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Symbols

The following standard symbols are used in Statistics Canada publications:

.	not available for any reference period
..	not available for a specific reference period
...	not applicable
e	estimate
p	preliminary figures
r	revised figures
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/h	kilometres per hour
kt	kilotonne
l	litre
m^3	cubic metre
MJ	megajoule
mm	millimetre
Mt	megatonne
µg	microgram
PJ	petajoule
ppb	parts per billion
ppm	parts per million
ppmv	parts per million by volume
SIC	Standard Industrial Classification
t	tonne
TJ	terajoule

Equivalences

1 km^2	=	100 hectares
1 hectare	=	1 km^2 / 100

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Preface

Human Activity and the Environment: Annual Statistics 2002 is the first 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 73 data tables in this edition cover those topics for which major updates have been made available since the publication of *Human Activity and the Environment 2000*. 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, "Air Quality 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 2002 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 Alison Clark-Milito was the assistant editor and 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; Health Division; Manufacturing, Construction and Energy Division; Input–Output Division; Public Institutions Division; Special Surveys Division; Transportation Division)

How to Use this Publication

Human Activity and the Environment: Annual Statistics 2002 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.

Users can also directly access the statistical tables using Excel, Excel Viewer or other spreadsheet software packages.

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Subject-matter assistance: Users with questions regarding the content of *Human Activity and the Environment: Annual Statistics 2002* are requested to call **(613) 951-0297**.

Air Quality in Canada

For millennia, changes in the earth's atmosphere were the result of natural forces. Over the past century, however, these changes have escalated as a result of human activities—mainly unprecedented growth in global population and consumption of natural resources to increase industrial production—that degrade and destroy the forests and other vital ecosystems essential to atmospheric processes.[1] Such human activities produce large quantities of substances that are released to air, where they can overload natural processes and build up to harmful levels over time. The result is poor air quality in urban and rural areas around the world.

Air pollution can have serious effects on human health. In 1952, 4 000 people died during Britain's Great London Smog, the worst air pollution event directly linked to human activity (see section 2.1–**Potential impacts on human health** for more details). An event of this magnitude has never occurred in Canada—in fact, since the 1970s air quality in large Canadian cities has improved. This has been due in large part to improvements in motor vehicle and gasoline technology as well as the increased use of both nuclear and hydro-electric power generation.[2] Nevertheless, some Canadians continue to be exposed to poor air quality (especially during summer months), which may have harmful effects on both humans and the environment in general.

This article addresses the following questions: What is the condition of our outdoor and indoor air? What effects does air quality have on our health and our environment? And what are governments and businesses doing to address air quality concerns?

Text Box 1
Air quality and emissions monitoring programs

Air quality monitoring programs
Air quality monitoring measures the concentrations of various substances that can affect air quality. Typically these concentrations are directly compared with ambient air quality objectives. Air quality can be affected by emissions levels, as well as by geography and climate. Weather and climate play a critical role in the concentration, dispersion, transport and redistribution of air pollutants, and in the chemical reactions these pollutants undergo. On days with stagnant weather, air pollution is often trapped in a shallow layer near the earth's surface; its concentration can reach high levels, particularly from automobile exhaust in large urban areas. However, pollutants can be carried by winds from urban and industrial regions to rural and less populated areas, sometimes thousands of kilometres from their original source. Measurable concentrations of pesticides have been detected in the Arctic and traced back to distant sources outside North America.[1]

Emissions monitoring programs
Emissions inventories record the quantities of pollutants released into the atmosphere. Changes in emissions can be a result of improved pollution control measures as well as changes in population or in industrial structure. However, changes in emissions do not necessarily change air quality, given the influences of weather and geography.

1. Commission for Environmental Co-operation, 1997, *Continental Pollutant Pathways*, Montréal.

1 The condition of our air

The quality of outdoor (ambient) and indoor air is affected by both human activities and natural processes. In Canada, a number of monitoring programs are in place to track the state of our air, including the types and amounts of pollutants released to it.

1.1 Outdoor air quality

In Canada, there has been some improvement in ambient air quality during the last 30 years.[3] Nevertheless, many areas in Canada continue to experience problems with air quality. Ground-level ozone and particulate matter are pollutants of serious concern in some parts of the country.

Outdoor air pollution comes from many different sources:

- stationary sources (power-generating stations, smelters, refineries, factories, commercial and residential buildings);
- mobile sources (cars, buses, planes, trucks, trains, ships, agricultural equipment, lawnmowers); and
- naturally occurring sources (windblown dust, volcanic eruptions).

Air quality monitoring programs

A number of national programs monitor air quality and air pollutant emissions (Text Box 1). Ambient air quality data measure the pollutant concentrations we actually breathe,

1. Environment Canada, 1991, *The State of Canada's Environment*, Ottawa.
2. Environment Canada, 1999, *Urban Air Quality*, National Environmental Indicator Series, SOE Bulletin no. 99-1, Ottawa.
3. *Ibid.*

Table 1
Annual Average Levels of National Air Pollution Surveillance Network Contaminants, 1979 to 1996

Year	Sulphur dioxide	Carbon monoxide	Nitrogen dioxide	Ozone	Total suspended particulates
	parts per billion				micrograms per m^3
1979	10	1 626	25	16	66
1980	9	1 495	25	16	67
1981	8	1 506	23	15	59
1982	8	1 280	23	16	52
1983	6	1 185	22	17	48
1984	7	1 045	23	17	46
1985	6	976	21	17	43
1986	6	931	22	17	43
1987	5	943	23	17	47
1988	6	902	21	19	44
1989	6	940	22	19	44
1990	6	804	21	17	39
1991	5	750	20	20	38
1992	5	721	18	18	35
1993	5	722	18	20	41
1994	5	644	18	21	41
1995	4	582	17	21	41
1996	5	595	17	21	39

Source:
Environment Canada, 1999, *Urban Air Quality*, National Environmental Indicator Series, SOE Bulletin no. 99-1, Ottawa.

and emission inventories indicate how total emissions are changing. In Canada, air quality is monitored by means of three programs: the National Air Pollution Surveillance Network, the National Ambient Air Quality Objectives, and the Index of the Quality of the Air.

National Air Pollution Surveillance Network

The National Air Pollution Surveillance (NAPS) Network was established in 1969 as a federal–provincial program to monitor air pollutants in major urban centres across Canada. NAPS typically monitors five common air pollutants: sulphur dioxide, carbon monoxide, nitrogen dioxide, ground-level ozone, and total suspended particulates. Map 1 displays the locations of the NAPS monitoring stations across Canada along with the population density around these stations.

With the exception of ozone and specific types of particulates, concentrations of these pollutants decreased between 1979 and 1996 (Table 1). However, to fully understand the impact of these concentrations, we need to understand the risks associated with their levels. For instance, is a carbon monoxide concentration of 595 parts per billion too high? As a result of this need for thresholds, the National Ambient Air Quality Objectives were created.

National Ambient Air Quality Objectives

Under the *Canadian Environmental Protection Act* (CEPA), the National Ambient Air Quality Objectives (NAAQOs) have been determined for five air pollutants monitored by NAPS (Table 2). Three levels of NAAQOs have been defined: ‘maximum desirable,’ ‘maximum acceptable,’ and ‘maximum tolerable.’

Table 2
National Ambient Air Quality Objectives[1]

Pollutant	Averaging period	Concentration: Maximum desirable	Concentration: Maximum acceptable	Concentration: Maximum tolerable
		parts per million		
Sulphur dioxide	annual	0.010	0.020	..
	24-hour	0.006	0.110	0.31
	1-hour	0.170	0.340	..
Carbon monoxide	8-hour	5.000	13.000	17.00
	1-hour	13.000	31.000	..
Nitrogen dioxide	annual	0.030	0.050	..
	1-hour	..	0.210	0.53
Ozone	annual	..	0.015	..
	1-hour	0.050	0.080	0.15
		micrograms per m^3		
Suspended particulate	annual	60	70	..
	24-hour	..	120	400

Note:
1. Conditions of 25°C and 101.32kP are used for the basis for conversion from micrograms per m^3 to parts per million or parts per billion.
Source:
Environment Canada, 1996, *Guideline for the Index of the Quality of the Air*, Report EPS 1/AP/3, Ottawa.

These three levels correspond to degrees of damage to the environment and health (section 2.1–**Potential impacts on human health**). The ‘maximum acceptable’ objective is intended to provide adequate protection against adverse effects on human health, animal health, vegetation, soil, water, materials and visibility. The ‘maximum tolerable’ objective defines concentrations of air contaminants where action is required to protect human health and the environment. Levels that exceed the maximum tolerable objective require immediate attention to improve air quality.[1]

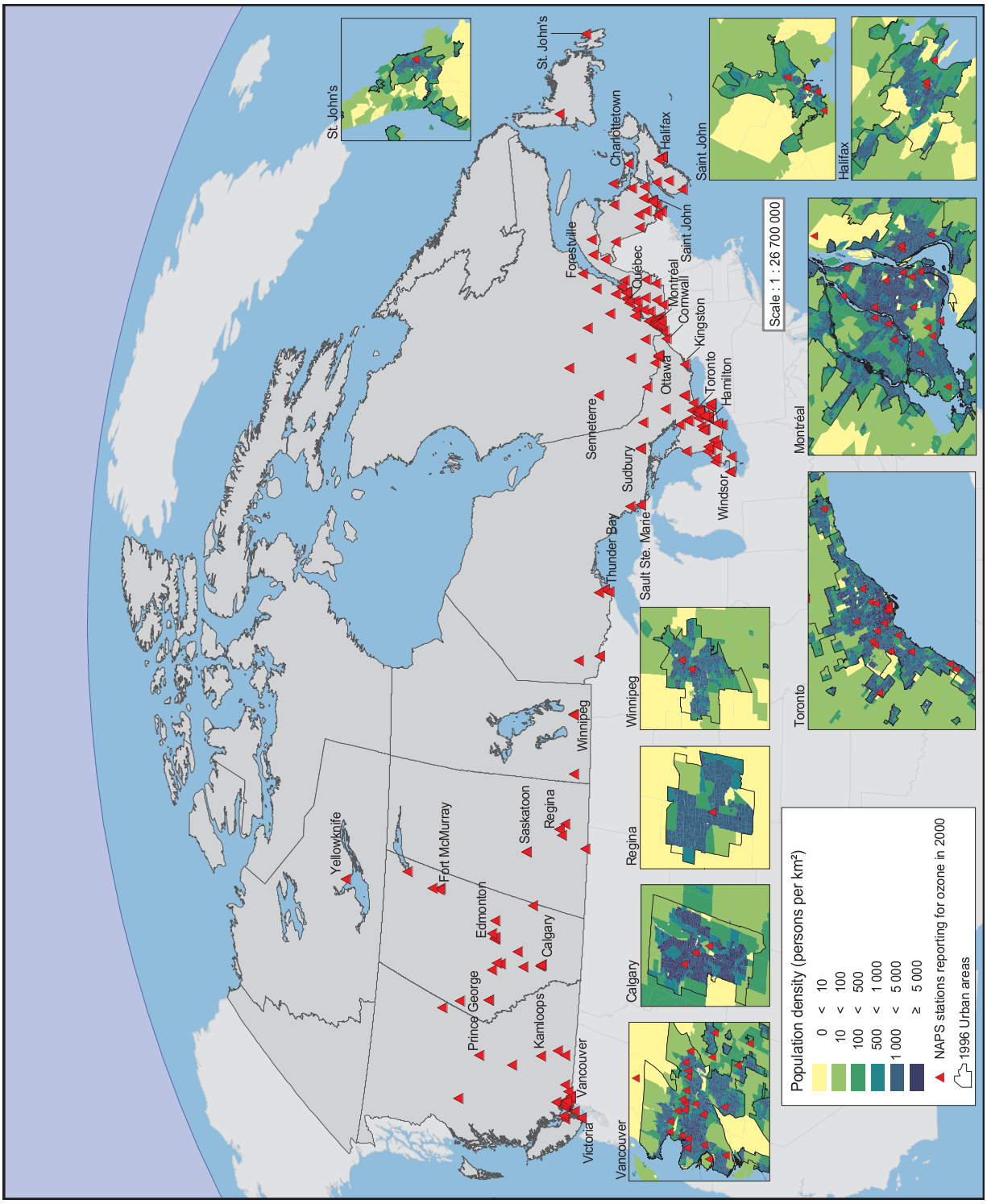
Generally, if concentrations are below the ‘maximum acceptable’ levels for much of the time, the population is considered to be adequately protected. Data are often presented as a percent of NAAQO standards: if levels above 100% of the maximum acceptable levels are reached, the population is considered to be at possible risk.

Index of the Quality of the Air

The Index of the Quality of the Air (IQUA) has also been created using the NAAQOs for Canada. In this index, air pollution is evaluated and rated as ‘good,’ ‘fair’ or ‘poor.’ The evaluations are derived from measuring the five air pollutants monitored by NAPS, averaged over periods ranging from of 1 to 24 hours in length.

1. Environment Canada, 1996, *Guidelines for the Index of the Quality of the Air,* Environmental Protection Series, Report EPS 1/AP/3, Ottawa.

Map 1
National Air Pollution Surveillance (NAPS) Stations and Population Density by Enumeration Areas, 1996



Source:
Environment Canada, Pollution Data Branch,
Statistics Canada, Environment Accounts and Statistics Division, and Census of Population.

NAPS, NAAQOs and the IQUA are commonly used to describe Canada's air quality. Given the large number of monitoring stations and difficulties in attributing the measurements from a specific NAPS station to a given geographic area, data are often aggregated to the national level. Although this aggregration may conceal specific regional trends, it does provide a snapshot of general air quality trends in the country.

Trends in Canadian air quality monitoring

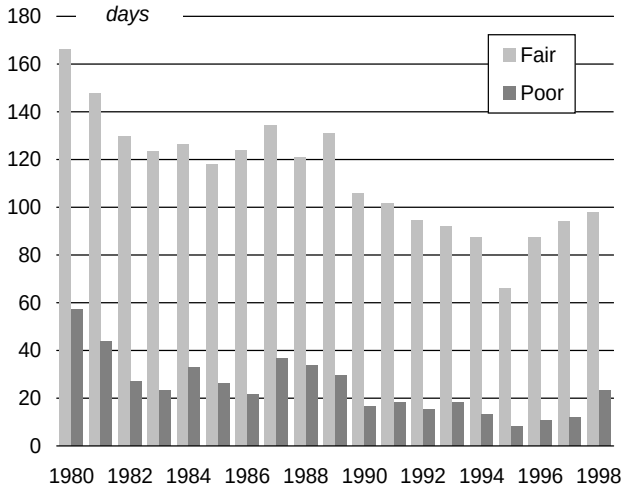
The IQUA is a useful index for analysing overall air quality trends in Canada. Although there has been significant variation in the last two decades, the number of good days has generally increased (Table 3). The number of fair and poor days has generally declined since the early 1980s; however, between 1996 and 1998, the number of poor days increased (see Figure 1). This increase has been attributed

Table 3
Air Quality Index[1,2] for Selected Cities, 1990 to 1998

City/Air quality index	1990	1991	1992	1993	1994	1995	1996	1997	1998
	number of days[3]								
St. John's, Nfld.Lab.									
Poor	0	0	0	0	1	0	0	0	0
Fair	25	21	15	2	0	8	8	2	12
Good	340	344	351	363	364	357	357	363	353
Halifax, N.S.									
Poor	..	..	..	1	1	1	..	..	0
Fair	..	..	..	23	22	30	..	..	40
Good	..	..	..	341	342	334	..	..	325
Montréal, Que.									
Poor	3	4	7	3	3	5	3	6	16
Fair	76	60	75	59	53	86	66	68	102
Good	286	301	283	303	309	274	297	291	247
Québec, Que.									
Poor	0	0	14	0	1	4	0	1	6
Fair	52	72	87	70	42	41	39	31	53
Good	313	293	264	295	322	320	326	333	305
Ottawa, Ont.									
Poor	1	4	4	9	3	3	1	2	1
Fair	65	50	59	48	48	53	45	45	81
Good	299	310	303	308	314	309	319	318	282
Toronto, Ont.									
Poor	16	29	9	12	14	18	12	10	18
Fair	136	155	90	110	168	116	97	130	142
Good	213	181	266	243	183	231	256	225	206
Hamilton, Ont.									
Poor	28	31	19	22	22	..	20	19	18
Fair	138	142	112	121	133	..	160	144	183
Good	199	193	236	222	210	..	185	202	164
Winnipeg, Man.									
Poor	15	23	13	3	0	..	3	6	13
Fair	103	68	48	53	61	..	51	65	73
Good	247	274	304	309	304	..	311	294	280
Regina, Sask.									
Poor	19	0	19	6	0	..	6	0	12
Fair	102	58	55	43	59	..	59	63	65
Good	244	307	291	315	306	..	300	302	288
Edmonton, Alta.									
Poor	0	14	15	12	18	..	14	24	27
Fair	158	117	151	136	135	..	68	120	150
Good	207	234	199	216	213	..	283	221	188
Calgary, Alta.									
Poor	1	35	18	44	23	..	22	25	51
Fair	149	156	142	121	132	..	119	106	127
Good	216	174	205	200	210	..	224	234	187
Vancouver, B.C.									
Poor	2	7	0	0	1	0	0	0	1
Fair	37	39	26	32	12	8	4	8	12
Good	326	319	339	333	352	357	361	357	353

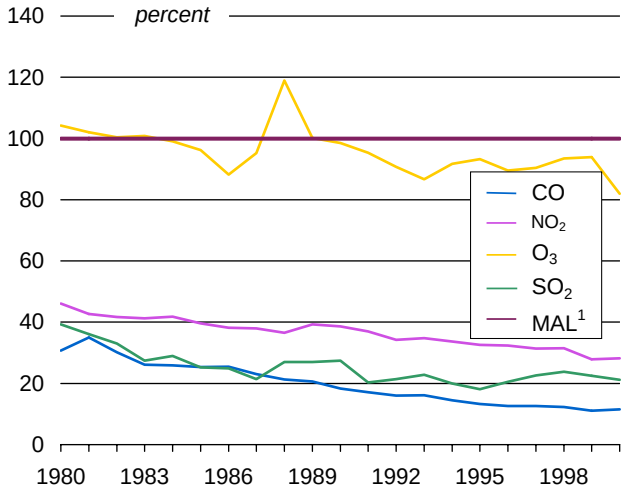
Notes:
In order to calculate an index, complete data for ozone and total suspended particulate matter are the minimum requirement.
1. Air pollution measurements were obtained from the National Air Pollution Surveillance Network.
2. Index of the quality of air converts air pollutant data for SO_2, NO_2, CO, O_3 (ozone) and TSP (total suspended particulate matter) to a common scale. The index is expressed as the number of days of poor-, fair- and good-quality air. TSP data were extrapolated to compute the index.
3. The values in the table represent city averages (from all index sites), normalized for 365 days.
Source:
Environment Canada, 2001, Air Quality Indicators Database.

Figure 1
Air Quality Index, Canada, 1980 to 1998



Source:
Environment Canada, 2001, Air Quality Indicators Database.

Figure 2
Quantities of Common Pollutants as Percentage of NAAQOs, Canada, 1980 to 2000



Note:
1. Maximum acceptable level as defined by the NAAQOs.
Source:
Environment Canada, Pollution Data Branch.

to higher levels of ground-level ozone and particulate matter.[1] When the IQUA is examined by city, the results are quite variable (Table 3). Calgary experienced only 1 poor air quality day in 1990, but 51 in 1998. Air quality in Hamilton improved, from 28 poor days in 1990 to 18 in 1998. Some cities, such as St. John's and Halifax, experienced no more than 1 poor air quality day in any year between 1990 and 1998. Vancouver, Halifax, St. John's and Ottawa were the only cities where more than 75% of each year consisted of good air quality days between 1990 and 1998.

Common air pollutants

The air we breathe comprises about 20% oxygen and about 80% nitrogen by volume. It also contains traces of thousands of other substances, both natural and human-sourced, including chemicals and biological substances (such as pollen). These trace components, either alone or in combination, can have an impact on air quality.

The five most commonly measured air pollutants are sulphur dioxide, carbon monoxide, nitrogen dioxide, ground-level ozone, and particulate matter. A major source of these pollutants is the burning of fossil fuels, such as gasoline, diesel fuel, oil and coal. Other pollutants of concern include toxic metals and compounds, such as lead and benzene.

Sulphur dioxide

Sulphur dioxide (SO_2) occurs naturally in the environment, but is also released from human activities. It is a colourless gas with a strong odour similar to burned matches. The burning at high temperature of fossil fuels containing sulphur creates SO_2. Oil and gas processing, sulphur-rich ore smelting and the burning of coal and oil contribute most of the major human-sourced SO_2. The two industries that produce the most SO_2 are electrical power generation and transportation.

In 2000, SO_2 levels were 21% of the maximum acceptable level.[2] This level represents an 18% drop since 1980 (Figure 2). However, the slight reversal in recent years in this general downward trend is due to a rise in emissions from thermal power generators.[3]

Carbon monoxide

Carbon monoxide (CO) is a toxic, colourless, odourless gas generated primarily from the incomplete combustion of fossil fuels. Although CO is released by natural sources such as volcanoes and forest fires, its most common source is transportation. Levels of CO tend to vary with traffic patterns during the day. Typically, CO concentrations are higher in urban areas than in rural areas.

The amount of CO created by human activities has dropped significantly since the introduction of catalytic converters in

1. Environment Canada, 2001, *Tracking Key Environmental Issues.* Catalogue no. En40-615/2001, Ottawa.

2. Data are often presented as a percent of NAAQO standards. This is calculated by dividing the level of pollutant measured by the NAAQO standard and multiplying by 100.
3. Canadian Institute for Health Information, Canadian Lung Association, Health Canada and Statistics Canada, 2001, *Respiratory Disease in Canada*, Catalogue no. H39-593/200IE, Ottawa.

cars and trucks in the early 1970s. In 1980, CO levels were 31% of the maximum acceptable level, but dropped to just 12% in 2000 (Figure 2).

Although CO levels are generally well below national objectives, it is important to note that CO levels in a given place can vary. Researchers using personal monitoring equipment found that individuals are often exposed to higher CO levels than are indicated at monitoring stations.[1] These results are due to the movement of individuals through different environments with greatly varying CO levels. Environments with the highest levels of CO include the interior of vehicles and the vicinity of combustion sources, such as fireplaces, gas stoves and furnaces in homes.

Nitrogen dioxide

Nitrogen dioxide (NO_2) is a reddish-brown corrosive gas with a strong unpleasant odour. When inhaled in high concentrations, NO_2 can narrow the airways and cause breathing difficulties, particularly for individuals with asthma or lung disease. NO_2 is generated through high-temperature combustion processes, including transportation and industrial fuel combustion. Given these sources, NO_2 levels are typically higher in urbanized areas.

There has been a general decline in concentrations of NO_2 across Canada. In the 20-year period between 1980 and 2000, annual NO_2 concentrations as a percent of the NAAQO maximum acceptable level dropped from 46% to 28% (Figure 2). Although concentrations of NO_2 are generally well below the national objectives, this is the pollutant most often linked to health problems.[2]

Ground-level ozone

Ground-level ozone, a colourless gas with a strong smell, is the primary component of the smog that has become a significant air pollution problem in several Canadian urban areas (Text Box 2). Ground-level ozone, which is produced by the sun's photochemical action with volatile organic compounds (VOCs) and nitrogen oxides (NO_x), should not be confused with stratospheric ozone, which is a thin layer of naturally occurring gas situated between 18 and 35 kilometres above the earth's surface.

Given that the production of ground-level ozone is dependant on sunlight and temperature, concentrations are at their highest during sunny days in the summer, particularly in the afternoon. Stratospheric ozone can also be a contributor to ground-level ozone: under specific weather conditions, stratospheric ozone can be transported from the upper atmosphere to the earth's surface.[3]

1. Toronto Public Health, 2000, *Toronto's Air: Let's Make It Healthy*, Toronto.
2. *Ibid.*
3. Greater Vancouver Regional District Air Quality Department, 1998, *Trends in Ambient Air Quality in Greater Vancouver 1987–1996.*

Text Box 2
Smog

The term 'smog' was coined more than four decades ago to describe a mixture of smoke and fog in the air. Today, smog refers to a mixture of air pollutants, including vapours, gases and particles, that can often be seen as a yellowish-brown haze in the air.

The two main components of smog in Canadian air are ground-level ozone and fine airborne particles. Ozone is produced by the sun's photochemical action on volatile organic compounds (VOCs) and nitrogen oxides. Human activity-sourced VOCs include car exhaust and vapours from gasoline pumps, oil-based paints and solvents. Forests are the main source of naturally occurring VOCs.

Canada's current maximum acceptable concentration for ground-level ozone is 82 parts per billion over a one-hour period. This concentration has been exceeded many times in the last two decades (Table 4).

Smog makes breathing more difficult for small children and the elderly, and it can aggravate the conditions of patients suffering from cardiorespiratory diseases. Even healthy young adults breathe less efficiently on days with heavy smog, especially if they are exercising outdoors. Canada's smog season usually lasts from May to September and is particularly visible in three regions of the country:

- In the Windsor–Québec corridor, much of the smog is generated locally. However, air pollution from the United States contributes up to about 50% of the ground-level ozone in southern Ontario.
- In Atlantic Canada, parts of Nova Scotia and New Brunswick receive air pollution from the eastern United States. Cross-border pollution contributes between 50% and 80% of the region's smog.
- In the Lower Mainland of British Columbia, 80% of ground-level ozone originates from local sources.

Source:
Environment Canada, 1997, *Canadian smog facts*, <http://www.ec.gc.ca/press/smog2_b_e.htm> (accessed July 8, 2002).

Generally, concentrations of ground-level ozone have declined slightly but still remain close to the maximum acceptable levels. In 1980, national ground-level ozone concentrations exceeded the NAAQO maximum acceptable level by 4%; by 2000, levels were 18% below the maximum acceptable level (Figure 2).

Ground-level ozone is more problematic in some specific regions of the country. The pollutant is a concern principally in the Windsor–Québec corridor, and to a lesser extent in Atlantic Canada and the Lower Mainland of British Columbia (Table 4).

Table 4
Number of Days with Ground-level Ozone Levels that Exceed NAAQO Objectives,[1] Selected Regions, 1980 to 1996

	Region				
Year	Atlantic Canada	Lower Mainland of B.C.	Prairies	Windsor–Québec corridor	Canada
	average number of days				
1980	2.0	4.2	0.7	8.0	5.3
1981	0.0	9.3	2.3	7.6	6.3
1982	4.0	3.0	1.7	4.5	3.6
1983	..	2.5	0.4	9.6	6.8
1984	17.0	1.2	1.8	4.8	4.1
1985	0.5	2.4	0.3	4.8	3.2
1986	0.0	1.5	0.3	4.4	3.0
1987	3.0	0.4	0.4	7.1	4.2
1988	3.5	4.5	0.9	17.1	10.5
1989	3.0	0.4	0.9	6.6	4.1
1990	2.0	2.8	0.6	4.0	2.9
1991	5.5	0.0	0.5	8.2	5.1
1992	0.5	0.0	0.0	2.2	1.4
1993	0.3	0.0	0.1	2.1	1.2
1994	1.0	0.5	0.6	3.3	2.1
1995	0.0	0.0	0.3	5.6	3.0
1996	0.0	0.0	0.1	2.9	1.6

Note:
1. The table shows the annual average number of days on which Canadian urban monitoring stations measured ozone levels exceeding the national maximum acceptable objective (i.e., 82 parts per billion for one-hour average levels) for at least one hour during the day, from May to September.
Source:
Environment Canada, 1999, *Urban Air Quality*, National Environmental Indicator Series, SOE Bulletin no. 99-1, Ottawa.

However, ozone can also be a problem in rural areas as a result of meterologic and geographic influences. Table 5 shows the 10-year trend for ambient annual ozone means in various communities in Ontario. The highest levels are often found in smaller towns surrounded by rural areas, such as Tiverton, Simcoe, Long Point and Grand Bend, whereas lower levels are found in large cities, such as Toronto, Hamilton and Ottawa. However, urban areas typically have more extreme events caused by ozone than their rural counterparts and also experience smog, an important by-product of ozone (Text Box 2).

Suspended particulate matter

Particulate matter (PM) is a broad category of air pollutants that includes a range of small solids or liquids varying in size and chemical composition. Total suspended particulate matter (TSP) refers to all particles. PM_{10} refers to particulate matter with particles that are 10 microns or less in size; $PM_{2.5}$ comprises particles that are 2.5 microns or less in size. The size of these particles is important, since at this size they can make their way into the human lung. The smallest particles, those in $PM_{2.5}$, are considered the most dangerous because they can penetrate deeply into the lungs.

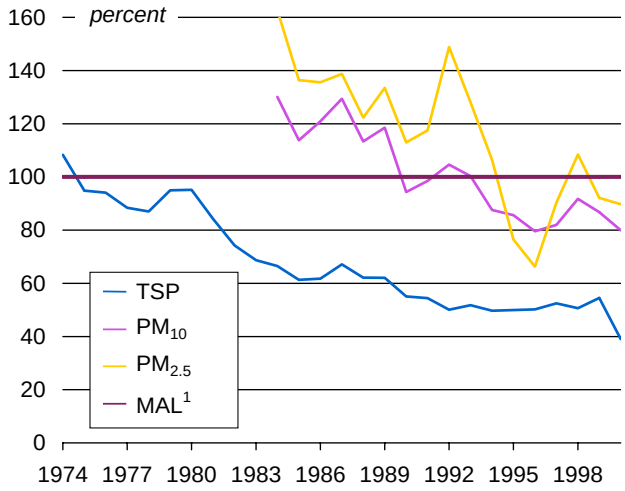
Suspended particulates are either naturally occurring (e.g., sea salt, dust, pollen, smoke and volcanic ash) or produced by human activities, such as transportation, mining opera-

Table 5
10-Year Trend for Ambient Annual Ozone Means in Communities in Ontario, 1989 to 1998

Community	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
	parts per billion									
Cornwall	20.4	21.2	20.7	20.8	21.6	21.7	23.5	21.0	22.8	24.2
Etobicoke	16.9	16.4	19.0	15.4	16.0	17.4	16.3	17.1	19.4	20.2
Grand Bend	28.0	27.4	n/a	29.7	31.3	30.2	31.3	31.9	31.2	31.2
Hamilton	16.7	17.6	19.9	16.9	16.9	17.0	18.0	17.3	18.1	19.1
Kitchener[1]	19.9	..	27.2	22.7	23.2	24.4	25.1	23.8	23.4	25.4
London[2]	22.9	22.1	22.7	20.3	22.8	23.1	21.7	23.1	22.8	25.1
Long Point	35.7	33.0	33.9	32.3	31.2	32.2	31.0	34.4	35.2	32.9
Mandaumin	28.4	23.7	28.1	23.5	24.5	24.6	24.0	23.4	27.9	29.9
Merlin	27.2	26.0	28.4	24.3	23.7	24.2	28.0	28.6	27.0	28.4
Mississauga	18.6	17.8	18.6	15.6	16.1	19.5	19.2	19.4	20.0	20.8
Oakville	22.1	22.2	22.1	19.3	21.0	22.5	20.4	21.1	20.8	21.8
Oshawa	21.9	18.8	22.6	20.3	21.4	23.8	22.7	21.9	23.2	23.1
Ottawa	20.9	21.5	20.8	17.4	18.1	19.7	20.9	18.9	20.6	19.1
Sarnia	25.3	21.4	23.4	21.3	22.6	21.4	22.2	25.2	24.5	26.1
Scarborough	17.9	17.6	19.1	14.3	17.0	18.2	19.3	18.9	18.0	20.6
Simcoe	28.6	26.3	29.1	25.1	27.8	30.2	30.7	29.9	28.6	31.1
St. Catharines	20.8	23.8	25.0	19.3	23.9	23.6	20.5	20.3	20.9	20.8
Stouffville	28.1	24.9	25.0	23.0	23.0	25.3	24.4	26.4	30.1	31.4
Sudbury	28.9	27.2	27.0	25.4	25.9	27.1	29.7	28.1	28.0	29.1
Tiverton	33.1	31.3	34.2	33.4	32.2	31.7	31.6	32.0	32.5	32.2
Toronto	16.9	15.7	18.0	12.5	14.6	16.9	16.6	12.2	13.7	17.8
Windsor	20.6	17.1	17.6	15.1	17.1	18.0	18.3	20.4	20.7	21.4
Composite Mean	23.4	21.8	24.3	21.2	23.1	23.9	23.4	23.4	24.1	25.1

Notes:
1. Kitchener site changed location from Edna/Fredrick (26029) to West/Homewood (26060) in 1990.
2. London site changed from King/Rectory (15001) to 900 Highbury (15025) in 1990.
Source:
Ontario Ministry of the Environment, 2001, *Air Quality Report 1998*, Toronto.

Figure 3
Quantities of Total Suspended Particulates as Percentage of NAAQO, Canada, 1974 to 2000



Notes:
The trends for both PM_{10} and $PM_{2.5}$ are based on a limited sample.
1. Maximum acceptable level as defined by NAAQOs.
Source:
Environment Canada, Pollution Data Branch.

tions, thermal power generation and incineration. In cities, the major sources of PM are motor vehicle exhaust and road dust.

In 1974, TSP levels exceeded the maximum acceptable level by 8%. Levels for 2000 were 61% lower than the maximum acceptable level (Figure 3). However, levels of $PM_{2.5}$ and PM_{10} did not drop as drastically, remaining much closer to the maximum acceptable level. Between 1985 and 2000, $PM_{2.5}$ levels dropped from 136% to 90% of the maximum acceptable level. PM_{10} levels exceeded the maximum acceptable level by 14% in 1985; however, by 2000 levels had dropped to around 80%.

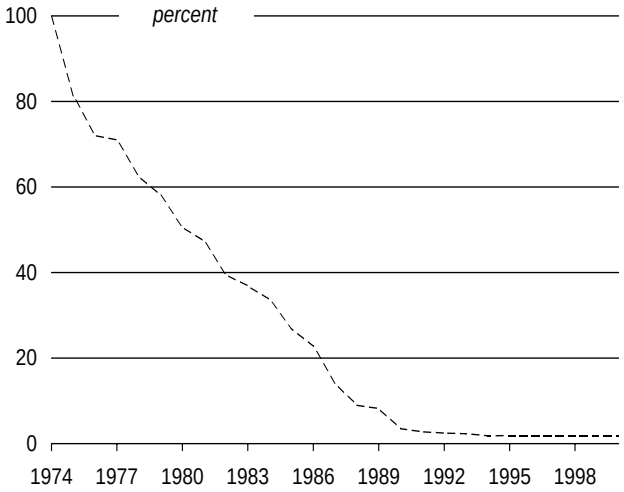
Toxic air pollutants

Lead

Lead is a neurotoxin, meaning it can negatively affect the nervous system. Negative impacts include a variety of developmental and behavioural impacts, particularly in children under 6 years of age.

Since the introduction of unleaded fuels, ambient levels of lead have decreased significantly. In 1974, lead levels in Canada were a significant concern (Figure 4). However, by 1992, lead levels had dropped drastically to only 2% of the 1974 level. Lead levels have since remained at 2% for several years. The drastic decline of lead since the early 1970s is viewed as one of the major accomplishments in Canadian air quality.

Figure 4
Quantities of Lead as Percentage of 1974 Levels, 1974 to 2000



Source:
Environment Canada, Pollution Data Branch.

Benzene

Benzene is linked to such ailments as leukemia and anemia. It is a naturally occurring substance that is found in petroleum products, such as gasoline. For this reason benzene concentrations at gasoline service stations are higher than average city concentrations and are typically higher in cities than in rural areas.

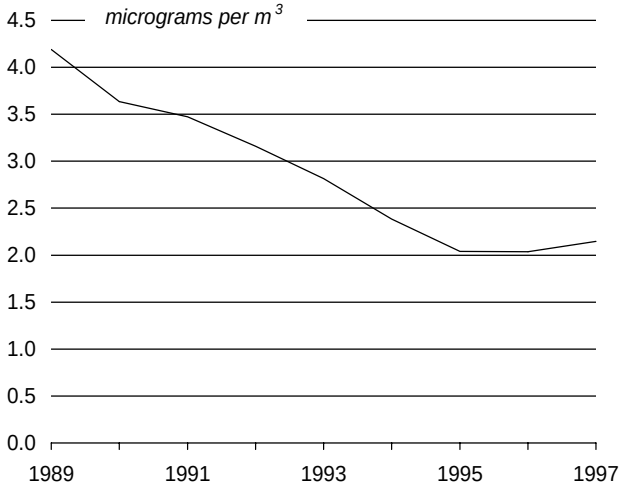
Between 1989 and 1997, concentrations of benzene in Canada dropped by 50% to 2.1 micrograms per m^3 (Figure 5). Whether these levels are acceptable is unknown as there are no Canada-wide standards for benzene. The federal and provincial governments are currently developing standards for benzene.[1]

1.2 Indoor air quality

Indoor air quality is an important occupational and environmental health issue, since most Canadians spend about 90% of their time indoors.[2] The trend toward energy conservation measures and more tightly sealed buildings in recent decades has resulted in an increase in complaints related to indoor air quality.[3] Given the specific and highly localized nature of indoor air quality, there are no national or regional data. Indoor air quality assessments are done for specific buildings at the expense of the owner.

1. Environment Canada, 1999, *Urban Air Quality,* National Environmental Indicator Series, SOE Bulletin 99-1, Ottawa.
2. Health Canada, 1998, *The Health and Environment Handbook for Health Professionals*, Ottawa.
3. Health Canada, 1995, *Office Air: A Worker's Guide to Air Quality in Offices, Schools and Hospitals,* Report no. 93-EHD-174 (revised), Ottawa.

Figure 5
Annual Average Levels of Benzene, 1989 to 1997



Source:
Environment Canada, Environmental Technology Centre, Ottawa.

Indoor air pollutants range from colourless, odourless gases, such as carbon monoxide and radon, to cooking odours, wood smoke, dust and tobacco smoke. Other common irritants and health hazards include formaldehyde, polycyclic aromatic hydrocarbons and other compounds, as well as molds, fungi and viruses. Common sources of indoor air pollution include combustion of fossil fuels, carpets, pets, damp materials, furnishings and consumer products (e.g., glues, cleaning materials, adhesives, paints, solvents and pesticides). Outdoor air pollution and the growing use of modern office equipment (e.g., photocopiers, laser printers and computers) also contribute to indoor air quality problems.[1,2] The four major factors that affect the quality of indoor air are described in Text Box 3.

The Federal–Provincial Advisory Committee on Environmental and Occupational Health has produced guidelines for indoor air quality.[3] These guidelines are not mandatory or enforceable as standards. Their objective is to assist individuals and public agencies in making scientific judgments regarding indoor air quality. In the longer term it is anticipated that the national guidelines will be used as a basis for developing or modifying building codes, product standards for construction material, and requirements for furnishing and ventilation. Exposure levels are recommended for a variety of substances, including aldehydes,

1. Health Canada, 1995, *Office Air: A Worker's Guide to Air Quality in Offices, Schools and Hospitals,* Report no. 93-EHD-174 (revised), Ottawa.
2. Health Canada, 1998, *The Health and Environment Handbook for Health Professionals*, Ottawa.
3. Health Canada, 1995, *Exposure Guidelines for Residential Indoor Air Quality: A Report of the Federal–Provincial Advisory Committee on Environmental and Occupational Health,* Catalogue no. H46-2/90-156E, Ottawa.

Text Box 3
Factors influencing indoor air quality

Potential contaminant sources
Indoor air contaminants can originate within a building or be drawn in from the outdoors.

- Air contaminants entering a building from outside include vehicle exhaust, pollen, dust, industrial pollutants, emissions from garbage dumpsters, soil gas (radon), pesticide drift, and microbial growth such as mold and mildew promoted by moisture or standing water on rooftops or in crawl spaces.
- Air contaminants within a building include emissions from office equipment, office supplies, shops, laboratories and elevator motors; and dust, fibres and chemicals released from personal and housekeeping products, paint, building components and furnishings.

Heating, ventilation and air-conditioning (HVAC) systems
When a building's HVAC system is not able to control air contaminants while ensuring a comfortable environment for the occupants, indoor air quality is compromised. The HVAC system consists of all heating, cooling and ventilation equipment servicing a building, including furnaces/boilers, chillers, cooling towers, air-handling units, exhaust fans, duct work, filters and hot-water piping.

When functioning properly, the HVAC system provides a building's occupants with comfortable temperature and humidity conditions and enough outdoor air to meet ventilation needs. It also isolates and removes odours and contaminants. Air quality problems can occur with an inadequate distribution of fresh air in the ventilation system, dust in the duct work, dirty air filters, or microbiological growth (e.g., mold) in the ductwork and/or humidifiers.

In regions that experience cold outdoor climates, modern HVAC systems often reduce the supply of fresh outdoor air to save on heating costs. This can lead to an increase in indoor air pollution levels.

Pollutant pathways
When one or more pathways connect an internal or external pollution source with the occupants of a building, indoor air quality problems can develop. The physical layout of the building, along with the HVAC system, will determine the most important pathway for air movement in the building. However, all of the building's components interact to affect the distribution of contaminants, including walls, ceilings, floors, HVAC equipment and occupants.

Natural forces exert an important influence on air movement within and between a building's interior and exterior. Wind can sometimes overpower a building's mechanical system and disrupt air circulation and ventilation, leading to indoor air quality problems.

Source:
U.S. Environmental Protection Agency, *Indoor Air Quality*, <http://www.epa.gov/iaq/index.html> (accessed April 30, 2002).

carbon dioxide, carbon monoxide, nitrogen dioxide, ozone, particulate matter, sulphur dioxide, water vapour, radon and formaldehyde.

1.3 Air pollutant emissions

Environment Canada is the federal agency responsible for monitoring emissions of air pollutants in Canada. It manages both the National Emissions Inventory of Criteria Air Contaminants and the National Pollutant Release Inventory.

National Emissions Inventory of Criteria Air Contaminants

The National Emissions Inventory of Criteria Air Contaminants is produced every five years in conjunction with the provincial and territorial ministries of energy and environment. It provides estimates of Canadian emissions for over 60 industrial and non-industrial activities. The most recent available version (1995) contains estimates for five common contaminants: particulate matter, sulphur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOCs) and carbon monoxide (CO). These emissions come from a number of sources, including industrial production, combustion of fossil fuels, road transportation, incineration and open sources (e.g., agriculture, construction and mining). These contaminants are of concern because they may affect human health and ecosystems. Based on the 1995 inventory (Table 6), the leading contributors to emissions of these five contaminants are described below.[1]

Particulate matter

As noted in section 1.1–**Outdoor air quality / Suspended particulate matter**, suspended particulate matter is classified by size. As shown in Table 6, for 1995, 94% of total particulate matter was attributable to open sources, especially dust from paved and unpaved roads (60%). The majority of $PM_{2.5}$ emissions came from forest fires (39%) and paved and unpaved roads (28%). Residential wood burning also accounted for a substantial percentage of total emissions.

Sulphur oxides (SO_x)

Sulphur oxides are produced mostly by industrial activity, which was responsible for 73% of total emissions in 1995.

1. With the exception of particulate matter, which is derived almost exclusively from open sources, the percentages provided for the contaminants exclude open sources so as to better illustrate the contributions that certain categories of point sources make to total emissions.

Table 6
Criteria Air Contaminant Emissions, 1995

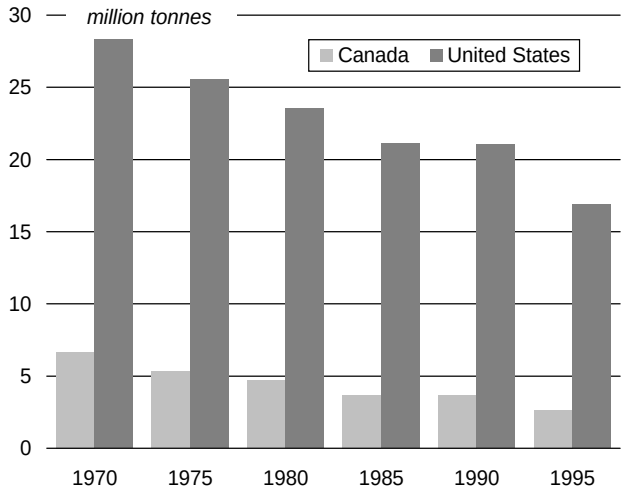
Emission category / Sector	Particulate matter[1]			SO_x[4]	NO_x[5]	VOCs[6]	CO
	Total	PM_{10}[2]	$PM_{2.5}$[3]				
	tonnes						
Industrial fuel combustion and processes							
Abrasives manufacture	784	361	254	2 827	187	1 481	519
Aluminum industry	11 758	7 787	5 331	46 236	1 058	963	297 931
Asbestos industry	80	48	25	763	240	1	23
Asphalt paving industry	32 930	5 460	1 950	2 384	2 014	3 318	1 423
Bakeries	0	0	0	0	5	6 005	0
Cement and concrete industry	21 079	8 486	3 769	33 984	32 168	438	27 995
Chemicals industry	4 495	2 611	1 391	6 430	24 118	9 403	6 708
Clay products industry	2 576	622	181	34	128	3	29
Coal mining industry	11 663	8 849	6 265	5 321	3 232	1 762	105
Ferrous foundries	667	448	362	1 673	28	1 807	3 581
Grain industries	58 274	11 729	1 742	1	31	2	6
Iron and steel industries	20 672	10 813	7 085	62 801	25 490	28 277	738 991
Iron ore mining industry	39 412	21 290	7 625	54 650	7 767	839	23 813
Mining and rock quarrying	86 016	11 508	3 223	20 770	14 578	688	3 430
Non-ferrous mining and smelting industry	15 630	13 159	9 845	891 720	3 532	75	399
Oil sands	3 937	1 787	1 407	160 948	16 542	81	1 447
Other petroleum and coal products industry	324	121	57	578	418	88	22
Paint and varnish manufacturing	124	99	35	0	18	1 957	3
Petrochemical industry	1 310	660	265	1 275	11 598	16 523	15 766
Petroleum refining	6 522	5 012	3 268	141 086	26 923	47 655	14 101
Plastics and synthetic resins fabrication	162	90	62	272	382	6 684	417
Pulp and paper industry	74 384	50 835	39 337	77 030	58 064	23 283	186 855
Upstream oil and gas industry	2 053	2 005	1 938	387 261	314 905	689 393	55 446
Wood industry	153 697	86 002	52 594	2 621	16 025	47 100	761 207
Other industries	72 623	37 477	23 835	48 953	60 902	52 995	37 052
Subtotal, industrial fuel combustion and processes	**621 171**	**287 258**	**171 849**	**1 949 617**	**620 351**	**940 821**	**2 177 266**

Table 6
Criteria Air Contaminant Emissions, 1995(continued)

Emission category / Sector	Particulate matter[1]			SO_x[4]	NO_x[5]	VOCs[6]	CO
	Total	PM_{10}[2]	$PM_{2.5}$[3]				
	tonnes						
Non-industrial fuel combustion							
Commercial fuel combustion	3 402	3 004	2 720	13 014	29 349	1 730	6 052
Electric power generation (utilities)	78 797	34 874	18 633	534 323	254 985	2 980	25 359
Residential fuel combustion	4 829	3 996	3 730	17 270	36 699	2 311	13 915
Residential fuelwood combustion	137 840	137 268	131 797	1 837	12 176	400 092	1 033 294
Subtotal, non-industrial fuel combustion	**224 868**	**179 141**	**156 881**	**566 445**	**333 210**	**407 112**	**1 078 622**
Transportation							
Air transportation	2 018	1 115	787	2 263	34 026	11 636	61 758
Heavy-duty diesel vehicles	32 075	32 075	29 498	32 807	378 300	48 540	224 438
Heavy-duty gasoline trucks	545	528	414	588	15 073	11 814	164 787
Light-duty diesel trucks	1 304	1 304	1 203	1 535	5 567	2 600	4 626
Light-duty diesel vehicles	379	379	347	632	1 978	747	1 667
Light-duty gasoline trucks	2 586	2 509	1 986	4 399	112 437	142 425	1 461 808
Light-duty gasoline vehicles[7]	4 870	4 717	3 256	11 048	273 396	355 873	3 558 667
Marine transportation	8 438	8 129	7 379	58 000	118 578	37 449	103 310
Motorcycles	16	16	11	34	630	2 027	10 873
Off-road use of diesel	17 081	17 081	15 714	16 149	209 231	22 581	66 365
Off-road use of gasoline	4 414	3 867	3 393	1 005	25 395	93 111	1 027 393
Rail transportation	19 492	19 492	17 933	7 226	115 604	5 608	22 022
Tire wear and brake linings	4 362	4 313	1 353	0	0	0	0
Subtotal, transportation	**97 580**	**95 524**	**83 276**	**135 686**	**1 290 214**	**734 412**	**6 707 715**
Incineration							
Crematorium	3	2	1	3	19	0	8
Industrial and commercial incineration	70	51	38	603	752	690	2 573
Municipal incineration	435	370	355	457	1 298	703	1 898
Wood waste incineration	1 846	1 015	738	42	318	4 568	41 360
Other incineration and utilities	157	38	16	149	163	294	818
Subtotal, incineration	**2 510**	**1 476**	**1 149**	**1 253**	**2 550**	**6 255**	**46 656**
Miscellaneous							
Cigarette smoking	962	962	962	0	8	8	3 124
Dry cleaning	0	0	0	0	1	7 832	0
Fuel marketing	30	30	30	2	256	98 498	127
General solvent use	0	0	0	0	0	274 926	0
Marine cargo handling industry	3 074	1 385	416	0	0	1	0
Meat cooking	1 594	1 594	1 583	0	0	0	0
Pesticides and fertilizer application	10 516	5 153	1 472	0	792	66	0
Printing	0	0	0	0	0	29 058	0
Structural fires	5 297	5 244	4 768	0	10	5 147	10 988
Surface coatings	0	0	0	0	0	134 194	0
Subtotal, miscellaneous	**21 472**	**14 368**	**9 232**	**2**	**1 068**	**549 731**	**14 239**
Open sources							
Agriculture (animals)	248 734	141 041	22 280	0	0	12 982	0
Agriculture (tilling and wind erosion)	1 754 440	848 408	20 664	0	0	0	0
Construction operations	2 402 115	528 449	10 707	0	0	0	0
Dust from paved roads[8]	2 549 526	511 159	129 517	0	0	0	0
Dust from unpaved roads[8]	6 833 650	2 020 663	300 644	0	0	0	0
Forest fires	835 391	706 095	585 048	478	211 027	902 444	6 772 432
Landfill sites	4 735	379	94	0	0	5 139	0
Mine tailings	46 858	3 749	937	0	0	0	0
Prescribed burning	41 415	32 986	26 872	92	5 551	16 306	330 906
Subtotal, open sources	**14 716 862**	**4 792 926**	**1 096 763**	**569**	**216 578**	**936 871**	**7 103 338**
Grand total	**15 684 465**	**5 370 694**	**1 519 149**	**2 653 571**	**2 463 971**	**3 575 202**	**17 127 836**

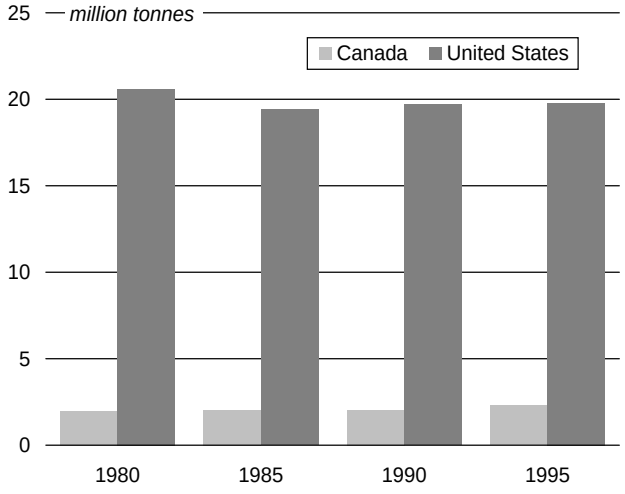
Notes:
Figures may not add up to totals due to rounding.
The 1995 Criteria Air Contaminants Inventory was compiled using the latest technical and statistical information and, with the exception of SO_x emissions estimates, is not comparable with earlier inventories.
1. Comprises solid and liquid particles released into the atmosphere with an upper-size limit generally considered to be 75 micrometres in aerodynamic equivalent diameter.
2. PM_{10} is the fraction of total particulate matter that is less than or equal to 10 micrometres in aerodynamic equivalent size.
3. $PM_{2.5}$ is the fraction of total particulate matter that is less than or equal to 2.5 micrometres in aerodynamic equivalent size.
4. SO_x comprises all emissions of gaseous sulphur dioxide (SO_2). In some cases, emissions may contain small amounts of sulphur trioxide (SO_3) and sulphurous and sulphuric acid vapour.
5. NO_x comprises gaseous nitrous oxide (NO) and nitrogen dioxide (NO_2).
6. Volatile organic compounds (VOCs) comprise all photochemically reactive hydrocarbon compounds (i.e., those that participate in chemical reactions when exposed to sunlight). They are major contributors to smog in urban areas.
7. The Ontario estimates include emissions from propane vehicles.
8. Work is in progress to improve the estimates for road dust emission.
Source:
Environment Canada, Pollution Data Branch.

Figure 6
Sulphur Dioxide Emissions, Canada and the United States, 1970 to 1995



Note:
The data labelled as 1975 for Canada are actually from 1976.
Source:
Environment Canada, 1998, *1997 Canadian Acid Rain Assessment, Volume 1: Summary of Results*, Downsview, Ontario.

Figure 7
Nitrogen Oxide Emissions, Canada and the United States, 1980 to 1995



Source:
Environment Canada, 1998, *1997 Canadian Acid Rain Assessment, Volume 1: Summary of Results*, Downsview, Ontario.

Two industries—non-ferrous metal smelting and refining, and oil and gas extraction—were the leading contributors in this category, with 34% and 15% of total emissions, respectively. Another 21% of the emissions were from non-industrial combustion, such as thermal-electric power generation. Emissions of sulphur dioxide (SO_2) in Canada and the United States have been falling steadily since the early 1970s (Figure 6). SO_2 and nitrogen oxides are largely responsible for the acid rain that affects our lakes and forests. Although emissions in Canada were halved between 1980 and 1995, the latest scientific studies have shown that ecosystems are taking much longer to recover than expected and that the steps we have taken to date will not be enough to protect our most sensitive lakes and forests.

Nitrogen oxides (NO_x)

Nitrogen oxides are important precursors in the formation of ground-level ozone (a key component of smog) and acid rain. They form mainly as a result of fossil fuel combustion. In 1995, the majority of emissions (57%) were attributable to the transportation sector. Industrial sources accounted for 28% of total emissions while non-industrial sources (such as thermo-electric power generation) accounted for 15% of the total. NO_x emissions have remained essentially unchanged since 1980 (Figure 7).

Volatile organic compounds (VOCs)

Volatile organic compounds (another precursor of ozone) react in the presence of light to form ground-level ozone. In 1995, VOC emissions came mostly from the transportation sector (28% of total emissions), the oil and gas extraction industry (26%) and residential fuelwood burning (15%).

Carbon monoxide (CO)

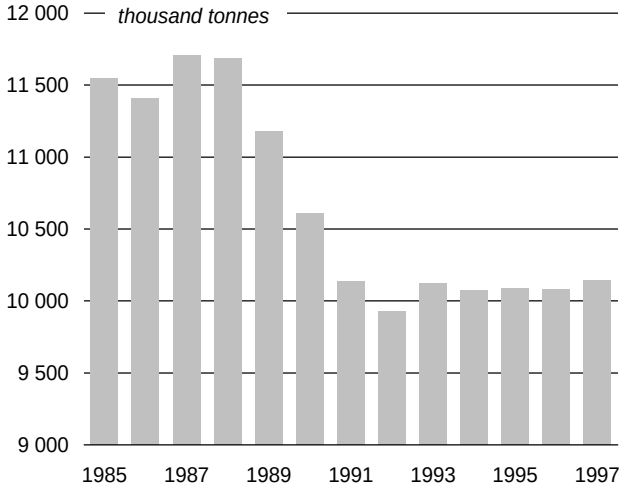
Carbon monoxide is a gas produced mainly by the incomplete combustion of fossil fuels. In 1995, two-thirds of CO emissions in Canada were attributable to the transportation sector. Various industrial sources accounted for 22% of total emissions while residential fuelwood burning alone accounted for 10%. Carbon monoxide emissions declined in the early 1990s and have remained relatively stable since then (Figure 8).

National Pollutant Release Inventory

The National Pollutant Release Inventory (NPRI) was established in 1992 to collect data on pollutants of concern in Canada and to inform Canadians of pollutants released in their communities. The 2000 version of the Inventory covers 268 substances, 55 of which are considered toxic under the *Canadian Environmental Protection Act*. Over 2 000 facilities scattered throughout the provinces and territories of Canada reported releases to the Inventory.

Facilities that meet the following criteria are required to report their releases: employees worked a total of 20 000 hours or more annually (equivalent to 10 full-time employees); the facility manufactured, processed or otherwise used at least 10 tonnes of an NPRI substance; the substance was manufactured, processed or otherwise

Figure 8
Total Carbon Monoxide Emissions Resulting from Human Activity, Canada, 1985 to 1997



Note:
The annual carbon monoxide emission figures for the period 1991 to 1997 are preliminary estimates.
Source:
Environment Canada, Pollution Data Branch.

used at a concentration greater than or equal to 1% by weight, except for NPRI substances considered to be by-products.[1]

Significant changes have been made to the 2000 NPRI, including lowering the minimum reporting threshold for substances that pose a serious threat to human health or the environment when released in small quantities.

In 1999, on-site releases to air accounted for 39% of total on-site releases by weight. Ten percent of those releases were substances declared to be toxic under the *Canadian Environmental Protection Act*. Table 7 shows the top 10 on-site releases to the air for 1999.

2 Effects of air pollution

About 8 000 litres of air pass through the lungs of the average person each day. This air usually includes many substances in addition to the nitrogen, oxygen, carbon dioxide, trace gases and water vapour that constitute 'pure' air. These contaminants run the gamut from dust, pollen, bacteria and yeast to sulphates, carbon monoxide, and volatile organic compounds such as benzene. It is not just

1. NPRI users are cautioned that the Inventory does not cover all releases of pollutants into the environment. For example, releases from mobile sources (automobiles and trucks) are not included, and some facilities do not meet the NPRI reporting threshold because they do not have enough employees or use enough of an NPRI substance. Collectively, however, such facilities may release the majority of certain pollutants.

Table 7
Top 10 On-site Releases to Air, 1996

Substance	Releases	As share of total
	tonnes	percent
Methanol	20 566.7	16.2
Ammonia (total)[1]	17 314.1	13.6
Hydrochloric acid	11 630.6	9.1
Sulphuric acid	9 369.2	7.4
Hydrogen sulphide	7 976.5	6.3
Toluene	7 191.4	5.6
Xylene (mixed isomers)	6 909.7	5.4
Zinc (and its compounds)	709.8	0.6
Nitrate ion in solution at pH >= 6.0	71.8	0.1
Calcium fluoride[2]	19.5	0.0

Note:
1. Refers to the total of both ammonia (NH_3) and ammonium ion (NH_4^+) in solution.
2. CEPA-toxic or carcinogenic.
Source:
Environment Canada, Pollution Data Branch, National Pollutant Release Inventory Database, <http://www.ec.gc.ca/pdb/npri/> (accessed February 1, 1999).

humans who can suffer from the effects of air pollution. Impacts on the environment can range from physical damage to plants to lake acidification resulting from the deposition of airborne acidic pollutants.

2.1 Potential impacts on human health

One of the most notorious illustrations of the negative impacts of air pollution is Britain's Great London Smog,[2] which occurred when a temperature inversion trapped soot, sulphur dioxide and other noxious gases. It is estimated that over 4 000 people died as a result of this event, which lasted from December 5 to 9, 1952. In addition to the human suffering, cattle in the area were reported to have been asphyxiated. At its worst, the smog reduced visibility to a few metres (pedestrians could not find their way through it at night) and the concentration of smoke in the air was recorded at 4.46 milligrams per m^3. This level of pollution was more than 10 times the current 24-hour maximum acceptable concentration of 0.4 milligrams per m^3 for total suspended particulates in Canada.

Several factors contributed to this exceptional pollution event, including colder-than-normal weather (resulting in greater coal combustion), an anticyclone inversion that trapped the pollution beneath it, and easterly winds that brought more pollution from continental Europe. Mortality rates from bronchitis and pneumonia increased seven-fold as a result of the acidified, smoke-filled air. Although caused by exceptional circumstances, this event triggered several pieces of legislation aimed at reducing the smoke and pollution generated by households and factories.

2. This account is taken from *The Great Smog of 1952*, <http://www.met-office.gov.uk/education/historic/smog.html> (accessed February 8, 2002).

Most of the pollution we experience today does not result in such direct and negative consequences. Rather, many of the common air pollutants are merely irritants or even go unnoticed at the levels most of us encounter. This pollution can lead to significant health impacts, however, as irritants can cause great distress in those suffering from asthma, chronic obstructive pulmonary disorder (COPD) or allergies.

Common air pollutants

Today, many of us have the benefit of relatively clean-burning fuels. We do not have the tremendous pollution problems that arise when the majority of households and industries rely on wood or coal for heating and manufacturing processes. Nonetheless, several common air contaminants have been identified that are public health concerns and that are generated by fossil fuel combustion and other human activities. As noted earlier, National Ambient Air Quality Objectives (NAAQOs) were established in the late 1970s for those contaminants that can pose problems for both the environment and human health (Table 2). These criteria air contaminants are described in section 1.3–**Air pollutant emissions** and their potential health and environmental impacts are listed in Text Box 4. Potential health effects are one of the contributing factors that determined the levels used to classify the Index of the Quality of the Air described in section 1.1–**Outdoor air quality**. Some of these health and environment effects are summarized in Table 8.

Text Box 4
Potential health effects of common air pollutants[1]

Sulphur dioxide
Individuals with asthma are particularly sensitive to SO_2 levels in the air and can suffer breathing problems when levels are high. Specifically, SO_2 irritates the upper respiratory tract in humans. Inhalation of the acidic aerosols in SO_2 has been linked to respiratory diseases such as bronchitis. Negative environmental impacts include soil and lake acidification.

Carbon monoxide
CO binds to red blood cells, preventing them from carrying oxygen. In low amounts, CO can slow reflexes and perception. It can cause unconsciousness and even death with chronic exposure to low levels, or with brief exposure to very high concentrations. High levels of CO are closely associated with adverse effects on the heart. Individuals with heart disease are most susceptible to the negative impacts of CO. Other individuals—such as elderly people with anemia and respiratory or lung disease, pregnant woman, the unborn, infants and children—are at increased risk from exposure to high levels of CO.

Nitrogen oxides
Those suffering from asthma or bronchitis can experience increased airway sensitivity. Exposure to high concentrations of NO_x may act as an immune system depressant. Children are particularly sensitive to these gases, which can also retard plant growth.

Ozone
O_3 can lead to symptoms ranging from general eye, nose and throat irritation to reduced pulmonary function. It can also lead to an increase in the incidence of pneumonia, bronchitis and other lung infections, asthma symptoms, and long-term lung disease. Children are particularly susceptible, as it can interfere with normal lung development. O_3 has been shown to increase the susceptibility of asthmatics to common allergens and has been linked to hospitilizations and emergency department visits. O_3 is also known to reduce plant growth by inhibiting photosynthesis.

Suspended particulate matter
The effect of suspended particulate matter on health is related to particle size. The smallest particles pose the greatest risk for health because they can enter deeply into the lungs. Nevertheless, all particles can contain toxic substances that can have a negative impact on human health.

Pollen, bacteria and other biological contaminants also fall under this heading. Health effects from the inhalation of suspended particulate matter include reduced lung function, heart disease, and the aggravation of existing respiratory conditions. They can also cause general eye, nose and throat irritation. They have been linked to emergency room visits for asthma, cardio-respiratory hospitalizations, and increased mortality. Reactions to biological contaminants can range from allergic responses to molds and pollen to the development of potentially fatal pneumonia caused by *Legionella* bacteria.

1. The details on these pollutants are from Health Canada, 1997, *Health and Environment*, Catalogue no. H49-112/1997E, Ottawa

Table 8
Examples of Types of Effects Used as Break Points for the Index of the Quality of the Air[1]

National Ambient Air Quality Objective	Carbon monoxide (CO) (1-hour, 8-hour)	Nitrogen dioxide (NO_2) (1-hour)	Ozone (O_3) (1-hour)	Sulphur dioxide (SO_2) (1-hour, 24-hour)	Suspended particulate[2] (24-hour)
Beyond tolerable (very poor range)	physiological stress on individuals with cardiovascular and respiratory disease; possible increased mortality	increasing sensitivity of patients with asthma and bronchitis	impairment of respiratory function; increased respiratory symptoms	hypersensitive individuals may experience breathing difficulties; increased morbidity	increasing sensitivity in patients with asthma and bronchitis
Maximum tolerable (poor range)	increasing cardiovascular symptoms in non-smokers with heart disease; some visual impairment	increased rate of respiratory illness from long-term exposure; odour and atmospheric discolouration	decreasing performance by some athletes exercising heavily	increasing sensitivity in patients with asthma and bronchitis; odorous; increasing vegetation damage and sensitivity	decreasing visibility; soiling evident; increased frequency and severity of lower respiratory disease in children
Maximum acceptable (fair range)	increasing cardiovascular impairment in smokers with heart disease; changes in blood chemistry	no known human health effects	increasing injury to some species of vegetation	increasing (foliar) injury to species of vegetation	decreasing visibility
Maximum desirable (good range)	no effects	no effects	materials affected by ambient air levels of oxidants	no effects	no effects

Notes:
1. This table is not intended to represent the full extent of potential health or environment effects.
2. Levels are not applicable to chemically active particles.

Sources:
Adapted from Environment Canada, 1996, *Guidelines for the Index of the Quality of the Air*, Environmental Protection Series, Report EPS 1/AP/3, Ottawa.

Hospital admissions and mortality studies[1]

Several Canadian studies have shown a link between levels of ambient air pollution and hospital admissions for respiratory complaints.[2] Burnett et al. (1995), for example, observed that an increase of 13 micrograms per m^3 in ambient particulate sulphate concentration was associated with a 3.7% increase in hospital admissions for respiratory complaints, and a 2.8% increase in cardiac admissions.[3] Another similar study observed that, between May and August (for the period 1983 to 1988), 5% of daily respiratory admissions was associated with ambient ozone concentrations, while a further 1% of these admissions was accounted for by ambient sulphate concentrations.[4]

Because children have more rapid respiration and greater intake of food and water relative to their size, they deserve particular attention in studies of the impacts of pollution. A recent study observed that ambient ozone levels should be considered a risk factor for respiratory problems in children younger than 2 years.[5] In particular, a five-day moving average of 45 parts per billion for the daily one-hour maximum ozone concentration was associated with a 35% increase in the daily hospitalization rate for respiratory problems in this age group in the May to August period.

Text Box 5
Cautionary Note

On June 5, 2002, *The New York Times* reported that a flaw had been discovered in the use of a statistical software package used to estimate the risk of death due to exposure to air pollution.[1] This problem was discovered by investigators of the National Morbidity, Mortality, and Air Pollution Study (NMMAPS) at Johns Hopkins University in the United States. The discovery has implications for any data analysed with the General Additive Model (GAM) in S-Plus. GAM uses an iterative process to reach a solution (in this case, risk of death), stopping the iterations when the preset convergence criteria are met. The problem in this case was that the default convergence criteria specified in the software (and used by the researchers) were not sufficient to reach a final value for the data sets being analysed. This led to both over- and under-estimates of the risk of death associated with exposure to pollution. Three of the Canadian studies cited in this section of "Air Quality in Canada" used the GAM in S-Plus for data analysis. The citations remain in the text, but the studies are noted with asterisks so that readers will be aware that the conclusions drawn may be suspect. These references have been retained to show readers the state of knowledge that was informing the debate over air pollution when this article was written.

1. *The New York Times*, 2002, "Data revised on soot in air and deaths: Scientists lower their estimate of risk from bad-air days," p. A23, June 5.

1. Since this article was written, concerns have been raised regarding the statistical methods used in three of the sources cited in this section. Please see the Cautionary Note in Text Box 5 for a detailed explanation. The three articles in question, cited in footnote 5 on page 15 and footnotes 1 and 2 on page 16, are preceded with **.
2. For a review of these studies, see Stieb, D.M., R.C. Beveridge, M. Smith-Doiron, R.T. Burnett, S. Judek, R.E. Dales and A.H. Anis, 2000, "Beyond Administrative Data: Characterizing Cardiorespiratory Disease Episodes Among Patients Visiting the Emergency Department," *Canadian Journal of Public Health*, Vol. 91, no. 2, pp.107–112.
3. Burnett, R.T., R. Dales, D. Krewski, R. Vincent, T. Dann and J.R. Brook, 1995, "Associations between Ambient Particulate Sulfate and Admissions to Ontario Hospitals for Cardiac and Respiratory Diseases," *American Journal of Epidemiology,* Vol. 142, no. 1, pp. 15–22.
4. Burnett, R.T., R.E. Dales, M.E. Raizenne, D. Krewski, P.W. Summers, G.R. Roberts, M. Raad-Young, T. Dann and J. Brook, 1994, "Effects of Low Ambient Levels of Ozone and Sulfates on the Frequency of Respiratory Admissions to Ontario Hospitals," *Environmental Research*, Vol. 65, pp. 172–194.
5. **Burnett, R.T., M. Smith-Doiron, D. Stieb, M.E. Raizenne, J.R. Brook, R.E. Dales, J.A. Leech, S. Cakmak and D. Krewski, 2001, "Association between Ozone and Hospitalization for Acute Respiratory Diseases in Children Less than 2 Years of Age," *American Journal of Epidemiology*, Vol. 153, no. 5, pp. 444–452.

Pollution generated by fossil fuel combustion has also been shown to be a risk factor, not just for hospital admissions but also for premature mortality, in 11 Canadian cities.[1] In particular, nitrogen dioxide showed the largest increased risk of death (4.1%), followed by ozone (1.8%), sulphur dioxide (1.4%), and carbon monoxide (0.9%). This observation is not supported by a more recent long-term study showing that, of the gaseous pollutants analysed, only sulphur dioxide was associated with increased risk of mortality.[2] This study did, however, observe that long-term exposure to fine particulate matter ($PM_{2.5}$) was a significant risk factor for cardiopulmonary and lung cancer mortality. Specifically, each increase of 10 micrograms per m^3 in $PM_{2.5}$ was associated with increases in cardiopulmonary and lung cancer mortality of approximately 6% and 8%, respectively.

Fossil fuel combustion and other industrial processes are not the sole sources of air contamination. Many people react negatively to common, natural components of air, such as pollen. Viruses, bacteria and other infectious agents are also present in the air we breathe, making it difficult to draw conclusions about the sources of health impacts in the absence of more detailed information. The hospital admissions studies discussed above are a case in point. Although these studies demonstrate a correlation between hospital admissions and ambient levels of air pollution, a recent study suggests that interpreting this correlation is fairly difficult.[3] In this study, follow-up interviews were conducted with people who had been admitted for respiratory complaints to two hospital emergency departments in Saint John, New Brunswick between July 5, 1995 and March 31, 1996. The most commonly reported trigger for the health episode that precipitated the hospital visit was infection (58.8% for asthma patients and 42.0% for COPD patients). Air pollution was identified as the cause of symptoms in 1.9% of the asthma visits and 2.4% of the COPD visits. Furthermore, a high proportion of those visiting the emergency department for these conditions were either smokers themselves or had a regular smoker in the household (36.4% and 55.1%, respectively, for asthma, and 44.8% and 51.2% for COPD). Although this study was conducted for only one period and in one city, it does suggest the need for further analysis in the interpretation of hospital admissions studies, and further illustrates the complexities encountered when trying to link environmental conditions to human health impacts.

1. **Burnett, R.T., S. Cakmak and J. R. Brook, 1998, "The Effect of the Urban Ambient Air Pollution Mix on Daily Mortality Rates in 11 Canadian Cities," *Canadian Journal of Public Health*, Vol. 89, no. 3, pp. 152–156.
2. **Pope, C.A. III, R.T. Burnett, M.J. Thun, E.E. Calle, D. Krewski, K. Ito and G.D. Thurston, 2002, "Lung Cancer, Cardiopulmonary Mortality, and Long-term Exposure to Fine Particulate Air Pollution," *Journal of the American Medical Association*, Vol. 287, no. 9, pp. 1132–1141.
3. Stieb, D.M., R.C. Beveridge, M. Smith-Doiron, R.T. Burnett, S. Judek, R.E. Dales and A.H. Anis, 2000, "Beyond Administrative Data: Characterizing Cardiorespiratory Disease Episodes Among Patients Visiting the Emergency Department," *Canadian Journal of Public Health*, Vol. 91, no. 2, pp.107–112.

The potential years of life lost indicator

Premature mortality caused by respiratory disease is illustrated by the potential years of life lost indicator displayed in Map 2.[4] The data yield some interesting observations on the differences across health regions in the levels of mortality due to respiratory illness. Urban areas, which might anecdotally be expected to show a greater-than-average rate of mortality, in fact show just the opposite (see insets in Map 2). This observation highlights some of the difficulties in drawing broad conclusions from basic indicators. In urban areas, for example, there may well be a greater burden of pollution or a greater burden of illness, but this can be outweighed by other factors, such as demographic profile, behavioural differences (e.g., prevalence of smoking), differing levels of health care services, or pollution avoidance behaviours on bad smog days.[5]

Indoor air

Some contaminants of indoor air, such as carbon monoxide from fuel combustion and volatile organic compounds from solvent use, also affect outdoor air. Other contaminants, however, are uniquely relevant to indoor environments (e.g., radon gas, cooking fumes, dust mites and pet allergens). Given the significant portion of time that the average Canadian spends indoors, the health risks associated with poor indoor air quality are noteworthy.[6]

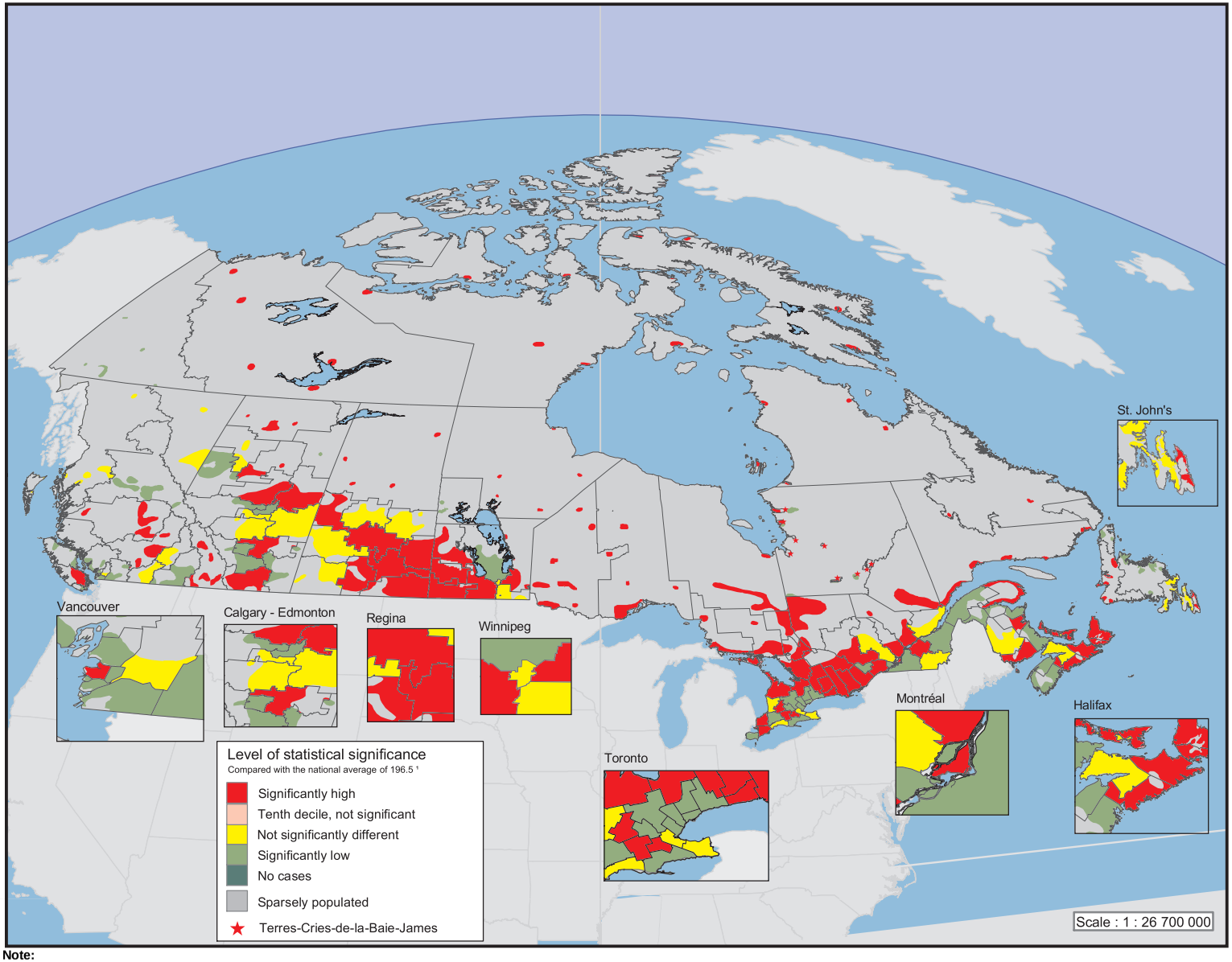
Environmental tobacco smoke

Environmental tobacco smoke (ETS, or second-hand smoke) has been linked to a variety of adverse health outcomes. It is only since the 1980s that governments, businesses and households have taken measures to discourage smoking in general and limit the exposure of non-smokers to this prevalent air contaminant. Environmental tobacco smoke comprises both the smoke generated directly from the burning tobacco product and the smoke exhaled by the smoker. It is a complex mixture of

4. This mortality indicator measures the number of years of life that are lost if each person is expected to live to an average life span of 75 years. Someone who dies from respiratory disease at the age of 50, for example, represents 25 years of potential lifetime lost. The aggregation of mortality data within a health region allows these data to be expressed as a mortality rate (i.e., years of life lost per 100 000 persons aged 0 to 74 years). For further details, see <http://www.statcan.ca/english/freepub/82-221-XIE/01201/toc.htm>.
5. It is for this reason that the Health Statistics Division at Statistics Canada groups health regions into categories with similar characteristics. This controls for some of the ambiguity that can result if regions with different underlying characteristics are compared.
6. For details on the exposure guidelines for indoor air, see Health Canada, 1995, *Exposure Guidelines for Residential Indoor Air Quality: A Report of the Federal–Provincial Advisory Committee on Environmental and Occupational Health*, Catalogue no. H46-2/90-156E, Ottawa.

Map 2

The Potential Years of Life Lost Indicator, 1996



Note:

1. In 1996, the Potential Years of Life Lost rate for deaths due to respiratory disease was 196.5 per 100 000 aged 0 to 74. That is, for every 100 000 aged 0 to 74, there was a potential loss of 196.5 years of life as a result of premature death due to respiratory disease.

Source:

Statistics Canada, 2001, *Health Indicators Volume 2001, no. 3,* <http://www.statcan.ca/english/freepub/82-221-XIE/01201/toc.htm> (accessed June 11, 2002).

chemical compounds, heavy metals and pesticide residues, comprising some 4 000 different substances. The majority of non-smokers (61%) report being bothered by second-hand smoke, with 47% of non-smokers suffering from physical symptoms, such as irritated eyes, breathing difficulties or sore throat.[1] Perhaps surprisingly, 21% of smokers also report being bothered by smoke. Physical irritation is only one element of the health burden associated with ETS, however. Exposure to this contaminant has been linked to such severe health outcomes as Sudden Infant Death Syndrome (SIDS), low birth weight, cancer, ear infections in children, heart disease, and the exacerbation of asthmatic symptoms.[2]

Radon[3]

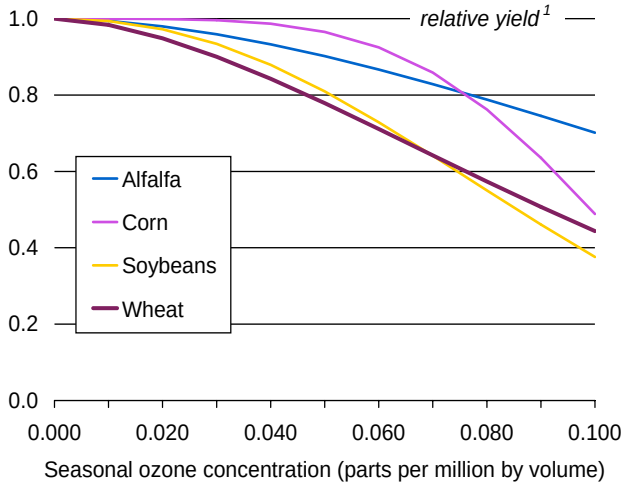
Radon gas enters homes after it is emitted from soils or rocks. Health Canada notes that even though high levels of radon exposure have been linked to lung cancer in uranium miners, most home-owners in Canada are unlikely to experience a problem with this gas. The risk of lung cancer is extremely low from naturally occurring radon; the majority of cases of lung cancer (85%) are directly linked to smoking.

Radon, or more properly radon-222, is a natural radioactive gas generated by the spontaneous decay of radium-226, which in turn is generated by the decay of uranium-238. Radon itself is inert, and so much of what we inhale is exhaled immediately afterwards. The concern is with the radioactive decay particles generated as the gas breaks down. These particles can adhere to household dust, which can remain in the lungs long enough to put the lungs at risk from ionizing radiation.

2.2 Potential impacts on ecosystems

The same air pollutants that can irritate humans can also affect ecosystems and damage agricultural crops and other plants. Ozone, for example, enters leaves along with other gases during the day. Once there, it reacts with plant tissues, causing cell membranes to break down.[4] The physiological impacts that can result from air pollution

Figure 9
Effect of Seasonal Ozone Exposure on Crop Yield, Various Crops



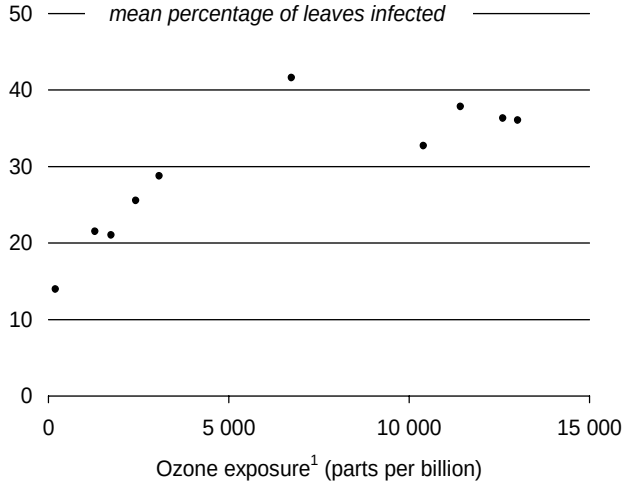
Notes:
Figure reproduced using methodology and data outlined in the source document.
1. Yield = 100% at zero ozone.
Source:
Lesser, V.M., J.O. Rawlings, S.E. Spruill and M.C. Somerville, 1990, "Ozone Effects on Agricultural Crops: Statistical Methodologies and Estimated Dose-Response Relationships," *Crop Science*, Vol. 30, January–February, pp. 148–155.

damage include the following: decreased photosynthesis; decreased nutrient uptake; increased sensitivity to climatic stress, pests and pathogens; decreased competitive ability; and decreased reproductive efficiency.[5] These factors can all contribute to yield loss in cultivated crops. Figure 9 illustrates the influence of ozone on the yields of several common agricultural crops, while Figure 10 shows how increased ozone exposure can influence disease resistance.

Sulphur dioxide is another contaminant that can have harmful effects on vegetation. In a sense it is a double threat: the gas itself can damage foliage; and once the gas is precipitated as an acid, the resulting soil or water acidity can pose problems for terrestrial and aquatic life. The Sudbury area in Ontario has been the site of significant smelting activity since the late 1800s. Since the early 1970s, the Ontario Ministry of the Environment has been monitoring the impacts of sulphur dioxide on the surrounding environment. Several instances of widespread damage to vegetation, ranging from clover and alfalfa to aspen and birch trees, were documented in the period prior to 1978, the year when orders were issued to limit emissions.[6]

1. Clark, Warren, 1998, "Exposure to Second-hand Smoke," *Canadian Social Trends*, no. 49, pp. 2–5, Statistics Canada Catalogue no. 11-008-XPE, Ottawa.
2. For a review see California Environmental Protection Agency, 1997, *Health Effects of Exposure to Environmental Tobacco Smoke—Final Report*, Office of Environmental Health Hazard Assessment, San Francisco.
3. The details on radon are taken from Health Canada, 1997, *Health and Environment*, Catalogue no. H49-112/1997E, Ottawa.
4. Janzen, H.H., R.L. Desjardins, J.M.R. Asselin and B. Grace (eds.),1998, *The Health of Our Air: Toward Sustainable Agriculture in Canada*, Agriculture and Agri-Food Canada, Research Branch, Catalogue no. A53-1981/1998E, Ottawa.
5. United States Environmental Protection Agency, 1999, *The Benefits and Costs of the Clean Air Act 1990 to 2010—EPA Report to Congress*, Office of Air and Radiation and Office of Policy, Catalogue no. EPA-410-R-99-001.
6. Ontario Ministry of the Environment, 1978, *Air Quality Assessment Studies in the Sudbury Area, Volume 2: Effects of Sulphur Dioxide and Heavy Metals on Vegetation and Soils 1970–1977*, Sudbury.

Figure 10
Downy Mildew Infection of Broccoli Exposed to Varying Levels of Ozone, 1993



Note:
1. Cumulative mean seasonal exposure.
Source:
Bowen, P.A. and V.C. Runeckles, Agriculture and Agri-Food Canada, personal communication.

3 Response and participation

Governments and businesses in Canada are actively engaged in initiatives to improve air quality. Various programs are in place to encourage compliance with the goal of reducing the negative effects of industrial activities on air quality. Businesses are taking steps to reduce their impacts on the environment, and this has created a demand for products and services to address their needs.

3.1 Government response

The most recent federal government efforts to monitor and improve air quality are described in the Clean Air Action Plan launched in May 2000. Text Box 6 lists examples of government initiatives under this plan. Various clean air programs have also been developed by provincial and territorial governments. Public awareness campaigns, smog forecasting programs, drive clean programs and vehicle retirement programs, to name a few, seek to address air quality issues that are specific to a particular region or province in Canada.

Reducing transboundary air pollution requires continued international co-operation. The Ozone Annex, a bilateral agreement under the 1991 Canada–United States Air Quality Agreement, was signed to reduce the flow of air pollution between the United States and eastern Canada.

Text Box 6
Examples of government initiatives under the Clean Air Action Plan

National Pollutant Release Inventory (NPRI) – Additional resources were allocated to expand the NPRI in 2002. The list of pollutants will be expanded to cover nitrogen oxides (NO_x), volatile organic compounds (VOCs), sulphur oxides (SO_x), particulate matter (PM), and carbon monoxide (CO).

National Air Pollution Surveillance (NAPS) Network and Canadian Air and Precipitation Monitoring Network (CAPMoN) – Equipment was upgraded and new monitoring stations were added to these federal–provincial–territorial air pollutant monitoring networks. There are currently 262 monitoring stations at urban and rural sites across Canada.

Canadian Foundation for Climate and Atmospheric Sciences (CFCAS) – Stimulating research and developing air quality science through funding initiatives are the goals.

Sulphur in Diesel Regulations – Reduction of sulphur in gasoline to 150 parts per million (ppm) by 2002 and 30 ppm by 2005 are the goals. Future plans include a further reduction to 15 ppm by 2006.

Canada-wide standards for PM and Ozone – Ambient air quality concentration targets are being set for ground-level ozone and fine particulate matter for 2010. Budget has been allocated to implement the reduction of VOC and NO_x emissions from paints and paint coatings, degreasing agents, solvents, printing chemicals and cleaners. Emission reduction strategies will be developed for major industrial sectors in Canada.

Source:
Environment Canada, <http://www.ec.gc.ca/air/> (accessed January 30, 2002).

3.2 Business response

Since 1994, Statistics Canada has collected information on how much money businesses[1] in Canada spend to protect the environment. The business sector is involved directly or indirectly in activities aimed at reducing its negative effects on the environment. These activities have often been brought about by regulations and, more recently, by voluntary agreements and actions (Text Box 7).

1. The *Survey of Environmental Protection Expenditures* collects information from 16 industry groups in primary and manufacturing industry sectors. For more detailed information, see Statistics Canada, 2001, *Environment Protection Expenditures in the Business Sector, 1998*, Catalogue no. 16F0006XIE, Ottawa.

Text Box 7

Examples of Voluntary Programs and Initiatives in Canada

Environmental regulations and mandatory programs are one method of achieving reductions in air pollutant emissions. Governments and businesses also use voluntary actions that include targets for the reduction of waste and emissions.

Accelerated Reduction/Elimination of Toxics (ARET)[1]

In force since 1994, ARET seeks the virtual elimination of emissions of 30 persistent, bioaccumulative and toxic substances and the reduction of another 87 toxic substances to levels insufficient to cause harm to the environment or society. As of May 2000, 316 facilities from 169 companies and government organizations were participating.

ARET's short-term goal for 2000 was to reduce persistent, bioaccumulative and toxic substance emissions by 90% and all other toxic substance emissions by 50%.

Responsible Care©[2]

Responsible Care targets emissions of chemicals, greenhouse gases (GHGs), ozone-depleting substances and heavy metals. This program was created by the Canadian Chemical Producers' Association (CCPA) in 1985 in response to public concerns regarding the safe and environmentally sound management of chemicals. In 2000, member companies produced over 90% of the industrial chemicals in Canada and reported a 62% reduction from 1992 in the emission of these substances.[3] Many of the 606 substances on the reporting list can also be found on Environment Canada's National Pollutant Release Inventory (NPRI) list, the ARET list, and the *Canadian Environmental Protection Act*, Schedule 1.

Voluntary Challenge and Registry (VCR)[4]

As part of their membership in the VCR program (ÉcoGeste in Quebec), participants are asked to set voluntary goals for the reduction of GHG emissions and to report the results against a base year, 1990. The targets are to be set in line with the Kyoto targets for GHG emission reductions for the period 2008 to 2012. More than 760 organizations, representing 75% of GHG emissions produced in Canada, submitted action plans in 2000.

Automotive Manufacturing Pollution Prevention Project

Signed in 1992 and renewed in December 2000, this is a joint project of Environment Canada, the Ontario Ministry of the Environment, the Canadian Vehicle Manufacturers' Association, Chrysler Canada, the Ford Motor Company of Canada and General Motors of Canada. Its goal is the use of pollution prevention to reduce or eliminate the use, generation and release of 65 substances by participating members of the Canadian Vehicle Manufacturing Association.[5]

Automotive Parts Manufacturers' Association Pollution Prevention Agreement

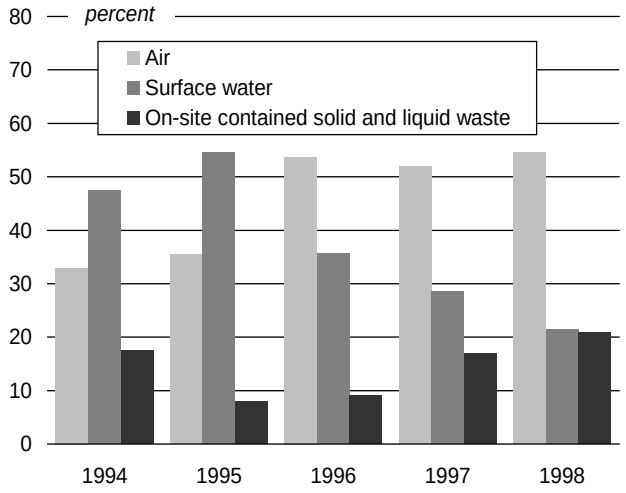
Signed in December 1993 and renewed in April 2002, this is a joint project of Environment Canada, Industry Canada, and the Automotive Parts Manufacturers' Association and participating member companies. The goal of this project is to reduce and/or eliminate the use, generation and release of various toxic substances in the automotive parts sector through ISO 14000 and pollution prevention.[6]

1. Environment Canada, 2000, *ARET: Environmental Leaders 3, Update (2000),* <http://www.ec.gc.ca/aret> (accessed April 4, 2002).
2. Canadian Chemical Producers' Association, 2000, *Reducing Emissions 9, 2000 Emissions Inventory and Five Year Projections,* <http://www.ccpa.ca> (accessed April 4, 2002).
3. *Ibid.*
4. Voluntary Challenge and Registry Inc., 2000, *Annual Report 2000,* <http://www.vcr-mvr.ca> (accessed April 4, 2002).
5. Canadian Vehicle Manufacturing Association, <http://www.on.ec.gc.ca/epb/toxics/pollution/cvma-e.html> (accessed March 7, 2002).
6. Automotive Parts Manufacturers' Association, <http://www.on. ec.gc.ca/laws/auto_agreement/intro_e.html> (accessed March 7, 2002).

In 1998, environmental protection expenditures totalled just over $4.7 billion.[1] Expenditures on pollution prevention[2] and pollution abatement and control[3] accounted for almost 80% of the total ($3.7 billion). Almost 60% of these expenditures ($2.2 billion) was for operating expenses.[4] Capital expenditures,[5] the remaining 40%, were split evenly between pollution abatement and control and pollution prevention processes ($684.6 million and $648.7 million, respectively).

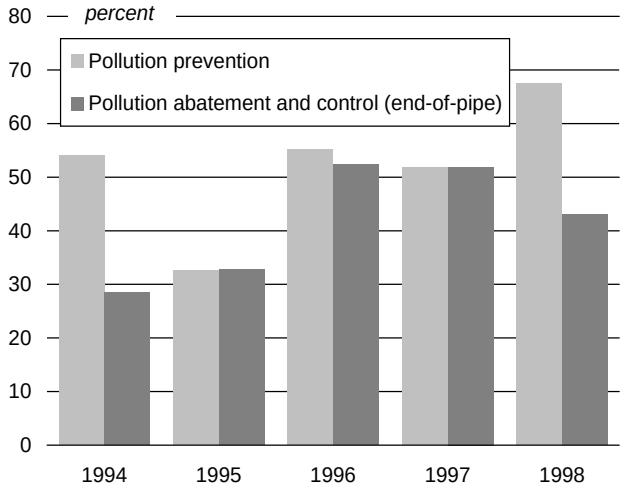
1. Statistics Canada, 2001, *Environment Protection Expenditures in the Business Sector, 1998*, Catalogue no. 16F0006XIE, Ottawa.
2. Pollution prevention refers to expenditures made to develop a new or significantly modified production process (integrated process) in order to avoid or minimize the creation of pollutants and waste.
3. Pollution abatement and control (end-of-pipe processes) refers to expenditures related to funding of separately identifiable processes whose sole purpose is to abate or control undesirable substances emitted during normal production, without any effect on the production process itself. It also refers to expenditures on waste and sewage management and treatment.
4. Operating expenses refer to all cash expenses, rather than accruals, incurred during the fiscal year for maintenance and repair (of existing environmental equipment), labour, fuel and electricity, materials and supplies, and purchased services.
5. Capital expenditures are all relevant outlays made in a fiscal year for machinery and equipment and their installation and repair, and for the construction of non-residential facilities (by contractors or own employees).

Figure 11
Proportion of Capital Expenditures on Pollution Prevention, Abatement and Control by Environmental Medium, 1994 to 1998



Source:
Statistics Canada, Environment Accounts and Statistics Division.

Figure 12
Proportion of Capital Expenditures on Pollution Prevention and on Pollution Abatement and Control to Mitigate Air Emissions, 1994 to 1998



Source:
Statistics Canada, Environment Accounts and Statistics Division.

Business investment in reduction of air emissions

Industries that have historically been the largest emitters of substances to air include the following: electric generation, transmission and distribution; chemicals; pulp, paper and paperboard mills; and primary metals.

Between 1994 and 1998, the focus of capital investment in pollution prevention, abatement and control[1] shifted from substances released to surface waters to those emitted to air (Figure 11). For example, almost 55% of these capital investments were directed toward preventing or abating substances emitted to air in 1998, up from just over 30% in 1994. In contrast, the capital expenditures directed at reducing substances released to surface waters declined from their peak of 55% in 1995 to 21% in 1998.

Between 1995 and 1997, businesses generally invested equal shares of their capital expenditures on air emission equipment in both pollution prevention and pollution abatement and control. At the same time, these expenditures increased as a share of all environmental protection capital expenditures, from approximately 30% in 1995 to over 50% in both 1996 and 1997 (Figure 12). Another shift occurred in 1998 when businesses again directed a larger share of each toward air emissions—about 67% of total pollution prevention capital expenditures, and just over 40% of pollution abatement and control expenditures.

Share of capital expenditures on air emissions by industry

In 1998, the natural gas distribution industry (Table 9) dedicated the greatest share of its capital expenditures to prevention, abatement and control of air emissions (84%), followed by petroleum and coal (76%), non-metallic mineral products (74%) and pulp, paper and paperboard mills (72%). Since 1994, three industries—natural gas distribution; pulp, paper and paperboard mills; and petroleum and coal products—have increased their share of capital expenditures to mitigate air emissions. The oil and gas extraction industry decreased its share of capital expenditures dedicated to air emissions, from 86% in 1994 to 46% in 1998.

3.3 Industrial development

Heightened public awareness and better understanding of air quality issues have brought about a parallel increase in the concerns related to monitoring and improving air quality in Canada. In turn, the resulting need for equipment and services used to monitor air quality and to prevent or control air pollution has stimulated the growth of firms that produce

1. Includes reported data only. Before the 1997 reference year, the category 'on-site contained solid and liquid waste' was titled 'soil and groundwater.' Comparisons should be made with caution.

Table 9
Distribution of Capital Expenditures on Pollution Prevention, Abatement and Control for Air Emissions by Industry, 1994 to 1998

Industry	1994	1995	1996	1997	1998
			percent		
Logging	22.0	43.1	13.5	7.1	36.1
Oil and gas extraction[1]	85.8	84.4	91.0	51.1	45.6
Mining	27.1	17.3	16.0	33.1	15.3
Electric power generation, transmission and distribution[2]	37.8	44.5	27.1	34.6	35.4
Natural gas distribution[3]	..	42.9	59.5	60.4	83.9
Food	18.0	39.1	20.3	23.7	19.6
Beverage and tobacco products	63.1	10.6	31.2	8.0	9.5
Wood products	..	..	..	70.6	37.7
Pulp, paper and paperboard mills	11.7	6.7	46.8	51.0	71.9
Petroleum and coal products	50.0	61.7	43.8	60.6	76.0
Chemicals	40.1	38.8	54.3	36.3	47.3
Non-metallic mineral products	74.0	67.8	97.2	72.3	73.8
Primary metals	41.0	47.9	66.2	61.0	53.2
Fabricated metal products	35.8	..	..	..	..
Transportation equipment	52.5	..	63.1	63.1	59.8
Pipeline transportation[4]	..	..	..	..	59.1
Other manufacturing[5]	..	64.4	54.2	58.4	35.6
Total	**32.9**	**35.5**	**53.7**	**51.9**	**54.5**

Notes:
This table includes reported capital expenditure shares only.
1. Includes petroleum and coal products in 1994.
2. Includes natural gas distribution in 1994.
3. Includes pipeline transport in 1994, 1995, 1996 and 1997.
4. Includes oil and gas extraction in 1994, 1995, 1996 and 1997.
5. Includes all other manufacturing industries not already specified.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

these goods and services. Collectively, these businesses form part of Canada's environment industry.[1]

Air pollution control

In 1998, Canadian businesses earned $527.3 million from air pollution control (APC) goods and services (Table 10). Of this total, APC goods (systems and equipment) generated $460.0 million in revenues. The types of APC 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 ventilation systems and emissions management systems for industrial processes. Other prominent APC goods were catalytic converters as well as air filtration systems including baghouses, dust collectors, electrostatic precipitators, scrubbers and gas turbine filters.

The environment industry derived an additional $67.3 million in revenues from APC services (Table 10). These services included the following: analytical services related to emissions monitoring, assessment and evaluation; planning and engineering design of APC systems; and services for the abatement of specific air contaminants (e.g., asbestos). Such services were provided mostly by the consulting engineering and construction engineering industries.

New and emerging technologies

Research and development efforts by both government and businesses have resulted in the introduction of technologies that address various air quality issues and concerns. Specific examples of new and emerging technologies that are aimed at mobile air pollution sources include fuel-cell, electric and electric-hybrid vehicles; alternative fuel vehicles; cleaner small engines; and air pollution reduction devices (fuels, engines, catalysts and other postcombustion technologies). Renewable-resource fuels and energy dedicated to mitigating or preventing air pollution from industrial processes (e.g., coating technologies, solvent-related technologies, biomass, solar, wind, stationary fuel cells and catalysts) are technologies that show promise (Text Box 8).

1. The environment industry comprises establishments operating in a variety of industries that produce environmental goods and services, i.e., goods and services that are used or can potentially be used to measure, prevent, limit or correct environmental damage (by both natural and human activity) to water, air and soil as well as problems related to waste, noise and ecosystems. 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, 2001, *Environment Industry Survey: Business Sector, 1998,* Catalogue no. 16F0008XIE, Ottawa.

Table 10
Revenues of Air Pollution Control (APC) Goods and Services by Industry, 1998

Industry[1]	Total environmental revenues	APC revenues		
		Goods	Services	Total APC
		million dollars		
Agriculture, forestry, fishing and hunting	13.6	x	x	x
Mining and oil and gas extraction	x	x	x	x
Utilities	19.2	x	0.0	x
Construction	2 243.1	5.8	10.8	16.6
Chemical manufacturing	221.7	1.2	0.0	1.2
Plastic and rubber products manufacturing	620.1	4.8	x	x
Non-metallic mineral product manufacturing	103.9	x	0.0	x
Primary metal manufacturing	148.9	0.0	x	x
Fabricated metal product manufacturing	310.0	x	0.0	x
Machinery manufacturing	640.0	105.4	x	x
Computer and electronic product manufacturing	124.9	13.1	x	x
Electrical equipment, appliance and component manufacturing	177.1	x	x	x
Rest of manufacturing sector	106.8	25.3	x	x
Wholesale trade	3 193.6	100.9	1.4	102.3
Retail trade	56.5	0.2	x	x
Finance and insurance services	17.7	x	x	x
Legal services	51.1	x	x	x
Architectural and landscape architectural services	21.1	x	x	x
Engineering services	2 082.1	13.1	20.4	33.5
Surveying and mapping (including geophysical) services	16.9	x	x	x
Testing laboratories	86.2	x	3.6	x
Computer systems design and related services	33.3	x	0.0	x
Management, scientific and technical consulting services	331.8	x	8.1	x
Scientific research and development services	42.8	x	x	x
All other professional, scientific and technical services	65.1	x	x	x
Management of companies and enterprises	110.0	x	1.0	x
Administrative and support services	92.7	x	1.5	x
Waste management and remediation services	3 039.3	x	x	x
Other services	x	x	x	x
Canada	**14 278.3**	**460.0**	**67.3**	**527.3**

Notes:
Figures may not add up to totals due to rounding.
1. Industry groups are based on the North American Industry Classification System (NAICS).
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Text Box 8
Selected technologies related to air quality monitoring and improvement

Clean car technologies – cars with alternative batteries, lightweight materials, direct injection engines, fuel cells, and/or enhanced recyclability, leading to lower fuel consumption and emissions.

Photovoltaics – automobiles using light-based energy.

Advanced sensors – sensors to monitor air quality.

New materials – advanced material technologies.

Renewable energy – improved power storage technology and combined conversion systems that will increase the use of electricity from renewable sources such as solar, wind and biomass.

Source:
Organisation for Economic Co-operation and Development (OECD), 1999, "Technology and Sustainable Development," special issue on Sustainable Development, STI Review, no. 25, Box 3, p.19.

Alternative fuels

Alternative fuels, which can be used in the place of gasoline and diesel fuel, include propane, natural gas, methanol, ethanol, electricity, hydrogen and diesel-fuel blends (Text Box 9). They are called 'clean fuels' because of their physical and chemical properties, which cause them to emit fewer pollutants to the atmosphere.[1] Revenues from the production and sale of alternative fuel systems and equipment were $30.5 million in 1998.[2]

Propane and natural gas for road transport and urban transit are the only alternative vehicle fuels currently available in Canada. The volume of auto propane sold reached 1.1 billion litres in 1998, representing 27% of final domestic propane demand.[3] During the same period, the volume of natural gas sold for road transport and urban transit was 66.8 million litres (0.10% of final domestic natural gas demand).

1. U.S. Environmental Protection Agency, <http://www.epa.gov/otaq/06-clean.htm> (accessed February 18, 2002).
2. Statistics Canada, Environment Industry Survey, Business Sector, 1998, special tabulation.
3. Statistics Canada, CANSIM II, Table 128-0003, "Supply and demand of primary and secondary energy in natural units, quarterly."

Text Box 9

Alternative fuels

A bit of history

In the early 1900s, Henry Ford designed his Model T to run on ethanol. He thought that ethanol made from renewable resources would be the main fuel used to run cars. Rudolf Diesel ran his prototype diesel engine using peanut oil. His vision was to have diesel engines operating on various types of vegetable oils. However, when petroleum-based gasoline and diesel fuel were introduced, they took over the fuel market. Petroleum-based fuels were cheaper and relatively efficient, with a (presumably) unlimited supply from oil field discoveries.

The oil crisis and fuel shortage of the late 1970s revived the market for alternative fuels. In Canada, for example, Manitoba first introduced ethanol-blended gas in 1981. Ethanol blends were available across western Canada by the late 1980s, followed by Ontario in 1992 and Quebec in 1995.

Recently, the market for alternative fuels has been driven by increasing pressure to produce cleaner fuels—not only to decrease the dependence on petroleum-based fuels but, more importantly, to improve air quality. Through the *Alternative Fuels Act* of 1995, Canada implemented measures to have federal departments and agencies use alternative fuels in any vehicles capable of operating on such fuels.

Alternative fuels today

Alternative fuels currently available in Canada include propane, natural gas and methanol. A few others, such as ethanol, electricity, hydrogen and reformulated gasoline, are in the research and development stage. The advantages and disadvantages of various types of alternative fuels are described below:

- Electricity – *Advantages:* potential for zero vehicle emissions; power plant emissions easier to control; can recharge at night when power demand is low; *Disadvantages:* current technology is limited; higher vehicle cost; lower vehicle travel range and performance; less convenient refuelling.
- Ethanol – *Advantages:* excellent automotive fuel; very low emissions of ozone-forming hydrocarbons and toxics; can be made from a variety of feedstocks, including renewables; *Disadvantages:* high fuel cost; somewhat lower vehicle range.
- Methanol – *Advantages:* excellent automotive fuel; very low emissions of ozone-forming hydrocarbons and toxics; can be made from a variety of feedstocks, including renewables; *Disadvantage:* somewhat lower vehicle range.
- Natural Gas (methane) – *Advantages:* very low emissions of ozone-forming hydrocarbons, toxic and carbon monoxide; can be made from a variety of feedstocks, including renewables; excellent fuel, especially for fleet vehicles; *Disadvantages:* higher vehicle cost; lower vehicle range; less convenient refuelling.
- Propane – *Advantages:* cheaper than gasoline today; most widely available clean fuel today; somewhat lower emissions of ozone-forming hydrocarbons and toxics; excellent fuel, especially for fleet vehicles; *Disadvantages:* cost will rise with demand; limited supply.
- Reformulated gasoline – *Advantages:* can be used in all cars without changing vehicles or fuel distribution system; somewhat lower emissions of ozone-forming hydrocarbons and toxics; *Disadvantage:* somewhat higher fuel cost.

Sources:
U.S. Environmental Protection Agency, <http://www.epa.gov/otaq/06-clean.htm> (accessed February 15, 2002).
Natural Resources Canada, <http://alt-fuels.nrcan.gc.ca> (accessed February 18, 2002).
Ethanol: Driving towards a GREENER future, <http://www.ethanol-crfa> (accessed February 18, 2002).


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Table Highlights and Annual Statistics

Table Highlights

Physiography

- Canada's area totals nearly 10 million km^2. Of this, 38% is forest; 25% is barren land; almost 12% is water; 10% is transitional shrubland and wetland; nearly 7% is covered with snow and ice; and another 7% is either cropland or other land types. Canada's urban population covers only 0.2% of the country's total land area.

Climate

- Despite record snowfalls and hurricane activity in the eastern part of the country and torrential rains along British Columbia's southern coast, 2001 proved to be one of Canada's driest years on record. In addition, four out of six northern climate regions in Canada experienced temperatures averaging at least 2˚C higher than normal that year. Most climate regions have experienced an increase in temperature of 1˚C to 2˚C since 1948.

Population

- By 2001, Canada's population had passed the 30-million mark. From 1951 to 2001, British Columbia's population increased by 235%, the highest rate of all provinces, while Saskatchewan's grew by only 18%, the lowest rate. With respect to actual population figures for the same period, Ontario experienced the biggest increase with 4.8 million people, while Nova Scotia showed the smallest growth with an increase of 265 000 people.
- While the natural increase (i.e., more births than deaths) in Canada's population continued to decline in the late 1990s, net migration rose, accounting for approximately 60% of Canada's population growth in 2001.
- In 2000, Canada experienced the highest interprovincial migration in 10 years, with more than 320 000 people moving to a new province or territory. British Columbia experienced the greatest loss in 2000, with 17 296 people leaving the province; Alberta had the largest gain, with 27 125 people moving in.

Economy

- Generally, there was a shift from resource-based industries to service-based industries in Canada from 1961 to 1996. Personal and business service industries increased their share of gross domestic product (GDP) from 13% to 21% over that period, while agricultural, forest and mineral products industries dropped from 22% of GDP to 13%.
- From 1961 to 1996, resource-based industries experienced the largest drop in employment, from 25% to 12% of total employment.
- In 1961, resource-based industries dominated Canada's exports, representing nearly two-thirds of goods and services sent abroad. By 1995, 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 24% of exports and 21% of imports.
- In 2001, Canadian manufacturers paid 20% more for raw materials than they did in 1999. This jump could be largely attributed to rising fuel prices, since Canadian manufacturers paid twice as much for natural gas in 2001 as they did in 1999.

Research and Development

- From 1993 to 2001, Canada's industries almost doubled their R&D expenditures—from $6.5 billion to $11.7 billion. Leading this trend was the manufacturing sector, which spent $7.9 billion on R&D in 2001.
- In the 1999–00 fiscal year, the federal government increased spending on R&D aimed at pollution prevention and protection of the environment by about 25% from the previous year. This accounted for some 7% of total federal government R&D expenditures in 1999–00.
- Total R&D expenditure in the higher education sector was $5.2 billion in 1999–00. The universities themselves contributed 53% of the funds in 1999–00. Most of the money went to engineering and non-health natural science programs.

Agriculture

- From 1941 to 2001, the number of farms in Canada decreased by 66%—from 732 832 farms to 246 923 farms.
- From 1970 to 2000, the total tonnage of fertilizer sold in western Canada increased by 732%. In 2000, nearly three times more fertilizer was sold in western Canada than in eastern Canada.
- From 1996 to 2001, fodder corn production increased by 13% after a 20-year period of steady decline. In the same period, soybean production dropped by 27% after 55 years of fairly steady increase.
- From 1996 to 2001, production of major small grains was down by approximately one-third for all types: all wheat (29%), oats (37%), barley (27%), all rye (37%) and mixed grain (36%).

- Stocks of cattle and calves, sheep and lambs, and pigs all rose from 1986 to 2001—by 24%, 50% and 30%, respectively.

Fish

- Since 1991, the fishing industry's contribution to Canada's GDP has declined. In 2000, the fishing industries accounted for $1.5 billion of GDP, or 0.2% of the national total, compared with $2.0 billion, or 0.3%, in 1991.
- From 1987 to 2001, the fishing industry's experienced a 17% drop in employment, while the total labour force in Canada grew by 22%. The proportion of the total labour force employed in the fishing industry's fell from 0.6% in 1987 to 0.4% in 2001.
- In 2001, Canada exported $4.7 billion worth of fish and fish products, representing 1.1% of all Canadian exports. That same year, Canada imported $1.9 billion worth of fish and fish products, representing 0.6% of all imports.
- From 1990 to 2000, the tonnage of fish caught in all Canadian fisheries decreased by 41%, whereas the value of the catch rose by 39%. The increased value may be attributed to the rising value of shellfish, which nearly tripled over the same period.
- Total aquaculture production increased by 42% from 1997 to 2000, while its value grew by 58%. Trout production experienced the largest growth (93%), while mussel fisheries incurred the largest increase in value (99%).

Forests

- Canada's production of pulpwood decreased by 17% from 1995 to 1999, while the production of logs and bolts and sawn lumber increased by approximately 8% over the same period.
- The share of Canada's GDP held by three forest industries—logging and forestry services; sawmill, planing mill and shingle mill products; and pulp and paper—has been declining fairly steadily since 1961. In 2000, these forest industries accounted for 1.6% of Canada's GDP, down from 3.3% in 1961.
- Employment in the forest products industries increased by 9% from 1998 to 2000. The largest increase occurred in Manitoba, where employment in these industries rose by about 82%.
- In the 1990s, the value of Canada's exports of forest products nearly doubled, reaching a value of $39.2 billion in 2000. However, despite Canada's position as one of the world's largest exporters of forest products, the country's forest product exports fell below 10% as a share of all Canadian exports in 2000.
- In the 1990s, the Canadian government increased expenditures on forest protection by more than one-third, to $561.9 million. However, government spending on silviculture declined to $218.8 million by 1999, less than half of what it had been in 1990.

Minerals

- Revenues from crude petroleum and natural gas have been rising steadily since 1981. In 2000, the industry generated $16.4 billion and accounted for 60% of all revenues in the mineral industry.
- From 1983 to 2000, employment in the mining, quarrying and oil well industry fell by 11% in Canada. Nova Scotia was the hardest hit, losing 60% of its labour force from this industry.
- Smelting, milling and refining activities of the mineral industries contributed $5.3 billion to GDP in 2000. This represented 0.67% of total GDP, a drop from 0.76% in 1990.
- The total value of the production of leading minerals in Canada (including fuels) was $84.2 billion in 2000, $65.7 billion of which was attributable to fuels.
- Canada's reserves of major metals declined from 1996 to 1999. Lead reserves suffered the greatest depletion, dropping 54% over that time.
- Production of most non-fuel minerals declined from 1996 to 2000. The greatest slowdown was in lead production, which decreased by 40% to 145 000 tonnes, its lowest level since 1951.

Transportation

- Canadian ports handled 281.2 million tonnes of international cargo in 1999, down 0.5% from 1997. For the first time in over a decade, domestic shipping grew in two consecutive years: following a growth of 3.4% in 1998, 1999 domestic cargo surged a further 8.1% to reach a total of 104.4 million tonnes.
- In 1999, the tonnage of goods transported by rail was up for the seventh consecutive year. It rose from 263.4 million tonnes of cargo in 1992 to 326.8 million tonnes in 1999.
- In 1998, air transportation dominated intercity transportation by moving 79% of travellers, followed by the bus (14%) and the train (7%).
- In 1998, more than three-quarters of the 18 million motor vehicles registered in Canada were private cars. In 1998, 35% more registered private cars and 25% more registered trucks and truck cabs were travelling Canadian highways than in 1980.

- From 1991 to 2000, total consumption of refined petroleum products by the transportation industry increased 26%, to 54.7 million m^3. The three largest increases in consumption over that period were incurred by air (64%), commercial highway (60%) and private (21%) transportation.

Wildlife

- In the 1999–00 season, ranch-raised and wild animal pelts were harvested in equal numbers in Canada. Ranch-raised pelts increased from 39% of the harvest in the 1995–96 season to 50% in 1999–00.
- Some 2.1 million pelts, worth about $65 million, were harvested in Canada in 1999–00. Almost 30% of these pelts were harvested in Ontario.

Water

- In 1998, 30% of Canada's population was reliant on groundwater as their primary source of water and 41% of municipal water systems in Canada were supplied by groundwater.
- In 1991, electric power generation was responsible for the majority (63%) of total water intake in Canada; the agriculture industry had the second-highest water intake (9%).
- In 1996, the Mixed Wood Plains Ecozone, which encompasses the Windsor–Québec corridor, was home to approximately half of Canada's population but contained only 5% of the country's natural water, measured in terms of area.
- In both 1996 and 1999, ammonia was the substance most heavily released to water by Canadian industries. About 87% more ammonia was released in 1999 than in 1996.

Energy

- In 2000, Canadians consumed 10 815 petajoules of energy—a 17% increase from 1990.
- Despite the 4% decrease in crude oil reserves from 1996 to 1999, the reserve life of this resource rose from 6.7 years to 7.0 years. However, reserves of crude bitumen (tar sands) nearly tripled over the same period, and its reserve life more than doubled from 23.5 years to about 52.5 years.
- From 1997 to 2000, Canada's coal production decreased by 20%, while consumption increased by 11%. During the same period, approximately twice as much natural gas was produced in Canada as was consumed.
- From 1981 to 1999, thermal-electric power stations in Canada more than doubled their use of sub-bituminous coal, lignite and natural gas.

Waste

- In 1998, 97% of Canadians who were served by sewers received some level of wastewater treatment, compared with 72% in 1983. In 1998, 40% received the highest level of wastewater treatment (tertiary), compared with 28% in 1983.
- In 2000, the waste management industry in Canada disposed of approximately 23.1 million tonnes of non-hazardous solid waste, representing a 11% increase since 1998. Each person in Canada disposed of an average of 0.75 tonnes of solid waste in 2000, compared with 0.69 tonnes in 1998.
- The waste management industry in Canada handled 8.8 million tonnes of materials for recycling or reuse in 1998. Most of these materials were ferrous metals (18% of all recycled materials), construction and demolition materials (17%) and mixed paper (17%).

Air

- Total greenhouse gas emissions increased by 15% from 1990 to 1999. The largest increases in emissions were associated with heavy-duty gasoline trucks (87%), pipelines (83%) and light-duty gasoline trucks (60%).

Soil

- In both 1996 and 1999, zinc (and its compounds) was the substance most heavily released to land by Canadian industries, representing 36% by weight of the top five on-site releases to land in both years. Releases of zinc to land tripled from 1996 to 1999.

Human Health

- The incidence of melanoma has been rising fairly steadily since 1972, especially among males. In 2001, the incidence of melanoma skin cancer was 25% higher and of melanoma-related mortality 88% higher among men than among women.

Protected Areas

- From 1989 to 2000, Canada's total protected land area more than doubled, from 29 million hectares to 68 million hectares. During that same period, the largest provincial increase in the proportion of protected area occurred in Manitoba, where it rose from 0.5% to 8.6% of total land area.

Species at Risk

- Between 1800 and 2001, 29 animal and plant species disappeared in Canada. Since 1999, the tiger salamander and timber rattlesnake have been added to the list of species that are extinct or at risk. Half of the species that have disappeared since 1950 are fish. The most frequent cause of their disappearance is the introduction of predators to their habitats.
- A total of 387 species were either extinct or at risk in Canada in 2001, representing a 14% increase from 1999. One-third of Canada's 358 species at risk in 2001 were listed as 'endangered.'

Invasive Species

- In 1998, the European water chestnut was listed as an invasive species in Canada for the first time. This dense, mat-forming aquatic plant hinders navigation, suppresses other aquatic plant growth, inhibits oxygen production in shallow waters, and provides little food value for wildlife.

Disasters

- In 1998, an ice storm that ripped through eastern Canada killed 28 people, left 945 people injured, forced the evacuation of more than 600 000 people from their homes, and caused massive power outages throughout the region.
- Seven floods that spilled through various regions in Canada from 1998 to 2001 injured only 1 person and forced the evacuation of more than 5 000 others.

Environmental Legislation

- The total number of activities conducted to enforce the *Canadian Environmental Protection Act* more than doubled from 1996–97 to 1998–99, but then dropped by 28% the following year. From 1998–99 to 1999–00, the total number of inspections was reduced by nearly one-half and investigations by one-sixth, despite increases in the number of warnings, directions and prosecutions.

Environmental Protection Expenditures

- From 1996 to 1998, Canadian industries spent almost $3 billion each year on environmental protection. The primary metals industry, which incurred higher operating expenditures than any other industry over that period, focused an average of 64% of its environmental protection expenditures on pollution abatement and control (end-of-pipe) processes, waste management and sewerage services.
- From 1995 to 1998, business investment spending on environmental protection decreased by 17%—from $2.1 billion to $1.7 billion. Spending on pollution abatement and control processes fell by 43%, while it more than doubled for pollution prevention processes.

Environment Industry

- In 1998, 164 341 people were employed in the environment industry in Canada—a 10% increase from 1995. Ontario firms retained 39% of the total number of employees in Canada's environment industry in 1988. Quebec firms employed 20%; those in Alberta and British Columbia followed with 15% and 13%, respectively.

Environmental Practices

- From 1995 to 1998, the most widely used pollution reduction method, employed by more than 60% of Canadian industries, was recirculation, recovery, reuse or recycling.

Recreation

- From 1996–97 to 1999–00, the number of visitors to Canada's national parks rose by 11%, from 14.6 million to 16.3 million. In 2000–01, however, the number of visitors dropped by 1.6% to 16.1 million. Despite this decrease, there were still 9.5% more visitors to national parks in 2000–01 than in 1996–97.

Annual Statistics

Physiography

Table A.1
Land Cover by Terrestrial Ecozone, 1995

Ecozone	Evergreen needleleaf forest	Deciduous broadleaf forest	Mixed forest	Burns[1]	Transition treed shrubland	Wetland/ shrubland	Grassland	Barren land	Cropland	Mosaic land[2]	Urban and built-up areas	Water	Snow/ ice	Total
							km^2							
Arctic Cordillera	0	0	0	30	100	710	0	58 620	0	0	0	10 005	175 450	244 917
Northern Arctic	0	0	0	600	5 800	11 170	0	941 160	0	0	278	149 999	413 720	1 522 730
Southern Arctic	54 790	0	100	4 180	15 520	26 420	0	589 110	0	0	4	147 480	13 190	850 787
Taiga Plains	292 430	990	67 870	33 390	73 600	46 070	0	52 060	350	1 500	21	87 535	70	655 891
Taiga Shield	501 910	0	760	107 630	56 000	27 130	0	428 090	0	70	13	268 931	60	1 390 596
Boreal Shield	913 320	13 380	450 160	47 560	88 420	76 080	170	39 030	1 970	9 740	2 981	278 323	220	1 921 344
Atlantic Maritime	20 450	11 560	132 030	140	1 170	3 090	40	30	8 100	13 370	2 239	9 089	0	201 294
Mixed Wood Plains	830	1 690	23 730	30	350	3 280	30	10	17 420	50 940	9 017	60 717	0	168 037
Boreal Plains	192 400	5 320	214 250	5 890	47 580	42 940	760	2 700	92 020	63 930	798	72 648	10	741 248
Prairie	240	50	3 950	0	590	4 090	46 540	200	293 400	90 280	3 999	23 568	0	466 903
Taiga Cordillera	24 810	0	4 890	390	24 290	65 280	0	140 710	0	0	0	2 755	3 910	267 035
Boreal Cordillera	186 410	220	21 490	4 520	59 070	79 350	0	91 310	0	0	53	10 910	17 240	470 575
Pacific Maritime	22 560	3 660	68 670	940	7 490	40 830	0	21 910	700	250	2 044	11 676	28 330	209 044
Montane Cordillera	195 550	830	118 530	1 010	26 420	54 720	1 480	58 550	2 090	4 950	917	15 010	10 190	490 236
Hudson Plains	239 320	0	2 820	4 400	65 790	29 820	0	16 300	0	0	6	16 070	0	374 525
Canada	**2 645 010**	**37 710**	**1 109 230**	**210 710**	**472 190**	**510 970**	**49 030**	**2 439 770**	**416 030**	**235 040**	**22 369**	**1 164 717**	**662 390**	**9 975 162**

Notes:
Figures may not add up to totals due to rounding.
Land cover information, other than 'urban and built-up,' was derived from an integration of two data sets: the Land Cover of Canada Version 1.1 and the Canada-wide 1-km water fraction derived from National Topographic Data Base maps. The Urban Areas section of Statistics Canada's Urban Areas Digital Boundary File/Digital Cartographic File supplements the 'urban/built-up areas' data from Land Cover of Canada. All data were projected to an Albers Equal Area projection (NAD27) and adjusted to the Geobase Level 0 shoreline.
1. Land previously occupied by forest which was subject to fire. At present it may contain broadleaf or needleleaf trees with a tree crown density of less than 10% or standing dead trees. Depending on site conditions, fire intensity and age, land cover after burns may vary from bare soil to vegetation cover approaching low-density forest canopy.
2. Land containing a mix of cropland, forest, shrubland, grassland or built-up areas in which no one component comprises more than about 70% (by area) of the landscape.
Sources:
Cihlar, J. and J. Beaubien, 1998, Land Cover of Canada Version 1.1, Special Publication, NBIOME Project, Produced by the Canada Centre for Remote Sensing and the Canadian Forest Service, Natural Resources Canada. Available on CD-ROM from the Canada Centre for Remote Sensing, Ottawa.
R.A. Fernandes, G. Pavlic, W. Chen and R. Fraser, 2001, Canada-wide 1-km water fraction derived from National Topographic Data Base maps, Natural Resources Canada, <http://geogratis.cgdi.gc.ca/frames.html> (accessed April 29, 2002).
Ecological Stratification Working Group, 1996, *A National Ecological Framework for Canada*, Agriculture and Agri-Food Canada, Research Branch, Centre for Land and Biological Resources Research and Environment Canada, State of the Environment Directorate, Ecozone Analysis Branch, Ottawa.
Natural Resources Canada, 2001, GeoBase Administrative Boundaries, Canada, <http://geogratis.cgdi.gc.ca/framework/framew_e.html> (accessed April 29, 2002).
Statistics Canada, 1996, Urban Areas Digital Boundary File/Digital Cartographic File, 1996 Census, Catalogue No. 92F0037XDE, Ottawa.

Climate

Table A.2
Top 10 Canadian Weather Stories of 2001

Rank	Event	Location	Date
1	Canada Dry From Coast to Coast (serious and extensive drought)	Canada	January to December
2	The Never-ending Winter (record snowfalls)	Eastern Canada	January to May
3	It's Never the Heat…It's Always the Humidity! (third warmest summer on record)	Canada	Summer
4	Close to a National Inferno (highest wildfire potential)	Canada	Spring/Summer
5	Air Quality Woes (one of the smoggiest summers on record)	Canada	Summer
6	Hurricane Gabrielle and 'The Perfect Storm'	Atlantic Canada	August to November
7	Winter Recreation - Best in the East and Least in the West	Canada	January to April
8	B.C.'s Big Blow (one week of powerful storms)	British Columbia	mid-December
9	Another Hot Year for Canada (third warmest on record) and the World	Canada	January to December
10	Freak Lightning Deaths in an Unusually Quiet Summer	Ontario/Quebec	Summer

Source:
Environment Canada, *Environment Canada's Top Weather Stories for 2001* (News Release), Meteorological Service of Canada, December 27, 2001, Ottawa, <http://www.ec.gc.ca/Press/2001/011227_n_e.htm> (accessed January 17, 2002).

Table A.3
Annual Regional Temperature Departures: Trends and Extremes, 1948 to 2001

		Extreme years					
		Coldest		Warmest		Annual 2001[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	-0.1	1972	-1.4	1999	2.0	9	0.8
Great Lakes/St. Lawrence Lowlands	0.4	1978	-1.0	1998	2.3	4	1.5
Northeastern Forest	0.5	1972	-1.9	1998	2.1	3	2.0
Northwestern Forest	1.7	1950	-2.1	1987	3.0	4	2.2
Prairies	1.4	1950	-2.1	1987	3.1	6	1.6
South British Columbia Mountains	1.3	1955	-1.8	1998	2.0	18	0.6
Pacific Coast	1.1	1955	-1.2	1958	1.6	23	0.3
North British Columbia Mountains/Yukon Territory	1.9	1972	-2.1	1981	2.8	14	1.2
Mackenzie District	2.0	1982	-1.5	1998	3.9	4	2.4
Arctic Tundra	1.1	1972	-2.4	1998	3.3	3	2.1
Arctic Mountains and Fiords	0.4	1972	-1.9	1981	2.2	6	1.0
Canada	**1.1**	**1972**	**-1.8**	**1998**	**2.5**	**3**	**1.7**

Notes:
1. The 2001 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.

Source:
Environment Canada, Meteorological Service of Canada, Climate Research Branch, 2002, *Climate Trends and Variations Bulletin for Canada, Annual 2001*, Ottawa.

Population

Table A.4
Total Population by Province and Territory, 1901, 1951 and 2001

	Total population			Change	
Province/Territory	1901	1951	2001	1901 to 1951	1951 to 2001
	thousands			percent	
Newfoundland and Labrador	…	361.4	512.9	…	42
Prince Edward Island	103.3	98.4	135.3	-5	37
Nova Scotia	459.6	642.6	908.0	40	41
New Brunswick	331.1	515.7	729.5	56	41
Quebec	1 648.9	4 055.7	7 237.5	146	78
Ontario	2 182.9	4 597.5	11 410.0	111	148
Manitoba	255.2	776.5	1 119.6	204	44
Saskatchewan	91.3	831.7	978.9	811	18
Alberta	73.0	939.5	2 974.8	1 187	217
British Columbia	178.7	1 165.2	3 907.7	552	235
Yukon Territory	27.2	9.1	28.7	-67	215
Northwest Territories	20.1[1]	16.0[1]	37.4	-20	133
Nunavut	…	…	26.7	…	…
Canada	**5 371.3**	**13 993.4**	**30 007.1**	**161**	**114**

Note:
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, 2002, *A Profile of the Canadian Population: where we live*, <http://geodepot.statcan.ca/Diss/Highlights/Highlights_e.cfm> (accessed March 26, 2002).

Table A.5
Components of Population Growth, 1960 to 2001

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	362	2.0	478.6	139.7	338.9	104.1	..	..
1961	18 271	343	1.9	475.7	141.0	334.7	71.7	..	..
1962	18 614	350	1.9	469.7	143.7	326.0	74.6	..	..
1963	18 964	361	1.9	465.8	147.4	318.4	93.2	..	..
1964	19 325	353	1.8	452.9	145.9	307.0	112.6	..	..
1965	19 678	370	1.9	418.6	148.9	269.7	146.8	..	..
1966	20 048	364	1.8	387.7	149.9	237.8	194.7	..	..
1967	20 412	317	1.6	370.9	150.3	220.6	222.9	..	..
1968	20 729	299	1.4	364.3	153.2	211.1	184.0	..	..
1969	21 028	296	1.4	369.7	154.5	215.2	161.5	..	..
1970	21 324	638	3.0	372.0	156.0	216.0	147.7	..	..
1971	21 962	257	1.2	362.2	157.3	204.9	121.9	..	..
1972	22 220	274	1.2	351.3	159.5	191.7	117.0	26.6	90.5
1973	22 494	315	1.4	345.8	162.6	183.2	138.5	27.7	110.8
1974	22 808	334	1.5	339.9	166.3	173.6	217.5	46.8	170.7
1975	23 142	308	1.3	353.5	168.8	184.8	209.3	40.5	168.8
1976	23 450	277	1.2	364.3	166.4	197.9	170.0	30.3	139.7
1977	23 726	238	1.0	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	314	1.3	362.2	165.8	196.4	84.5	30.9	53.7
1980	24 516	304	1.2	367.3	171.5	195.8	143.6	20.5	123.1
1981	24 820	297	1.2	372.1	170.5	201.6	127.0	17.8	109.2
1982	25 117	250	1.0	372.5	172.4	200.1	135.1	29.1	106.0
1983	25 367	241	0.9	373.6	176.5	197.1	101.2	31.1	70.1
1984	25 608	235	0.9	374.5	174.2	200.4	88.3	31.8	56.6
1985	25 843	258	1.0	376.3	179.1	197.2	83.7	28.1	55.6
1986	26 101	349	1.3	375.4	183.4	192.0	88.6	24.8	63.8
1987	26 450	348	1.3	373.0	182.6	190.4	130.8	22.5	108.4
1988	26 798	488	1.8	370.0	189.9	180.1	152.4	18.1	134.3
1989	27 286	415	1.5	384.0	188.4	195.6	178.2	18.4	159.7
1990	27 701	330	1.2	403.3	192.6	210.7	203.0	19.7	183.3
1991	28 031	346	1.2	402.9	192.4	210.5	219.3	22.8	196.5
1992	28 377	327	1.2	403.1	197.0	206.1	241.8	23.1	218.7
1993	28 703	333	1.2	392.2	201.8	190.4	265.4	21.7	243.7
1994	29 036	318	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	315	1.1	372.5	209.7	162.7	217.0	24.2	192.8
1997	29 987	261	0.9	357.3	217.2	140.1	224.9	49.0	175.9
1998	30 248	251	0.8	345.1	217.7	127.4	194.5	56.1	138.4
1999	30 499	270	0.9	339.6	219.8	119.8	173.2	58.5	114.7
2000	30 770	312	1.0	336.4	221.2	115.1	205.7	61.9	143.9
2001	31 082	…	…	329.8	227.1	102.7	252.1	65.5	186.6

Note:
Population growth figures do not equal the sum of the natural increase and net migration. One needs to add the balance of non-permanent residents and the number of returning Canadians, as well as a residual.
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 051-0004 and 051-0005.

Table A.6
Net Migration by Province and Territory, 1970 to 2000

Year	Nfld.Lab.	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**
1978	-3 540	25	-109	-1 644	-33 424	415	-9 557	-3 701	31 987	20 698	-178	-972	…	**348 929**

Table A.6
Net Migration by Province and Territory, 1970 to 2000 (continued)

Year	Nfld.Lab.	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													
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	-1 055	-14	**298 158**
1999	-3 916	212	947	-638	-11 712	18 424	-2 387	-7 146	19 692	-12 413	-601	-457	-5	**276 495**
2000	-4 236	-163	-650	-974	-12 368	22 691	-3 624	-9 159	27 125	-17 296	-752	-644	50	**321 161**
Total	**-108 229**	**5 002**	**-4 595**	**-9 281**	**-524 453**	**176 946**	**-160 665**	**-201 594**	**323 526**	**517 490**	**-6 529**	**-11 731**	**-933**	**10 392 532**

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.7
Gross Domestic Product by Industry, 1961 to 1996, Selected Years

Industry[1]	1961	1966	1971	1976	1981	1986	1991	1996
	percent of total output							
Agricultural products[2]	8.5	9.0	6.5	6.4	5.7	5.4	4.7	4.5
Forest products[2]	6.2	5.6	4.7	4.8	4.5	4.5	3.6	4.9
Mineral products[2]	7.5	7.6	6.4	5.6	5.2	4.4	3.6	3.9
Fuel and energy	4.7	4.3	4.7	6.4	8.0	7.2	6.3	6.9
Chemical products	2.1	2.3	2.0	1.8	2.1	2.1	2.1	2.5
Textiles, fabrics and clothing	2.3	2.1	1.8	1.5	1.3	1.2	0.9	0.8
Electrical products	1.6	1.8	1.6	1.3	1.3	1.2	1.1	1.1
Machinery and equipment	1.5	1.8	1.4	1.3	1.5	1.3	1.1	1.3
Transportation equipment	1.9	2.4	2.6	2.2	1.8	2.4	2.2	3.3
Miscellaneous goods	0.7	0.7	0.6	0.6	0.6	0.5	0.4	0.6
Construction	7.6	7.7	7.4	8.4	7.8	6.1	6.4	5.0
Transportation and communication	9.2	8.8	8.7	8.1	8.2	8.2	7.5	7.4
Retail and wholesale trade	12.3	11.7	11.9	11.7	10.8	11.6	11.4	10.7
Finance and insurance	7.5	7.0	7.6	7.4	7.6	8.3	8.9	8.5
Real estate	4.8	4.3	4.8	4.3	5.1	6.0	7.0	7.3
Personal service	10.7	11.5	13.5	13.8	13.8	14.4	16.0	15.5
Government service	9.0	9.2	10.9	11.4	10.7	11.0	11.8	10.2
Business service	1.9	2.2	2.8	3.2	4.0	4.2	5.0	5.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes:
1. The industry classification in this table is a special aggregation based on the 1980 Standard Industrial Classification (SIC).
2. Includes both extraction and downstream manufacturing industries.

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

Table A.8
Employment by Industry, 1961 to 1996, Selected Years

Industry[1]	1961	1966	1971	1976	1981	1986	1991	1996
				percent				
Agricultural products[2]	14.1	10.8	9.0	7.0	7.1	6.5	5.7	5.5
Forest products[2]	5.5	5.2	4.7	4.4	4.1	3.8	3.4	3.5
Mineral products[2]	5.1	5.4	4.9	4.5	4.0	3.3	2.9	2.8
Fuel and energy[2]	1.1	1.0	1.1	1.1	1.3	1.3	1.3	1.2
Chemical products	1.6	1.6	1.6	1.6	1.5	1.5	1.4	1.4
Textiles, fabrics and clothing	3.6	3.3	2.8	2.5	2.0	1.8	1.4	1.2
Electrical products	1.5	1.7	1.6	1.4	1.3	1.1	1.0	0.8
Machinery and equipment	1.3	1.6	1.4	1.4	1.5	1.3	1.1	1.3
Transportation equipment	1.7	2.1	2.0	1.9	1.9	2.0	1.7	1.9
Miscellaneous goods	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.7
Construction	8.6	9.0	7.8	8.3	6.9	6.2	6.4	5.9
Transportation and communication	7.1	6.9	6.3	6.2	6.2	5.9	5.7	5.9
Retail and wholesale trade	15.4	15.5	16.3	16.6	17.0	17.8	17.4	17.4
Finance and insurance	3.4	3.6	4.1	4.6	5.0	5.2	5.6	5.3
Real estate	…	…	…	…	…	…	…	…
Personal service	11.0	12.0	12.2	13.0	14.6	16.4	17.5	18.6
Government service	16.5	17.3	20.5	21.1	20.1	20.1	20.8	19.4
Business service	1.6	2.2	2.8	3.5	4.6	5.2	6.1	7.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes:
1. The industry classification in this table is a special aggregation based on the 1980 Standard Industrial Classification (SIC).
2. Includes both extraction and downstream manufacturing industries.

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

Table A.9
Composition of Exports and Imports, 1961 to 1995, Selected Years

	Exports					Imports				
Industry[1]	1961	1971	1981	1991	1995	1961	1971	1981	1991	1995
	percent of total exports					percent of total imports				
Agricultural products[2]	17.0	10.2	10.7	7.1	6.6	12.5	8.0	7.2	6.5	5.7
Forest products[2]	21.3	13.6	12.5	11.0	12.8	4.0	3.3	2.9	3.7	3.9
Mineral products[2]	24.3	17.8	17.6	13.3	11.3	12.2	10.3	12.0	8.4	9.3
Fuel and energy[2]	3.7	6.2	10.5	7.6	6.2	7.9	5.9	10.9	4.3	3.1
Chemical products	3.1	2.1	3.5	4.7	5.4	5.9	5.9	6.0	7.5	8.6
Textiles, fabrics and clothing	1.0	0.9	1.0	1.2	1.6	6.5	5.5	4.3	4.9	4.5
Electrical products	1.1	2.3	2.5	4.5	4.9	5.6	5.6	6.3	9.3	10.0
Machinery and equipment	3.1	4.6	6.1	6.3	7.2	14.2	15.6	15.4	13.8	15.9
Transportation equipment	2.8	21.4	17.1	21.9	23.6	11.7	21.9	20.0	21.3	21.2
Miscellaneous goods	0.3	0.7	1.5	1.7	2.1	2.4	2.0	2.6	3.4	3.1
Construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transportation and communication	9.2	7.6	8.0	7.9	6.5	1.7	1.3	2.5	3.3	3.0
Retail and wholesale trade	1.8	2.7	2.4	3.4	3.3	0.1	0.4	0.2	0.2	0.2
Finance and insurance	0.9	0.8	1.2	2.3	2.2	1.3	1.9	1.9	3.4	3.2
Real estate	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Personal service	0.3	0.5	2.5	3.3	2.5	0.4	0.9	3.4	4.9	3.5
Government service	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business service	0.7	0.9	1.6	2.4	2.5	1.6	1.8	2.9	3.0	3.2
Unallocated imports and exports	9.4	7.8	1.3	1.2	1.2	11.9	9.8	1.6	1.9	1.6
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 industry classification in this table is a special aggregation based on the 1980 Standard Industrial Classification (SIC).
2. Includes both extraction and downstream manufacturing industries.

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

Table A.10
Raw Materials Price Indexes, 1981 to 2001

Commodities (1997=100)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Vegetable products	85	74	77	84	77	76	73	81	82	76	68	69	74	90	98	107	100	91	80	79	85
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
Wood	44	42	44	45	46	48	53	58	58	58	59	65	89	100	109	101	100	85	88	92	85
Logs and bolts	38	35	37	38	38	42	48	53	52	52	52	60	88	100	105	100	100	82	86	91	82
Pulpwood	66	68	69	72	73	72	75	79	84	84	87	87	90	100	125	103	100	101	98	99	102
Recycled paper	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	116	180	138
Ferrous materials	73	71	72	79	80	81	80	84	81	75	73	75	85	98	103	100	100	98	88	89	87
Iron ore	88	92	93	97	101	102	98	93	87	85	83	87	92	97	101	99	100	109	100	102	110
Iron and steel scrap	65	54	55	68	65	65	67	79	79	70	66	68	81	100	105	100	100	92	81	81	73
Non-ferrous metals	87	77	80	80	75	78	89	104	100	90	76	76	71	94	114	98	100	87	87	90	82
Copper and nickel concentrates	0	0	0	0	0	0	0	0	0	0	0	87	75	99	127	101	100	78	80	98	83
Lead concentrates	80	56	46	58	45	54	85	82	84	92	67	66	66	81	94	110	100	100	90	74	75
Zinc concentrates	64	58	62	76	68	66	70	91	121	108	80	83	70	76	80	79	100	82	85	89	72
Radio-active concentrates	222	245	218	211	204	202	198	175	121	117	101	97	116	109	131	134	100	86	84	69	72
Precious metals	127	105	126	108	98	110	126	114	97	94	86	86	96	112	113	113	100	101	96	97	96
Other base metals	86	78	82	90	81	83	89	108	99	80	67	67	65	96	123	100	100	92	93	104	100
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
Non-metallic minerals	70	78	81	83	87	90	89	92	93	93	93	89	90	92	96	97	100	103	106	108	109
Mineral fuels	92	111	118	120	126	80	88	69	78	94	85	83	79	80	86	102	100	79	103	160	158
Coal (thermal)	76	84	84	90	91	91	91	81	82	82	86	91	94	96	94	100	100	96	99	96	97
Crude mineral oil	100	120	130	132	138	80	88	69	79	96	87	84	79	80	87	104	100	73	99	161	142
Natural gas	87	111	117	114	115	112	109	100	96	96	98	98	104	115	94	95	100	111	126	168	250
Aluminum materials	64	56	73	77	60	69	83	115	101	80	62	63	63	92	111	90	100	88	91	101	97
Copper materials	71	62	66	58	61	63	75	100	105	97	84	86	76	102	129	100	100	81	78	89	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
Other agricultural products	75	78	77	82	80	82	84	82	85	88	85	84	90	90	92	98	100	93	92	99	105
Fishing and trapping products	69	66	64	66	66	74	88	80	72	76	90	91	88	87	94	101	100	102	107	104	102
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
Raw materials, total	**77**	**83**	**86**	**89**	**90**	**74**	**80**	**77**	**79**	**83**	**78**	**78**	**82**	**90**	**98**	**101**	**100**	**87**	**94**	**115**	**113**

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

Research and Development

Table A.11
Total Research and Development Expenditures, Selected Industry, 1993 to 2001

Industry	1993[r]	1994[e]	1995[e]	1996[e]	1997[e]	1998[e]	1999[p]	2000[p]	2001[1]
	million dollars								
Agriculture, fishing and logging	45	47	64	70	64	66	58	62	62
Mining and oil wells	165	176	206	201	199	155	120	140	126
Manufacturing									
Aircraft and parts	670	602	753	771	1 057	1 130	1 143	1 333	1 526
Telecommunication equipment	906	1 110	1 381	1 517	1 749	2 130	2 113	2 498	2 640
Pharmaceutical and medicine	362	395	457	498	502	548	625	665	731
Other manufacturing	2 089	2 169	2 393	2 276	2 413	2 617	2 677	2 817	3 042
Construction	13	18	29	26	38	24	26	27	28
Utilities	231	223	205	233	186	216	185	175	173
Services									
Wholesale trade	291	372	523	516	633	600	664	740	778
Computer and related services	318	430	546	555	596	652	615	679	728
Engineering and scientific services	556	637	734	707	732	899	1 040	1 140	1 197
Other services	893	941	768	673	612	585	553	587	626
Total	**6 539**	**7 120**	**8 059**	**8 043**	**8 781**	**9 622**	**9 819**	**10 863**	**11 657**

Note:
1. Figures are spending intentions.
Source:
Statistics Canada, 2001, *Industrial Research and Development*, Catalogue No. 88-202-XIB, Ottawa.

Table A.12
Federal Government Research and Development Expenditures by Socio-economic Objective, 1995-96 to 1999-00

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

Note:
Non-program (indirect) costs are excluded.
Source:
Statistics Canada, 2001, *Science Statistics*, Vol. 25, No. 9, Catalogue No. 88-001-XIB, Ottawa.

Table A.13
Research and Development Expenditures and Source of Funds in the Higher Education Sector, 1999-00

			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	1 056.7	20.5	13.4	9.1	7.9	69.6	0.0
Health sciences	1 911.9	37.1	18.9	7.5	20.2	52.2	1.2
Other natural sciences and engineering	2 185.7	42.4	26.5	11.0	15.4	45.6	1.6
Total	**5 154.3**	**100.0**	**21.0**	**9.3**	**15.6**	**53.0**	**1.1**

Note:
1. Includes private business and private not-for-profit organizations.
Source:
Statistics Canada, 2001, *Estimation of research and development expenditures in the higher education sector, 1999-2000*, Catalogue No. 88-001-XIB, Vol. 25, No. 7, Ottawa.

Agriculture

Table A.14
Number of Farms by Province, 1871 to 2001, Selected Years

Year	Nfld.Lab.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	**Total**
	number										
1871	…	…	46 316	31 202	118 086	172 258	…	…	…	…	**367 862**
1881	…	13 629	55 873	36 837	137 863	206 989	9 077	1 014[2]	…	2 743	**464 025**
1891[1]	…	14 549	60 122	38 577	174 996	216 195	22 008	9 244[3]	…	6 490	**542 181**
1901[1]	…	13 748	54 478	37 006	140 110	204 054	32 252	13 445	9 479	6 501	**511 073**
1911[1]	…	14 113	52 491	37 755	149 701	212 108	43 631[4]	95 013[4]	60 559[4]	16 958	**682 329**
1921	…	13 701	47 432	36 655	137 619	198 053	53 252[4]	119 451[4]	82 954[4]	21 973	**711 090**
1931	…	12 865	39 444	34 025	135 957	192 174	54 199	136 472	97 408	26 079	**728 623**
1941	…	12 230	32 977	31 889	154 669	178 204	58 024	138 713	99 732	26 394	**732 832**
1951	3 626	10 137	23 515	26 431	134 336	149 920	52 383	112 018	84 315	26 406	**623 087**
1961	1 752	7 335	12 518	11 786	95 777	121 333	43 306	93 924	73 212	19 934	**480 877**

Table A.14
Number of Farms by Province, 1871 to 2001, Selected Years (continued)

Year	Nfld.Lab.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	**Total**
	number										
1971	1 042	4 543	6 008	5 485	61 257	94 722	34 981	76 970	62 702	18 400	**366 110**
1981	679	3 154	5 045	4 063	48 144	82 448	29 442	67 318	58 056	20 012	**318 361**
1991	725	2 361	3 980	3 252	38 076	68 633	25 706	60 840	57 245	19 225	**280 043**
1996	742	2 217	4 453	3 405	35 991	67 520	24 383	56 995	59 007	21 835	**276 548**
2001	643	1 845	3 923	3 034	32 139	59 728	21 071	50 598	53 652	20 290	**246 923**

Notes:
1. Excludes plots under one acre, to attain comparability with data for later years.
2. Data comprise the portion of the Northwest Territories located west of Manitoba.
3. Data comprise the districts of Assiniboia, Saskatchewan and Alberta.
4. Data exclude farms located on Indian reserves.

Sources:
Statistics Canada, 1983, *Historical Statistics of Canada, Second Edition*, F.H. Leacy (ed.), Catalogue No. 11-516-XPE, Ottawa.
Statistics Canada, 1997, *Historical Overview of Canadian Agriculture*, Catalogue No. 93-358-XPB, Ottawa.
Statistics Canada, 2001, Census of Agriculture, <http://www.statcan.ca/english/Pgdb/Economy/Census/econ102a.htm> (accessed May 16, 2002).

Table A.15
Fertilizer Sold and Nutrient Content in Eastern and Western Canada, 1970 to 2000

	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
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

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, 2001, *Canadian Fertilizer Consumption, Shipments and Trade, 1999/2000,* Farm Inputs Markets Unit, Farm Income Policy and Programs Directorate, Agriculture and Agri-Food Canada, Ottawa.

Table A.16
Selected Field Crop Production, 1911 to 2001, 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	8 170 800	2 196 400	251 500	1 581 800	97 700	6 091 700

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

Table A.17
Production of Major Small Grains, 1911 to 2001, 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	21 282 100	2 769 200	11 354 900	193 900	370 600

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

Table A.18
Selected Livestock Populations, 1976 to 2001[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	10 090
1981	13 364	803	9 872
1982	13 170	812	9 702
1983	12 836	803	9 888
1984	12 582	769	10 272
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	10 820
1990	12 560	874	10 146
1991	12 843	918	10 444
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	14 910	822	11 672
1998	14 706	830	12 357
1999	14 477	881	12 392
2000	14 416	978	12 357
2001	14 640	1 041	12 883

Note:
1. Number on farms at July 1.
Source:
Statistics Canada, 2002, *Livestock Statistics*, Catalogue No. 23-603E, Ottawa.

Fish

Table A.19
Gross Domestic Product of Fishing Industries, 1961 to 2000

Year	Total GDP	Fishing industries			Share of total GDP
		Fishing and trapping	Fish products	Total	
	million dollars				percent
1961	199 053	943	536	1 479	0.74
1962	212 135	974	629	1 603	0.76
1963	223 164	951	555	1 506	0.67
1964	237 777	992	665	1 657	0.70
1965	253 453	956	733	1 689	0.67
1966	269 949	942	719	1 661	0.62
1967	277 341	858	630	1 488	0.54
1968	293 122	1 070	653	1 723	0.59
1969	308 154	907	697	1 604	0.52
1970	314 948	942	552	1 494	0.47
1971	331 494	877	615	1 492	0.45
1972	349 749	803	636	1 439	0.41
1973	374 957	813	714	1 527	0.41
1974	388 342	697	430	1 127	0.29
1975	392 681	658	441	1 099	0.28
1976	415 825	748	522	1 270	0.31
1977	428 333	888	579	1 467	0.34
1978	442 550	972	844	1 816	0.41
1979	460 572	873	804	1 677	0.36
1980	469 180	904	736	1 640	0.35
1981	483 350	978	675	1 653	0.34
1982	469 034	1 049	783	1 832	0.39
1983	480 971	1 009	758	1 767	0.37

Table A.19
Gross Domestic Product of Fishing Industries, 1961 to 2000 (continued)

Year	Total GDP	Fishing industries			
		Fishing and trapping	Fish products	Total	Share of total GDP
	million dollars				percent
1984	508 010	904	792	1 696	0.33
1985	534 324	1 053	910	1 963	0.37
1986	548 405	1 072	908	1 980	0.36
1987	569 537	909	914	1 823	0.32
1988	594 891	1 019	929	1 948	0.33
1989	607 564	1 123	872	1 995	0.33
1990	609 231	1 260	954	2 214	0.36
1991	600 004	1 116	889	2 005	0.33
1992	604 275	1 026	794	1 820	0.30
1993	618 422	1 059	833	1 892	0.31
1994	645 957	865	923	1 788	0.28
1995	663 082	704	907	1 611	0.24
1996	672 799	724	834	1 558	0.23
1997	700 039	747	806	1 553	0.22
1998	721 879	733	767	1 500	0.21
1999	753 047	723	796	1 519	0.20
2000	786 838	708	769	1 477	0.19

Source:
Statistics Canada, CANSIM II, table 379-0004.

Table A.20
Employment in the Fishing Industries, 1987 to 2001

Year	Total employment	Fishing industries				
		Fishing	Animal aquaculture	Seafood product preparation and packaging	Total	Share of total employment
	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

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

Table A.21
Exports and Imports of Fish and Fish Products,[1] 1971 to 2001

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	76 680	1 265	1.65	67 903	354	0.52

Table A.21
Exports and Imports of Fish and Fish Products,[1] 1971 to 2001 (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
1981	84 432	1 494	1.77	77 140	360	0.47
1982	84 393	1 591	1.89	66 738	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
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	139 216	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	3 258	1.43	207 872	1 126	0.54
1995	265 334	3 496	1.32	229 936	1 286	0.56
1996	280 079	3 444	1.23	237 689	1 470	0.62
1997	303 378	3 498	1.15	277 726	1 434	0.52
1998	326 181	3 664	1.12	303 378	1 636	0.54
1999	365 233	4 224	1.16	326 844	1 869	0.57
2000	422 559	4 531	1.07	363 281	1 928	0.53
2001	413 110	4 678	1.13	350 503	1 944	0.55

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

Table A.22
Landed Catch and Value, 1989 to 2000

Year	Groundfish		Pelagic fish		Shellfish		Total[1]	
	Catch	Value	Catch	Value	Catch	Value	Catch	Value
	tonnes	million dollars	tonnes	million dollars	tonnes	million dollars	tonnes	million dollars
1989	816 115	431 914	493 086	412 244	249 004	548 638	1 605 087	1 413 388
1990	785 457	471 932	565 500	425 041	251 390	519 649	1 645 938	1 433 748
1991	786 715	497 336	434 878	295 186	251 363	583 199	1 509 033	1 393 949
1992	626 659	414 085	391 026	316 174	269 415	649 514	1 319 816	1 400 267
1993	428 806	297 168	420 749	364 538	288 307	730 932	1 163 188	1 422 505
1994	323 373	243 183	361 236	414 953	317 925	1 011 776	1 035 215	1 702 712
1995	230 122	224 405	312 093	239 684	308 510	1 269 756	880 290	1 770 412
1996	263 777	220 163	320 028	271 032	310 662	1 016 055	925 166	1 547 854
1997	260 716	251 152	315 071	231 349	338 322	1 061 933	947 428	1 582 825
1998[p]	285 202	286 409	314 981	147 667	370 445	1 121 833	1 002 483	1 578 081
1999[p]	298 708	328 153	296 563	141 822	396 276	1 393 719	1 010 192	1 887 649
2000[p]	228 186	308 669	292 372	125 618	430 527	1 538 761	967 885	1 991 615

Note:
1. Includes marine plants, lumpfish roe and miscellaneous other marine products.
Source:
Department of Fisheries and Oceans, Statistical Services, <http://www.dfo-mpo.gc.ca/communic/statistics/stat_e.htm> (accessed February 21, 2002).

Table A.23
Aquaculture Production, 1989 to 2000

	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

Table A.23
Aquaculture Production, 1989 to 2000 (continued)

	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
1996	5 654	28 940	7 946	11 340	45 502	290 116	9 832	11 936	71 191	353 343
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

Note:
1. Also includes char, cod, clams and scallops.
Source:
Department of Fisheries and Oceans, Statistical Services, <http://www.dfo-mpo.gc.ca/communic/statistics/stat_e.htm> (accessed February 21, 2002).

Forests

Table A.24
Production of Selected Forest Products, 1922 to 1999, 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	37 270	26 645
1980	109 952	38 909	44 597
1985	119 317	40 620	54 587
1990	118 950	35 865	54 544
1995	150 026	31 089	64 572
1999	161 451	25 861	69 531

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, 2001, *National Forestry Database Program*, <http://nfdp.ccfm.org> (accessed March 8, 2002).
Statistics Canada, CANSIM II, table 303-0009.

Table A.25
Gross Domestic Product of Selected Forest Products Industries, 1961 to 2000

	Industries				Industries as share of GDP			
Year	Logging and forestry services	Sawmill, planing mill and shingle mill products	Pulp and paper	Total	Logging and forestry services	Sawmill, planing mill and shingle mill products	Pulp and paper	Total
	million 1992 dollars				percent			
1961	2 881	815	2 777	6 473	1.45	0.41	1.40	3.25
1962	2 991	947	2 723	6 661	1.41	0.45	1.28	3.14
1963	3 028	1 106	2 806	6 940	1.36	0.50	1.26	3.11
1964	3 202	1 182	3 035	7 419	1.35	0.50	1.28	3.12
1965	3 247	1 199	3 072	7 518	1.28	0.47	1.21	2.97
1966	3 313	1 145	3 254	7 712	1.23	0.42	1.21	2.86
1967	3 111	1 197	3 065	7 373	1.12	0.43	1.11	2.66
1968	3 147	1 379	3 230	7 756	1.07	0.47	1.10	2.65
1969	3 395	1 368	3 530	8 293	1.10	0.44	1.15	2.69
1970	3 457	1 440	3 416	8 313	1.10	0.46	1.08	2.64
1971	3 469	1 393	3 317	8 179	1.05	0.42	1.00	2.47

Table A.25
Gross Domestic Product of Selected Forest Products Industries, 1961 to 2000 (continued)

	Industries				Industries as share of GDP			
Year	Logging and forestry services	Sawmill, planing mill and shingle mill products	Pulp and paper	Total	Logging and forestry services	Sawmill, planing mill and shingle mill products	Pulp and paper	Total
	million 1992 dollars				percent			
1972	3 535	1 449	3 618	8 602	1.01	0.41	1.03	2.46
1973	3 903	1 620	3 938	9 461	1.04	0.43	1.05	2.52
1974	3 870	1 661	4 276	9 807	1.00	0.43	1.10	2.53
1975	3 420	1 359	2 731	7 510	0.87	0.35	0.70	1.91
1976	3 656	1 779	3 596	9 031	0.88	0.43	0.86	2.17
1977	3 850	2 025	3 586	9 461	0.90	0.47	0.84	2.21
1978	4 185	1 991	4 109	10 285	0.95	0.45	0.93	2.32
1979	4 223	1 983	4 044	10 250	0.92	0.43	0.88	2.23
1980	4 229	2 225	4 008	10 462	0.90	0.47	0.85	2.23
1981	4 034	2 025	3 817	9 876	0.83	0.42	0.79	2.04
1982	3 530	1 732	3 426	8 688	0.75	0.37	0.73	1.85
1983	4 419	2 197	3 832	10 448	0.92	0.46	0.80	2.17
1984	4 753	2 501	4 031	11 285	0.94	0.49	0.79	2.22
1985	4 625	2 893	4 015	11 533	0.87	0.54	0.75	2.16
1986	4 457	2 821	4 218	11 496	0.81	0.51	0.77	2.10
1987	5 274	3 299	4 377	12 950	0.93	0.58	0.77	2.27
1988	5 360	3 391	4 378	13 129	0.90	0.57	0.74	2.21
1989	5 127	3 280	4 195	12 602	0.84	0.54	0.69	2.07
1990	4 533	3 004	4 135	11 672	0.74	0.49	0.68	1.92
1991	3 959	2 698	3 869	10 526	0.66	0.45	0.64	1.75
1992	4 031	2 818	4 011	10 860	0.67	0.47	0.66	1.80
1993	4 243	2 860	4 324	11 427	0.69	0.46	0.70	1.85
1994	4 442	2 885	4 558	11 885	0.69	0.45	0.71	1.84
1995	4 645	2 922	4 350	11 917	0.70	0.44	0.66	1.80
1996	4 281	2 969	4 271	11 521	0.64	0.44	0.63	1.71
1997	4 316	3 057	4 458	11 831	0.62	0.44	0.64	1.69
1998	4 221	3 047	4 347	11 615	0.58	0.42	0.60	1.61
1999	4 608	3 235	4 708	12 551	0.61	0.43	0.63	1.67
2000	4 683	3 252	4 836	12 771	0.60	0.41	0.61	1.62

Source:
Statistics Canada, CANSIM II, table 379-0004.

Table A.26
Employment in Forest Products Industries[1] by Province, 1983 to 2000

Year	Nfld.Lab.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	**Total**
	persons										
1983	1 729	x	5 405	10 827	61 384	40 928	2 311	1 198	6 313	70 650	**200 745**
1984	1 973	x	5 961	12 700	57 855	41 108	2 629	1 303	6 137	68 447	**198 113**
1985	1 459	x	6 363	11 477	57 752	41 091	2 374	1 293	5 985	66 836	**194 630**
1986	1 251	110	6 040	12 751	57 591	40 862	1 995	1 233	5 861	62 248	**189 942**
1987	1 498	106	6 096	12 479	60 529	40 757	2 393	1 507	6 485	74 647	**206 497**
1988	1 611	x	6 464	13 267	60 934	39 822	2 486	1 504	6 773	78 195	**211 056**
1989	1 602	x	6 323	13 133	59 195	37 848	2 489	1 438	6 718	79 448	**208 194**
1990	1 886	115	6 558	11 792	54 651	36 760	2 336	1 375	7 488	78 412	**201 373**
1991	1 505	111	5 315	12 222	52 129	32 366	1 714	1 049	7 569	76 043	**190 023**
1992	1 545	114	5 162	10 968	50 838	30 602	1 661	1 080	7 072	69 137	**178 179**
1993	1 496	124	5 452	11 184	49 017	29 571	1 696	1 258	8 373	69 993	**178 164**
1994	1 499	179	4 337	10 802	50 126	29 461	919	963	7 814	73 978	**180 078**
1995	1 842	x	3 808	12 004	54 647	29 205	870	1 019	7 943	72 243	**183 581**
1996	1 634	x	5 902	12 048	54 322	27 648	1 268	1 036	9 029	74 595	**187 482**
1997	1 945	x	6 436	12 609	55 571	29 056	1 283	1 075	8 759	72 349	**189 083**
1998	1 773	x	6 184	12 224	58 489	29 124	1 342	1 232	8 951	68 596	**187 915**
1999	1 584	x	6 141	11 962	59 522	29 394	1 342	1 915	9 761	72 723	**194 344**
2000	2 361	x	6 862	13 412	62 881	29 789	2 441	1 688	8 962	76 146	**204 542**

Note:
1. Includes the following industries: logging; forestry services; sawmill, planing mill and shingle mill products; and pulp and paper.
Source:
Statistics Canada, CANSIM II, table 281-0005.

Table A.27
Export of Forest Products, 1978 to 2000

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	24.6	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	463.7	13 293.6	961.2	7 474.1	13 761.9	349.2	36 363.4	10.2
2000	5.3	84.8	575.5	12 186.3	979.1	9 886.6	15 092.4	352.4	39 162.4	9.5

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

Table A.28
Total Annual Expenditures on Forest Management by Activity and Source of Funding, 1990 to 1999

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	220 258	..	864 637	..	64 769	..	672 152	..
1999	218 773	..	561 889	..	65 724	..	621 818	..

Source:
Canadian Council of Forest Ministers, *National Forestry Database Program*, <http://nfdp.ccfm.org> (accessed February 12, 2002).

Table A.29
Volume of Roundwood Harvested by Province and Territory, 1980 to 2000

Year	Nfld.Lab.	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	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	4 112	7 795	34 234	22 808	1 803	3 555	6 586	60 780	124	..	**144 736**[r]
1982	2 379	357	3 105	6 320	29 133	19 778	1 498	2 526	5 714	56 231	161	..	**127 202**[r]
1983	2 429	381	2 596	7 442	36 288	23 736	1 520	2 612	7 344	71 443	192	..	**155 983**[r]
1984	2 889	400	3 894	8 378	36 519	28 130	1 698	2 726	8 457	74 556	177	..	**167 824**[r]
1985	2 509	411	3 515	7 896	35 400	28 225	1 717	3 016	8 979	76 868	186	..	**168 722**[r]
1986	2 408	424	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	5 039	9 199	39 381	29 338	1 883	3 818	11 990	86 807	172	..	**190 616**[r]
1989	2 535	416	4 772	9 281	36 192	29 642	1 848	3 685	12 293	87 414	176	..	**188 254**[r]
1990	2 876	448	4 639	8 824	30 148	25 420	1 563	2 758	11 911	73 861	82	46	**162 576**[r]

Table A.29
Volume of Roundwood Harvested by Province and Territory, 1980 to 2000 (continued)

Year	Nfld.Lab.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.[1]	**Canada**
							thousand m^3						
1991	2 680	452	4 348	8 643	28 943	23 829	1 278	2 957	12 926	74 706	79	46	**160 887**[r]
1992	2 821	510	4 248	9 205	31 002	24 286	1 598	3 081	14 594	78 579	162	49	**170 134**[e]
1993	3 131	534	4 585	8 959	34 100	25 432	1 539	4 433	14 897	78 004	193	203	**176 008**[r]
1994	2 445	519	5 106	9 269	38 227	25 952	1 786	4 468	19 790	75 093	421	181	**183 257**[e]
1995	2 983	638	5 483	10 055	41 432	26 260	1 987	4 258	20 287	74 622	214[e]	127[e]	**188 347**[e]
1996	2 742	557	6 012	10 902	38 190	25 871	2 148	4 126	20 037	72 252	424	202[e]	**183 463**[r]
1997	2 558	514	6 989	11 253	42 546	26 595	2 183	4 205	22 217	69 298	324[r]	123	**188 803**[r]
1998	2 398	520	5 903	11 534	43 466	24 126	2 328	3 348	17 172	65 938	122	142	**176 995**[r]
1999	2 720	693	6 164	11 259	45 601	24 814	2 171	3 348	19 395	76 933	..	71	**193 168**[e]
2000	..	..	..	..	..	..	..	..	..	75 085	..	..	**..**

Note:
1. Includes Nunavut.
Source:
Canadian Council of Forest Ministers, *Compendium of Canadian Forestry Statistics 2002: National Forestry Database Program*, Natural Resources Canada, Canadian Forest Service, <http://nfdp.ccfm.org> (accessed March 8, 2002).

Table A.30
Area Burned of Stocked Timber-Productive Forest Land, 1980 to 2000

Year	Nfld.Lab.	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	4 902	330 825	304 049	89 237	465 441	32 743	111 537	12 975	..	**1 355 074**
1981	2 893	22	169	92	2 170	40 817	220 336	..	944 494	57 277	12 735	25 643	..	**1 306 648**
1982	4 392	25	359	5 407	7 202	297	7 094	..	462 674	280 676	68 127	2 536	..	**838 789**
1983	107	50	92	1 129	206 952	74 663	66 962	9 478	1 215	32 848	14 805	1 188	..	**409 489**
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	1 952	127	5 367	9 020	3 820	54 231	11 407	6	4 927	**132 886**
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	1 778	273 066	35 994	295 930	24 187	5 149	3 284	288	3	..	**639 777**
1989	2 651	2	159	280	2 108 206	4 990	1 539 180	137 404	2 994	11 089	70 439	..	..	**3 877 394**
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**
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	60 739	445 425	320 993	163 376	26 888	..	0	7 082	**1 432 488**
1996	8 519	0	172	1 591	410 342	179 207	..	4 755	433	2 670	..	0	…	**607 689**
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	..	..	234 109	..	..	0	..	**313 562**
1999	20 779	..	1 174	1 135	88 472	72 481	..	..	..	..	..	..	..	**..**
2000	..	..	..	..	603	..	..	..	1 902	..	..	..	..	**..**

Note:
1. Includes Nunavut.
Source:
Canadian Council of Forest Ministers, *Compendium of Canadian Forestry Statistics 2002: National Forestry Database Program*, Natural Resources Canada, Canadian Forest Service, <http://nfdp.ccfm.org> (accessed March 8, 2002).

Minerals

Table A.31
Gross Domestic Product at Factor Cost, Mineral Industries, 1961 to 2000

Year	Metal mines	Non-metal mines (except coal)	Coal mines	Crude petroleum and natural gas	Quarries and sand pits	Services incidental to mineral industries	Total mineral industries[1]	Mineral industries as share of GDP
				million dollars				percent
1961	3 670	512	132	5 435	292	619	10 269	5.2
1962	3 528	539	127	6 234	314	634	10 598	5.0
1963	3 660	608	125	6 664	341	644	11 161	5.0
1964	4 216	684	136	7 304	434	654	12 605	5.3
1965	4 181	740	134	7 877	511	694	13 087	5.2
1966	3 932	858	137	8 623	548	783	13 473	5.0
1967	4 265	887	143	9 638	497	782	14 506	5.2

Table A.31
Gross Domestic Product at Factor Cost, Mineral Industries, 1961 to 2000 (continued)

Year	Metal mines	Non-metal mines (except coal)	Coal mines	Crude petroleum and natural gas	Quarries and sand pits	Services incidental to mineral industries	Total mineral industries[1]	Mineral industries as share of GDP
				million dollars				percent
1968	4 503	966	206	10 887	584	781	15 949	5.4
1969	4 578	1 017	215	11 652	610	783	16 634	5.4
1970	4 814	1 044	234	13 398	542	827	17 981	5.7
1971	4 339	1 102	234	14 472	581	778	18 020	5.4
1972	4 473	1 139	245	17 035	568	879	19 778	5.7
1973	5 766	1 208	289	19 457	539	1 119	23 488	6.3
1974	5 026	1 314	250	18 234	562	1 059	21 737	5.6
1975	4 363	993	295	15 180	637	1 074	18 830	4.8
1976	4 431	1 192	233	12 906	557	1 182	17 926	4.3
1977	4 266	1 235	270	12 924	594	1 413	18 147	4.2
1978	3 995	1 164	324	11 700	598	1 743	17 497	4.0
1979	3 802	1 350	405	13 440	649	2 217	19 212	4.2
1980	3 810	1 347	422	11 767	611	2 805	19 026	4.1
1981	3 407	1 358	439	9 299	590	2 757	17 061	3.5
1982	3 210	962	451	9 456	462	2 686	16 697	3.6
1983	3 183	1 056	483	10 121	514	2 461	17 457	3.6
1984	4 262	1 360	788	10 719	597	2 810	19 855	3.9
1985	4 271	1 197	806	11 549	690	3 030	20 884	3.9
1986	4 278	1 183	773	10 918	809	2 263	19 742	3.6
1987	4 875	1 341	890	11 466	874	1 904	20 824	3.7
1988	5 200	1 259	1 055	12 384	860	2 385	22 646	3.8
1989	5 061	1 205	956	11 931	831	1 940	21 500	3.5
1990	4 953	1 194	1 016	11 941	690	2 061	21 480	3.5
1991	5 187	1 206	1 020	12 648	563	2 079	22 406	3.7
1992	4 994	1 163	797	14 001	562	1 537	23 054	3.8
1993	4 660	1 121	929	14 708	609	1 915	23 942	3.9
1994	4 305	1 325	966	15 412	679	2 380	25 067	3.9
1995	4 346	1 364	1 017	15 881	757	2 567	25 932	3.9
1996	4 499	1 244	1 042	15 733	786	2 941	26 245	3.9
1997	4 319	1 339	1 106	15 856	822	3 620	27 062	3.9
1998	4 273	1 356	1 041	16 305	938	2 677	26 590	3.7
1999	3 901	1 534	997	15 832	976	2 460	25 700	3.4
2000	3 966	1 592	944	16 387	1 026	3 503	27 418	3.5

Notes:
Including milling and quarrying.
1.The total is not equal to the sum of the components until 1991. This is caused by changing the set of relative prices when a new base year is adopted.
Source:
Statistics Canada, CANSIM II, table 379-0004.

Table A.32
Employment in Mining, Quarrying and Oil Well Industries by Province and Territory, 1983 to 2000

Year	Nfld.Lab.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T. and Nvt.	**Canada**
							persons						
1983	3 616	..	5 072	2 840	17 215	29 556	4 671	8 707	69 029	14 160	x	x	**158 130**
1984	3 687	..	4 385	2 826	18 020	29 257	4 913	9 831	72 476	14 493	x	x	**163 471**
1985	3 187	..	4 531	3 131	18 105	27 950	4 818	10 386	78 120	15 274	x	x	**169 035**
1986	2 728	..	4 801	3 048	17 171	26 713	4 106	9 884	71 362	14 777	x	x	**157 715**
1987	2 912	..	4 994	3 268	17 226	28 200	4 057	9 010	69 884	14 882	x	x	**157 644**
1988	3 256	..	4 879	3 296	17 261	30 446	4 213	8 889	73 013	15 556	x	x	**164 277**
1989	3 517	..	3 918	3 311	17 099	29 683	4 643	8 779	71 829	14 958	x	x	**160 820**
1990	3 461	..	4 181	2 705	17 547	27 595	4 549	8 423	71 369	15 011	x	x	**157 690**
1991	2 828	..	4 216	2 708	16 095	22 508	4 141	7 559	74 211	14 411	x	x	**151 031**
1992	2 378	..	3 648	2 830	14 848	20 613	4 073	7 315	63 918	10 990	x	x	**133 057**
1993	2 499	..	3 361	2 615	13 156	21 556	3 832	7 367	59 121	9 278	x	x	**124 758**
1994	2 784	..	3 686	2 584	14 711	19 598	3 569	7 479	70 048	10 658	x	x	**137 053**
1995	2 506	..	3 473	3 141	13 951	20 966	3 352	8 940	64 017	12 011	x	x	**134 379**
1996	2 621	..	2 818	3 236	13 273	21 103	2 879	9 194	61 670	11 783	x	x	**131 239**
1997	2 818	..	3 090	3 206	15 467	21 179	3 902	10 140	68 080	12 674	x	1 863	**143 404**
1998	3 080	..	2 627	3 142	15 116	18 693	3 814	9 849	71 635	12 621	x	1 334	**142 673**
1999	3 073	..	2 565	3 378	14 922	18 326	3 032	9 504	69 214	10 283	x	1 591	**136 539**
2000	2 862	..	2 058	3 575	14 859	17 730	3 387	10 177	72 905	10 233	x	2 377	**140 856**

Note:
Data do not add up to Canada total because of unavailable data for some provinces or territories.
Source:
Statistics Canada, CANSIM II, table 281-0005.

Table A.33
Gross Domestic Product at Factor Cost for Smelting, Milling and Refining Activities of the Mineral Industries, 1961 to 2000

Year	Non-ferrous metal	Iron and steel	Petroleum and coal	Total as a share of GDP
	million dollars			percent
1961	838	1 223	324	1.20
1962	834	1 441	411	1.27
1963	833	1 591	426	1.28
1964	877	1 827	464	1.33
1965	992	2 095	484	1.41
1966	989	2 107	525	1.34
1967	942	1 983	469	1.22
1968	955	2 192	513	1.25
1969	990	2 167	475	1.18
1970	1 034	2 399	478	1.24
1971	948	2 265	533	1.13
1972	1 003	2 269	500	1.08
1973	1 043	2 705	653	1.17
1974	1 028	2 817	608	1.15
1975	1 001	2 355	674	1.03
1976	950	2 293	687	0.95
1977	989	2 464	908	1.02
1978	972	2 663	828	1.01
1979	867	2 730	620	0.92
1980	1 045	2 468	660	0.89
1981	1 024	2 405	793	0.87
1982	969	1 798	713	0.74
1983	1 072	1 994	700	0.78
1984	1 287	2 361	705	0.86
1985	1 387	2 416	681	0.84
1986	1 365	2 287	738	0.80
1987	1 506	2 448	822	0.84
1988	1 490	2 567	896	0.83
1989	1 466	2 579	961	0.82
1990	1 588	2 030	1 001	0.76
1991	1 753	1 836	966	0.76
1992	1 775	2 035	975	0.79
1993	1 633	2 292	982	0.79
1994	1 600	2 347	1 029	0.77
1995	1 641	2 388	1 044	0.77
1996	1 729	2 268	1 064	0.75
1997	1 735	2 340	1 057	0.73
1998	1 800	2 273	1 051	0.71
1999	1 749	2 371	1 081	0.69
2000	1 798	2 359	1 094	0.67

Source:
Statistics Canada, CANSIM II, table 379-0004.

Table A.34
Production of Leading Minerals by Province and Territory, 2000[1]

	Selected metallic minerals						Mineral fuels			Selected other minerals		Total production		
Province/Territory	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	20.06	976.43	0.00	0.13	0.00	0.00	2 207.93	0.00	0.00	7.04	996.62	2 207.93	38.93
Prince Edward Island	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.14	0.00	0.00	5.20
Nova Scotia	0.00	0.00	0.00	0.00	0.00	0.00	65.84	98.02	813.21	0.00	11.30	0.00	977.06	225.64
New Brunswick	25.51	3.15	0.00	0.00	49.18	397.87	24.17	0.00	0.00	x	11.72	522.97	24.17	243.43
Quebec	251.15	447.69	x	298.21	41.32	331.53	0.00	0.00	0.00	0.00	82.77	2 248.18	0.00	1 368.29
Ontario	551.45	960.85	0.00	1 489.19	35.28	142.97	0.00	67.68	96.92	0.00	413.46	3 715.80	164.61	1 986.26
Manitoba	127.93	94.57	0.00	570.13	7.34	135.56	0.00	169.65	0.00	0.00	26.79	1 014.48	169.65	75.74
Saskatchewan	1.69	24.82	0.00	0.00	0.11	1.73	131.82	5 073.19	1 074.82	x	34.10	513.68	6 279.83	1 699.71
Alberta	0.00	0.26	0.00	0.00	0.00	0.00	364.06	22 669.81	27 149.99	0.00	196.58	0.26	50 183.86	657.22

Table A.34
Production of Leading Minerals by Province and Territory, 2000[1] (continued)

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													
British Columbia	729.96	335.15	x	0.00	139.60	247.42	729.39	835.48	3 637.68	0.00	163.42	1 572.07	5 202.54	499.21
Yukon Territory	0.00	51.60	0.00	0.00	0.34	0.00	0.00	0.00	48.41	0.00	3.08	51.94	48.41	3.08
Northwest Territories	0.00	58.15	0.00	0.00	0.25	0.00	0.00	381.49	59.05	0.00	4.81	58.40	440.54	645.82
Nunavut	0.00	49.16	0.00	0.00	3.76	310.18	0.00	0.00	0.00	0.00	0.00	384.46	0.00	0.00
Canada	**1 687.68**	**2 045.44**	**1 540.84**	**2 357.52**	**277.31**	**1 567.27**	**1 315.28**	**31 503.24**	**32 880.08**	**1 714.45**	**956.21**	**11 078.87**	**65 698.59**	**7 448.51**

Notes:
Figures may not add up to totals due to rounding.
1. Preliminary data.
2. Includes natural gas by-products.
Source:
Natural Resources Canada, *Canadian Minerals Yearbook, 2000*, <http://www.nrcan.gc.ca/mms/cmy/index_e.html> (accessed February 20, 2002).

Table A.35
Reserves of Selected Major Metals, 1977 to 1999

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
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

Source:
Natural Resources Canada, *Canadian Minerals Yearbook, 2000*,
<http://www.nrcan.gc.ca/mms/cmy/index_e.html> (accessed January 22, 2002).

Table A.36
Annual Production[1] of Non-fuel Minerals, 1948 to 2000

Year	Copper	Nickel	Lead	Zinc	Iron ore	Gold	Potash	Salt	Gypsum
	thousand tonnes								
1948	218	119	152	212	1 213	0.110	0	672	2 916
1949	239	117	145	262	3 334	0.130	0	679	2 735
1950	240	112	150	284	3 271	0.140	0	779	3 325
1951	245	125	144	309	4 246	0.140	0	875	3 450
1952	234	127	153	337	4 783	0.140	0	882	3 255
1953	230	130	176	364	5 906	0.130	0	866	3 483
1954	275	146	198	342	6 679	0.140	0	880	3 584
1955	296	159	184	393	14 772	0.140	0	1 129	4 234
1956	322	162	171	384	20 274	0.140	0	1 443	4 440
1957	326	170	165	375	20 205	0.140	0	1 607	4 151
1958	313	127	169	386	14 267	0.140	0	2 155	3 596
1959	359	169	169	359	22 215	0.140	0	2 985	5 335

Table A.36
Annual Production[1] of Non-fuel Minerals, 1948 to 2000 (continued)

Year	Copper	Nickel	Lead	Zinc	Iron ore	Gold	Potash	Salt	Gypsum
					thousand tonnes				
1960	398	195	186	369	19 550	0.140	0	3 007	4 722
1961	398	211	209	377	18 469	0.140	0	2 945	4 478
1962	415	211	195	420	24 820	0.130	0	3 301	4 836
1963	416	200	184	424	27 300	0.120	0	3 377	5 409
1964	444	207	185	611	34 857	0.120	0	3 618	5 770
1965	463	242	268	747	36 181	0.110	1 335	4 159	5 718
1966	461	203	276	872	36 914	0.100	1 979	3 746	5 421
1967	547	224	285	994	37 788	0.090	2 389	4 532	4 549
1968	575	240	309	1 052	43 040	0.090	2 576	4 413	5 378
1969	520	194	289	1 096	36 337	0.080	3 161	4 199	5 782
1970	610	278	353	1 136	47 458	0.070	3 108	4 919	5 733
1971	654	267	368	1 134	42 957	0.070	3 558	5 061	6 081
1972	720	235	335	1 129	38 736	0.060	3 495	4 902	7 349
1973	824	249	342	1 227	47 499	0.060	4 454	5 047	7 610
1974	821	269	294	1 127	46 784	0.050	5 776	5 447	7 226
1975	721	240	315	1 004	44 742	0.050	4 726	5 123	5 746
1976	731	241	256	982	55 416	0.050	5 215	5 994	6 003
1977	759	233	281	1 071	53 621	0.050	5 764	6 039	7 231
1978	659	128	320	1 067	42 931	0.050	6 344	6 452	8 074
1979	636	126	311	1 100	59 617	0.050	7 074	6 881	8 099
1980	710	188	280	920	50 224	0.050	7 225	7 226	7 285
1981	691	160	269	911	49 551	0.050	6 549	7 239	7 025
1982	613	89	272	966	33 198	0.060	5 309	7 930	5 986
1983	653	125	272	988	32 959	0.070	6 294	8 602	7 507
1984	722	174	264	1 063	39 930	0.080	7 527	10 235	7 775
1985	739	170	268	1 049	39 502	0.090	6 661	10 085	7 761
1986	699	164	334	988	36 167	0.100	6 753	10 740	8 802
1987	794	189	373	1 158	37 804	0.120	7 668	10 129	9 095
1988	758	199	351	1 370	39 934	0.130	8 154	10 687	9 513
1989	704	196	269	1 273	39 445	0.160	7 014	11 158	8 195
1990	771	195	233	1 179	35 670	0.170	7 345	11 191	7 977
1991	780	188	248	1 083	35 917	0.180	7 087	11 871	6 729
1992	762	178	340	1 196	32 137	0.160	7 040	11 088	7 293
1993	711	178	183	991	33 774	0.150	6 880	10 993	7 564
1994	591	142	168	976	36 728	0.150	8 517	12 244	8 586
1995	701	172	204	1 095	37 024	0.150	8 855	10 957	8 055
1996	653	182	242	1 163	34 709	0.160	8 120	12 248	8 201
1997	648	181	171	1 027	39 293	0.170	9 235	13 497	8 628
1998	691	198	150	992	36 847	0.160	8 884	13 034	8 307
1999	582	177	155	963	33 990	0.160	8 475	12 686	9 347
2000	622	181	145	932	35 247	0.150	8 913	12 209	8 527

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.37
Water Transport, 1988 to 1999

	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	1 440 266	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	1 696 466	40.4
1992	52.3	153.8	52.3	69.3	275.4	1.0	12.6	1 567 265	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

Table A.37
Water Transport, 1988 to 1999 (continued)

Year	Freight loaded		Freight unloaded		Net	Containerized freight		Movement	Passengers
	Domestic	International	Domestic	International	Tonnage	Domestic	International	of freight	transported by ferry
	tonnes							tonne-km[1]	passengers
	millions								
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

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.
Transport Canada, <http://www.tc.gc.ca> (accessed January 8, 2002).

Table A.38
Rail Transport, 1981 to 1999

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
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
1996	299.5	282 482	4.0	1 513	3 293	466	109 578	2 088	77 387
1997	318.7	306 907	4.1	1 515	3 143	426	107 976	2 258	74 949
1998	320.7	299 472	4.0	1 458	3 142	430	105 676	2 129	73 360
1999	326.8	297 249	4.1	1 592	3 115	435	102 917	1 979	70 346

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 Industry Classification (SIC) starting in 1991.
Source:
Statistics Canada, *Rail in Canada*, Catalogue No. 52-216-XIB, Ottawa, various issues.

Table A.39
Truck Transport, 1989 to 1999

	Freight carried		Shipments		
			Number of	Weight per	Distance per
Year	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

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.40
Air Transport, 1988 to 1998

	Freight carried		Passengers	
Year	weight	tonne-km[1]	passengers	passenger-km[2]
	tonnes		millions	
1988	592 700	1 516	34.8	62 140
1989	604 520	1 552	35.8	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	815 710	2 278	45.0	94 467

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-XPB, Ottawa, various issues.

Table A.41
Transportation by Bus and Mass Transit, 1980 to 1998

	Distance travelled				Paying passengers			Number of vehicles			
	Intercity	Mass			Intercity	Mass		Intercity	Mass		
Year	transportation	transit	Other[1]	Total	transportation	transit	Total	transportation	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
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

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.42
Motor Vehicle Registrations, 1980 to 1998

	Highway vehicles							Non-highway vehicles	
Year	Private cars	Trucks and truck cabs	Buses	Motorcycles	Mopeds	Other vehicles[1]	Total	Snowmobiles	Other vehicles[2]
	thousands								
1980	10 256	2 903	52	389	68	50	13 717	476	197
1981	10 200	3 138	54	407	39	12	13 850	509	162
1982	10 530	3 239	54	431	42	13	14 309	451	191
1983	10 732	3 308	57	466	43	14	14 620	400	222
1984	10 781	3 047	52	470	37	19	14 406	425	208
1985	11 118	3 095	54	453	35	64	14 819	455	295
1986	11 586	3 156	57	430	35	72	15 337	488	365
1987	11 686	3 517	59	414	34	83	15 794	532	375
1988	12 086	3 706	60	370	31	84	16 336	546	407
1989	12 380	3 827	63	348	30	72	16 720	600	392
1990	12 622	3 867	64	331	28	69	16 981	636	429
1991	13 061	3 680	64	324	27	67	17 223	661	445
1992	13 322	3 624	64	313	27	61	17 411	689	474
1993	12 925	3 345	63	311	26	47	16 717	728	497
1994	13 131	3 393	64	306	24	53	16 971	745	513
1995	13 192	3 411	64	298	22	60	17 047	735	548
1996	13 251	3 476	65	291	21	79	17 183	709	560
1997	13 515	3 533	66	299	20	85	17 518	707	598
1998	13 887	3 626	68	314	20	73	17 988	759	588

Notes:
1. Includes ambulances, fire trucks, hearses, etc.
2. Includes farm tractors and registered construction vehicles.

Source:
Statistics Canada, *Road Motor Vehicle Registrations*, Catalogue No. 53-219-XIB, Ottawa, various issues.

Table A.43
Consumption of Refined Petroleum Products[1] by Mode of Transportation, 1991 to 2000

	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	4 446	2 801	7 175	38 101	21	**54 713**

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.44
Pelts Harvested by Province and Territory, 1999-2000[1]

Species	Nfld.Lab.	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	87	190	76	0	0	0	0	**353**
Bear	10	0	22	0	714	37	947	69	37	56	0	32	76	**2 000**
Beaver	2 399	353	4 126	9 437	50 073	71 296	21 012	27 646	20 270	4 086	470	1 976	0	**213 144**
Coyote	15	246	1 388	1 095	2 926	1 157	2 401	13 339	21 022	704	68	0	0	**44 361**
Ermine	3 653	6	1 156	911	13 209	7 248	2 067	2 252	4 147	3 169	126	348	0	**38 292**

Table A.44
Pelts Harvested by Province and Territory, 1999-2000[1] (continued)

Species	Nfld.Lab.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nvt.	**Canada**
	number													
Fisher	0	0	115	493	4 869	6 883	1 541	1 451	973	256	5	34	0	**16 620**
Fox	3 734	389	662	1 150	13 405	4 876	1 372	2 078	942	283	83	1 460	2 881	**33 315**
Lynx	120	0	11	0	1 471	635	275	1 229	1 456	602	459	2 303	0	**8 561**
Marten	1 312	0	0	2 209	28 369	45 896	15 602	2 970	7 855	19 270	4 362	10 695	4	**138 544**
Mink	5 354	323	1 686	942	8 456	11 030	5 632	2 585	1 037	874	104	2 061	0	**40 084**
Muskrat	1 876	1 881	15 859	22 063	78 152	182 209	38 427	24 377	9 840	2 635	451	17 412	0	**395 182**
Otter	803	0	440	410	2 959	6 046	1 815	1 021	332	442	13	20	0	**14 301**
Racoon	0	354	2 018	1 574	7 318	12 760	1 225	994	88	92	0	0	0	**26 423**
Skunk	0	0	247	8	97	218	0	23	14	22	0	0	0	**629**
Squirrel	3 691	64	1 486	380	5 200	2 200	4 376	7 476	51 828	5 337	972	274	0	**83 284**
Wildcat	0	0	1 403	285	0	13	0	17	4	79	0	0	0	**1 801**
Wolf	11	0	0	0	448	576	225	232	140	154	149	109	553	**2 597**
Wolverine	0	0	0	0	0	4	18	6	10	160	157	99	22	**476**
Other[2]	0	0	0	0	0	150	0	0	0	0	0	301	6 207	**6 658**
Total wild	**22 978**	**3 616**	**30 619**	**40 957**	**217 666**	**353 234**	**97 022**	**87 955**	**120 071**	**38 221**	**7 419**	**37 124**	**9 743**	**1 066 625**
Ranch-raised														
Fox	5 290	2 150	6 300	3 500	2 760	1 730	320	610	280	1 150	0	0	0	**24 090**
Mink	x	23 400	389 300	x	50 200	258 800	28 200	0	x	231 300	0	0	0	**1 039 800**
Total ranch-raised	**x**	**25 550**	**395 600**	**x**	**52 960**	**260 530**	**28 520**	**610**	**x**	**232 450**	**0**	**0**	**0**	**1 063 890**
Total pelts	**x**	**29 166**	**426 219**	**x**	**270 626**	**613 764**	**125 542**	**88 565**	**x**	**270 671**	**7 419**	**37 124**	**9 743**	**2 130 515**

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

Source:
Statistics Canada, CANSIM II, table 003-0013.

Table A.45
Value of Pelts Harvested by Province and Territory, 1999-2000[1]

Species	Nfld.Lab.	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	2 689	5 086	2 105	0	0	0	0	**9 880**
Bear	1 916	0	2 491	0	137 142	5 498	202 042	8 010	7 301	10 075	0	18 587	69 432	**462 494**
Beaver	49 371	9 970	128 154	274 798	1 252 826	1 716 808	500 716	564 616	482 426	103 457	12 220	43 899	0	**5 139 261**
Coyote	487	5 846	35 852	27 545	63 933	23 776	78 129	401 823	754 269	18 403	2 040	0	0	**1 412 103**
Ermine	11 178	20	3 769	3 498	48 081	26 238	5 850	8 187	16 339	15 433	542	1 124	0	**140 259**
Fisher	0	0	2 566	13 957	131 950	177 788	45 660	41 937	26 826	7 365	140	630	0	**448 819**
Fox	104 521	12 762	19 304	29 774	347 658	104 665	27 268	36 673	21 122	6 455	1 909	33 423	64 592	**810 126**
Lynx	5 184	0	493	0	75 374	30 143	14 927	69 130	95 237	38 781	26 163	116 375	0	**471 807**
Marten	67 161	0	0	76 717	1 107 526	1 850 527	697 253	106 696	329 439	894 128	196 290	505 041	116	**5 830 894**
Mink	81 809	6 551	30 095	15 993	119 483	185 856	109 824	42 471	11 086	16 405	1 768	39 899	0	**661 240**
Muskrat	5 140	7 771	66 925	73 433	207 103	550 271	91 456	72 214	31 390	6 271	1 488	34 508	0	**1 147 970**
Otter	54 853	0	40 564	33 803	224 677	478 904	148 703	78 136	37 393	47 869	1 066	1 844	0	**1 147 812**
Racoon	0	2 472	16 447	13 739	62 935	96 848	11 527	10 564	957	712	0	0	0	**216 201**
Skunk	0	0	435	16	237	783	0	87	37	51	0	0	0	**1 646**
Squirrel	3 470	49	1 471	321	4 420	1 716	5 251	7 012	46 127	6 511	972	281	0	**77 601**
Wildcat	0	0	76 281	13 704	0	546	0	2 535	224	7 688	0	0	0	**100 978**
Wolf	1 354	0	0	0	29 595	31 363	22 003	33 490	13 955	15 971	14 304	14 584	108 190	**284 809**
Wolverine	0	0	0	0	0	840	4 107	930	2 282	37 542	37 994	22 824	4 503	**111 022**
Other[2]	0	0	0	0	0	359	0	0	0	0	0	9 030	185 817	**195 206**
Total wild	**386 444**	**45 441**	**424 847**	**577 298**	**3 812 940**	**5 282 929**	**1 967 405**	**1 489 597**	**1 878 515**	**1 233 117**	**296 896**	**842 049**	**432 650**	**18 670 128**
Ranch-raised														
Fox	251 684	107 139	309 486	172 209	133 995	84 908	15 781	28 348	11 847	38 562	0	0	0	**1 153 959**
Mink	x	868 750	17 922 221	x	2 142 351	10 590 819	1 197 237	0	x	9 701 340	0	0	0	**45 055 694**
Total ranch-raised	**x**	**975 889**	**18 231 707**	**x**	**2 276 346**	**10 675 727**	**1 213 018**	**28 348**	**x**	**9 739 902**	**0**	**0**	**0**	**46 209 653**
Total pelts	**x**	**1 021 330**	**18 656 554**	**x**	**6 089 286**	**15 958 656**	**3 180 423**	**1 517 945**	**x**	**10 973 019**	**296 896**	**842 049**	**432 650**	**64 879 781**

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

Source:
Statistics Canada, CANSIM II, table 003-0013.

Water

Table A.46
Groundwater Use in Canada, 1996 and 1998

Province/Territory	1996				1998			
	Population reliant on groundwater[1]		Municipal water systems on groundwater[2]		Population reliant on groundwater[1]		Municipal water systems on groundwater[2]	
	number	percent	number	percent	number	percent	number	percent
Newfoundland and Labrador	189 921	33.9	19	23.5	181 340	33.3	18	22.2
Prince Edward Island	136 188	100.0	5	100.0	136 895	100.0	7	100.0
Nova Scotia	426 433	45.8	15	41.7	428 630	45.8	13	38.2
New Brunswick	501 075	66.5	40	72.7	500 346	66.4	39	73.6
Quebec	2 013 340	27.7	142	36.7	1 909 699	26.1	141	36.5
Ontario	3 166 662	28.5	132	42.7	3 258 755	28.6	113	43.6
Manitoba	342 601	30.2	22	50.0	355 398	31.2	21	47.7
Saskatchewan	435 941	42.8	44	65.7	422 115	41.2	43	64.2
Alberta	641 350	23.1	36	29.0	651 228	22.4	36	29.0
British Columbia	1 105 803	28.5	63	45.3	1 067 459	26.7	64	45.4
Yukon Territory	15 294	47.9	4	100.0	13 956	44.3	4	100.0
Northwest Territories[3]	18 971	28.1	0	0.0	18 910	28.0	0	0.0
Canada	**8 993 579**	**30.3**	**522**	**41.2**	**8 944 731**	**29.6**	**499**	**41.0**

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

Sources:
Environment Canada, Municipal Water Use Database.
Statistics Canada, CANSIM II, table 051-0001.

Table A.47
Hydro-electric Power Generation by Province and Territory, 1994 to 1999

	Nfld.Lab.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	**Canada**
Hydro	gigawatt hours												
1994	37 606.7	0.0	1 020.4	2 772.2	157 850.7	39 080.7	28 146.2	3 392.5	1 806.3	54 304.1	266.1	188.2	**326 434.1**
1995	36 287.0	0.0	904.4	2 706.1	167 945.3	38 808.9	29 013.3	4 118.4	2 190.2	50 181.3	314.4	204.4	**332 673.6**
1996	35 292.1	0.0	1 123.7	3 531.5	165 201.2	41 659.2	30 865.7	4 375.9	2 260.6	67 668.3	360.9	264.1	**352 603.2**
1997	40 177.0	0.0	978.3	2 373.0	160 831.7	39 966.1	33 391.3	3 986.5	2 170.4	63 319.8	257.4	292.4	**347 743.9**
1998	43 639.8	0.0	903.2	2 862.2	148 148.4	35 415.7	30 781.0	3 442.4	2 047.1	60 859.3	270.0	257.4	**328 626.4**
1999	41 381.9	0.0	1 000.8	3 380.5	162 768.8	37 292.7	28 137.6	3 688.9	2 168.0	61 582.0	247.3	295.6[1]	**341 944.2**
Total electric power													
1994	38 482.6	40.0	9 767.4	15 891.2	163 600.7	152 429.2	28 443.4	15 478.1	52 361.3	62 070.4	299.3	578.1	**539 441.7**
1995	37 910.5	21.8	9 571.1	12 786.8	173 097.6	151 747.1	29 238.1	16 395.9	52 452.7	59 053.8	386.6	808.7	**543 470.5**
1996	36 773.3	8.8	10 175.4	15 483.0	171 275.6	148 211.0	31 183.5	16 555.0	52 006.6	72 673.5	500.0	835.3	**555 680.9**
1997	41 747.7	20.9	10 517.8	16 779.5	166 218.8	147 065.3	33 660.7	16 879.6	54 069.2	68 750.1	374.7	802.6	**556 886.9**
1998	44 947.1	2.6	10 779.6	19 034.5	154 955.0	142 099.2	31 724.1	16 961.1	55 623.8	67 770.3	312.9	689.8	**544 900.0**
1999	42 630.1	8.2	11 142.9	18 676.2	169 175.8	148 391.5	28 690.9	16 987.8	55 188.0	68 181.3	295.7	746.4[1]	**560 114.8**
Hydro as share of total	percent												
1994	97.7	0.0	10.4	17.4	96.5	25.6	99.0	21.9	3.4	87.5	88.9	32.6	**60.5**
1995	95.7	0.0	9.4	21.2	97.0	25.6	99.2	25.1	4.2	85.0	81.3	25.3	**61.2**
1996	96.0	0.0	11.0	22.8	96.5	28.1	99.0	26.4	4.3	93.1	72.2	31.6	**63.5**
1997	96.2	0.0	9.3	14.1	96.8	27.2	99.2	23.6	4.0	92.1	68.7	36.4	**62.4**
1998	97.1	0.0	8.4	15.0	95.6	24.9	97.0	20.3	3.7	89.8	86.3	37.3	**60.3**
1999	97.1	0.0	9.0	18.1	96.2	25.1	98.1	21.7	3.9	90.3	83.6	39.6[1]	**61.0**

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

Source:
Statistics Canada, *Electric Power Generation, Transmission and Distribution*, Catalogue No. 57-202-XPB, Ottawa, various issues.

Table A.48
Major Withdrawal Uses of Water, 1981, 1986, 1991 and 1996

Sector/Industry	Year	Total intake		Recirculation		Gross water use		Total discharge		Consumption	
		Quantity	Change from previous period	Quantity	Change from previous period	Quantity	Change from previous period	Quantity	Change from previous period	Quantity	Change from previous period
		million m^3	percent	million m^3	percent	million m^3	percent	million m^3	percent	million m^3	percent
Business sector											
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	4 636	16.2	0	…	4 636	16.2	1 197	32.7	3 439	11.3
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
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	41 489	0.8	20 809	73.2	62 298	17.1	36 785	-1.3	4 704	20.9
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	45 411	1.0	20 809	73.2	66 220	16.2	40 268	-1.0	5 144	19.1

Note:
Figures may not add up to totals due to rounding.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.49
Distribution of Water Area and Population by Terrestrial Ecozone, 1971 and 1996

	Area			Population					
				1971			1996		
		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	244 917	10 005	4.1	843	0.00	0.00	1 196	0.00	0.01
Northern Arctic	1 522 730	149 999	9.9	9 512	0.01	0.01	18 881	0.01	0.01
Southern Arctic	850 787	147 480	17.3	4 261	0.01	0.01	11 729	0.01	0.02
Taiga Plains	655 891	87 535	13.3	15 406	0.02	0.03	23 986	0.04	0.04
Taiga Shield	1 390 596	268 931	19.3	26 165	0.02	0.02	36 888	0.03	0.03
Boreal Shield	1 921 344	278 323	14.5	2 542 899	1.32	1.55	2 895 761	1.51	1.76
Atlantic Maritime	201 294	9 089	4.5	2 268 835	11.27	11.80	2 549 061	12.66	13.26
Mixed Wood Plains	168 037	60 717	36.1	11 029 522	65.64	102.77	14 839 547	88.31	138.27
Boreal Plains	741 248	72 648	9.8	559 543	0.75	0.84	745 172	1.01	1.11
Prairie	466 903	23 568	5.0	2 917 475	6.25	6.58	3 979 522	8.52	8.98
Taiga Cordillera	267 035	2 755	1.0	216	0.00	0.00	358	0.00	0.00
Boreal Cordillera	470 575	10 910	2.3	20 613	0.04	0.04	32 904	0.07	0.07
Pacific Maritime	209 044	11 677	5.6	1 653 827	7.91	8.38	2 848 289	13.63	14.43
Montane Cordillera	490 236	15 010	3.1	509 148	1.04	1.07	851 656	1.74	1.79
Hudson Plains	374 525	16 071	4.3	10 046	0.03	0.03	11 811	0.03	0.03
Canada	**9 975 162**	**1 164 717**	**11.1**	**21 568 311**	**2.17**	**2.45**	**28 846 761**	**2.91**	**3.28**

Notes:
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 1996 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, 1971 Census of Population and 1996 Census of Population.
R.A. Fernandes, G. Pavlic, W. Chen and R. Fraser, 2001, Canada-wide 1-km water fraction derived from National Topographic Data Base maps, Natural Resources Canada, <http://geogratis.cgdi.gc.ca/frames.html> (accessed April 29, 2002).
Ecological Stratification Working Group, 1996, *A National Ecological Framework for Canada*, Agriculture and Agri-Food Canada, Research Branch, Centre for Land and Biological Resources Research and Environment Canada, State of the Environment Directorate, Ecozone Analysis Branch, Ottawa.
Natural Resources Canada, 2001, GeoBase Administrative Boundaries Level 0, <http://geogratis.cgdi.gc.ca/framework/framew_e.html> (accessed April 29, 2002).

Table A.50
Top Five On-site Releases to Water, 1996 and 1999

Substance	Releases	Share of total	Percentage change (1996-1999)
	tonnes	percent	
1996			
Ammonia (total)[1]	5 971.6	45.8	…
Nitrate ion in solution at pH >= 6.0	3 138.9	24.1	…
Methanol	2 172.0	16.7	…
Zinc and its compounds	341.4	2.6	…
Manganese and its compounds	288.9	2.2	…
1999			
Ammonia (total)[1]	11 154.6	53.7	86.8
Nitrate ion in solution at pH >= 6.0	6 274.1	30.2	99.9
Methanol	1 844.7	8.9	-15.1
Manganese and its compounds	790.2	3.8	173.5
Zinc and its compounds	206.9	1.0	-39.4

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, <http://www.ec.gc.ca/pdb/npri/> (accessed March 28, 2002).

Table A.51
Water Bodies Receiving Dioxins and Furans, 2000

Water body	Releases	Share of total
	g TEQ[1]	percent
Northumberland Channel, B.C.	0.875	74.5
Rainy River, Ont.	0.249	21.2
Ottawa River, Que.	0.016	1.4
Kaministiquia River, Ont.	0.010	0.8
St. Lawrence River, Ont. and Que.	0.010	0.8
Mistassini River, Que.	0.008	0.7
Saint-Louis River, Que.	0.004	0.3
Sable River, Que.	0.003	0.3

Notes:
The totals do not include releases to tributaries of the named rivers.
1.The term 'toxic equivalent' (TEQ) refers to the sum of the mass or concentration of individual dioxin and furan congeners multiplied by weighting factors.
Source:
Environment Canada, Pollution Data Branch, National Pollutant Release Inventory Database, <http://www.ec.gc.ca/pdb/npri/> (accessed May 16, 2002).

Energy

Table A.52
Basic Energy Indicators, 1958 to 2000

Year	Consumption of primary energy[1]	Population	Real GDP	Energy consumption per person	Energy consumption per dollar of real GDP
	petajoules	thousands	million 1997 dollars	gigajoules	megajoules per 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	237 899	180.3	13.85
1962	3 491.3	18 614	254 150	187.6	13.74
1963	3 740.3	18 964	267 126	197.2	14.00
1964	3 926.4	19 325	284 612	203.2	13.80
1965	4 131.3	19 678	303 008	209.9	13.63
1966	4 407.9	20 048	322 874	219.9	13.65
1967	4 524.2	20 412	332 517	221.6	13.61
1968	4 877.9	20 729	350 302	235.3	13.92
1969	5 141.3	21 028	368 963	244.5	13.93
1970	5 545.5	21 324	378 623	260.1	14.65
1971	5 889.7	21 962	399 550	268.2	14.74
1972	6 411.2	22 220	420 929	288.5	15.23
1973	6 937.4	22 494	451 197	308.4	15.38
1974	7 208.9	22 808	469 894	316.1	15.34
1975	7 080.7	23 142	480 304	306.0	14.74
1976	7 183.0	23 450	506 675	306.3	14.18
1977	7 295.6	23 726	524 205	307.5	13.92
1978	7 641.3	23 964	545 592	318.9	14.01
1979	8 176.0	24 202	568 529	337.8	14.38
1980	8 214.9	24 516	576 398	335.1	14.25
1981	7 862.6	24 820	595 996	316.8	13.19
1982	7 381.5	25 117	578 747	293.9	12.75
1983	7 299.9	25 367	594 721	287.8	12.27
1984	7 737.5	25 608	628 614	302.2	12.31
1985	7 908.8	25 843	662 446	306.0	11.94
1986	7 834.4	26 101	679 963	300.2	11.52
1987	8 122.2	26 450	707 956	307.1	11.47
1988	8 660.1	26 798	742 728	323.2	11.66
1989	8 945.2	27 286	761 814	327.8	11.74
1990	9 229.9	27 701	764 386	333.2	12.07
1991	9 091.0	28 031	749 549	324.3	12.13
1992	9 176.3	28 377	756 754	323.4	12.13
1993	9 314.1	28 703	774 865	324.5	12.02
1994	9 564.3	29 036	811 943	329.4	11.78
1995	9 695.2	29 354	834 189	330.3	11.62
1996	10 097.2	29 672	846 928	340.3	11.92
1997	10 200.1	29 987	885 021	340.1	11.53
1998	10 194.9	30 248	920 075	337.0	11.08
1999	10 518.3	30 499	967 155	344.9	10.88
2000	10 814.8	30 770	1 011 858	351.5	10.69

Note:
1. 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 380-0002.

Table A.53
Energy Resource Reserves, 1976 to 1999

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
	megatonnes	years	million m^3	years	million m^3	years	billion 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

Table A.53
Energy Resource Reserves, 1976 to 1999 (continued)

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
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

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.54
Production and Consumption of Primary Energy Resources, 1958 to 2000

Year	Coal		Crude oil		Natural gas[1]		Electricity[2]		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
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

Table A.54
Production and Consumption of Primary Energy Resources, 1958 to 2000 (continued)

Year	Coal		Crude oil		Natural gas[1]		Electricity[2]		Total	
	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption
	terajoules									
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	1 297 492	5 001 157	4 251 781	7 732 622	3 869 363	1 524 753	1 396 149	15 768 437	10 814 785

Notes:
1. Includes natural gas liquids (ethane, butane, propane and pentanes plus).
2. Includes primary steam.

Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.55
Fuels Consumed in Thermal-electric Power Stations, 1981 to 1999

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	1.9	0.2
1984	5.4	10.3	15.4	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	1.1	0.3	1.0	0.3
1987	5.8	7.9	18.5	9.7	1.9	0.3	1.4	0.3
1988	6.2	8.4	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	1.4	0.3	3.0	0.9
1997	4.2	7.7	25.8	11.2	2.3	0.2	4.0	..
1998	3.3	10.2	25.5	11.7	3.5	0.2	5.3	0.8
1999	3.3	10.7	24.3	11.2	2.9	0.2	5.4	0.9

Sources:
Statistics Canada, Manufacturing, Construction and Energy Division, Annual Electric Power Thermal Generating Station Fuel Consumption Survey Database, various issues.
Statistics Canada, *Electric Power Generation, Transmission and Distribution*, Catalogue No. 57-202-XPB, Ottawa, various issues.

Waste

Table A.56
Municipal Wastewater Treatment Level for Population Served by Sewers, 1983 to 1998, 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 treatment from population with 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:
Environment Canada, Municipal Water Use Database.

Table A.57
Disposal of Waste[1] by Province and Territory, 1994 to 2000, Selected Years

Province/Territory	Waste disposed				Waste disposed per capita			
	1994	1996	1998	2000	1994	1996	1998	2000
	tonnes							
Newfoundland and Labrador	486 523	372 324	366 280	409 599	0.84	0.67	0.67	0.76
Prince Edward Island	x	x	x	x	x	x	x	x
Nova Scotia	713 941	553 638	502 577	432 487	0.76	0.59	0.54	0.46
New Brunswick	576 102	505 957	468 571	472 612	0.76	0.67	0.62	0.63
Quebec[2]	5 189 400	5 491 000	5 537 465	6 912 000	0.71	0.75	0.75	0.94
Ontario	7 350 586	6 913 786	6 988 157	7 615 923	0.67	0.62	0.61	0.65
Manitoba	951 142	947 884	964 726	938 624	0.84	0.84	0.85	0.82
Saskatchewan	925 121	900 210	848 408	828 359	0.91	0.88	0.83	0.81
Alberta	2 329 327	2 435 884	2 527 817	2 750 004	0.86	0.88	0.87	0.91
British Columbia	2 791 478	2 413 528	2 458 484	2 592 191	0.76	0.62	0.61	0.64
Yukon and Northwest Territories[3]	x	x	x	x	x	x	x	x
Canada	**21 464 714**	**20 673 903**[r]	**20 840 883**	**23 109 369**	**0.73**	**0.69**	**0.69**	**0.75**

Notes:
Figures may not add up to totals due to rounding.
1. Total amount of waste disposed of in public and private waste disposal facilities. Does not include waste disposed of in hazardous waste disposal facilities nor waste managed by the waste generator on site.
2. Figures are derived from the results of complementary surveys conducted by the province.
3. Includes Nunavut.
Sources:
Statistics Canada, Environment Accounts and Statistics Division and Demography Division.

Table A.58
Materials Prepared for Recycling or Reuse by Type and by Province and Territory, 1998[1]

Type of materials	Nfld.Lab.	P.E.I.	N.S.	N.B.	Que.[3]	Ont.	Man.	Sask.	Alta.	B.C.	Y.T. and N.W.T.[4]	**Canada**
	tonnes											
Newsprint	1 386	x	90 296	15 823	..	401 020	83 812	4 906	64 001	156 012	x	**818 303**
Cardboard and boxboard	x	x	23 722	25 218	..	186 157	30 259	7 219	51 015	301 816	x	**644 884**
Mixed paper	x	x	x	12 988	777 800[5]	463 082	x	x	31 836	135 024	x	**1 453 356**
Glass	0	x	17 610	x	101 000	104 836	27 727	x	42 766	35 523	0	**361 453**
Ferrous metals	x	x	9 442	x	915 500	283 360	142 058	x	x	39 277	x	**1 604 422**
Copper and aluminum	x	x	x	x	..	27 936	6 036	x	x	23 265	0	**71 430**
Other metals	506	0	820	2 421	107 070	37 534	27 017	2 142	2 371	18 209	0	**198 090**
Plastics	4 071	2 143	12 020	11 944	23 265	24 889	8 474	3 531	3 078	20 022	0	**113 437**
Bricks and drywall	x	0	5 098	0	..	38 621	0	x	0	62 835	0	**106 561**
Construction and demolition	x	227	24 675	4 116	1 156 900[6]	219 430	0	550	x	81 721	0	**1 492 901**
Oils and solvents	x	0	8 165	x	..	20 618	0	x	x	12 107	x	**336 637**
Organics	x	x	16 751	x	174 500	723 687	x	x	5 814	141 305	0	**1 100 286**
Other materials[2]	1 203	681	6 807	x	67 600	233 991	2 827	33 091	21 397	102 933	x	**508 512**
Total	**40 928**	**x**	**217 676**	**141 665**	**3 350 870**	**2 765 160**	**332 516**	**275 552**	**540 340**	**1 130 049**	**x**	**8 810 272**

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 material preparation activities.
2. Other materials include tires, textiles, contaminated soil and whitegoods.
3. Figures are derived from the results of complementary surveys conducted by the province.
4. Includes Nunavut.
5. Includes all paper materials.
6. Includes all construction and demolition materials as well as bricks and drywall.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Air

Table A.59
Greenhouse Gas Emissions Summary, 1990 and 1999

Source	Carbon dioxide (CO_2)		Methane (CH_4)		Nitrous oxide (N_2O)		CO_2-equivalents[1]		Change
	1990	1999	1990	1999	1990	1999	1990	1999	1990 to1999
	kilotonnes								percent
Fossil fuel combustion									
Fossil fuel industries	49 500	62 300	78.0	110.0	1.0	1.3	51 500	65 100	26.4
Electricity and steam generation	94 700	118 000	1.8	3.5	1.8	2.2	95 300	119 000	24.9
Mining	6 150	7 620	0.1	0.2	0.1	0.2	6 190	7 680	24.1
Manufacturing	54 100	51 400	1.7	1.7	1.2	1.2	54 500	51 700	-5.1
Construction	1 860	1 160	0.0	0.0	0.1	0.0	1 880	1 170	-37.8
Transportation									
Gasoline cars	51 500	47 500	8.9	5.1	6.3	7.8	53 700	50 000	-6.9
Light-duty gasoline trucks	20 400	31 900	4.0	4.5	4.2	8.8	21 700	34 700	59.9
Heavy-duty gasoline trucks	2 990	5 610	0.4	0.8	0.4	0.8	3 140	5 880	87.3
Motorcycles	225	232	0.2	0.2	0.0	0.0	230	237	3.0
Off-road gasoline vehicles	4 860	5 290	5.6	6.0	0.1	0.1	5 010	5 450	8.8
Diesel cars	656	563	0.0	0.0	0.0	0.0	672	576	-14.3
Light-duty diesel trucks	578	394	0.0	0.0	0.0	0.0	591	403	-31.8
Heavy-duty diesel trucks	24 300	36 500	1.2	1.8	0.7	1.1	24 600	36 900	50.0
Off-road diesel vehicles	10 000	14 000	0.5	0.7	4.0	5.6	11 300	15 700	38.9
Propane and natural gas vehicles	2 160	1 470	1.7	1.9	0.0	0.0	2 210	1 520	-31.2
Domestic air transport	10 400	13 200	0.7	0.6	1.0	1.3	10 700	13 600	27.1
Domestic shipping	4 730	4 830	0.4	0.4	1.0	1.0	5 050	5 160	2.2
Rail	6 310	5 780	0.4	0.3	2.5	2.3	7 110	6 510	-8.4
Pipelines	6 700	12 200	6.7	12.2	0.2	0.3	6 900	12 600	82.6
Residential	41 300	40 500	100.0	95.0	1.7	1.7	44 000	43 000	-2.3
Commercial and institutional	25 700	28 700	0.5	0.5	0.5	0.6	25 800	28 900	12.0
Other	2 400	2 670	0.0	0.0	0.1	0.1	2 420	2 690	11.2
Fugitive emissions - fossil fuels[2]									
Solid fuels (i.e., coal mining)	0	0	91.0	51.0	0.0	0.0	1 900	1 100	-42.1
Crude oil and natural gas	9 800	14 000	1 200.0	1 800.0	0.0	0.0	36 000	52 000	44.4
Industrial processes									
Non-metallic mineral production	8 160	8 670	0.0	0.0	0.0	0.0	8 160	8 670	6.3
Ammonia, adipic acid and nitric acid production	3 130	4 050	0.0	0.0	37.0	8.2	15 000	6 600	-56.0
Ferrous metal production	7 590	8 500	0.0	0.0	0.0	0.0	7 590	8 500	12.0
Aluminum and magnesium production	2 640	3 820	0.0	0.0	0.0	0.0	11 000[3]	12 000[4]	9.1
Other and undifferentiated production	11 000	14 000	0.0	0.0	0.0	0.0	11 000	14 000	27.3
Solvent and other product use	0	0	0.0	0.0	1.0	2.0	400	1 000	150.0
Agriculture									
Enteric fermentation[5]	0	0	760.0	850.0	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	2 500	2 400	-4.0
Waste									
Solid waste disposal on land	0	0	880.0	1 000.0	0.0	0.0	19 000	22 000	15.8
Wastewater handling	0	0	17.0	19.0	2.8	3.1	1 200	1 300	8.3
Waste incineration	250	280	0.4	0.3	0.2	0.2	320	350	9.4
Grand total	**472 000**	**546 000**	**3 500.0**	**4 300.0**	**170.0**	**170.0**	**607 000**	**699 000**	**15.2**

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. 1999 CO_2-equivalent emissions for this industry include 6 000 kilotonnes of PFC emissions and 1 700 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, 2001, *Canada's Greenhouse Gas Inventory, 1990-1999: Emission and Removal Estimation Practices and Methods*, Ottawa.

Soil

Table A.60
Top Five On-site Releases to Land, 1996 and 1999

Substance	Releases	As 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
1999		
Zinc (and its compounds)	15 744.6	35.9
Calcium fluoride	13 035.7	29.7
Manganese (and its compounds)	3 196.3	7.3
Lead (and its compounds)	2 995.2	6.8
Ethylene glycol	1 804.2	4.1

Source:
Environment Canada, National Pollutant Release Inventory, *National Overview 1999*, <http://www.ec.gc.ca/pdb/npri/npri_dat_rep_e.cfm#annual> (accessed March 1, 2002).

Human Health

Table A.61
Melanoma Incidence and Mortality, 1972 to 2001

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	10.6	8.7	2.6	1.5
1993	10.4	9.0	2.4	1.5
1994	10.8	9.1	2.7	1.5
1995	11.3	9.4	2.8	1.6
1996	11.1	9.5	2.6	1.5
1997	11.3[e]	9.4[e]	2.8	1.5
1998	11.5[e]	9.4[e]	2.8[e]	1.5[e]
1999	11.7[e]	9.5[e]	2.9[e]	1.6[e]
2000	11.8[e]	9.6[e]	3.0[e]	1.6[e]
2001	12.0[e]	9.6[e]	3.0[e]	1.6[e]

Source:
National Cancer Institute of Canada, 2001, *Canadian Cancer Statistics 2001*, Toronto, <http://www.cancer.ca> (accessed March 12, 2002).

Protected Areas

Table A.62
Total Area Protected by Province and Territory, 1989 and 2000[1]

Province/Territory	1989		2000		Change in protected area as a share of total land 1989 to 2000
	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	1 736 300	4.3	3.4
Prince Edward Island	6 000	1.1	23 709	4.2	3.1
Nova Scotia	138 700	2.5	458 615	8.3	5.8
New Brunswick	88 800	1.2	232 500	3.2	2.0
Quebec	622 800	0.4	6 646 278	4.3	3.9
Ontario	5 152 900	4.8	9 405 300	8.7	4.0
Manitoba	315 400	0.5	5 579 883	8.6	8.1
Saskatchewan	1 936 000	3.0	3 912 800	6.0	3.0
Alberta	5 642 000	8.5	6 612 303	10.0	1.5
British Columbia	4 958 300	5.2	10 770 100	11.4	6.2
Yukon Territory	3 218 300	6.7	5 008 000	10.4	3.7
Northwest Territories and Nunavut	6 978 550	2.0	17 941 954	5.2	3.2
Canada	**29 425 250**	**3.0**	**68 327 742**	**6.8**	**3.9**

Notes:
1. The 1989 to 2000 time frame reflects the timelines of the World Wildlife Fund's Endangered Spaces Campaign.
2. Defined by WWF 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.

Source:
World Wildlife Fund Canada, 2000, *Endangered Spaces; The Wilderness Campaign that Changed the Canadian Landscape 1989-2000*, Toronto.

Species at Risk

Table A.63
Species Extinct and Extirpated in Canada, 2001

Species	Group	Last sighting	Probable cause(s) of extinction or extirpation
Tiger salamander	amphibian	..	introduced predators
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
Longjaw cisco	fish	1975	commercial fishing; 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
Gravel chub	fish	1958	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
Passenger pigeon	bird	1914	hunting; habitat alteration
Island marble butterfly	lepidopteran	1908	loss of food source
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
Atlantic walrus (northwest Atlantic population)	mammal (marine)	1850	excessive commercial hunting
Great auk	bird	1844	hunting
Grey whale (Atlantic population)	mammal (marine)	1800	excessive hunting

Source:
Environment Canada, 2001, Canadian Wildlife Service, COSEWIC, *Canadian Species at Risk*, Ottawa.

Table A.64
Species Extinct and At Risk in Canada, 2001

Group	Status assessment					
	Extinct	Extirpated	Endangered	Threatened	Special concern[1]	**Total**
	number					
Mammals						
Terrestrial	1	2	9	7	17	**36**
Marine	1	2	7	7	8	**25**
Birds	3	2	20	8	21	**54**
Fish	6	2	10	21	37	**76**
Amphibians	0	1	5	5	7	**18**
Reptiles	0	2	5	8	6	**21**
Molluscs	1	1	7	1	1	**11**
Lepidopterans	0	3	3	2	2	**10**
Vascular plants	0	2	49	34	44	**129**
Lichens	0	0	1	0	3	**4**
Mosses	0	0	2	1	0	**3**
Total	**12**	**17**	**118**	**94**	**146**	**387**

Note:
1. Formerly described as 'vulnerable' from 1990 to 1999 and 'rare' prior to 1990.
Source:
Environment Canada, 2001, Canadian Wildlife Service, COSEWIC, *Canadian Species at Risk*, Ottawa.

Invasive Species

Table A.65
Invasive Plant Species, 2002

Species	Place and date of discovery	Current area	Impacts/Notes
Canada thistle *Cirsium arvense*	eastern Canada: 1600s	common across Canada	primarily invades agricultural ecosystems; according to Haber, "considered to be one of the most economically important agricultural weeds" in Canada; damages pastures; serves as a pest and pathogen host; increases cleaning costs of some crops; invades natural areas through disturbed sites; produces abundant seeds; spreads vegetatively; chemically inhibits the growth of other plants; native to southeastern Europe and eastern Mediterranean
Common buckthorn *Rhamnus cathartica*	frequent introductions: 1890s	Nova Scotia to Alberta	excludes native species; host for crown rust fungus that afflicts oats; native to Eurasia and North Africa
Eurasian watermilfoil *Myriophyllum spicatum*	Lake Erie: 1961	southern British Columbia, Ontario and Quebec	competes with native vegetation and interferes with fish species; affects recreational uses of water bodies; reproduces and spreads easily via stem fragments; particularly successful in sites cleared of other vegetation; seasonal breakdown can affect water quality, particularly through oxygen depletion and release of substantial quantities of phosphorus during decay; native to Europe
European frog-bit *Hydrocharis morsus-ranae*	Ottawa, Ont.: circa 1939 (escaped from Central Experimental Farm)	along the Great Lakes from Point Pelee to Québec and north to Ottawa	dense floating mats block sunlight, affecting submerged species of plants and animals; inhibits recreational activities; mechanical removal is a temporary control measure; native to Europe and Asia
European water chestnut *Trapa natans*	first introduced to North America around 1874 but reported for the first time in Canada in 1998 in southwestern Quebec	along the Richelieu River just north of the U.S.-Canada border	a significant nuisance aquatic weed: due to its dense, clonal, mat-forming growths, the species impedes navigation; its low food value for wildlife could have a substantial impact on the use of the area by native species; dense surface mats likely to reduce aquatic plant growth of other species beneath the shade of the floating canopy; abundant detritus in the fall and its decomposition could contribute towards lower oxygen levels in shallow waters and impact other aquatic organisms; sharp spiny fruits can be hazardous to bathers; native to Eurasia
Flowering-rush *Butomus umbellatus*	La Prairie, Que.: 1897; numerous intentional introductions across Canada	coast to coast; more abundant in lower Great Lakes and along St. Lawrence River	competes with native vegetation; impedes small boat traffic; native to Europe and Asia
Garlic mustard *Alliaria petiolata*	Long Island, N.Y.: 1868; Toronto, Ont.: 1879	southern regions of Ontario and Quebec	threat (via shading) to endangered wood poppy and threatened white aster; mechanical and chemical methods used to control spread; native to Europe
Glossy buckthorn *Rhamnus frangula* also known as *Frangula alnus*	London, Ont.: 1898; numerous intentional introductions	Nova Scotia to Manitoba; most abundant in southern Ontario	dense growths displace other species; host for crown rust fungus that afflicts oats; European starling, another introduced species, implicated as one agent contributing to the spread of buckthorn; native to Eurasia and North Africa
Japanese knotweed *Polygonum cuspidatum*	brought to North America in the late 1800s	greatest abundance in the Atlantic provinces	the dense tall thickets shade other species and prevent regeneration of native plants; the space occupied by these thickets also precludes the natural regeneration of a diverse assemblage that would normally be present in contrast to the monoculture formed by Japanese knotweed; threat to riparian habitats since it can survive severe floods and rapidly colonize scoured shores and islands; native to eastern Asia

Table A.65
Invasive Plant Species, 2002 (continued)

Species	Place and date of discovery	Current area	Impacts/Notes
Leafy spurge *Euphorbia esula*	New England coast: 1800s; Huron County, Ont.: 1889; believed to have been introduced in ship ballast (soil)	coast to coast; most prevalent in southern Manitoba and Saskatchewan	pest of agricultural fields and pastures; also competes with native grassland species; exhibits allelopathic properties; sticky sap an irritant to livestock; can foul farm equipment; native to Europe and Asia
Mile-a-minute *Polygonum perfoliatum*	Oregon around 1890 in ship's ballast	various urban centres in southern Ontario	although most infestations occur on disturbed lands such as roadsides, ditches, cleared woodlands, fields and gardens, there are concerns that this species may spread into wetlands serving as habitats for rare species; once established in a sensitive ecosystem, its rapid spread could make eradication difficult and costly; at present not a threat to agricultural crops; its rampant growth in hydro line corridors and clear-cut sites needed for reforestation can result in costly control actions; native to Asia
Purple loosestrife *Lythrum salicaria*	eastern Canada: established by 1880s (probably arrived in early 1800s); Alberni, B.C.: 1916; Charlottetown, P.E.I.: 1950; Lomond, Nfld.: 1973	coast to coast, primarily in the southern regions of the country; particularly prevalent in southern Ontario and Quebec	displaces native plant species and affects those animals that use the displaced native for food or shelter; still introduced as a garden ornamental; varieties once thought sterile have been shown to produce viable seeds through cross-pollination with wild varieties; controlled through mechanical, biological and chemical means; prolific seed producer; spread of purple loosestrife is aided by roadside ditches; damages irrigation ditches, drainage ditches and pasture land in addition to natural wetland sites; native to Europe and Asia
Reed canary grass *Phalaris arundinacea*	date uncertain	all provinces and territories (both native and introduced genotypes)	native and introduced varieties difficult to distinguish; European genotypes, introduced for hay and forage, have contributed to the spread; aggressive competitor that displaces other vegetation; often found in conjunction with purple loosestrife, whose showiness tends to obscure presence of grass; native to temperate America and Eurasia
Russian-olive *Elaeagnus angustifolia*	first introduced as an ornamental tree and windbreak in the United States in the late 1800s	known to spread from cultivation in British Columbia, Alberta, Manitoba and southern Ontario	although Russian-olive has been promoted for a variety of uses such as erosion control, shelterbelt plantings, a source of wildlife food and honey production, it is increasingly being recognized for its invasiveness in natural areas, especially riparian ecosystems; areas dominated by Russian-olive are considered inferior wildlife habitats; native to southern Europe and western Asia

Sources:
Haber, E., *Invasive Exotic Plants of Canada: Fact Sheets 1 through 14*, Invasive Plants of Canada Project, <http://infoweb.magi.com/~ehaber/ipcan.html> (accessed April 30, 2002).
White, D.J., E. Haber and C. Keddy, 1993, *Invasive Plants of Natural Habitats in Canada: An Integrated Review of Wetland and Upland Species and Legislation Governing their Control*, North American Wetlands Conservation Council, Canada, <http://www.cws-scf.ec.gc.ca/publications/inv/index_e.cfm> (accessed April 30, 2002), Canadian Wildlife Service, Environment Canada, Ottawa.

Disasters

Table A.66
Major Disasters, 1998 to 2001

Year	Event	Description	Location	Deaths
1998	earthquake	west of Vancouver Island, with a magnitude of 6.0 on the Richter scale	Vancouver Island, B.C.	0
1998	tornado	tornado hits June 2, causing extensive damage	Norwich, Ont.	0
1998	avalanche	avalanche in Kokanee Glacier Park buries skiers	Kaslo, B.C.	6
1998	avalanche	skiers killed in an avalanche after skiing to the bottom of a mountain bowl	South Columbia Mountains, B.C.	2
1998	avalanche	avalanche buried snowmobilers, 1 perished	Elliott Lake, B.C.	1
1998	avalanche	2 avalanches pushed skiers into Kokanee Lake, 1 drowned	Kokanee Lake, B.C.	1
1998	flood	warm weather and thunderstorms caused spring flooding, 3 757 evacuated	Eastern Ontario and Quebec	0
1998	storm	ice storm with freezing rain (50 to > 100 mm) caused massive power outages, 945 injured and 600 000 evacuated	Eastern Canada	28
1998	storm	snowstorm dropped 30 cm of snow on Greater Vancouver, 2 injured and 10 evacuated	Southern B.C.	2
1998	accident	freighter *Flare* sinks off Newfoundland	Southwest of Newfoundland	21
1998	accident	Swissair MD11 (Flight 111) crashes off Peggy's Cove	Peggy's Cove, N.S.	229
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	tornado	4 injured and 200 evacuated	Drummondville, Que.	1
1999	avalanche	avalanche sweeps into school gymnasium, 25 injured	Kangiqsualujjuag, Que.	9
1999	avalanche	1 skier killed and 4 others injured	Glacier National Park, B.C.	1
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	flooding of rivers in northwestern B.C. closed roads and highways, 118 evacuated	British Columbia	0
1999	flood	about 62 cm of snow and 122 mm of rain fell, 350 evacuated	Clearwater, Alta.	0
1999	flood	record 1-day rainfall caused by remnants of tropical storm Harvey and Hurricane Gert, 90 evacuated	Maritimes	0
1999	storm	11 people died shovelling heavy wet snow, 7 injured	Southern Ontario	11
1999	storm	major storm dumped 78 cm of snow on Toronto and continued east to the Maritimes	Toronto, Ont. to Maritimes	2
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	2 powerful windstorms hit the Lower Mainland of B.C. with winds exceeding 100 km/h	Southern British Columbia	3
1999	storm	winter storm caused whiteout conditions, freezing rain and power outages all over the Maritimes	Maritimes, Gaspé region of Quebec	4
1999	storm	heavy rains resulted in 144 mm of precipitation falling in 18 hours, 12 evacuated	Kenora, Ont.	0
1999	storm	stormy weather spawned heavy rain and a tornado, 4 evacuated	Saskatchewan	0
1999	storm	100 000 people were left without power by a powerful windstorm	Vancouver, B.C.	0
2000	tornado	tornado hit at 300 km/h, 140 injured and 1 000 evacuated	Pine Lake, Alta.	12
2000	flood	more than 333 mm of rain fell in one day, 12 evacuated	Vanguard, Sask.	0
2000	flood	heavy rains hit Cape Breton and Victoria County for nearly 10 days, 1 injured and 800 evacuated	Sydney, N.S.	0
2000	storm	intense storm hit the Maritimes for 6 days, 216 evacuated	Maritimes	0
2000	storm	1 child suffered injuries in Toronto due to violent winds that gusted up to 80 km/h	Southern Ontario	0

Table A.66
Major Disasters, 1998 to 2001 (continued)

Year	Event	Description	Location	Deaths
2000	accident	E-Coli in water supply	Walkerton, Ont.	7
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

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:
Jones, Robert L., *Canadian Disasters - An Historical Survey,* <http://www.ott.igs.net/~jonesb/DisasterPaper/disasterpaper.html> (accessed March 20, 2002).
Office of Critical Infrastructure Protection and Emergency Preparedness, Department of National Defence, *EPC Electronic Disaster Database*, <http://www.ocipep-bpiepc.gc.ca/research/epcdatab_e.html> (accessed March 20, 2002).
Geological Survey of Canada, *National Earthquake Hazards Program*, <http://www.seismo.nrcan.gc.ca> (accessed March 20, 2002).

Environmental Legislation

Table A.67
***Canadian Environmental Protection Act* Enforcement Activities, 1991-92 to 1999-00[1]**

Enforcement activity	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00
Inspections	1 574	1 233	1 548	1 362	963	701	1 647	1 555	779
Investigations	120	93	55	64	94	87	60	77	64
Warnings	82	105	120	127	87	28	208	253	478
Directions	6	4	1	0	0	2	0	4	9
Prosecutions	16	22	3	8	15	5	7	3	26
Convictions	2	17	10	9	8	7	3	1	1
Total	**1 800**	**1 474**	**1 737**	**1 570**	**1 167**	**830**	**1 925**	**1 893**	**1 357**

Note:
1. This date is based upon a fiscal year.
Source:
Environment Canada, CEPA Annual Reports, <http://www.ec.gc.ca/CEPARegistry/gene_info/> (accessed March 12, 2002).

Environmental Protection Expenditures

Table A.68
Government Expenditures on Pollution Abatement and Control and Water Purification and Supply, 1988-89 to 1998-99

Level of government/Activity	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
	million dollars										
All levels[1]											
Sewage collection and disposal	1 416.1	1 736.3	2 001.1	1 953.3	2 051.3	2 186.1	2 297.4	2 742.2	2 547.5	2 692.8	2 415.4[r]
Waste collection and disposal	886.7	1 039.8	1 220.3	1 324.7	1 427.2	1 346.2	1 578.1	1 366.4	1 343.5	1 395.8	1 464.4[r]
Other pollution control activities	268.7	357.6	397.6	318.9	263.8	239.6	240.3	204.2	186.7	179.3	182.2[r]
Other environmental services	804.4	910.4	1 096.3	1 289.0	1 272.6	1 329.2	1 317.1	1 338.7	1 274.5	1 353.8	1 397.1[r]
Total PAC	**3 375.9**	**4 044.0**	**4 715.3**	**4 885.9**	**5 014.8**	**5 101.1**	**5 432.9**	**5 651.5**	**5 352.2**	**5 621.8**	**5 459.1[r]**
Water purification and supply	2 099.8	2 247.7	2 470.5	2 377.3	2 426.0	2 747.5	2 965.6	3 014.0	3 029.4	3 082.0	3 059.5[r]
PAC and water	**5 475.7**	**6 291.7**	**7 185.8**	**7 263.2**	**7 440.8**	**7 848.6**	**8 398.4**	**8 665.5**	**8 381.6**	**8 703.8**	**8 518.5[r]**
Federal											
Sewage collection and disposal	0.0	0.0	0.0	0.0	0.0	229.4	320.7	313.7	300.7	371.5	341.5
Waste collection and disposal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other pollution control activities	70.3	112.6	117.9	20.2	4.3	11.2	14.7	13.9	5.7	4.7	4.0
Other environmental services	505.7	545.4	620.2	720.9	747.0	728.7	745.3	703.2	635.6	761.8	785.4
Total PAC	**576.1**	**657.9**	**738.1**	**741.1**	**751.4**	**969.4**	**1 080.8**	**1 030.7**	**942.0**	**1 138.0**	**1 130.9**
Water purification and supply	23.8	16.0	7.1	7.8	9.6	235.1	344.7	360.0	328.9	392.0	360.7
PAC and water	**599.9**	**673.9**	**745.2**	**748.9**	**761.0**	**1 204.5**	**1 425.5**	**1 390.8**	**1 270.9**	**1 529.9**	**1 491.7**
Provincial/Territorial											
Sewage collection and disposal	75.7	72.4	75.3	100.9	97.8	90.6	132.8	256.3	186.8	181.4	119.1[r]

Table A.68
Government Expenditures on Pollution Abatement and Control and Water Purification and Supply, 1988-89 to 1998-99 (continued)

Level of government/Activity	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
	million dollars										
Waste collection and disposal	81.0	120.5	132.4	164.1	176.7	121.5	295.8	71.3	30.5	27.8	32.1[r]
Other pollution control activities	243.7	305.0	327.3	375.8	328.2	309.9	235.8	202.2	187.4	181.0	179.8[r]
Other environmental services	253.9	312.3	443.4	535.0	467.0	516.7	531.3	564.0	531.0	494.9	493.4[r]
Total PAC	**654.3**	**810.3**	**978.4**	**1 175.7**	**1 069.7**	**1 038.7**	**1 195.5**	**1 093.8**	**935.8**	**885.0**	**824.4[r]**
Water purification and supply	933.6	1 071.9	1 130.6	1 012.5	991.5	872.3	948.6	985.8	987.1	822.5	701.2[r]
PAC and water	**1 587.9**	**1 882.2**	**2 109.0**	**2 188.3**	**2 061.3**	**1 911.0**	**2 144.1**	**2 079.6**	**1 922.9**	**1 707.5**	**1 525.6[r]**
Local											
Sewage collection and disposal	1 413.6	1 734.8	2 002.0	1 954.3	2 055.8	1 950.5	2 040.7	2 419.7	2 313.6	2 394.4	2 109.4
Waste collection and disposal	817.1	935.8	1 125.9	1 228.2	1 297.4	1 253.4	1 293.1	1 310.9	1 331.8	1 392.3	1 447.0
Other environmental services[2]	75.2	82.6	82.3	80.9	102.6	126.8	144.2	133.0	129.4	129.8	141.9
Total PAC	**2 305.9**	**2 753.2**	**3 210.2**	**3 263.4**	**3 455.7**	**3 330.7**	**3 478.0**	**3 863.6**	**3 774.8**	**3 916.5**	**3 698.2**
Water purification and supply	1 758.2	1 861.0	2 078.2	2 039.6	2 105.0	2 296.8	2 479.4	2 555.7	2 524.9	2 525.9	2 499.2
PAC and water	**4 064.1**	**4 614.2**	**5 288.5**	**5 303.0**	**5 560.8**	**5 627.5**	**5 957.4**	**6 419.3**	**6 299.7**	**6 442.3**	**6 197.4**

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 provides a more accurate account of total government revenues and expenditures.
2. 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, Environment Accounts and Statistics Division and Public Institutions Division.

Table A.69
Operating Expenditures on Environmental Protection by Industry and Type of Activity, 1995 to 1998

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
Chemical and chemical products	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; gas distribution systems	5.5	1.9	3.4	0.3	8.8	1.1	1.6	8.5	31.1
Other manufacturing[1,2]	..	..	..	..	..	..	..	..	466.6
Total excluding other manufacturing	**197.1**	**69.6**	**271.7**	**88.5**	**845.4**	**210.1**	**60.1**	**176.9**	**1 919.5**
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	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
Chemical and chemical products	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

Table A.69
Operating Expenditures on Environmental Protection by Industry and Type of Activity, 1995 to 1998 (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								
Pipeline transport; gas distribution systems	1.4	2.6	5.7	x	11.4	0.0	x	12.6	35.7
Other manufacturing[2]	..	..	..	..	..	..	..	..	357.7
Total excluding other manufacturing	**266.8**	**82.3**	**304.6**	**142.7**	**1 280.9**	**265.8**	**89.7**	**193.3**	**2 626.0**
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	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
Chemical products	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[3]	1.4	2.6	5.0	0.3	13.4	2.9	0.9	8.3	34.8
Other manufacturing[2]	..	..	..	..	..	..	..	..	291.2
Total excluding other manufacturing	**206.1**	**81.0**	**298.2**	**147.4**	**1 293.2**	**421.8**	**80.9**	**177.2**	**2 705.9**
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	2.0	0.7	4.2	0.3	8.1	4.4	1.4	11.2	32.2
Other manufacturing[2]	..	..	..	..	..	..	..	..	338.8
Total excluding other manufacturing	**190.2**	**84.3**	**300.1**	**139.2**	**1 304.8**	**348.8**	**84.9**	**199.1**	**2 651.4**
Total	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**..**	**2 990.2**

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. Includes the two following industries: Pipeline transport and Gas distribution systems.
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 Statistics Canada, 2001, *Environmental Protection Expenditures in Business Sector 1998*, Catalogue No. 16F0006XIE, Ottawa.
5. Operating expenditures on 'wildlife and habitat protection' are included with operating expenditures on 'reclamation and decommissioning.'
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Table A.70

Investment Expenditures on Environmental Protection by Industry and Type of Activity, 1995 to 1998

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; 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
Chemical and chemical products	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
Other manufacturing[1,2]	..	..	..	..	..	..	308.0
Total excluding other manufacturing	**77.7**	**38.0**	**144.9**	**49.3**	**1 203.5**	**268.9**	**1 782.3**
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; gas distribution systems	0.8	2.8	7.4	2.3	20.6	11.6	45.6
Food	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
Chemical and chemical products	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
Transportation equipment	0.8	0.2	3.3	0.7	25.3	31.0	61.4
Other manufacturing[2]	..	..	..	..	..	..	135.0
Total excluding other manufacturing	**73.3**	**40.1**	**136.5**	**27.6**	**821.4**	**681.8**	**1 780.7**
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[3]	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	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
Chemical products	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
Other manufacturing[2]	..	..	..	..	..	..	82.9
Total excluding other manufacturing	**60.9**	**52.3**	**113.8**	**32.3**	**690.3**	**716.0**	**1 665.7**
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

Table A.70
Investment Expenditures on Environmental Protection by Industry and Type of Activity, 1995 to 1998 (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						
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	0.6	6.4	2.9	0.5	41.6	63.7	115.6
Other manufacturing[2]	..	..	..	..	..	..	135.0
Total excluding other manufacturing	**60.7**	**51.0**	**112.5**	**41.6**	**684.6**	**648.7**	**1 599.1**
Total	**..**	**..**	**..**	**..**	**..**	**..**	**1 734.2**

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. Includes the two following industries: Pipeline transport and Gas distribution systems.
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 Statistics Canada, 2001, *Environmental Protection Expenditures in Business Sector 1998*, Catalogue No. 16F0006XIE, Ottawa.
5. Operating expenditures on 'wildlife and habitat protection' are included with operating expenditures on 'reclamation and decommissioning.'
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Environment Industry

Table A.71
Total Business and Business Environmental Revenues and Total Business Employment[1] by Province and Territory, 1998

Province/Territory	Establishments[2]	Total employment	Total revenues	Environmental revenues			
				Goods	Services	Construction	Total
	number		million dollars				
Newfoundland and Labrador	145	2 354	202.0	16.4	62.4	35.9	114.7
Prince Edward Island	37	781	94.3	x	12.6	x	66.6
Nova Scotia	330	4 744	562.6	83.1	130.7	58.0	271.8
New Brunswick	270	3 719	640.8	101.6	91.1	72.0	264.7
Quebec	1 591	35 463	5 431.4	1 493.7	1 465.9	382.5	3 342.1
Ontario	1 988	63 961	10 881.5	2 977.1	2 380.7	604.8	5 962.6
Manitoba	190	3 255	459.3	62.4	192.4	43.3	298.1
Saskatchewan	252	3 606	329.7	71.3	96.8	52.9	221.0
Alberta	612	25 076	3 185.1	378.0	926.0	621.3	1 925.3
British Columbia	840	20 910	2 851.6	514.4	938.7	322.5	1 775.6
Yukon and Northwest Territories[3]	39	472	51.2	x	19.8	x	35.7
Canada	**6 294**	**164 341**	**24 689.5**	**5 708.2**	**6 317.1**	**2 253.1**	**14 278.2**

Notes:
Figures may not add up to totals due to rounding.
1. Represents all employment related to the production of both environmental and non-environmental goods.
2. The total number of establishments does not include engineering construction establishments (NAICS 2313) because of the methodology used to derive the estimates.
3. Includes Nunavut.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Environmental Practices

Table A.72
Pollution Prevention Methods by Industry, 1995 to 1998

Year/Industry	End-of-pipe process	Pollution prevention: Product design of reformulation	Substitution or modification of production process	Prevention of leaks and spills	Recirculation, recovery, reuse or recycling	Energy conservation	Material or solvent substitution	Other
				percent[1]				
1995								
Logging	18.8	0.0	25.0	37.5	31.3	18.8	6.3	6.3
Crude petroleum and natural gas	48.4	6.5	38.7	71.0	48.4	77.4	41.9	9.7
Mining	38.6	4.5	25.0	59.1	50.0	38.6	36.4	6.8
Electric power systems	36.4	18.2	27.3	45.5	72.7	72.7	81.8	18.2
Pipeline transport and gas distribution	38.5	7.7	23.1	69.2	61.5	76.9	38.5	0.0
Food	31.0	3.9	25.6	51.2	69.0	33.3	13.2	0.8
Beverage	41.7	12.5	33.3	33.3	75.0	45.8	16.7	4.2
Pulp and paper	61.9	11.1	46.0	54.0	44.4	25.4	15.9	3.2
Refined petroleum and coal products	46.2	7.7	0.0	53.8	38.5	46.2	15.4	0.0
Chemical and chemical products	26.6	19.5	36.7	58.6	68.8	29.7	41.4	7.8
Non-metallic mineral products	42.6	19.1	23.4	48.9	68.1	38.3	34.0	8.5
Primary metals	61.4	8.8	50.9	42.1	64.9	36.8	42.1	7.0
Other manufacturing[2]	22.9	7.3	28.3	42.4	68.8	35.6	42.9	2.9
Total	**35.2**	**9.9**	**31.8**	**50.2**	**63.5**	**36.9**	**33.0**	**4.7**
1996								
Logging	33.3	4.2	4.2	62.5	45.8	25.0	16.7	0.0
Crude petroleum and natural gas	58.6	3.4	41.4	79.3	65.5	75.9	41.4	0.0
Mining	39.4	4.5	22.7	48.5	57.6	42.4	27.3	21.2
Electric power systems	29.4	11.8	23.5	47.1	76.5	82.4	58.8	5.9
Pipeline transport and gas distribution	53.6	3.6	7.1	75.0	67.9	71.4	42.9	3.6
Food	39.0	11.7	24.7	51.9	59.7	42.9	28.6	6.5
Beverage	40.0	12.5	42.5	37.5	82.5	42.5	15.0	5.0
Pulp and paper	55.7	5.1	40.5	50.6	46.8	36.7	26.6	12.7
Refined petroleum and coal products	43.8	12.5	12.5	75.0	50.0	43.8	18.8	12.5
Chemical and chemical products	32.2	20.0	35.7	62.2	70.8	29.6	43.5	17.4
Non-metallic mineral products	45.5	9.1	30.3	42.4	72.7	39.4	39.4	9.1
Primary metals	48.1	5.1	36.7	49.4	69.6	38.0	39.2	6.3
Transportation equipment	39.2	17.6	43.1	51.0	80.4	56.9	56.9	5.9
Other manufacturing[2]	19.2	12.7	28.5	38.5	71.9	38.1	39.6	4.2
Total	**35.9**	**10.9**	**30.6**	**49.2**	**66.2**	**41.7**	**36.5**	**8.4**
1997								
Logging	..	8.6	2.9	80.0	34.3	5.7	14.3	5.7
Crude petroleum and natural gas	..	34.3	40.0	94.3	74.3	65.7	48.6	5.7
Mining	..	3.8	22.5	50.0	58.8	53.8	23.8	2.5
Electric power systems	..	6.7	20.0	93.3	53.3	73.3	53.3	13.3
Pipeline transport and gas distribution	..	16.7	11.1	77.8	50.0	72.2	44.4	11.1
Food and tobacco products	..	13.7	30.1	63.0	67.1	58.9	30.1	5.5
Beverage	..	25.0	17.9	50.0	57.1	32.1	21.4	14.3
Wood	..	16.3	20.9	60.5	58.1	34.9	34.9	9.3
Pulp and paper	..	8.3	27.1	58.3	71.9	40.6	31.3	11.5
Refined petroleum and coal products	..	38.9	44.4	77.8	72.2	61.1	50.0	0.0
Chemical products	..	26.8	22.8	68.5	61.1	38.9	35.6	5.4
Non-metallic mineral products	..	11.5	25.0	38.5	75.0	32.7	30.8	7.7
Primary metals	..	11.0	43.0	51.0	70.0	54.0	37.0	2.0
Transportation equipment	..	18.5	32.1	56.8	64.2	55.6	55.6	4.9
Other manufacturing[2]	..	11.7	17.9	30.1	63.0	32.7	40.8	17.6
Total	**..**	**14.7**	**24.2**	**51.2**	**63.6**	**42.1**	**37.0**	**9.9**
1998[3]								
Logging	..	0.0	15.2	81.8	33.3	12.1	3.0	3.0
Oil and gas extraction	..	27.1	35.4	87.5	70.8	75.0	39.6	6.3
Mining	..	5.9	17.6	52.9	67.1	42.4	21.2	8.2
Electric power generation, transmission and distribution	..	13.0	21.7	87.0	65.2	73.9	52.2	4.3
Natural gas distribution	..	0.0	25.0	75.0	37.5	62.5	25.0	0.0
Food	..	13.1	26.3	54.5	71.7	60.6	34.3	3.0
Beverage and tobacco products	..	7.9	15.8	63.2	50.0	50.0	23.7	10.5
Wood products	..	23.3	24.7	57.5	61.6	39.7	21.9	12.3
Pulp, paper and paperboard mills	..	10.1	23.6	73.0	76.4	53.9	38.2	6.7
Petroleum and coal products	..	26.3	31.6	78.9	73.7	63.2	26.3	0.0

Table A.72
Pollution Prevention Methods by Industry, 1995 to 1998 (continued)

Year/Industry	End-of-pipe process	Pollution prevention: Product design of reformulation	Substitution or modification of production process	Prevention of leaks and spills	Recirculation, recovery, reuse or recycling	Energy conservation	Material or solvent substitution	Other
				percent[1]				
Chemicals	..	29.6	24.0	70.9	71.5	33.0	27.4	3.9
Non-metallic mineral products	..	17.8	20.0	48.9	66.7	51.1	26.7	8.9
Primary metals	..	14.2	28.3	55.0	81.7	54.2	30.8	5.8
Transportation equipment	..	21.1	25.4	69.0	69.0	56.3	50.7	8.5
Pipeline transportation	..	25.0	25.0	91.7	58.3	75.0	33.3	0.0
Other manufacturing[2]	..	14.8	19.7	39.1	55.7	34.5	31.1	20.0
Total	**..**	**16.7**	**23.0**	**58.6**	**65.5**	**45.3**	**30.7**	**9.7**

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 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 Statistics Canada, 1998, *Environmental Protection Expenditures in Business Sector*, Catalogue No. 16F0006XIE, Ottawa.
Source:
Statistics Canada, Environment Accounts and Statistics Division.

Recreation

Table A.73
Characteristics of Canada's National Parks System, 1996-97 to 2000-01[1]

National park	Park area	Number of visitors: 1996-97	1997-98	1998-99	1999-00	2000-01	Visitors per park area: 1996-97	1997-98	1998-99	1999-00	2000-01	Trails	Length of trails
	km^2	person-visits[2]					person-visits/km^2					number	km
Gros Morne, Nfld.Lab.	1 805.0	120 943	115 158	119 156	119 156	118 071	67	64	66	66	65	19	74
Terra Nova, Nfld.Lab.	399.9	230 469	228 554	235 755	244 608	274 186	576	572	590	612	686	26	79
Prince Edward Island, P.E.I.	27.0	749 212[3]	799 182[3]	945 613[3]	954 288[3]	881 264[3]	27 749	29 599	35 023	35 344	32 639	15	42
Cape Breton Highlands, N.S.	948.0	379 689	427 866	393 138	440 663	361 809	401	451	415	465	382	35	217
Kejimkujik, N.S.	403.7	56 592	49 084	53 996	52 027	52 221	140	122	134	129	129	42	144
Fundy, N.B.	205.9	220 714	230 147	270 480	259 782	245 840	1 072	1 118	1 314	1 262	1 194	26	111
Kouchibouguac, N.B.	239.2	229 562	229 752	237 162	245 770	230 372	960	960	991	1 027	963	15	93
Forillon, Que.	240.4	173 914	178 880	182 659	186 695	172 678	723	744	760	777	718	15	83
La Mauricie, Que.	536.1	215 888	209 860	213 880	206 302	179 305	403	391	399	385	334	81	67
Mingan Archipelago, Que. (R)	150.7	19 860	34 233	35 137	33 702	29 525	132	227	233	224	196	8	4
Saguenay-St. Lawrence, Que. (M)	1 138.0	377 382	399 981	421 378	431 510	433 250	332	351	370	379	381	2	1
Bruce Peninsula, Ont.	154.0	207 624	205 988	226 918	228 049	212 457	1 348	1 338	1 473	1 481	1 380	8	12
Fathom Five, Ont. (M)	112.0	404 350	403 865	468 923	456 809	435 794	3 610	3 606	4 187	4 079	3 891	…	…
Georgian Bay Islands, Ont.	25.6	68 903	50 579	47 347	49 982	47 622	2 692	1 976	1 849	1 952	1 860	15	51
Point Pelee, Ont.	15.0	359 043	360 282	365 028	357 837	323 350	23 936	24 019	24 335	23 856	21 557	17	29
Pukaskwa, Ont.	1 877.8	7 940	8 960	9 547	11 081	10 207	4	5	5	6	5	5	66
St. Lawrence Islands, Ont.	8.7	63 278	64 915	70 619	70 619	81 232	7 273	7 461	8 117	8 117	9 337	7	9
Riding Mountain, Man.	2 973.1	353 134	289 297	314 061	314 061	399 291	119	97	106	106	134	48	673
Wapusk, Man.	11 475.0	..	..	..	..	..	..	..	..	..	..	..	..
Grasslands, Sask.	906.4	3 451	3 851	5 947	4 430	4 904	4	4	7	5	5	3	13
Prince Albert, Sask.	3 874.3	171 522	178 874	220 986	224 040	224 566	44	46	57	58	58	35	381
Banff, Alta.	6 641.0	4 453 021	4 269 105	4 368 172	4 677 466	4 635 705	671	643	658	704	698	154	1 215
Elk Island, Alta.	194.0	152 852	212 481	213 980	235 765	225 540	788	1 095	1 103	1 215	1 163	13	86
Jasper, Alta.	10 878.0	1 820 506	1 756 473	1 848 145	1 973 312	1 952 392	167	161	170	181	179	109	1 772
Waterton Lakes, Alta.	505.0	348 445	368 052	425 436	422 376	416 265	690	729	842	836	824	33	211
Gwaii Haanas and Haida Heritage Site, B.C. (R)	1 495.0[5]	2 145	1 798	1 562	1 811	1 805	1	1	1	1	1	..	..
Kootenay, B.C.	1 406.4	1 260 310	1 558 576	1 690 882	1 590 596	1 590 596	896	1 108	1 202	1 131	1 131	39	261
Mount Revelstoke and Glacier, B.C.[4]	1 609.0	532 153	558 343	559 198	530 638	530 638	331	347	348	330	330	51[4]	201[4]
Pacific Rim, B.C. (R)	285.8[5]	797 690	530 656	567 327	560 309	560 309	2 791	1 857	1 985	1 960	1 960	21	339
Yoho, B.C.	1 313.1	814 801	1 040 185	1 068 730	1 371 105	1 371 105	621	792	814	1 044	1 044	71	266
Ivvavik, Y.T.	9 750.0	141	253	210	128	155	0	0	0	0	0	..	..
Kluane, Y.T.	22 013.3	75 718	70 298	62 737	59 501	59 517	3	3	3	3	3	18	235

Table A.73
Characteristics of Canada's National Parks System, 1996-97 to 2000-01[1] (continued)

National park	Park area	Number of visitors					Visitors per park area					Trails	Length of trails
		1996-97	1997-98	1998-99	1999-00	2000-01	1996-97	1997-98	1998-99	1999-00	2000-01		
	km^2	person-visits[2]					person-visits/km^2					number	km
Vuntut, Y.T.	4 345.0	..	..	..	..	..	..	..	..	..	..	..	..
Aulavik, N.W.T.	12 200.0	20	45	40	32	63	0	0	0	0	0	..	..
Nahanni, N.W.T. (R)	4 765.2	4 605	768	1 526	7 281	6 918	1	0	0	2	1	4	12
Tuktut Nogait, N.W.T.	16 340.0	..	..	..	..	..	..	..	..	..	..	..	..
Wood Buffalo, N.W.T. and Alta.	44 802.0	6 040	5 753	4 066	1 800	1 681	0	0	0	0	0	10	67
Auyittuq, Nvt. (R)	19 707.4[6]	470	355	1 191	467	579	0	0	0	0	0	1	100
Quttinirpaaq (Ellesmere Island), Nvt.(R)	37 775.0	462	450	508	192	192	0	0	0	0	0	..	..
Total	**222 291.0[7]**	**14 682 849**	**14 842 899**	**15 651 440**	**16 324 190**	**16 071 404**	**66**	**66**	**70**	**73**	**72**	**895**	**6 713**

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. 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*, <http://parkscanada.pch.gc.ca/Library/DownloadDocuments/DocumentsArchive/attendance_e.pdf> (accessed February 21, 2002).

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