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EnviroStats

Summer 2007 Vol. 1 no. 1

Introducing EnviroStats

Welcome to the first issue of EnviroStats, Statistics Canada's quarterly bulletin of environmental and sustainable development statistics.

Starting with this issue, EnviroStats will provide regular statistical analysis of environmental topics written for a broad audience. At the core of each issue will be a feature article on a particular topic. Shorter articles will highlight new statistical developments or introduce new concepts. "Updates" will cover recent and upcoming events such as releases of new statistical products or overviews of surveys underway. The data table found on page 14 will be updated each quarter to ensure that you have the most recent environmental statistics available. Each issue will also feature a map illustrating and analyzing a current environmental topic.

A set of front-cover indicators has been selected to stress the interrelationships between the population, the economy and the environment. Population change and gross domestic product represent the most familiar socio-economic indicators. To these we have added environmental sustainability indicators: greenhouse gas emissions, particulate matter and ground-level ozone levels in air. By bringing these indicators together in one place, it will be easier for you to monitor socio-economic and environmental sustainability trends side-by-side.

We encourage your participation in EnviroStats. If you have suggestions for articles or comments on what we have presented, please contact the editorial team (613-951-0297; fax: 613-951-0634; environ@statcan.ca, Environment Accounts and Statistics Division).

In this issue:

Latest indicators

Population 2005 to 2006 percentage change	1.0%
Gross domestic product February 2007 to March 2007 percentage change	0.3%
Greenhouse gas emissions 2004 to 2005 percentage change	-0.1%
Particulate matter ($PM_{2.5}$) 2000 to 2004	No significant trend
Ground-level ozone 1990 to 2004 median percent change per year	0.9%

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Canada

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Symbols

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.	not available for any reference period
..	not available for a specific reference period
...	not applicable
0	true zero or a value rounded to zero
0^s	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p}	preliminary
^{r}	revised
x	suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E}	use with caution
F	too unreliable to be published

Recycling in Canada

Avani Babooram and Jennie Wang

There is concern that Canada's landfills are reaching capacity and it is becoming increasingly difficult to find sites for new ones.[1] Landfills also produce approximately 25% of Canada's methane emissions (methane is a powerful greenhouse gas).[2] Recycling can help reduce the amount of waste entering landfills and help conserve natural resources.

Access to recycling programs has improved since the mid-1990s and Canadian households are recycling larger quantities than ever before. Income and education have little impact on recycling behaviour; households with access to recycling programs tend to use them equally.

However, differences in levels of access are apparent depending on dwelling type. Canadians who live in single detached homes are more likely to have access to recycling services than Canadians living in mobile homes or apartments.

What you should know about this study

This study is based on data from the 2004, 2002, and 2000 *Waste Management Industry Survey*, the 2006 *Households and the Environment Survey* (HES), conducted as part of the Canadian Environmental Sustainability Indicators project, and the 1994 *Households and the Environment Survey*.

The *Waste Management Survey* publishes data on the tonnage of waste disposed and diverted, by source.

Residential recyclable materials include solid non-hazardous materials produced in residences including materials that are picked up by the municipality (either using its own staff or through contracting firms) and materials from residential sources that are self-hauled to depots, transfer stations and disposal facilities. Data do not cover any wastes that are managed on-site by the waste generator.

For the *Households and the Environment Survey*, access to a recycling program indicates that households reported that they had access to a municipally- or privately-operated collection system, including curb-side pick-up or drop-off centres or depots.

How much do we recycle?

In 2004, Canadian households produced 13.4 million tonnes of waste. Nearly three-quarters (73%) of this waste was sent for disposal, according to Statistics Canada's 2004 *Waste Management Survey*, while the rest was recycled.[3]

Residential waste production increased by 2.1 million tonnes (19%) between 2000 and 2004. While some of the increase was due to a rise in population, most was a result of increases in the amount of waste generated per person. Canadians produced 366 kg per person of residential waste in 2000; by 2004, this figure had increased to 418 kg per person. By way of comparison, residential waste production by our neighbours in the United States was 440 kg per person in 2001.[4]

Recycling is becoming a more popular method of dealing with trash. Two-thirds of the increase in waste generation between 2000 and 2004 was offset by increased recycling, while the other third was disposed of in landfills and incinerators. Households

1. Environment Canada, 2003, *The 4 R's – Reduce, Reuse, Recycle, and Recover,* www.atl.ec.gc.ca/udo/reuse.html (accessed March 28, 2007).
2. Environment Canada, 2006, *National Inventory Report, Greenhouse Gas Sources and Sinks in Canada, 1990 to 2004*, Gatineau.
3. Statistics Canada, 2007, *Waste Management Industry Survey: Business and Government Sectors,* Statistics Canada Catalogue no. 16F0023XIE, Ottawa.
4. Organisation for Economic Co-operation and Development, 2005, *OECD Environmental Data Compendium 2004,* Paris.

Table 1
Canadians recycling more and more, 2000 to 2004

Province/Territory	Residential recycling			Residential recycling per capita			Residential recycling rate[1]		
	2000	2002	2004	2000	2002	2004	2000	2002	2004
	tonnes			kilograms			percent		
Newfoundland and Labrador	x	25,993	x	x	50	x	x	10.7	x
Prince Edward Island	x	x	x	x	x	x	x	x	x
Nova Scotia	75,165	122,707	147,317	80	131	157	30.5	42.0	45.1
New Brunswick	44,697	57,192	61,519	60	76	82	18.4	21.9	22.8
Quebec[2]	496,000	595,000	697,000	67	80	92	15.6	17.1	19.4
Ontario	872,859	1,029,042	1,504,678	75	85	121	20.8	23.0	29.9
Manitoba	50,416	79,923	80,326	44	69	69	10.0	16.2	15.1
Saskatchewan	33,797	39,345	53,445	34	40	54	11.0	12.4	15.2
Alberta	169,565	320,536	361,926	56	103	113	17.0	27.0	27.7
British Columbia	402,209	496,751	606,603	100	121	144	31.1	34.8	37.7
Yukon Territory, Northwest Territories and Nunavut	x	x	x	x	x	x	x	x	x
Canada	**2,173,236**	**2,789,669**	**3,582,301**	**71**	**89**	**112**	**19.3**	**22.8**	**26.8**

1. The residential recycling rate refers to the amount of residential waste diverted as a proportion of waste generated.
2. Waste diversion data are derived from a survey administered by RECYC-QUÉBEC.
Source: Environment Accounts and Statistics Division, Waste Management Industry Survey: Business and Government Sector, 2004.

across the country sent nearly 3.6 million tonnes of materials for recycling in 2004, an increase of 65% compared to 2000 (Table 1).

The average Canadian recycled 112 kg of material in 2004 compared to 71 kg in 2000. The residential recycling rate—the amount diverted as a proportion of waste generated—also increased between 2000 and 2004, with 27% of residential waste going for recycling in 2004 compared to 19% in 2000.

While on the rise overall, recycling varies quite widely from province to province. Ontario and Quebec recycle the largest quantities of materials, but the amounts of material recycled per person and the recycling rates are higher in Nova Scotia and British Columbia.

By weight, organics comprise the largest portion, accounting for 22% of recycled materials from all sources,[5] followed by newsprint (17%) and cardboard and boxboard (17%). Materials such as yard and food waste, paper, cardboard, metals, plastics and other materials can all be composted or recycled, although the availability of recycling programs differs across the country.

Household access to and use of recycling programs

While it is useful to look at recycling in terms of the amount of residential waste recycled by province, it is also useful to examine the availability of recycling programs to households across the country. Different levels of access to recycling programs between provinces could help explain the differences in provincial recycling rates.

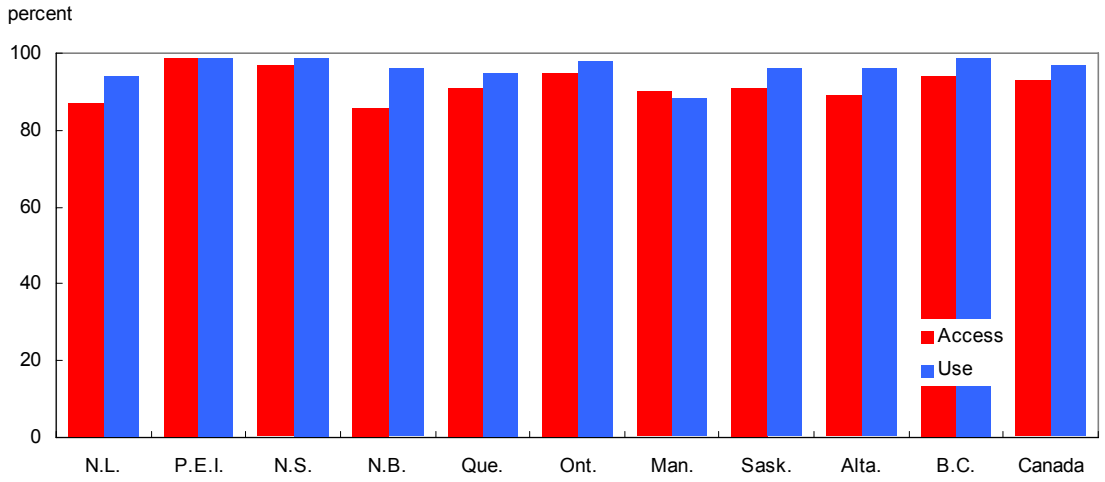
Data from Statistics Canada's 2006 *Households and the Environment Survey* (HES) show that, overall, Canadians had high access to glass, paper, plastic and metals recycling programs.[6] Ninety-three percent of the nation's households had access to at least one form of recycling program. Of these households, 97% made use of at least one recycling program (Chart 1).

There was some variability in access to and use of recycling programs from province to province (Table 2). Prince Edward Island led the pack for both access and utilisation: 99% of households reported having access to and making use of at least one recycling program.

5. Information on waste recycled by type of material is unavailable at the residential level. Data are available for all sources including residential, industrial, commercial and institutional (ICI) and construction and demolition (C&D) sources.

6. Statistics Canada, 2007, *Households and the Environment, 2006,* Catalogue no. 11-526-XIE, Ottawa.

Chart 1
Access to[1] and use of[2] any recycling program, by province, 2006



1. As a percentage of all households.
2. As a percentage of those households that reported having access to a recycling program.
Source: Environment Accounts and Statistics Division, Households and the Environment Survey, 2006.

Table 2
Households that had access to and used recycling programs, by province, 2006

	Glass		Paper		Plastic		Metal cans		Any recyclable material[3]	
	Access to program[1]	Used program[2]	Access to program[1]	Used program[2]	Access to program[1]	Used program[2]	Access to program[1]	Used program[2]	Access to any program[1]	Used any program[2]
	percent									
Newfoundland and Labrador	75	92	35	74	72	92	61	90	87	94
Prince Edward Island	96	98	98	96	99	99	99	99	99	99
Nova Scotia	94	97	93	96	93	98	93	97	97	99
New Brunswick	69	92	62	83	69	93	66	93	86	96
Quebec	86	93	89	94	87	94	85	93	91	95
Ontario	93	97	93	97	92	97	91	97	95	98
Manitoba	85	84	87	86	84	86	83	87	90	88
Saskatchewan	81	92	81	83	77	91	74	86	91	96
Alberta	84	92	79	88	77	89	77	87	89	96
British Columbia	89	96	91	96	88	96	88	95	94	99
Canada	**88**	**94**	**88**	**94**	**87**	**95**	**86**	**94**	**93**	**97**

1. As a percentage of all households.
2. As a percentage of those households that reported having access to a recycling program.
3. Includes any recyclable materials such as glass, paper, plastics, or metal cans.
Source: Environment Accounts and Statistics Division, Households and the Environment Survey, 2006.

Nova Scotia and Ontario rounded out the top three for both access to and use of recycling programs for glass, paper, plastics and metal cans. Overall, 97% of Nova Scotia households and 95% of Ontario households had access to at least one recycling program. Usage of one or more programs was also high in those parts of the country.

Looking at provinces that lagged in terms of access to recycling programs, Alberta, New Brunswick and Newfoundland and Labrador provided below-median access to recycling programs. However, the large majority of households with access to recycling used at least one recycling program in these provinces.

Manitoba was below the median for use of all recycling programs. While 90% of households in the province had access to recycling programs, only 88% of these households recycled, making Manitobans least likely to recycle.

In general, provinces offered fairly comprehensive access to recycling programs for different materials. Eighty-eight percent of households had access to glass and paper recycling programs, 87% had access to plastic recycling, and 86% had access to recycling for metal cans.

The notable exception is Newfoundland and Labrador, where only 35% of households had access to paper recycling, 61% had access to metal recycling, and 72% and 75% had access to plastic and glass recycling.

Households were almost equally likely to use recycling programs for all recyclable materials, as long as they had access. The exceptions were for paper recycling in Newfoundland and Labrador and New Brunswick. Use of paper recycling in Newfoundland and Labrador was only 74%, while it was 90% and above for the other recyclable materials. Only 83% of New Brunswick households recycled their paper products, while it was 92% and above for glass, metals and plastics.

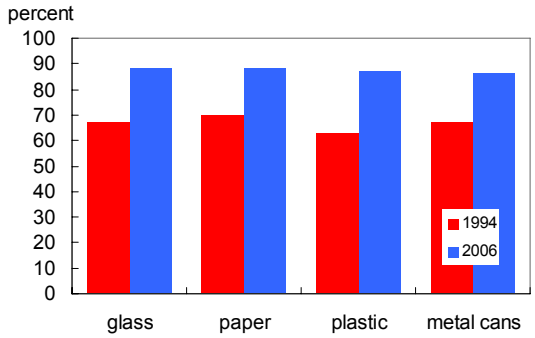
Has access and use improved from 1994 to 2006?

Overall, Canadian access to glass, paper, plastic and metal recycling programs all improved between 1994 and 2006 (Chart 2). This was also true in each province except for New Brunswick, where access to glass and metal recycling declined slightly.

Use of recycling programs by Canadian households increased between 1994 and 2006 for all recyclable materials, at both the national and provincial level (Chart 3). Canadians may have become more aware of the importance of recycling, or there may have been improvements in municipal collection programs and methods.

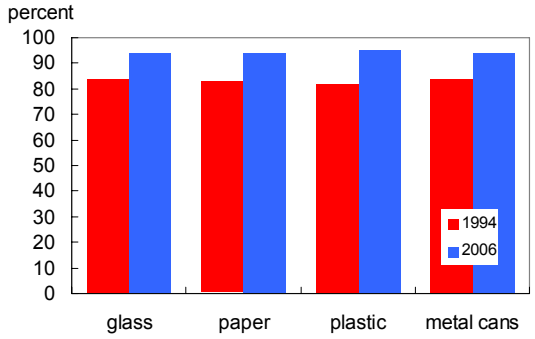
Of the provinces, Prince Edward Island showed the greatest improvement between 1994 and 2006. By 2006, Prince Edward Island had displaced Ontario, the front runner in 1994, for first place in access and use for all but one recycling program. In 1994, in Prince Edward Island there was less than 21% access to recycling programs for each recyclable material, and household use of each recycling program was below 70%. In 2006, Islanders' access and use for each recycling program rose to above 95%.

Chart 2
Percentage of Canadian households with access to recycling programs, 1994 and 2006



Source: Environment Accounts and Statistics Division, Households and the Environment Survey, 1994 and 2006.

Chart 3
Percentage of Canadian households with access to recycling programs that used them, 1994 and 2006



Source: Environment Accounts and Statistics Division, Households and the Environment Survey, 1994 and 2006.

Factors affecting household recycling

Having access to recycling programs is one of the key factors that determines whether Canadians recycle. Although access varies by province and municipality, results of the 2006 HES show that it also differs according to social and economic characteristics.

Many factors influence the willingness to recycle, including social norms, promotional and information

campaigns, and barriers to recycling such as collection method, distance to drop-off location and required sorting of materials.[7]

Previous studies have linked income, education and recycling behaviour.[8] Another study using data from the 1991 *Household Facilities and Equipment Survey* showed that education, income, and apartment dwelling were significant predictors of access to recycling programs, but that these factors played a lesser role in determining the actual use of recycling programs.[9]

Results of the 2006 HES show that access to recycling programs depends on dwelling type. Differences in access are also apparent based on income and education, important indicators that can influence whether households own or rent, and whether they live in detached homes or apartments. On average, Canadians with a higher level of education also have higher incomes.[10] At the same time, household income affects dwelling type and size.[11]

Access to recycling was highest for those living in single detached homes, with 96% having access to a recycling program. Households living in mobile homes and apartment buildings were less likely to have access to recycling programs. Ninety percent of households in mobile homes had access, compared to 85% in low-rise apartments.

Households with the highest levels of income and education were more likely to have access to recycling services. On average, 98% of households with an income greater than $80,000 had access to recycling compared to 89% of households with an income less than $40,000. As well, 95% of households with at least one university graduate had access to recycling programs, while only 87% of households where no one had completed high school had access.

The 2006 HES showed that the vast majority of households with access to recycling do make use of these programs. Despite their impact on access to recycling, factors such as household income, education level and dwelling type had little impact on the use of recycling programs.

Given access to recycling, 97% of households took advantage of at least one of these programs, with no significant difference based on different levels of household income.[12] Education only had a slight impact on recycling behaviour.

Given access to recycling programs, the type of dwelling also had little impact on the likelihood households recycled—97% of households in single detached homes recycled compared to 95% in low-rise apartments.

7. Wesley, P. Schultz, Stuart Oskamp and Tina Mainieri, 1995, "Who recycles and when? A review of personal and situational factors," *Journal of Environmental Psychology,* Vol. 15. p. 105-121.
8. Wesley, P. Schultz, Stuart Oskamp and Tina Mainieri, "Who recycles and when?".
9. Ida E. Berger, 1997, "The demographics of recycling and the structure of environmental behaviour," *Environment and Behavior,* Vol. 29, no. 4, July, p. 515-541.
10. Statistics Canada, 2006, *Report of the Pan-Canadian Education Indicators Program 2005,* Statistics Canada Catalogue no. 81-582-XIE, Ottawa.
11. Statistics Canada, 2006, "Measuring housing affordability," *Perspectives on Labour and Income,* Statistics Canada Catalogue no. 75-001-XIE, November 2006, Vol. 7, no. 11, Ottawa.
12. At the 95% confidence level, there was no significant difference in recycling behaviour for different household income groups.

Canada's growing population and its environmental influence, 1956 to 2006

Nancy Hofmann

Introduction

Humanity's impact on the environment is complex—affluence and technology affect how we interact with our natural environment.[1,2] Human population growth—the focus of this analysis, is another important factor. The more people there are, the larger the potential impact on the environment. In this analysis, we look at the influence of population on the environment. Future articles in this bulletin will examine the implications of affluence and technology in more detail.

This analysis presents data on Canadian population growth from 1956 to 2006. To illustrate how our growing population has an influence on the environment, the paper also looks at the number of road motor vehicles registered over time, one example of how population growth, combined with growing affluence and technological change have influenced our environment.

Canada's population continues to grow…

In 2006, approximately 6.5 billion people lived on the planet, up considerably from the 2.8 billion in 1956 (+130%). At a national level, Canada's population growth has risen at a slower pace than the global average. Between 1956 and 2006, Canada's population almost doubled from 16 million to 31.6 million people (Chart 1).

The highest growth rates occurred in the late 1950s and early 1960s (Chart 2). During the baby boom years of the fifties and sixties, increased fertility, lower death rates and increased immigration levels helped to increase Canada's population growth.[3] The post-baby boom decline in fertility and the increase in deaths due to population aging have both played a role in slowing the pace of population growth substantially.[4]

Most of the population increase in the last half-century occurred in Ontario, but rates of growth were strongest in parts of northern and western Canada

Over the last fifty years, population growth varied widely from province to province. Ontario experienced the largest absolute growth between 1956 and 2006, with the population rising by approximately 6.8 million people, almost 45% of the gain for the entire country. With 2.9 million more people in 2006 than in 1956, Quebec ranked second overall in terms of absolute gains. British Columbia and Alberta followed with increases of 2.7 million and 2.2 million people respectively.

In terms of rates of growth, the three territories, followed by British Columbia and Alberta had the largest increases (Chart 3). The population in the north more than tripled over the last half-century and

1. In the early 1970s Ehrlich and Holdren devised a simple equation, in dialogue with Commoner, identifying three factors that created environmental impact. Thus, impact (I) was expressed as the product of population (P), affluence (A), and technology (T). (See Chertow, 2001).
2. Marion Chertow, 2001, "The IPAT Equation and Its Variants: Changing Views of Technology and Environmental Impact," *Journal of Industrial Ecology,* Vol. 4, p. 13-29. mitpress.mit.edu/journals/pdf/jiec_4_4_13_0.pdf (accessed May 15, 2007).
3. Statistics Canada, 2007, *Portrait of the Canadian Population in 2006, 2006 Census,* Statistics Canada Catalogue no. 97-550-XIE. www12.statcan.ca/english/census06/analysis/popdwell/pdf/97-550-XIE2006001.pdf (accessed May 14, 2007).
4. Statistics Canada, *Portrait of the Canadian Population in 2006*.

Chart 1
Population in Canada, 1956 to 2006

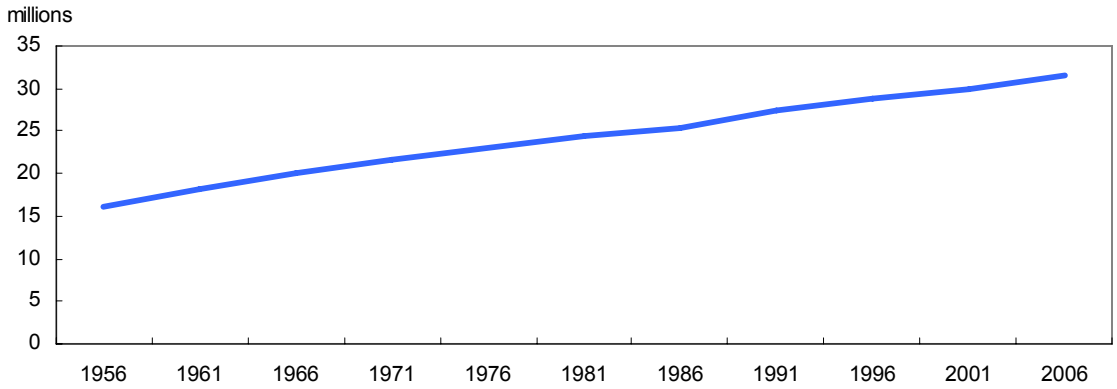
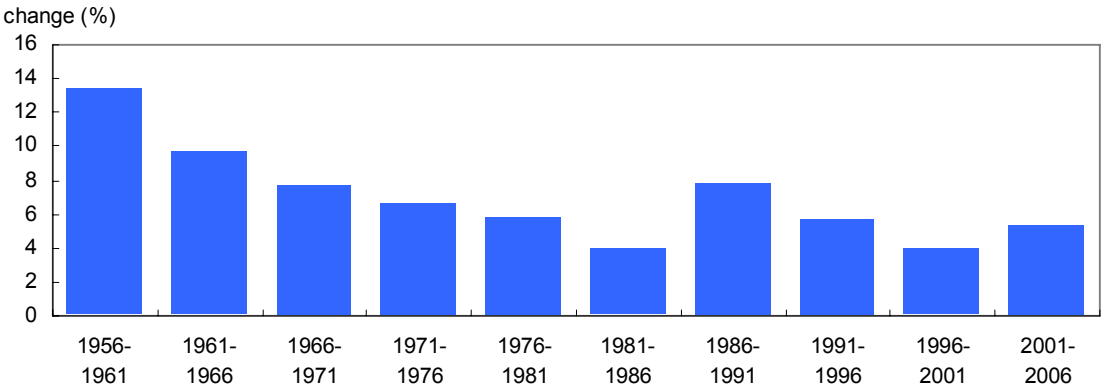


Chart 2
Canadian population growth rates, 5-year periods, 1956 to 2006



Source: Statistics Canada, 2007, *Portrait of the Canadian Population in 2006, 2006 Census,* Statistics Canada Catalogue no. 97-550-XIE, www12.statcan.ca/english/census06/analysis/popdwell/pdf/97-550-XIE2006001.pdf (accessed May 14, 2007).

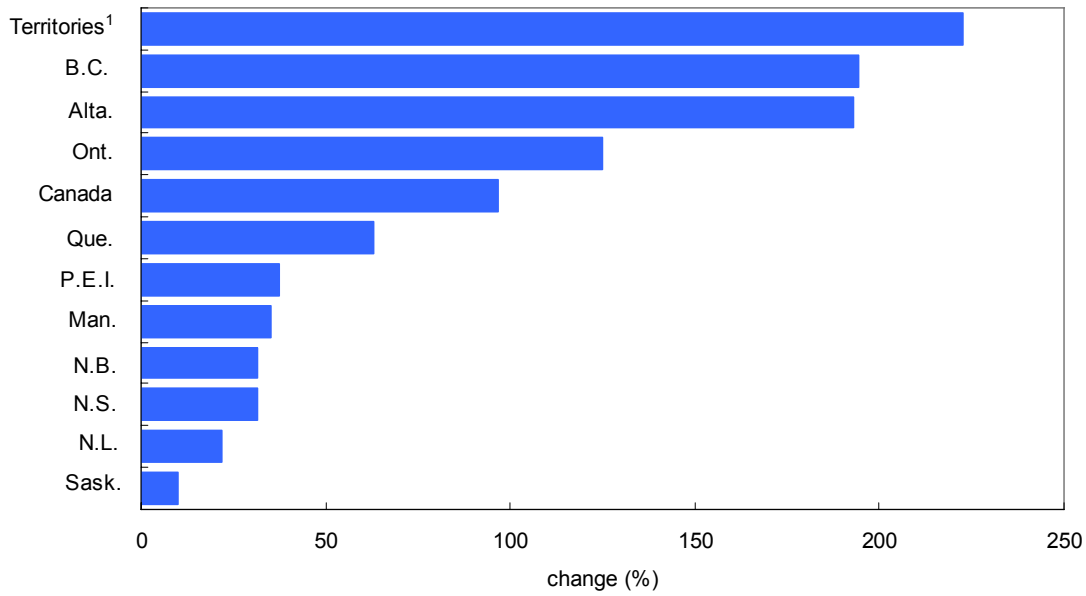
there were substantial increases in British Columbia and Alberta as well.

The growth rate was lowest in Saskatchewan, where population rose by only 10%. Other provinces with relatively low rates included Newfoundland and Labrador, Nova Scotia and New Brunswick. In recent years, these four provinces experienced declines in population. For example, in Newfoundland and Labrador, the population dropped by 7% between 1996 and 2001—the largest provincial five-year decline.

The population and its influence on the environment

Every day, Canadians engage in activities that place pressures on the environment. Some environmental impacts are more proportional to population growth while others are less so. For instance, drinking water consumption typically rises proportionally with population. However, water use for residential, commercial and industrial purposes can increase at higher rates than population as a result of increased economic activity.

Chart 3
Population growth rates, Canada, provinces and territories, 1956 to 2006



1. Territories include the Yukon Territory, Northwest Territories and Nunavut.
Source: Statistics Canada, *Portrait of the Canadian Population in 2006.*

Transportation's impact on the environment is not strictly proportional to population, but also affected by affluence and technology. Below is an illustration of the influence of population growth on the use of road motor vehicles, such as cars, trucks, minivans, sport utility vehicles, buses, and motorcycles.

Effects of population growth—more people mean more road vehicles

Driving has many environmental impacts, including air pollution, greenhouse gas emissions, the use of raw materials and energy to manufacture cars, and the loss of wildlife habitat to develop road networks. With increases in Canada's population, there has been an expansion in the number of vehicles on the road. This, in turn, has increased pressure on the environment.

Between 1956 and 2006 the number of vehicles in Canada increased by 15.8 million, while the population grew by about 15.5 million people (Chart 4). In terms of growth rates, the number of motor vehicles increased by 370%, well in excess of population growth (97%).

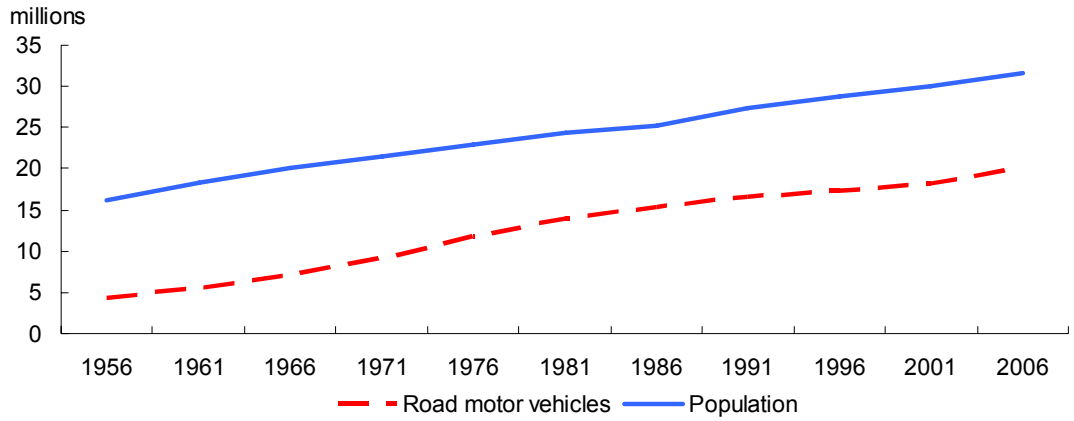
The national growth in cars and trucks outpaced population growth particularly during the late fifties, sixties and early seventies, when the 5-year growth rates of vehicle registrations were at least 15 percentage points higher than the growth rates for population (Chart 5). In recent years, there has been more similar growth in both population and vehicle registrations.

Ontario had the largest fifty-year growth in both population and vehicles. The southern portion of the province is also well-known for its transportation-related air pollution problems. For instance, between 1990 and 2004, southern Ontario had the highest concentrations and fastest rise of ground-level ozone[5] in the country.[6]

However, in terms of growth rates, Ontario's vehicle registrations increased slower than the national rate, but population grew faster than the national rate (Chart 6). The fastest growth rates in both population and vehicles occurred in the territories, followed by Alberta.

5. Human activities contribute to the formation of ground-level ozone by increasing the concentrations of nitrogen oxides and volatile organic compounds. Road motor vehicles are a key source of these two pollutants.
6. Environment Canada, Statistics Canada and Health Canada, 2006, *Canadian Environmental Sustainability Indicators 2006,* Statistics Canada Catalogue no.16-251-XWE, Ottawa.

Chart 4
Population and road motor vehicle registration growth, Canada, 1956 to 2006



Note: In 1999, Statistics Canada changed the data collection methodology for road motor vehicles. Some of the difference in the vehicle trend after 1999 may be attributable to this methodological change.
Sources: Statistics Canada, *Portrait of the Canadian Population in 2006.*
Statistics Canada, n.d., CANSIM Table 405-0004.
Statistics Canada, Environment Accounts and Statistics Division.

From the postwar era onwards, vehicle ownership rates were spurred on by relatively low prices for vehicles and gasoline, and improved road systems such as expressways. Technological advances including efficiencies in manufacturing processes, including mechanized assembly lines, assisted in reducing the cost of automobiles. Socio-economic factors such as higher household incomes, smaller-sized households, and more women in the workforce meant that more Canadian families could afford to buy and operate vehicles.[7]

The rate of growth of vehicle registrations began to decline in the latter half of the 1970s (Chart 5). One possible reason for this was that the number of vehicles per household was approaching saturation—there are only so many vehicles that Canadian households need or want. For instance, in 1956, there were just under four persons per vehicle in Canada. By 1976, the number of persons per vehicle declined to under two, and has remained between 1.5 and 2 persons per vehicle ever since.

More specifically, in 2006, 83% of Canadian households owned or leased a motor vehicle. Almost half of households with cars or trucks reported having one, whereas 39% reported having two and the remaining 12% reported having 3 or more.[8] Another possible reason for the slower growth in vehicle registration was the rising costs related to purchasing and operating a vehicle.

A future article will discuss how technology can help offset environmental impacts. Advances in technology related to vehicles and fuels have led to decreased emissions from road transportation. Between 1990 and 2005, nitrogen oxides emitted from road vehicles decreased 39%, while volatile organic compounds (VOC) decreased 60%.[9] However, even with technological improvements, from 1990 to 2005, greenhouse gas emissions from road transportation increased 33% to 135 Mt of CO_2 equivalent.[10]

7. Statistics Canada, 2006, *Human Activity and the Environment: Annual Statistics,* Statistics Canada Catalogue no. 16-201-XIE, www.statcan.ca/english/freepub/16-201-XIE/16-201-XIE2006000.pdf (accessed April 23, 2006).

8. Statistics Canada, 2007, *Households and the Environment, 2006,* Catalogue no. 11-526-XIE, Ottawa.

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Chart 5
Population and road motor vehicle registration growth rates, Canada, 5-year percentage change, 1956 to 2006

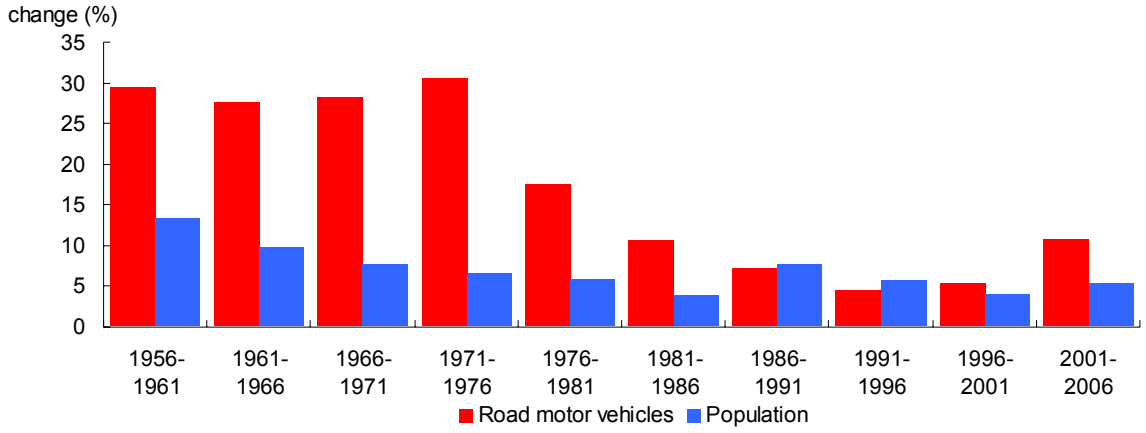
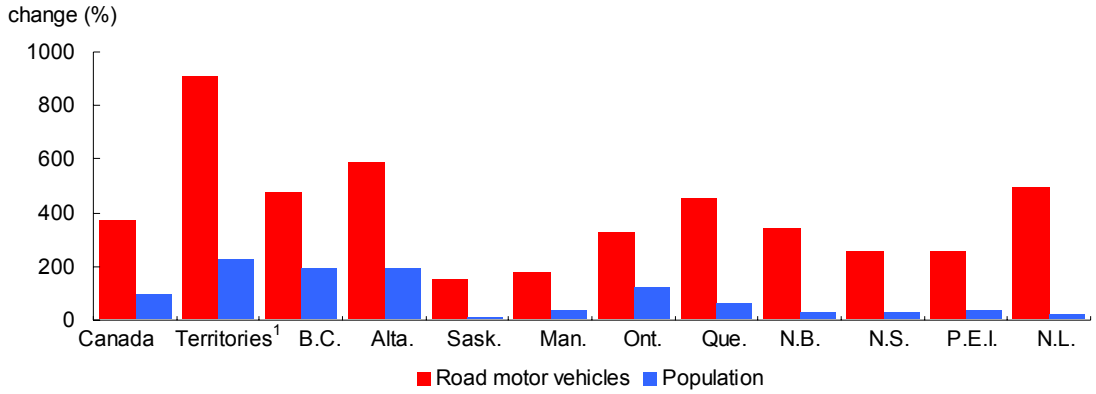


Chart 6
Population and road motor vehicle registration growth rates, Canada and provinces/territories, 1956 to 2006



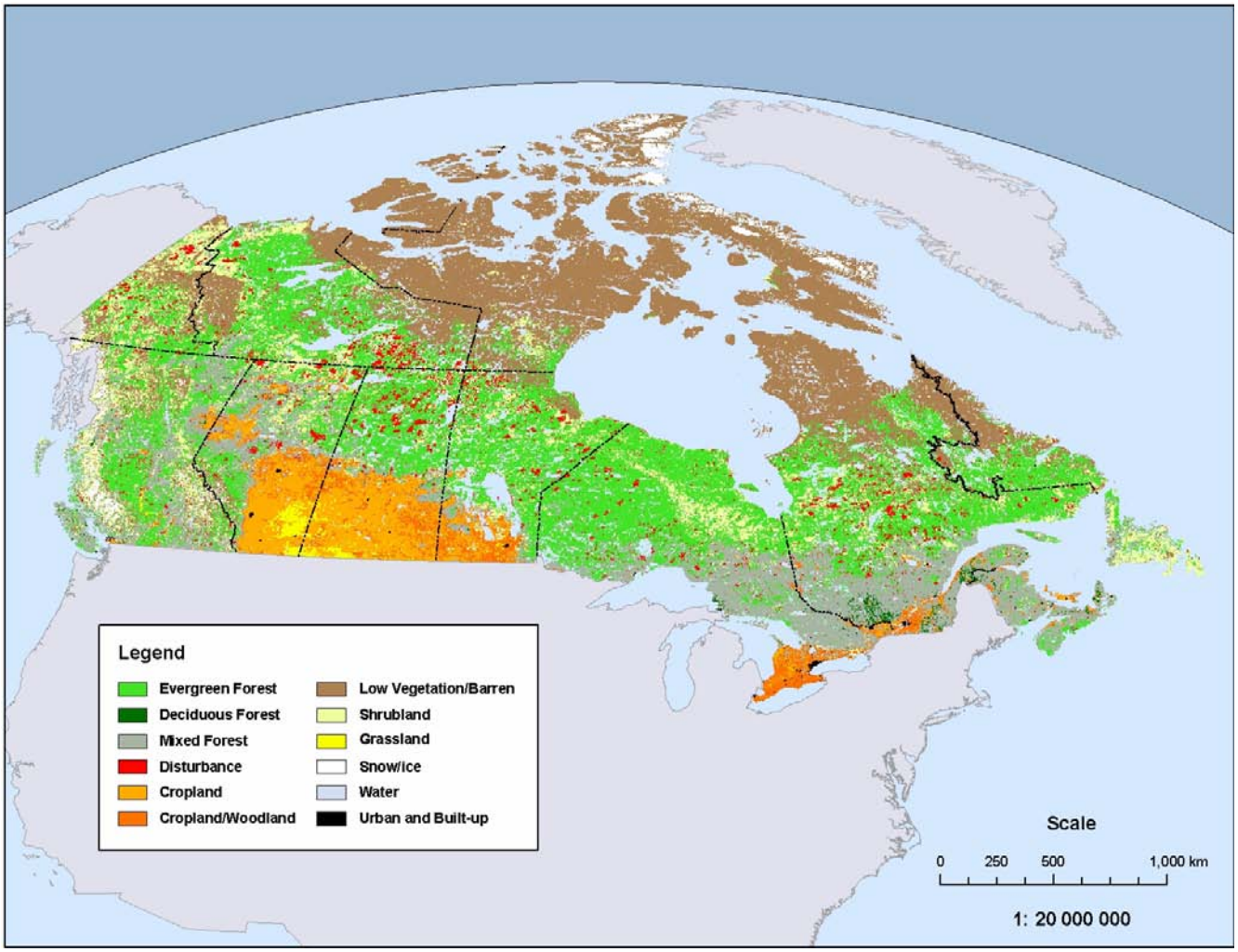
1. Territories includes Nunavut, Yukon Territory and the Northwest Territories.
Note: In 1999, Statistics Canada changed the data collection methodology for road motor vehicles. Some of the difference in the vehicle trend after 1999 may be attributable to this methodological change.
Sources: Statistics Canada, *Portrait of the Canadian Population in 2006.*
Statistics Canada, n.d., CANSIM Table 405-0004.
Statistics Canada, Environment Accounts and Statistics Division.

Conclusion

Over the last fifty years, Canada's population has doubled. This increase in population has had environmental consequences. However, numerous other factors also influence Canadians' impact on the environment, which makes determining the influence of population growth more challenging. Population growth is an important piece of the puzzle for understanding our impact on the environment; however, it must be considered in conjunction with the other pieces.

Land cover map of Canada, 2005

Hugo Larocque and Nancy Hofmann



Sources: Latifovic, Rasim and Darren Pouliot, 2005, "Multi-temporal land cover mapping for Canada: Methodology and Products," *Canadian Journal of Remote Sensing,* Vol. 31, no. 5, p. 347-363.
Natural Resources Canada, Canada Centre for Remote Sensing.
Statistics Canada, Environment Accounts and Statistics Division.

Land cover represents the surface properties of the land and describes an integral component of the environment in a particular area. It is an important factor in many environmental processes and conditions such as soil erosion, water quality, wildlife habitat and carbon sequestration.

Of Canada's vast 10 million square kilometres of land (see map), 37% is covered by some type of forest, including evergreen, deciduous and mixed forests. Approximately 31% of our land mass is comprised of snow, ice, barren land or low vegetation areas (such as lichen). Another 17% of the country is covered by shrubland, cropland, cropland/woodland and grassland. Water occupies about 12% of the nation's land mass. The remaining area is covered by disturbed (e.g. predominately burned areas) and urban built-up land. Although urban built-up areas are home to about eighty percent of Canadians, a very small proportion of Canada's total land area (1%) is devoted to it.

The data were derived from the Advanced Very High Resolution Radiometer (AVHRR) sensor that is carried by the United States National Oceanic and Atmospheric Administration (NOAA) series of satellites.

Environment and sustainable development indicators

Table 1
Selected environmental statistics

	2001	2002	2003	2004	2005	2006
Population						
Population (number)[1]	31,021,251	31,372,587	31,676,077	31,989,454	32,299,496	32,623,490
percentage change	1.1	1.1	1.0	1.0	1.0	1.0
aged 65 and over (percent of total)	12.6	12.7	12.8	13.0	13.1	13.2
urban (percent of total)	79.7	..	..	..	..	80.2
density (per square kilometre)	3.4	3.5	3.5	3.5	3.6	3.6
Economy						
Gross Domestic Product (million chained 2002 dollars)	1,120,146	1,152,905	1,174,592	1,210,656	1,247,780	1,282,204
percentage change	1.8	2.9	1.9	3.1	3.1	2.8
per capita (chained 2002 dollars)	36,109	36,749	37,081	37,845	38,632	39,303
Consumer Price Index (1992 = 100)	116.4	119.0	122.3	124.6	127.3	129.9
Unemployment rate (percent)	7.2	7.7	7.6	7.2	6.8	6.3
Social						
Average household spending (current dollars)						
water and sewage	195	190	209	209	217	..
electricity	973	1,019	1,056	1,065	1,099	..
food	6,415	6,692	6,787	6,910	7,135	..
Personal expenditure on consumer goods and services (million chained 2002 dollars)	632,781	655,722	675,443	698,138	724,942	755,204
Residential waste						
production per capita (kilograms)	..	390	..	418	..	..
disposal (tonnes)	..	9,447,531	..	9,792,787	..	..
disposal per capita (kilograms)	..	301	..	306	..	..
diversion (tonnes)	..	2,789,669	..	3,582,301	..	..
diversion per capita (kilograms)	..	89	..	112	..	..
diversion rate (percent of waste production)	..	23	..	27	..	..
Asthma (percent of population age 12 and over)	..	..	8.4	..	8.3	..
Energy						
Primary energy availability (terajoules)	10,950,393	11,163,501	11,478,526	11,527,500	11,310,201	..
Primary and secondary energy (terajoules)						
export	9,305,984	9,491,341	9,444,883	9,810,695	9,641,137	..
residential consumption	1,239,970	1,286,677	1,338,166	1,313,015	1,296,130	..
Established reserve, closing stock[2]						
crude bitumen (million cubic metres)	1,830	1,840	1,720	1,660	1,620	..
crude oil (million cubic metres)	644.7	606.1	590.0	603.8	752.3	..
natural gas (million cubic metres)	1,590.8	1,569.7	1,504.1	1,532.2	1,621.2	..
Recoverable reserves, closing stock[2]						
coal (million tonnes)	4,555.4	4,485.3	4,423.1	4,357.2	..	..
uranium (tonnes)	452,000	439,000	429,000	444,000	..	..

Table 1
Selected environmental statistics (continued)

	2001	2002	2003	2004	2005	2006
Total electricity generation (megawatt hours)	565,757,322	578,728,900	564,218,465	571,291,905	597,248,219	585,014,239
hydro (percent of total)	58.0	59.8	59.0	58.7	60.0	60.0
nuclear (percent of total)	12.8	12.3	12.5	14.9	14.5	15.8
thermal-electric (percent of total)	29.2	27.9	28.5	26.4	25.4	24.2
Research and development expenditures						
private sector R&D in alternative energy (million constant 1997 dollars)	228	196	204	..	..	..
Environment and Natural Resources						
GHG emissions (megatonnes of carbon dioxide equivalent)	714	720	745	747	747	..
GHG emissions by final demand (megatonnes of carbon dioxide equivalent)						
exports	278	264	..	..	..	..
personal consumption	200	210	..	..	..	..
Annual temperature departures,[3] Canada (degrees Celsius)	1.7	0.6	1.1	0.1	1.7	2.4
Value of selected natural resources (million current dollars)						
land	926,150	1,013,754	1,095,419	1,226,497	1,352,999	1,493,300
timber	300,445	303,278	297,474	302,358	281,125[p]	263,192[p]
subsoil resource stocks	396,760	375,276	465,083	558,023	817,416[p]	818,926[p]
Average farm pesticide expenditures (current dollars)	6,312	6,228	7,232	7,602	7,606	..
Air quality[4]						
ozone (population weighted, parts per billion)	40	41	40	35	..	..
$PM_{2.5}$ (population weighted, micrograms per cubic metre)	9	10	9	8	..	..

1. Population data is based on the Estimates of Population program, except for data on urban population, which is based on the Census of Population.

2. The size of the reserve at year-end.

3. Annual departures from the 1951-1980 temperature normals.

4. Ground level ozone and fine particulate matter ($PM_{2.5}$) are two key components of smog that have been linked to health impacts ranging from minor respiratory problems to hospitalizations and premature death. There are no established thresholds below which these pollutants are safe and do not pose a risk to human health.

Sources: Statistics Canada, n.d., CANSIM tables 051-0001, 153-0037, 380-0017, 326-0002, 282-0002, 203-0003, 203-0002, 105-0400, 128-0002, 128-0009, 153-0012, 153-0013, 153-0014, 153-0017, 153-0018, 153-0019, 127-0001, 378-0005, and 002-0044.
Chiru, Radu, 2006, "Research and Development for New Energy Technologies in the Private Sector, *Analysis in Brief,* Catalogue no. 11-621-MWE2006050, Ottawa.
Environment Canada, 2007, *Canada's 2005 Greenhouse Gas Inventory: A Summary of Trends,* www.ec.gc.ca/pdb/ghg/inventory_e.cfm (accessed June 20, 2007).
Environment Canada, 2006, *Climate Trends and Variations Bulletin,* www.msc-smc.ec.gc.ca/ccrm/bulletin/annual06/national_e.cfm (accessed June 20, 2007).
Statistics Canada, *Waste Management Industry Survey: Business and Government Sectors,* Catalogue no. 16F0023-XIE, Ottawa.
Statistics Canada, Environment Accounts and Statistics Division, Material and Energy Flow Accounts.

Updates

New releases

Households and the Environment Survey, 2006:

The Household Environment Survey (HES) measures the environmental practices and behaviours of Canadian households that relate to the condition of our air, water and soils.

Released July 11, 2007

Waste Management Industry Survey: Business and Government Sector, 2004:

Information on the physical quantities of non-hazardous and hazardous waste collected, disposed of and recycled was gathered from these surveys. Information on the employment and financial characteristics of businesses and local governments involved in the supply of these services is also reported.

Released February 5, 2007

Upcoming releases

Environmental Protection Expenditures, 2004:

To be released shortly

New developments

Industrial Water Use Survey, 2005:

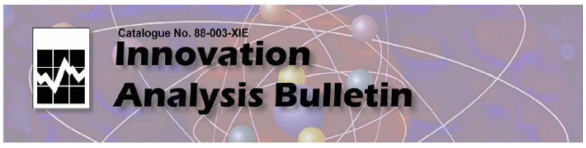
Andy Shinnan

This new survey addresses a lack of information available on water use by industry. Conducted on an occasional basis from 1972 to 1996 by Statistics Canada on behalf of Environment Canada, the survey has been re-instituted with funding from the Canadian Environmental Sustainability Indicators project. The survey was completely redesigned in light of the length of time since it was last conducted. In addition, the new survey will be a Statistics Canada survey from start to finish, whereas in the past Environment Canada conducted all processing, analysis and dissemination following initial data collection by Statistics Canada.

The survey will provide information about quantities of water consumed and information on costs, water sources, water treatment and discharges of water. Separate mailout-mailback questionnaires are geared towards the manufacturing, mining and thermal-electric power generation industries. These questionnaires were mailed to respondents in June 2006 and collection continued through January 2007. Since January, the data has been put through various edits and the results put through an imputation system to account for missing data. Final estimates were calculated and confidentiality checks performed in May and June, 2007. The results will be released in July.

A biennial survey, questionnaires for the oil and gas sector and hydro-electric power generation may be added in the future. Collection of 2007 water use data is scheduled to begin in April 2008.

You may also be interested in:



Innovation Analysis Bulletin

The Innovation Analysis Bulletin (IAB) provides statistical and analytical updates on government science and technology activities, industrial research and development, intellectual property commercialization, advanced technology and innovation, biotechnology, information society, telecommunications and broadcasting, and electronic commerce.

Statistics Canada Catalogue no. 88-003-XIE/XWE/XPE.