.7	x	42.0	23.5	297.6
Food and tobacco products	9.3	2.7	4.9	1.5	69.9	3.1	4.8	4.6	100.7
Beverage	1.1	0.4	0.4	0.0	14.0	0.1	2.4	2.3	20.6
Pulp and paper	92.1	12.6	7.6	18.0	236.8	31.8	9.6	21.3	429.8
Refined petroleum and coal products	22.7	2.6	5.1	x	114.8	42.1	x	22.2	212.5
Chemicals	37.5	9.1	38.3	x	102.3	x	x	15.4	216.5
Non-metallic mineral products	4.2	1.5	5.3	0.1	14.3	0.3	2.5	3.3	31.5
Primary metals	33.2	5.3	40.7	6.9	293.3	80.0	6.8	19.6	485.8
Transportation equipment	5.2	2.1	4.7	0.1	99.5	3.7	0.8	9.7	125.8
Pipeline transport and gas distribution systems	1.4	2.6	5.7	x	11.4	0.0	x	12.6	35.7

Table A.66
Operating expenditures on environmental protection by industry and type of activity, 1995 to 2000, selected years (continued)

Year/Industry	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Pollution abatement and control processes (end-of-pipe), waste management and sewerage services	Pollution prevention processes	Fees, fines and licences	Other	Total
	million dollars								
Operating expenditures, excluding 'other manufacturing'	**266.8**	**82.3**	**304.6**	**142.7**	**1 280.9**	**265.8**	**89.7**	**193.3**	**2 626.0**
Other manufacturing[2]	..	..	..	..	..	..	..	..	357.7
Total	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**2 983.8**
1997									
Logging	1.6	3.1	10.5	68.8	7.9	1.7	0.5	2.0	96.1
Crude petroleum and natural gas	17.4	13.4	107.4	1.6	61.1	15.2	6.8	26.0	248.8
Mining	20.4	7.5	54.9	3.2	122.4	39.0	4.1	20.0	271.6
Electric power systems	6.4	x	x	25.6	70.2	x	30.2	28.7	240.3
Food and tobacco products	8.3	x	x	0.6	70.6	x	9.7	3.4	115.8
Beverage	0.6	0.5	1.4	0.0	13.4	1.3	2.8	2.2	22.2
Wood products[3]	5.9	2.2	5.9	10.4	28.9	8.9	6.6	2.8	71.7
Pulp and paper	52.6	11.9	6.4	25.4	251.1	95.7	9.2	26.1	478.3
Refined petroleum and coal products	7.3	3.8	32.8	0.5	111.2	66.0	0.2	13.5	235.3
Chemicals	31.9	7.0	30.6	1.3	104.7	34.1	2.2	15.1	226.9
Non-metallic mineral products	1.8	3.2	6.2	0.0	17.6	5.5	1.4	3.4	39.1
Primary metals	44.0	5.6	28.5	6.0	319.0	60.5	4.9	16.9	485.4
Transportation equipment	6.5	2.7	2.8	3.8	101.7	12.0	1.4	8.7	139.5
Pipeline transport and gas distribution systems	1.4	2.6	5.0	0.3	13.4	2.9	0.9	8.3	34.8
Operating expenditures, excluding 'other manufacturing'	**206.1**	**81.0**	**298.2**	**147.4**	**1 293.2**	**421.8**	**80.9**	**177.2**	**2 705.9**
Other manufacturing[2]	..	..	..	..	..	..	..	..	291.2
Total	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**2 997.1**
1998[4]									
Logging	3.0	5.0	19.1	70.4	5.4	4.4	1.4	7.8	116.5
Oil and gas extraction	16.0	8.6	110.2	1.3	55.0	26.4	9.2	31.7	258.4
Mining	20.6	4.8	55.8	2.3	104.9	38.7	4.6	17.2	248.8
Electric power generation, transmission and distribution	6.6	34.2	5.7	12.0	x	5.3	32.7	x	295.6
Natural gas distribution	0.3	1.6	0.6	0.1	2.4	0.7	0.1	3.2	8.9
Food	11.0	2.6	0.2	3.7	78.4	14.2	9.6	4.0	123.7
Beverage and tobacco products[5]	0.8	0.5	0.9	..	13.3	1.6	2.3	1.8	21.2
Wood products	8.5	2.4	15.8	29.4	x	21.4	5.6	x	137.6
Pulp, paper and paperboard mills	43.7	3.6	3.3	11.4	241.9	62.8	8.0	12.8	387.5
Petroleum and coal products[5]	7.3	2.4	4.2	..	101.5	56.4	1.1	14.4	187.3
Chemicals	25.0	6.5	42.3	1.3	101.5	34.5	2.5	18.3	231.9
Non-metallic mineral products	2.5	3.3	2.8	1.0	20.8	5.9	2.8	4.1	43.2
Primary metals	37.2	5.8	16.9	5.8	275.7	61.4	2.7	13.6	419.2
Transportation equipment	5.8	2.3	18.0	0.1	89.8	10.8	0.9	11.7	139.4
Pipeline transportation[6]	2.0	0.7	4.2	0.3	8.1	4.4	1.4	11.2	32.2
Operating expenditures, excluding 'other manufacturing'	**190.2**	**84.3**	**300.1**	**139.2**	**1 304.8**	**348.8**	**84.9**	**199.1**	**2 651.4**
Other manufacturing[2]	..	..	..	..	..	..	..	..	338.8
Total	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**2 990.2**
2000[7]									
Logging	3.8	9.4	29.6	106.4	3.8	3.8	1.2	3.4	161.4
Oil and gas extraction	19.7	15.0	117.4	3.0	81.2	35.7	12.9	39.7	324.7
Mining	25.5	14.4	53.2	4.1	99.9	44.1	8.7	17.7	267.6
Electric power generation, transmission and distribution	9.1	16.4	23.0	6.8	106.3	28.9	10.5	54.9	255.8
Natural gas distribution[8]	0.2	0.3	0.5	..	1.7	0.4	0.1	3.0	6.1
Food	15.5	3.6	7.6	0.5	84.8	11.1	13.4	4.2	140.7
Beverage and tobacco products[8]	1.1	1.1	0.0	..	14.0	1.1	4.7	1.3	23.4
Wood products	8.5	5.0	18.8	17.5	69.1	11.2	7.7	5.9	143.7
Pulp, paper and paperboard mills	51.1	5.1	12.2	6.8	263.3	67.7	6.0	13.3	425.4
Petroleum and coal products	7.3	7.0	11.2	0.9	85.6	75.5	9.6	15.9	212.9
Chemicals	29.9	6.3	22.5	1.1	106.9	42.4	1.8	21.3	232.0
Non-metallic mineral products	2.9	1.9	5.0	0.7	21.4	6.1	2.8	2.8	43.6
Primary metals	40.4	8.6	28.4	2.0	327.2	64.4	4.3	15.3	490.6
Fabricated metal products[9]	3.1	1.5	1.5	0.1	52.8	5.2	0.4	5.0	69.6

Table A.66
Operating expenditures on environmental protection by industry and type of activity, 1995 to 2000, selected years (continued)

Year/Industry	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Pollution abatement and control processes (end-of-pipe), waste management and sewerage services	Pollution prevention processes	Fees, fines and licences	Other	Total
	million dollars								
Transportation equipment	6.5	4.6	2.5	0.1	119.3	15.8	1.5	19.9	170.2
Pipeline transportation[6]	5.2	6.8	18.2	3.9	6.4	10.1	3.8	6.5	61.0
Operating expenditures, excluding 'other manufacturing'	**229.8**	**106.8**	**351.7**	**153.8**	**1 443.8**	**423.6**	**89.3**	**230.0**	**3 028.9**
Other manufacturing[2]	..	..	..	..	..	..	..	..	241.7
Total	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**3 270.6**

Notes:
Figures may not add up to totals due to rounding.
1. In 1995, transportation equipment is included in 'other manufacturing' because of data quality constraints.
2. Includes all other manufacturing industries not already specified.
3. Before 1997 the wood products industry was included with 'other manufacturing'.
4. Before the 1998 reference year establishments were selected based on the 1980 Standard Industrial Classification System (SIC). However, beginning with reference year 1998, industry selection was based on the North American Industry Classification System (NAICS). For further information, see *Environmental Protection Expenditures in Business Sector 1998*, (Catalogue no. 16F0006XIE).
5. Operating expenditures on wildlife and habitat protection are included with operating expenditures on reclamation and decommissioning.
6. Includes the two following industries: pipeline transport and gas distribution systems.
7. As of reference year 1998, the Survey of Environmental Protection Expenditures is being conducted every two years. The survey was not conducted for reference year 1999.
8. Operating expenditures on wildlife and habitat protection are included with operating expenditures on other.
9. Before 2000 the fabricated metal products industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.67
Capital expenditures on environmental protection by industry and type of activity, 1995 to 2000, selected years

Year/Industry	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Pollution abatement and control processes (end-of-pipe)	Pollution prevention processes	Total
	million dollars						
1995							
Logging	0.1	x	0.2	x	3.3	0.6	7.9
Crude petroleum and natural gas	3.2	5.9	82.1	1.1	209.1	16.5	317.9
Mining	11.0	0.6	21.7	0.1	45.6	5.4	84.5
Electric power systems	9.4	x	10.4	x	47.4	16.1	146.0
Pipeline transport and gas distribution systems	2.8	2.1	4.1	1.7	13.4	5.5	29.7
Food	2.4	x	0.8	x	13.1	7.8	24.4
Beverage	1.4	0.1	0.7	0.0	1.6	3.7	7.5
Pulp and paper	11.3	2.2	6.6	3.8	670.0	128.5	822.3
Refined petroleum and coal products	16.1	0.5	0.3	0.0	67.1	12.4	96.5
Chemicals	10.5	0.2	16.8	0.9	34.7	20.2	83.3
Non-metallic mineral products	2.3	0.2	0.9	0.4	42.6	6.4	52.8
Primary metals	7.2	0.5	0.3	0.1	55.6	45.8	109.5
Capital expenditures, excluding 'other manufacturing'	**77.7**	**38.0**	**144.9**	**49.3**	**1 203.5**	**268.9**	**1 782.3**
Other manufacturing[1,2]	..	..	..	..	..	..	308.0
Total	**..**	**..**	**..**	**..**	**..**	**..**	**2 090.3**
1996							
Logging	0.4	0.3	1.4	1.9	10.1	1.3	15.4
Crude petroleum and natural gas	6.7	3.8	79.5	3.7	158.4	18.5	270.6
Mining	1.7	1.5	11.1	0.4	49.2	13.6	77.5
Electric power systems	7.0	22.4	6.4	16.9	37.0	7.9	97.6
Pipeline transport and gas distribution systems	0.8	2.8	7.4	2.3	20.6	11.6	45.6
Food and tobacco products	1.7	x	0.1	x	37.4	29.1	68.8
Beverage	2.1	0.2	0.7	0.0	3.5	1.6	8.0
Pulp and paper	16.9	2.4	13.7	1.4	297.4	319.0	650.8
Refined petroleum and coal products	3.1	3.6	4.5	0.0	42.1	44.4	97.7
Chemicals	24.6	0.4	6.5	0.1	45.1	17.2	93.9
Non-metallic mineral products	2.0	x	1.3	x	33.6	6.3	43.5
Primary metals	5.3	x	0.7	x	61.8	180.5	250.0

Table A.67
Capital expenditures on environmental protection by industry and type of activity, 1995 to 2000, selected years (continued)

Year/Industry	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Pollution abatement and control processes (end-of-pipe)	Pollution prevention processes	Total
	million dollars						
Transportation equipment	0.8	0.2	3.3	0.7	25.3	31.0	61.4
Capital expenditures, excluding 'other manufacturing'	**73.3**	**40.1**	**136.5**	**27.6**	**821.4**	**681.8**	**1 780.7**
Other manufacturing[2]	..	..	..	..	..	..	135.0
Total	**..**	**..**	**..**	**..**	**..**	**..**	**1 915.8**
1997							
Logging	0.0	0.6	0.8	0.8	0.9	4.6	7.6
Crude petroleum and natural gas	7.7	8.7	63.4	3.2	59.2	40.7	183.0
Mining	2.3	5.2	7.7	0.8	31.0	33.4	80.4
Electric power systems	x	18.9	x	17.5	57.4	9.8	113.9
Pipeline transport and gas distribution systems	0.6	6.2	5.0	1.3	14.1	43.3	70.6
Food and tobacco products	x	0.1	x	x	39.5	31.5	73.8
Beverage	0.8	0.1	0.8	0.0	3.4	1.4	6.5
Wood products[3]	3.4	1.0	x	x	49.3	21.6	77.4
Pulp and paper	6.2	1.9	3.5	3.0	180.0	136.8	331.5
Refined petroleum and coal products	2.8	3.1	13.4	3.8	38.7	63.2	124.8
Chemicals	7.4	5.3	9.4	0.8	64.5	65.0	152.5
Non-metallic mineral products	0.3	0.7	1.9	0.0	19.8	9.4	32.1
Primary metals	18.5	0.4	x	x	107.7	161.9	290.4
Transportation equipment	0.8	0.2	x	x	24.8	93.2	121.2
Capital expenditures, excluding 'other manufacturing'	**60.9**	**52.3**	**113.8**	**32.3**	**690.3**	**716.0**	**1 665.7**
Other manufacturing[2]	..	..	..	..	..	..	82.9
Total	**..**	**..**	**..**	**..**	**..**	**..**	**1 748.6**
1998[4]							
Logging	0.5	0.1	0.2	3.0	1.5	2.1	7.4
Oil and gas extraction	4.3	9.9	69.4	0.9	55.5	46.5	186.5
Mining	2.1	5.8	8.1	3.8	33.4	28.1	81.2
Electric power generation, transmission and distribution	4.9	19.2	1.7	20.7	56.5	21.0	124.0
Natural gas distribution	0.1	0.6	0.6	0.2	1.0	14.5	16.8
Food	2.5	0.9	1.3	5.8	37.6	12.7	60.8
Beverage and tobacco products	1.0	0.2	0.1	0.2	2.6	1.5	5.5
Wood products	3.1	0.6	6.4	2.4	66.0	17.8	96.3
Pulp, paper and paperboard mills	13.2	0.5	4.6	1.1	89.1	179.2	287.7
Petroleum and coal products	0.5	3.0	5.4	1.2	82.2	48.6	141.0
Chemicals	18.6	3.3	7.0	0.4	65.7	94.3	189.2
Non-metallic mineral products[5]	4.0	0.1	2.5	..	32.6	15.1	54.3
Primary metals	4.6	0.4	1.4	1.3	102.9	73.4	184.0
Transportation equipment	0.7	0.2	1.0	0.2	16.3	30.4	48.7
Pipeline transportation[6]	0.6	6.4	2.9	0.5	41.6	63.7	115.6
Capital expenditures, excluding 'other manufacturing'	**60.7**	**51.0**	**112.5**	**41.6**	**684.6**	**648.7**	**1 599.1**
Other manufacturing[2]	..	..	..	..	..	..	135.0
Total	**..**	**..**	**..**	**..**	**..**	**..**	**1 734.2**
2000[7]							
Logging	0.0	0.1	0.1	3.4	0.1	1.2	4.8
Oil and gas extraction	11.8	14.1	73.8	5.9	244.8	114.8	465.1
Mining	1.5	0.8	5.0	2.9	65.0	67.4	142.6
Electric power generation, transmission and distribution[8]	7.8	36.5	..	4.0	56.0	78.1	182.4
Natural gas distribution	0.2	1.0	0.3	0.2	0.5	0.6	2.8
Food	3.3	4.8	4.7	0.2	45.5	27.8	86.3
Beverage and tobacco products	0.2	0.0	0.2	0.5	0.9	2.5	4.4
Wood products[8]	1.3	6.7	..	1.0	51.2	63.1	123.3
Pulp, paper and paperboard mills	3.2	0.9	2.7	1.8	85.8	140.4	234.8
Petroleum and coal products	1.6	0.3	3.0	0.3	119.1	90.3	214.6
Chemicals	4.5	1.1	13.4	0.4	60.6	67.5	147.6
Non-metallic mineral products	2.0	2.4	3.3	0.0	85.5	13.2	106.3
Primary metals	1.9	0.5	1.8	0.4	37.1	63.6	105.3
Fabricated metal products[9]	0.6	0.1	0.5	0.1	5.7	7.9	14.9

Table A.67
Capital expenditures on environmental protection by industry and type of activity, 1995 to 2000, selected years (continued)

Year/Industry	Environmental monitoring	Environmental assessments and audits	Reclamation and decommissioning	Wildlife and habitat protection	Pollution abatement and control processes (end-of-pipe)	Pollution prevention processes	Total
	million dollars						
Transportation equipment	0.2	0.5	0.8	0.0	13.7	187.9	203.1
Pipeline transportation[6]	1.3	1.9	3.0	0.6	9.9	17.4	33.9
Capital expenditures, excluding 'other manufacturing'	**41.4**	**71.7**	**112.5**	**21.8**	**881.4**	**943.7**	**2 072.5**
Other manufacturing[2]	..	..	..	..	..	..	105.4
Total	**..**	**..**	**..**	**..**	**..**	**..**	**2 177.9**

Notes:
Figures may not add up to totals due to rounding.
1. In 1995, transportation equipment is included in 'other manufacturing' because of data quality constraints.
2. Includes all other manufacturing industries not already specified.
3. Before 1997 the wood products industry was included with 'other manufacturing'.
4. Before the 1998 reference year establishments were selected based on the 1980 Standard Industrial Classification System (SIC). However, beginning with reference year 1998, industry selection was based on the North American Industry Classification System (NAICS). For further information, see *Environmental Protection Expenditures in Business Sector 1998*, (Catalogue No. 16F0006XIE).
5. Capital expenditures on wildlife and habitat protection are included with capital expenditures on reclamation and decommissioning.
6. Includes the two following industries: pipeline transport and gas distribution systems.
7. As of reference year 1998, the Survey of Environmental Protection Expenditures is being conducted every two years. The survey was not conducted for reference year 1999.
8. Capital expenditures on reclamation and decommissioning are included with capital expenditures on environmental assessments and audits.
9. Before 2000 the fabricated metal products industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Environment Industry

Table A.68
Total and environmental revenues by province and territory, 2000

Province/Territory	Establishments[1]	Total employment	Total revenues[2]	Environmental goods	Environmental services	Environment-related construction	Total environmental revenues
	number		million dollars				
Newfoundland and Labrador	150	1 938	170.6	18.5	62.7	20.3	101.6
Prince Edward Island	43	1 172	125.7	x	12.0	x	51.1
Nova Scotia	365	5 679	576.2	102.8	168.2	39.4	310.4
New Brunswick	292	3 729	408.6	86.7	107.6	49.1	243.4
Quebec	1 735	30 041	5 199.2	1 625.6	1 098.2	439.8	3 163.7
Ontario	2 379	64 483	12 783.8	3 173.3	2 526.6	465.1	6 165.1
Manitoba	228	3 352	690.3	373.4	117.4	27.3	518.0
Saskatchewan	286	3 668	350.2	93.4	76.6	33.1	203.1
Alberta	905	24 797	3 100.9	333.8	1 062.7	479.7	1 876.2
British Columbia	1 050	20 088	2 704.8	409.0	1 010.1	281.8	1 700.9
Yukon Territory, Northwest Territories and Nunavut	41	322	30.0	x	12.6	x	26.2
Canada	**7 474**	**159 269**	**26 140.3**	**6 227.4**	**6 254.6**	**1 877.7**	**14 359.7**

Notes:
Figures may not add up to totals due to rounding.
1. The total number of establishments does not include engineering construction (NAICS 2313) establishments due to the methodology used to derive the estimates.
2. Total revenues of establishments that were considered to be in scope for the purpose of the survey.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Environmental practices

Table A.69
Pollution prevention methods by industry, 1995 to 2000, selected years

Year/Industry	Pollution prevention								
	Product design or reformulation	Equipment or process modifications	Recirculation, recovery, reuse or recycling	Materials, feedstock or solvent substitution	Improved management or purchasing techniques	Prevention of leaks and spills	Good operating practices or pollution prevention training	Energy conservation	Other
	percent[1]								
1995									
Logging	0	25	31	6	..	38	..	19	6
Crude petroleum and natural gas	7	39	48	42	..	71	..	77	10
Mining	5	25	50	36	..	59	..	39	7
Electric power systems	18	27	73	82	..	46	..	73	18
Pipeline transport and gas distribution systems	8	23	62	39	..	69	..	77	0
Food	4	26	69	13	..	51	..	33	1
Beverage	13	33	75	17	..	33	..	46	4
Pulp and paper	11	46	44	16	..	54	..	25	3
Refined petroleum and coal products	8	0	39	15	..	54	..	46	0
Chemicals	20	37	69	41	..	59	..	30	8
Non-metallic mineral products	19	23	68	34	..	49	..	38	9
Primary metals	9	51	65	42	..	42	..	37	7
Other manufacturing[2]	7	28	69	43	..	42	..	36	3
Total	**10**	**32**	**64**	**33**	**..**	**50**	**..**	**37**	**5**
1996									
Logging	4	4	46	17	..	63	..	25	0
Crude petroleum and natural gas	3	41	66	41	..	79	..	76	0
Mining	5	23	58	27	..	49	..	42	21
Electric power systems	12	24	77	59	..	47	..	82	6
Pipeline transport and gas distribution systems	4	7	68	43	..	75	..	71	4
Food and tobacco products	12	25	60	29	..	52	..	43	7
Beverage	13	43	83	15	..	38	..	43	5
Pulp and paper	5	41	47	27	..	51	..	37	13
Refined petroleum and coal products	13	13	50	19	..	75	..	44	13
Chemicals	20	36	71	43	..	62	..	30	17
Non-metallic mineral products	9	30	73	39	..	42	..	39	9
Primary metals	5	37	70	39	..	49	..	38	6
Transportation equipment	18	43	80	57	..	51	..	57	6
Other manufacturing[2]	13	29	72	40	..	39	..	38	4
Total	**11**	**31**	**66**	**37**	**..**	**49**	**..**	**42**	**8**
1997									
Logging	9	3	34	14	..	80	..	6	6
Crude petroleum and natural gas	34	40	74	49	..	94	..	66	6
Mining	4	23	59	24	..	50	..	54	3
Electric power systems	7	20	53	53	..	93	..	73	13
Pipeline transport and gas distribution systems	17	11	50	44	..	78	..	72	11
Food and tobacco products	14	30	67	30	..	63	..	59	6
Beverage	25	18	57	21	..	50	..	32	14
Wood products[3]	16	21	58	35	..	61	..	35	9
Pulp and paper	8	27	72	31	..	58	..	41	12
Refined petroleum and coal products	39	44	72	50	..	78	..	61	0
Chemicals	27	23	61	36	..	69	..	39	5
Non-metallic mineral products	12	25	75	31	..	39	..	33	8
Primary metals	11	43	70	37	..	51	..	54	2
Transportation equipment	19	32	64	56	..	57	..	56	5
Other manufacturing[2]	12	18	63	41	..	30	..	33	18
Total	**15**	**24**	**64**	**37**	**..**	**51**	**..**	**42**	**10**
1998[4]									
Logging	0	15	33	3	..	82	..	12	3
Oil and gas extraction	27	35	71	40	..	88	..	75	6
Mining	6	18	67	21	..	53	..	42	8
Electric power generation, transmission and distribution	13	22	65	52	..	87	..	74	4
Natural gas distribution	0	25	38	25	..	75	..	63	0
Food	13	26	72	34	..	55	..	61	3
Beverage and tobacco products	8	16	50	24	..	63	..	50	11
Wood products	23	25	62	22	..	58	..	40	12
Pulp, paper and paperboard mills	10	24	76	38	..	73	..	54	7

Table A.69
Pollution prevention methods by industry, 1995 to 2000, selected years (continued)

Year/Industry	Pollution prevention								
	Product design or reformulation	Equipment or process modifications	Recirculation, recovery, reuse or recycling	Materials, feedstock or solvent substitution	Improved management or purchasing techniques	Prevention of leaks and spills	Good operating practices or pollution prevention training	Energy conservation	Other
	percent[1]								
Petroleum and coal products	26	32	74	26	..	79	..	63	0
Chemicals	30	24	72	27	..	71	..	33	4
Non-metallic mineral products	18	20	67	27	..	49	..	51	9
Primary metals	14	28	82	31	..	55	..	54	6
Transportation equipment	21	25	69	51	..	69	..	56	9
Pipeline transportation[5]	25	25	58	33	..	92	..	75	0
Other manufacturing[2]	15	20	56	31	..	39	..	35	20
Total	**17**	**23**	**66**	**31**	**..**	**59**	**..**	**45**	**10**
2000[6]									
Logging	0	24	46	20	35	79	78	..	28
Oil and gas extraction	18	86	76	36	58	96	91	..	26
Mining	10	40	84	33	51	92	92	..	18
Electric power generation, transmission and distribution	21	40	62	39	55	79	84	..	19
Natural gas distribution	25	78	56	0	56	100	82	..	0
Food	22	46	61	26	36	65	72	..	12
Beverage and tobacco products	6	41	52	11	33	76	80	..	10
Wood products	24	47	70	27	42	67	75	..	17
Pulp, paper and paperboard mills	17	68	83	36	34	87	89	..	16
Petroleum and coal products	48	54	76	34	44	91	94	..	6
Chemicals	40	54	77	40	45	82	88	..	15
Non-metallic mineral products	22	48	73	31	40	66	76	..	22
Primary metals	16	57	76	34	33	78	80	..	10
Fabricated metal products[7]	13	39	60	29	34	68	77	..	15
Transportation equipment	33	59	69	53	58	82	88	..	22
Pipeline transportation[5]	40	49	49	35	55	98	95	..	11
Other manufacturing[2]	26	40	56	37	41	55	67	..	11
Total	**24**	**48**	**67**	**34**	**42**	**73**	**79**	**..**	**14**

Notes:
Figures may not add up to totals due to rounding.
This table includes reported data only.
The question on pollution prevention methods differed in reference years 1995 and 1996. Therefore, comparisons from 1995 to 1998 provide a general view but should be treated with caution.
1. Number of establishments indicating they used the pollution prevention method as a percentage of all establishments that provided a response.
2. Includes all other manufacturing industries not already specified.
3. Before 1997 the wood products industry was included with 'other manufacturing'.
4. Before the 1998 reference year, establishments were selected based on the 1980 Standard Industrial Classification System (SIC). However, beginning with reference year 1998, industry selection was based on the North American Industry Classification System (NAICS). For further information, see *Environmental Protection Expenditures in Business Sector*, (Catalogue No. 16F0006XIE).
5. Includes the two following industries: pipeline transportation and gas distribution systems.
6. As of reference year 1998, the Survey of Environmental Protection Expenditures is being conducted every two years. The survey was not conducted for reference year 1999.
7. Before 2000 the fabricated metal products industry was included with 'other manufacturing'.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.70
Distribution of environmental management practices by industry, 1998 and 2000

Year/Industry	Uses an environmental management system	Uses life cycle analysis	Has ISO 14000 certification	Participates in environmental voluntary agreements	Has a 'green' procurement policy	Participates in an 'eco-labelling program'	Prepares environmental performance reports	Other	Total[2]
	percent[1]								
1998									
Logging	59	10	17	16	3	5	50	10	72
Oil and gas extraction	88	47	3	77	24	6	40	20	93
Mining	72	22	5	51	18	..	55	39	91
Electric power generation, transmission and distribution	74	27	27	68	8	12	52	50	93
Natural gas distribution	92	25	8	91	42	..	67	..	100
Food	50	9	4	12	12	2	13	8	63
Beverage and tobacco products	55	14	3	25	23	19	14	7	78
Wood products	50	9	5	14	9	6	28	12	69

Table A.70
Distribution of environmental management practices by industry, 1998 and 2000 (continued)

Year/Industry	Uses an environmental management system	Uses life cycle analysis	Has ISO 14000 certification	Participates in environmental voluntary agreements	Has a 'green' procurement policy	Participates in an 'eco-labelling program'	Prepares environmental performance reports	Other	Total[2]
	percent[1]								
Pulp, paper and paperboard mills	70	11	17	65	11	16	63	21	95
Petroleum and coal products	74	52	7	58	11	11	49	50	88
Chemicals	69	28	17	46	17	9	34	28	89
Non-metallic mineral products	61	17	5	11	14	3	31	14	75
Primary metals	58	13	6	28	11	..	18	13	82
Transportation equipment	62	19	23	26	19	2	23	17	81
Pipeline transportation	91	43	5	86	14	..	52	33	100
Total	**64**	**19**	**10**	**37**	**14**	**6**	**34**	**20**	**82**
2000									
Logging	76	2	50	26	9	17	61	12	86
Oil and gas extraction	82	23	10	82	27	5	62	13	92
Mining	66	16	3	49	16	2	67	20	84
Electric power generation, transmission and distribution	53	14	17	47	18	8	44	14	73
Natural gas distribution	91	30	0	82	46	10	80	x	100
Food	48	10	4	10	14	3	25	10	64
Beverage and tobacco products	41	1	3	23	7	1	36	10	67
Wood products	42	5	11	23	13	11	38	7	63
Pulp, paper and paperboard mills	65	12	25	57	11	11	71	15	89
Petroleum and coal products	71	36	15	46	13	24	61	15	80
Chemicals	60	15	5	36	14	7	46	14	78
Non-metallic mineral products	60	8	2	18	17	4	36	9	78
Primary metals	55	9	11	34	10	1	38	8	74
Fabricated metal products	41	8	7	13	8	6	15	5	57
Transportation equipment	65	16	30	20	19	0	33	11	76
Pipeline transportation	81	14	0	93	14	0	86	0	100
Total	**58**	**12**	**11**	**34**	**14**	**6**	**45**	**11**	**75**
Other manufacturing[3]	32	7	10	10	12	3	17	8	60
Total including other manufacturing	**52**	**11**	**11**	**29**	**13**	**5**	**38**	**10**	**72**

Notes:
This table includes reported data only.
1. Number of establishments indicating they used the practice as a percentage of all establishments that provided a response.
2. Number of establishments indicating they used at least one environmental practice as a percentage of the total number of establishments that provided a response.
3. Includes all other manufacturing industries not already specified. Information on environmental management practices used by the 'other manufacturing' category was not collected in 1998.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Recreation

Table A.71
Characteristics of Canada's national parks system, 1997/98 to 2001/02[1]

National park	Park area	Number of visitors					Visitors per park area					Trails	Length of trails
		1997/98	1998/99	1999/00	2000/01	2001/02	1997/98	1998/99	1999/00	2000/01	2001/02		
	km^2	person-visits[2]					person-visits/km^2					number	km
Gros Morne, N.L.	1 805.0	115 158	119 156	119 156	118 071	118 071	64	66	66	65	65	19	74
Terra Nova, N.L.	399.9	228 554	235 755	245 798	251 090	248 746	572	590	615	628	622	26	79
Prince Edward Island, P.E.I.	27.0	799 182[3]	945 613[3]	954 288[3]	881 264[3]	927 625[3]	29 599	35 023	35 344	32 639	34 356	15	42
Cape Breton Highlands, N.S.	948.0	427 866	393 138	440 663	361 809	366 617	451	415	465	382	387	35	217
Kejimkujik, N.S.	403.7	49 084	53 996	52 027	52 222	66 472	122	134	129	129	165	42	144
Fundy, N.B.	205.9	230 147	270 490	259 782	242 529	249 314	1 118	1 314	1 262	1 178	1 211	26	111
Kouchibouguac, N.B.	239.2	229 752	237 162	245 770	230 372	242 388	961	991	1 027	963	1 013	15	93
Forillon, Que.	240.4	181 472	185 095	189 722	172 678	180 320	755	770	789	718	750	15	83
La Mauricie, Que.	536.1	209 860	213 880	206 302	179 315	196 786	391	399	385	334	367	81	67
Mingan Archipelago, Que. (R)	150.7	34 233	35 137	33 702	29 469	32 269	227	233	224	196	214	8	4
Saguenay-St. Lawrence, Que. (M)	1 138.0	399 981	421 378	431 510	433 250	442 182	351	370	379	381	389	2	1
Bruce Peninsula, Ont.	154.0	205 988	226 918	228 049	212 457	212 457	1 338	1 473	1 481	1 380	1 380	8	12
Fathom Five, Ont. (M)	112.0	403 865	468 923	456 809	435 794	435 794	3 606	4 187	4 079	3 891	3 891	…	…
Georgian Bay Islands, Ont.	25.6	50 579	47 347	49 982	47 619	91 331	1 976	1 849	1 952	1 860	3 568	15	51
Point Pelee, Ont.	15.0	360 282	363 341	360 019	323 350	331 244	24 019	24 223	24 001	21 557	22 083	17	29
Pukaskwa, Ont.	1 877.8	8 960	9 547	11 081	10 207	8 488	5	5	6	5	5	5	66

Table A.71
Characteristics of Canada's national parks system, 1997/98 to 2001/02[1] (continued)

National park	Park area	Number of visitors					Visitors per park area					Trails	Length of trails
		1997/98	1998/99	1999/00	2000/01	2001/02	1997/98	1998/99	1999/00	2000/01	2001/02		
	km^2	person-visits[2]					person-visits/km^2					number	km
St. Lawrence Islands, Ont.	8.7	64 915	70 619	70 619	81 232	65 603	7 461	8 117	8 117	9 337	7 541	7	9
Riding Mountain, Man.	2 973.1	289 297	314 061	314 061	399 291	411 267	97	106	106	134	138	48	673
Wapusk, Man.	11 475.0	..	..	..	..	..	..	..	..	..	..	..	..
Grasslands, Sask.	906.4	3 851	5 947	4 430	4 904	6 773	4	7	5	5	7	3	13
Prince Albert, Sask.	3 874.3	178 874	220 986	224 040	224 566	230 530	46	57	58	58	60	35	381
Banff, Alta.	6 641.0	4 269 105	4 368 172	4 677 466	4 636 748	4 687 378	643	658	704	698	706	154	1 215
Elk Island, Alta.	194.0	212 481	213 980	235 765	219 008	211 547	1 095	1 103	1 215	1 129	1 090	13	86
Jasper, Alta.	10 878.0	1 756 473	1 848 145	1 973 312	1 952 392	1 947 286	161	170	181	179	179	109	1 772
Waterton Lakes, Alta.	505.0	368 052	425 436	422 376	416 265	413 515	729	842	836	824	819	33	211
Gwaii Haanas and Haida Heritage Site, B.C. (R)	1 495.0[5]	1 798	1 562	1 811	1 805	2 331	1	1	1	1	2	..	..
Kootenay, B.C.	1 406.4	1 558 576	1 690 882	1 590 596	1 590 596	1 590 596	1 108	1 202	1 131	1 131	1 131	39	261
Mount Revelstoke and Glacier, B.C.[4]	1 609.0	558 343	584 436	532 317	564 589	566 679	347	363	331	351	352	51[4]	201[4]
Pacific Rim, B.C. (R)	285.8[5]	530 656	567 327	560 309	560 309	644 841	1 857	1 985	1 960	1 960	2 256	21	339
Yoho, B.C.	1 313.1	1 040 185	1 068 730	1 371 105	1 371 105	1 371 105	792	814	1 044	1 044	1 044	71	266
Ivvavik, Y.T.	9 750.0	253	210	128	155	165	0	0	0	0	0	..	..
Kluane, Y.T.	22 013.3	70 298	62 737	59 501	59 517	59 517	3	3	3	3	3	18	235
Vuntut, Y.T.	4 345.0	..	..	..	..	..	..	..	..	..	..	..	..
Aulavik, N.W.T.	12 200.0	45	55	30	72	88	0	0	0	0	0	..	..
Nahanni, N.W.T. (R)	4 765.2	768	1 526	7 281	6 918	6 918	0	0	2	1	1	4	12
Tuktut Nogait, N.W.T.	16 340.0	..	..	..	..	..	..	..	..	..	..	..	..
Wood Buffalo, N.W.T. and Alta.	44 802.0	5 753	4 066	1 800	1 700	1 305	0	0	0	0	0	10	67
Auyittuq, Nvt. (R)	19 707.4[6]	355	1 191	467	364	413	0	0	0	0	0	1	100
Quttinirpaaq (Ellesmere Island), Nvt. (R)	37 775.0	450	508	192	192	192	0	0	0	0	0	..	..
Total	**222 291.0[7]**	**14 845 491**	**15 677 452**	**16 332 266**	**16 073 224**	**16 368 153**	**67**	**71**	**73**	**72**	**74**	**946**	**6 914**

Notes:
(R) National park reserve: an area set aside as a national park pending settlement of any outstanding Aboriginal land claim.
(M) Marine conservation area.
1. These dates are based upon the federal government fiscal year, from April 1 to March 31 of each year.
2. Considered to be each time a person enters a park reporting unit for the purpose of recreation. Same-day re-entries and re-entries by visitors staying overnight in the reporting unit do not constitute new person-visits.
3. Excludes visits to Green Gables House.
4. Glacier and Mount Revelstoke are separate national parks; however their close proximity to each other necessitates the inclusion of their data as one reporting unit for visitor attendance.
5. Excludes marine portion.
6. Park area measurement pending review by Surveyor General.
7. Excludes Fathom Five and Saguenay-St. Lawrence Marine Conservation areas, as well as marine portions of Gwaii Haanas (3 570 km^2) and Pacific Rim Park (214 km^2) reserves.
Sources:
Parks Canada, 1998, *State of the Parks, 1997 Report*, Ottawa.
Parks Canada, Table of Visitor Statistics, www2.parkscanada.gc.ca/Library/DownloadDocuments/documents_e.htm (accessed March 19, 2003).

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