Catalogue no.16-002-X

# EnviroStats

Summer 2008 Vol. 2, no. 2

## In this issue:



### Latest indicators

| | | | |
|---|---|---|---|
| Population<br>2006 to 2007<br>Percentage change | 1.0% | Particulate matter ($PM_{2.5}$)<br>2000 to 2005 | No significant trend |
| Gross domestic product<br>March 2008<br>Percentage change | -0.2% | Ground-level ozone<br>1990 to 2005<br>Median percent change per year | 0.8% |
| Greenhouse gas emissions<br>2005 to 2006<br>Percentage change | -1.9% | Natural resource wealth<br>2006 to 2007<br>Percentage change | 7.1% |

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**EnviroStats**

Summer 2008 Vol. 2, no.2

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**Editor-in-Chief**

Michael Bordt

**Editor**

Jennie Wang

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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 |

# Against the flow: Which households drink bottled water?

Neil Rothwell, Environmental Accounts and Statistics Division, now with Agriculture Division

Canadians are drinking more bottled water than in the past. The International Council of Bottled Water Associations estimates that in 2000, 820 million litres of bottled water were produced for Canadian consumption. By 2003 that figure had risen to almost 1.5 billion litres.[1] A household might choose to drink bottled water in the home as opposed to water from the tap for several reasons including increased convenience, taste preferences, concerns over the tap water quality or ongoing marketing by the bottled water industry.

Bottled water has raised considerable controversy both in Canada and abroad and has attracted a good deal of media attention (see Text Box: Bottled Water). Overall, almost 3 in 10 households reported drinking bottled water in the home in 2006. This study finds that higher-income households were more likely to drink bottled water, but that households living in apartments, households with seniors and households with at least one member with a university education were less likely to drink bottled water than other groups.

## Income, education and bottled water drinking: A complex relationship

There is a close association between those with high income and those with a university education and they normally share many characteristics. However, drinking bottled water is not one of them.

In general, households with higher income were more likely to drink bottled water (Chart 1). Close to a quarter of households with a total household income of $40,000 or less drank bottled water in the home, with the proportion increasing to a third among households earning more than $91,000.

For low-income households, bottled water may be a relatively expensive purchase. From this perspective, bottled water is a luxury item that affluent households are more able to afford.

### What you should know about this study

This article uses data from the 2006 Households and the Environment Survey (HES). The 2006 HES was conducted by Statistics Canada to measure the actions of Canadian households with respect to a wide range of environmental behaviours, including drinking bottled water as the main source of drinking water in the home. Using the HES, a number of socioeconomic and demographic variables are linked to those households drinking primarily bottled water in the home and the results are presented as a share of total households.

Data collection for the 2006 HES took place in conjunction with the Labour Force Survey (LFS). It should be noted that the 2006 HES did not inquire about drinking bottled water outside of the home (at work for instance) where the convenience of bottled water becomes a factor. The results, therefore, underestimate the share of households that regularly consume bottled water.

Four characteristics are used to investigate bottled water drinking among Canadian households:

1. Income

Households are divided into quintiles—five equal groups based on the total income, from all sources, received by all members of the household.

2. Education

Households are divided into four groups based on the highest level of education attained by any member of the household.

3. Age

Households are divided into five groups based on the presence of household members in three age categories: children (under the age of 18); working-aged adults (aged 18 to 64 years); seniors (aged 65 and over).

4. Dwelling

Households are divided into four groups based on the type of dwelling within which the household resides.

For the sake of brevity, “drinking primarily bottled water in the home” may be referred to in the text as “drinking bottled water.”

The likelihood of drinking bottled water also increased with higher education, but only to the ‘some postsecondary’ level. Close to a third of households with some postsecondary education drank bottled water (Chart 2). Households in the ‘University’ group had the lowest rate of bottled water consumption compared to all other educational categories. A quarter of university-educated households drank bottled water in the home.

1. International Council of Bottled Water Associations, Zenith Marketing and Beverage Marketing Corporation, 2007, *Global Bottled Water Statistics,* www.icbwa.org (accessed November 8, 2007).

**Bottled water: The controversy overflows**

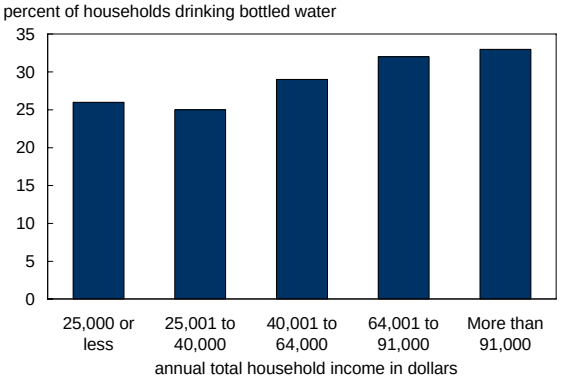
Bottled water consumption has caused huge debate both in Canada and abroad and has attracted a good deal of media attention. The increasing use of bottled water has raised a number of environmental, moral and health concerns. These issues include concern over selling a substance that many consider a "public good," drinking water quality and boil water advisories and orders, claims of health and safety benefits of bottled water over tap water and the potential environmental damage caused by manufacturing, transportation and disposal of plastic water bottles.

In May of 2007, *Maclean's Magazine* reported on bottled water. The CBC news service has also run stories on many aspects of bottled water including concerns over the privatization of water, the possible impact bottled water has on dental health and the problems associated with the disposal of plastic water bottles.

In addition, the websites of many environmental advocacy groups such as the Polaris Institute and the Sierra Club of Canada devote much space to issues surrounding bottled water consumption.

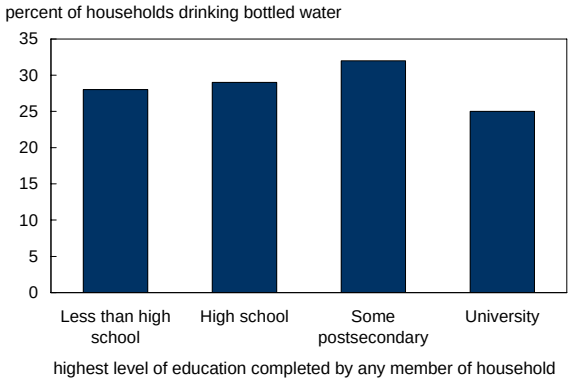
The debate over bottled water consumption has washed into the political arena, both in Canada and abroad. For example, there have been calls for a special tax on bottled water at the City of Toronto, while concerns over the environmental impact of bottled water have appeared on the Government of California website.

**Chart 1**
**High-income households are most likely to drink bottled water, 2006**




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

**Chart 2**
**University-educated households are less likely to drink bottled water, 2006**




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

The lower share of bottled water consumption for university-educated households (25%) contrasts with the higher bottled water consumption for the top income group (33%) (Table 1). A close association often exists between university-level education and high income and it would be expected that rates of bottled water drinking would be similar for the university-educated and high income earners. However, this was not the case.

Looking in more detail at bottled water consumption for different educational and income groups, households with high income but where no one had completed a university degree had the highest rates of drinking bottled water (Table 1).

Among households with an income over $91,000, fully 44% in the 'High school' category and 38% in the 'Some postsecondary' category drank bottled water. This compares to only 29% in the same income group with at least one member who had completed a university degree.

Similarly, in the second highest income group, 41% of households where all members were in the 'Less than high school' group drank bottled water compared to 26% of households with at least one member who had completed a university degree.

There is a strong relationship between university education and a lower likelihood of drinking bottled water in the home. Further, this relationship is strong enough to override most of the positive impact that high income has on bottled water drinking. The affinity for bottled water among high income households is driven primarily

**Table 1**
**Share of households drinking bottled water, by education level and income group, 2006**

| | Annual total household income ($) | | | | | |
|---|---|---|---|---|---|---|
| | 0 to 25,000 | 25,001 to 40,000 | 40,001 to 64,000 | 64,001 to 91,000 | Over 91,000 | All households |
| | Share (%) drinking primarily bottled water in the home | | | | | |
| **Highest level of education completed by any member of household** | | | | | | |
| Less than high school | 31 | 26 | 33 | 41 | F | 28 |
| High school | 24 | 28 | 34 | 37 | 44 | 29 |
| Some postsecondary | 25 | 26 | 33 | 37 | 38 | 32 |
| University | 16 | 20 | 21 | 26 | 29 | 25 |
| All households | 26 | 25 | 29 | 32 | 33 | 29 |

**F** too unreliable to be published.
**Source:** Environment Accounts and Statistics Division, Households and the Environment Survey, 2006.

by those households where no one has a university education.

It is possible that university graduates are more aware of the environmental issues surrounding bottled water. They may also be more sceptical of the claims that bottled water is a healthier choice than tap water.

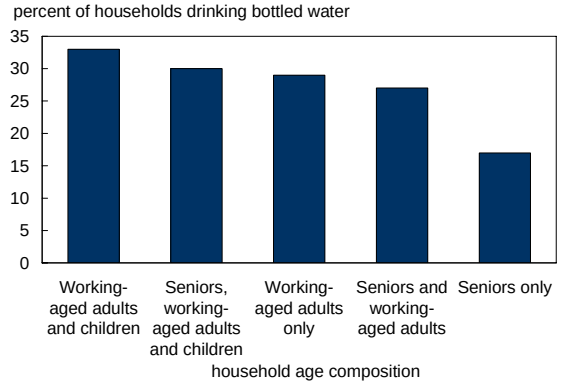
## Drinking bottled water less popular among seniors

Household consumption of bottled water varied with the age of household members. With the exception of those households that included seniors, working-aged adults and children, households with seniors were less likely to drink bottled water than those households without seniors (Chart 3). Moreover, households composed only of seniors were the least likely to drink bottled water in the home (17%).

The very low rate of bottled water consumption among senior-only households may be due, in part, to a continuation of an established behaviour. For most of their lives bottled water was perhaps not readily available to seniors and therefore relatively few developed a habit of purchasing bottled water.

In addition, there is an income-related link. Seniors tend to have lower incomes than many other groups. According to the survey, fully half of senior-only households had an annual income of $25,000 or less, while one-quarter had an income between $25,000 and $40,000. At the other end of the scale, only 3% of senior-only households had an income over $91,000. These figures compare to 20% in each income category in the population as a whole. As already noted, lower household income is generally associated with lower rates of drinking bottled water.

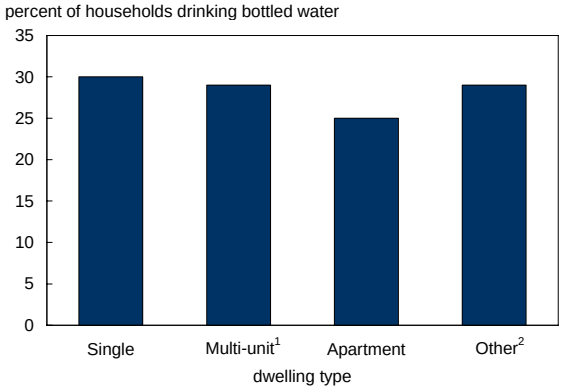
**Chart 3**
**Seniors prefer the tap, 2006**




**Note:**
Children are those under 18 years, working-aged are those aged 18 to 64 years and seniors are those aged 65 and over.
**Source:**
Environment Accounts and Statistics Division, Households and the Environment Survey, 2006.

In contrast to the results for seniors, households where children were present were more likely to drink bottled water. Households composed of working-aged adults and children were the most likely to drink bottled water in the home (33%). This finding is partially income-related. More than one-half of all households with children had an income of over $64,000 while only 14% had an income of $25,000 or less.

**Chart 4**
**Households in apartments are less likely to drink bottled water, 2006**




1. Comprises doubles, row units and duplexes.
2. Comprises mobile homes, institutions, hotels and other types of dwellings.

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

## Apartment dwellers also stay away from bottled water

Bottled water consumption also varied by the type of dwelling in which a household resided. The share of households living in apartments that drank bottled water was five percentage points lower than those living in single family homes and four percentage points lower than those in multi-units (Chart 4).

The low rate of bottled water consumption among households living in apartments may have both an age-related and an income-related link. One-third of all senior-only households lived in an apartment compared to only 13% of households with children. As shown, senior-only households had a very low rate of drinking bottled water.

In addition, apartment dwellers tended to have lower household incomes and lower income is also associated with lower rates of drinking bottled water. Households living in apartments were twice as likely to be in the lowest income category compared to all households (40% versus 20%). Meanwhile, only 6% of households in apartments had an income over $91,000 per year compared to the 20% of all households that were in this highest income category.

## Conclusion

Drinking bottled water in the home was more prevalent in households that had higher incomes. Despite this, university-educated households were less likely to drink bottled water than households with a lower level of formal education. The lower rate of bottled water drinking among university-educated households, set against the higher rates seen in high income households, shows that behaviours associated with income are not necessarily also associated with level of education.

Households living in apartments and those that included seniors were less likely to drink bottled water, while households that included children were more likely to drink bottled water. Senior-only households had a particularly low rate of bottled water drinking.

# Gone fishing: A profile of recreational fishing in Canada

Nancy Hofmann, Environment Accounts and Statistics Division

With the longest coastline in the world and about a quarter of the planet's freshwater resources, Canada is well-known for its fisheries—including its recreational fisheries. Fishing or angling has historically been a popular leisure activity for both Canadians and visitors alike. The important economic contributions of recreational fishing are felt in all parts of Canada, especially in many remote areas. However, this activity can have environmental implications, particularly on fish populations. In addition to the effect of recreational fishing, fish numbers are also influenced by a number of other factors including commercial fishing, water quality, fish habitat, invasive species and fish stocking. Recreational fishing activities, which can include fish stocking, can have a positive impact on our environment. Similarly, cleaner waterways and ecosystems, which are promoted by this industry, benefit not only angling activities, but also the environment in general.

This article provides a portrait of recreational fishing in Canada. Overall, the declining number of anglers has led to reduced fish harvests, particularly in Ontario, Quebec and British Columbia where the majority of Canada's recreational anglers live. From an economic point of view, each angler is spending about the same amount of money as ten years ago. However, the reduction in the total number of anglers has lowered total expenditures on recreational fishing.

**What you should know about this study**

All recreational fishing data in this article came from the Survey of Recreational Fishing in Canada conducted by the Department of Fisheries and Oceans. Although the survey has been in existence since 1975, only the 1995, 2000 and 2005 versions are comparable due to methodological improvements. The survey's target population covered all individuals identified in the 2005 provincial and territorial recreational fishing licence databases. In 2005, the questionnaires were mailed out to over 80,000 households within Canada and in other countries. This study examines only the recreational fishing activities of active adult anglers covered in the survey. The adult angler population does not include individuals less than 16 years of age (18 years of age in Newfoundland and Labrador and Quebec).

Recreational fishing refers to non-commercial fishing; recreational angling and sport fishing are covered in the definition used by the survey. Note that ceremonial fishing and subsistence fishing are not covered by the survey and are therefore not included in any of the estimates presented in this report. Illegal fishing activities are also not included in these data.

Due to separate licencing systems in British Columbia, tidal and freshwater fishing are presented separately. This presents a challenge for analyzing British Columbia's anglers. A given resident could hold both a tidal and freshwater licence, thus combining categories is not possible.

For more information on the Survey of Recreational Fishing in Canada please visit the following website: www.dfo-mpo.gc.ca/communic/statistics/recreational/index_e.htm.

## Recreational anglers in Canada

In 2005, more than 3.2 million adults bought licences and fished for recreation in Canada. Trends show that these numbers have decreased at an average annual rate of 2% during the past ten years.[1]

Approximately eight out of every ten, or 2.5 million, anglers fished within their home province or territory. The remaining population of recreational anglers consisted of about 628,000 visitors to Canada and also just over 150,000 Canadians who fished outside their home province or territory. This article focuses only upon those active anglers who fished within their own province, known as "resident anglers."

### Where are these anglers?

Approximately three quarters of active resident anglers live in Ontario, Quebec or British Columbia (Table 1). When the proportion of the adult population engaged in recreational fishing is analyzed by province, a varied portrait emerges.

Nationally, about one in every ten Canadian adults were active anglers. In Newfoundland and Labrador, almost one third of the adult population were active anglers (Chart 1). The other provinces where the participation rates were higher than the national rate were Yukon, Saskatchewan, Manitoba and Quebec. In Nunavut, only 4% of the

1. Fisheries and Oceans Canada, 2007, *2005 Survey of Recreational Fishing in Canada,* www.dfo-mpo.gc.ca/communic/statistics/recreational/canada/2005/index_e.htm (accessed December 19, 2007).

**Table 1**
**Number and average age of active resident anglers, by gender and jurisdiction, 2005**

| | Total | Males | Females | Males | Females | Males | Females |
|---|---|---|---|---|---|---|---|
| | number of anglers | | | percentage | | average age | |
| Newfoundland and Labrador | 131,578 | 85,668 | 45,910 | 65 | 35 | 49 | 47 |
| Prince Edward Island | 6,929 | 6,520 | 409 | 94 | 6 | 49 | 43 |
| Nova Scotia | 43,775 | 38,919 | 4,856 | 89 | 11 | 50 | 49 |
| New Brunswick | 43,382 | 37,197 | 6,186 | 86 | 14 | 49 | 49 |
| Quebec | 656,543 | 445,603 | 210,940 | 68 | 32 | 50 | 46 |
| Ontario | 764,374 | 562,827 | 201,547 | 74 | 26 | 46 | 43 |
| Manitoba | 121,788 | 95,489 | 26,299 | 78 | 22 | 48 | 47 |
| Saskatchewan | 119,824 | 86,162 | 33,662 | 72 | 28 | 47 | 45 |
| Alberta | 179,461 | 142,624 | 36,837 | 79 | 21 | 44 | 42 |
| British Columbia - Freshwater | 211,403 | 171,587 | 39,816 | 81 | 19 | 51 | 49 |
| British Columbia - Tidal waters | 169,863 | 130,106 | 39,757 | 77 | 23 | 45 | 37 |
| Yukon | 5,048 | 3,596 | 1,452 | 71 | 29 | 45 | 44 |
| Northwest Territories | 2,138 | 1,639 | 499 | 77 | 23 | 43 | 37 |
| Nunavut | 769 | 562 | 207 | 73 | 27 | 43 | 38 |
| **Canada** | **2,456,876** | **1,808,499** | **648,377** | **74** | **26** | **48** | **44** |

**Note**:
Figures may not add up to total due to rounding.
**Sources:**
Fisheries and Oceans Canada, 2005 Survey of Recreational Fishing in Canada.
Statistics Canada, Environment Accounts and Statistics Division.

adult population participated in recreational fishing.

### Recreational fishing is losing popularity

Between 1995 and 2005, the number of resident anglers in Canada dropped by one quarter—meaning there were over 825 thousand fewer anglers (Chart 2).

The largest drops in angler numbers were found in Quebec (-370,200) and Ontario (-275,207), comprising about three quarters of the total loss in anglers. However, resident angler populations actually increased in three parts of the country: Newfoundland and Labrador, Manitoba and Nunavut. Between 1995 and 2005, the number of recreational anglers who called Newfoundland and Labrador home increased by 7%.

## Who are these anglers?

Of the 2.5 million active resident anglers in Canada in 2005, almost three quarters were male (Table 1). These results coincide with public perception that recreational fishing is a predominantly male activity, and comparable results have also been found in surveys in the United States and Australia. Research has shown that for women, commitments to children and family and perceptions of traditional gender roles have a negative influence on their likelihood to fish. Other factors include issues related to the lack of time, skill and other cultural influences.[2]

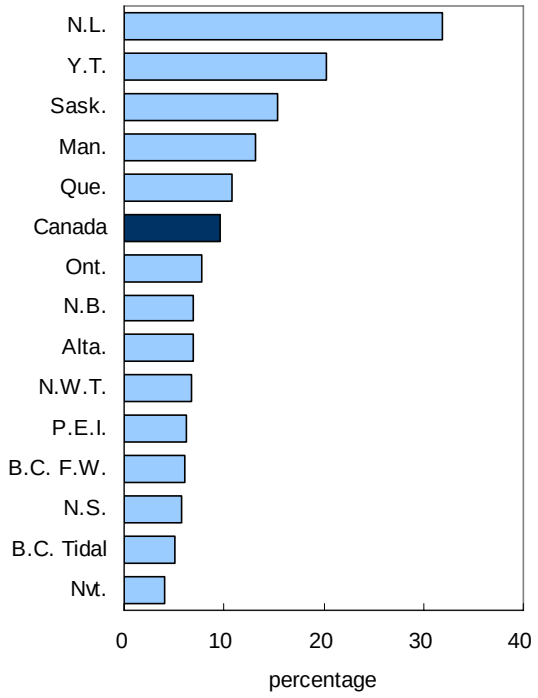
There were some provincial and territorial differences related to gender, but in all cases female anglers were a minority. In Newfoundland and Labrador and Quebec, about one third of anglers were female. Meanwhile in Prince Edward Island, only 6% of anglers were female.

### The angler population is aging

Typically, anglers tended to be baby boomers. Male anglers were typically older than female anglers. Nationally, the average male angler was

2. Laura E. Anderson, David K. Loomis and Ronald J. Salz, 2004, "Constraints to recreational fishing: Concepts and questions to understand underrepresented angling groups," *Proceedings of the 2004 Northeastern Recreational Research Symposium,* GTR-NE-326, www.fs.fed.us/ne/newtown_square/publications/technical_reports/pdfs/2005/326papers/anderson326.pdf (accessed February 6, 2008).

**Chart 1**
**Active resident anglers as a proportion of adult population, 2005**

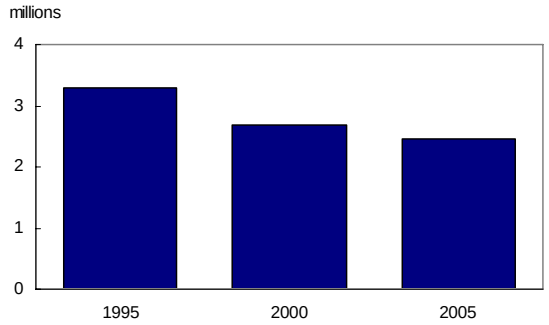



**Notes:**
*B.C. F.W.* represents British Columbia's freshwater anglers. Adult anglers are those 16 years of age and older (18 years of age in Newfoundland and Labrador and Quebec). Corresponding criteria were used to determine the adult population.
**Sources:**
Statistics Canada, CANSIM Table 051-0001.
Fisheries and Oceans Canada, 2005 Survey of Recreational Fishing in Canada.
Statistics Canada, Environment Accounts and Statistics Division.

48 years old, whereas female anglers were on average four years younger (Table 1).

The Atlantic Provinces tended to have the oldest anglers, while the Northwest Territories and Nunavut had the youngest anglers. These trends correspond with overall population trends; the average age of the entire population is about 40 years in each of the Maritime Provinces, about 30 years of age in the Northwest Territories and only 23 years in Nunavut.[3]

**Chart 2**
**Number of active resident anglers, 1995, 2000 and 2005, Canada**




**Sources:**
Fisheries and Oceans Canada, 2005 Survey of Recreational Fishing in Canada.
Statistics Canada, Environment Accounts and Statistics Division.

Similar to the Canadian population as a whole, the angler population has aged over the past ten years. In 2005, the average age of male anglers was 48, six years older than in 1995; female anglers were on average 44 years of age in 2005, four years older than in 1995.

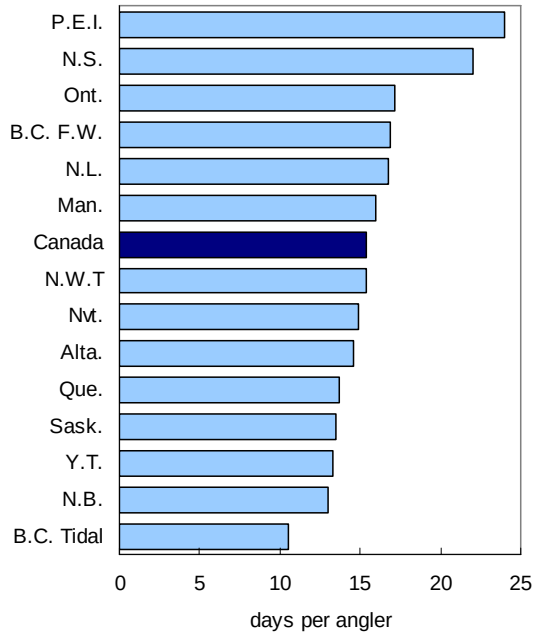
## Total days fished in Canada declines, but days fished per angler remains steady

Given its direct relationship with the number of active anglers, the total number of days spent fishing declined over the past 10 years. In 2005, resident anglers fished a total of 37.7 million days in Canada, less than the 48.8 million days fished ten years earlier. The number of days fished per angler stayed the same, at about fifteen days per angler. Thus a smaller number of anglers appear to be fishing at the same level of activity.

Canadian anglers spent slightly over two weeks fishing in 2005 (Chart 3). On average, Prince Edward Islanders and Nova Scotians spent the greatest number of days fishing—they fished in total more than three weeks. Anglers in New Brunswick, Yukon, Saskatchewan and Quebec spent the least amount of time fishing per year.

3. Statistics Canada, CANSIM Table 051-0001 Estimates of population, by age group and sex for July 1, Canada, provinces and territories, annual, CANSIM (database), http://cansim2.statcan.ca/cgi-win/cnsmcgi.exe?Lang=E&CANSIMFile=CII\CII_1_E.htm&RootDir=CII/ (accessed May 23, 2008).

**Chart 3**
**Average number of days fished by resident anglers, 2005**




**Note:**
B.C. F.W. represents British Columbia's freshwater anglers.
**Sources:**
Fisheries and Oceans Canada, 2005 Survey of Recreational Fishing.
Statistics Canada, Environment Accounts and Statistics Division.

## How much did they spend?

In terms of direct expenditures, resident anglers spent over $1.6 billion on recreational fishing in 2005 (Table 2). Three quarters of these expenditures were spent on food, lodging and transportation costs. Less than 10% of the direct expenditures were for actual fishing supplies.

Of the $1.6 billion spent by resident anglers in Canada, almost 60% were spent in Ontario and Quebec. The large number of anglers in these two provinces explains their dominance in total expenditures. The relatively high expenditure per angler in these provinces is another contributing factor.

When looking at expenditures per angler by province, tidal water anglers from British Columbia led the country with over $1,100 each in direct expenditures. This was much higher than the national average of $650 per angler. In 2005, each resident angler in the Northwest Territories, Ontario, British Columbia (freshwater), and Alberta typically spent over the national average on recreational fishing.

Although Prince Edward Island's anglers were the most successful in terms of fish caught per angler, they spent the least amount of money. Anglers in Prince Edward Island, Nunavut and Newfoundland and Labrador spent less than half of the national average expenditure or one third of that of the tidal anglers in British Columbia.

### Declining total expenditures, but expenditures per angler remains stable

Total direct expenditures for recreational fishing in Canada declined from $1.8 billion in 1995 to $1.6 billion in 2005. Expenditures per angler increased from $533 to $652 per angler during the same time frame. However, when adjusted for inflation, the average expenditure remained roughly the same at $513 per angler. Thus the drop in expenditures is a result of the decline in angler numbers; anglers are still spending at the same levels over time.

## Total catch down, fish caught per angler edges up

Although the number of fish caught per angler increased to 64 fish in 2005 from 60 in 1995, in just ten years, the total number of fish caught decreased by 20%. The total harvest dropped from 196 million in 1995 to 156 million in 2005 (Chart 4).

The largest drop occurred in Quebec, where 17 million fewer fish were caught in 2005 than in 1995. In Ontario, 9.7 million fewer fish were caught during this time frame. British Columbia's tidal waters catch also experienced a decline, with over 5 million fewer fish caught. These declines can be attributed to the drop in the number of anglers.

**Table 2**
**Direct recreational fishing expenditures made by resident anglers, 2005**

| | Package deals | Food and lodging | Transportation costs | Fishing services | Fishing supplies | Other | Total | Expenditure per angler |
|---|---|---|---|---|---|---|---|---|
| | thousand dollars | | | | | | | dollars |
| Newfoundland and Labrador | 1,176 | 15,936 | 19,916 | 981 | 4,681 | 194 | 42,885 | 326 |
| Prince Edward Island | 8 | 368 | 934 | 227 | 380 | 26 | 1,944 | 281 |
| Nova Scotia | 60 | 6,459 | 9,647 | 1,162 | 2,826 | 167 | 20,321 | 464 |
| New Brunswick | 1,287 | 4,739 | 6,869 | 1,447 | 1,996 | 368 | 16,708 | 385 |
| Quebec | 47,622 | 118,551 | 142,147 | 33,249 | 35,710 | 1,614 | 378,894 | 577 |
| Ontario | 22,044 | 187,648 | 237,574 | 42,255 | 50,013 | 1,137 | 540,671 | 707 |
| Manitoba | 2,069 | 20,121 | 32,961 | 2,883 | 5,864 | 192 | 64,090 | 526 |
| Saskatchewan | 3,552 | 25,275 | 32,379 | 5,534 | 5,066 | 120 | 71,926 | 600 |
| Alberta | 3,349 | 46,750 | 54,408 | 7,578 | 12,158 | 339 | 124,582 | 694 |
| British Columbia - Freshwater | 3,672 | 51,830 | 63,689 | 9,412 | 14,669 | 3,827 | 147,100 | 696 |
| British Columbia - Tidal waters | 40,149 | 36,547 | 91,315 | 7,693 | 11,237 | 163 | 187,105 | 1,102 |
| Yukon | 0 | 938 | 1,608 | 124 | 254 | 5 | 2,929 | 580 |
| Northwest Territories | 162 | 379 | 973 | 34 | 147 | 16 | 1,710 | 800 |
| Nunavut | 2 | 94 | 98 | 2 | 46 | 1 | 244 | 317 |
| **Canada** | **125,152** | **515,638** | **694,519** | **112,582** | **145,048** | **8,169** | **1,601,108** | **652** |

**Sources:**
Fisheries and Oceans Canada, 2005 Survey of Recreational Fishing.
Statistics Canada, Environment Accounts and Statistics Division.

### Most fish caught in Ontario, but Prince Edward Islanders were the most successful individual anglers

Three quarters of the 156 million fish caught in 2005 were caught by resident anglers in the provinces of Ontario, Quebec and Alberta (Table 3). Over 40% of the total number of fish caught, or 65 million, were caught in Ontario alone.

The lowest numbers of fish were caught in the Northwest Territories and Nunavut. These trends were influenced by the relatively large number of anglers in Ontario and Quebec compared to the lower angler numbers in Nunavut and the Northwest Territories (see Table 1).

The catch per angler reflects the success of each angler and is not influenced by the angler population. On average, each resident angler caught 64 fish in 2005 (Table 3).

Anglers in Prince Edward Island were the most successful, with an average of 90 fish caught per angler. Other provinces with anglers who caught more fish than the national average were Alberta, Manitoba, Ontario and Nova Scotia.

The anglers in B.C.'s tidal waters caught just 14 fish each on average. Anglers in the three territories also did not fare so well; anglers in Nunavut caught 18 fish each in 2005.

### What did they catch?

One quarter of fish caught by resident anglers in 2005 were trout. Other popular species were walleye (17%), perch (17%), bass (13%), northern pike (8%) and salmon (3%). The remaining 17% comprised other less common fish such as grayling, char and whitefish.

Trout were also more likely to be retained than other types of fish. Almost 60% of trout were kept, whereas only 14% of bass were retained by resident anglers in 2005.

**Table 3**
**Fish caught and kept by resident anglers, 2005**

| | Fish caught | | Fish kept | | Fish kept as a share of the total catch |
|---|---|---|---|---|---|
| | thousand | average per angler | thousand | average per angler | percent |
| Newfoundland and Labrador | 8,251 | 63 | 5,984 | 45 | 73 |
| Prince Edward Island | 621 | 90 | 367 | 53 | 59 |
| Nova Scotia | 3,835 | 88 | 1,531 | 35 | 40 |
| New Brunswick | 2,302 | 53 | 877 | 20 | 38 |
| Quebec | 40,270 | 61 | 27,092 | 41 | 67 |
| Ontario | 65,094 | 85 | 16,069 | 21 | 25 |
| Manitoba | 8,705 | 71 | 2,278 | 19 | 26 |
| Saskatchewan | 5,827 | 49 | 2,025 | 17 | 35 |
| Alberta | 11,991 | 67 | 1,629 | 9 | 14 |
| British Columbia - Freshwater | 6,809 | 32 | 1,913 | 9 | 28 |
| British Columbia - Tidal waters | 2,369 | 14 | 980 | 6 | 41 |
| Yukon | 104 | 21 | 32 | 6 | 31 |
| Northwest Territories. | 90 | 42 | 25 | 12 | 28 |
| Nunavut | 14 | 18 | 6 | 8 | 46 |
| **Canada** | **156,281** | **64** | **60,811** | **25** | **39** |

**Sources**:
Fisheries and Oceans Canada, 2005 Survey of Recreational Fishing.
Statistics Canada, Environment Accounts and Statistics Division.

## Catch-and-release fishing becoming more popular

The amount of fish being kept has declined, which likely indicates that catch-and-release fishing has increased. In 1995, about half the fish caught by resident anglers were kept, whereas by 2005, only about 40% were kept (Chart 4). Possible reasons for the increased use of this practice include anglers viewing it as a conservation technique, legal requirements in some jurisdictions to catch-and-release and lastly because some fish are not fit for human consumption because of mercury or other sources of contamination.[4]

There was some variation among the provinces in catch-and-release practices. For instance, in Newfoundland and Labrador and in Prince Edward Island, the percentage of fish kept actually increased over the ten year period. The largest percentage point decline occurred in British Columbia's tidal waters where the proportion of fish kept dropped from 71% in 1995 to 41% in 2005. Declines in the proportion of fish kept over the ten year period were larger than the national average in Alberta, Nova Scotia and Ontario.

### Newfoundlanders keep the most

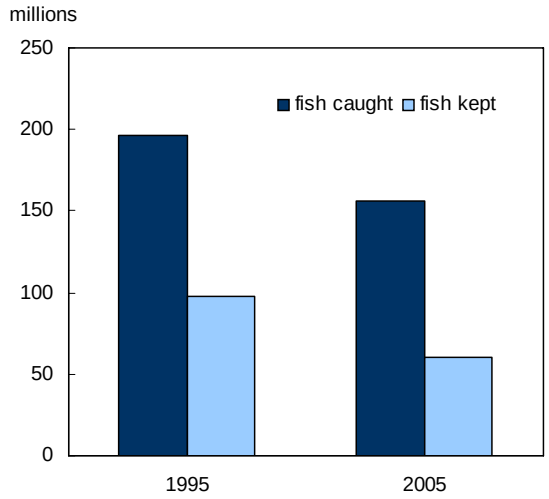
In 2005, resident anglers in Newfoundland retained the highest share of their catch at 73%, about 45 fish per angler (Table 3). With the exception of Ontario, anglers from the East were more likely to keep their fish than those in the West. In Alberta, only 14% of the total catch was kept, about 9 fish per angler.

## Recreational fishing effects and is affected by the environment

In many parts of the country, anglers are encouraged or often required by law to release fish that they have caught. For instance, an angler may have reached their allowable catch for a certain species on a given day and must return all further fish of that species caught on that day. Keeping any endangered or threatened fish species listed

4. S.J. Casselman, 2005, *Catch-and-Release Angling: A Review with Guidelines for Proper Fish Handling Practices,* Fish & Wildlife Branch, Ontario Ministry of Natural Resources, Peterborough, Ontario, www.mnr.gov.on.ca/en/Business/LetsFish/2ColumnSubPage/STEL02_198018.html (accessed May 26, 2008).

**Chart 4**
**Comparison of fish caught and kept, Canadian resident anglers, 1995 and 2005**




**Sources:**
Fisheries and Oceans Canada, 2005 Survey of Recreational Fishing in Canada.
Statistics Canada, Environment Accounts and Statistics Division.

under the *Species at Risk Act* is illegal and these fish must always be released if caught, due to their limited populations. For instance in Ontario, it is illegal to fish for or possess American eel, cutlip minnow and redside dace.[5]

In addition to catch-and-release programs, "put-and-take" or "put, grow and take" programs also minimize the influence of recreational fishing on natural fish stocks. In such a program, fish are put into a water body and allowed to grow in order to be removed by anglers. Many provinces stock lakes and rivers for recreational fishing purposes, in addition to stocking them to re-establish populations where they have deteriorated or even collapsed. In Alberta, for instance, over 50 million fish were placed in rivers and lakes as part of the province's stocking program in 2007.[6] The stocking of lakes and streams is not new; fish

stocking has occurred in Ontario and British Columbia since the late 1800s.

In addition to fish stocking activities, government agencies and non-government agencies have also established programs to improve habitat including enhancing spawning beds, stabilizing banks, controlling shoreline erosion, clearing obstructions and building underwater or in-stream structures.[7] Programs and policies geared to improving water quality such as reducing toxins and phosphorus, implemented by various levels of government, can indirectly help fish stocks by improving water quality.

## Conclusion

The pressure of recreational fishing on fish populations appears to be decreasing. The downward trend in angler numbers, increasing age of anglers, decreased harvests and increased participation in catch-and-release fishing help to reduce the overall impact of recreational fishing on Canadian fish populations.

5. Fish and Wildlife Branch, 2007, *Fishing Regulations Summary, 2008-2009*, Ontario Ministry of Natural Resources, www.mnr.gov.on.ca/en/Business/LetsFish/Publication/STEL02_163615.html (accessed May 23, 2008).
6. Sustainable Resource Development, Government of Alberta, 2007, *Stocking Report,* www.mywildalberta.com/Home/Fishing/StockingReports.aspx (accessed May 23, 2008).
7. LandOwner Resource Centre, 1999, "Improving fish habitat," *Extension Notes,* www.lrconline.com/Extension_Notes_English/pdf/fsh_hab.pdf (accessed February 6, 2008).

# Canadian industry's expenditures to reduce greenhouse gas emissions

Jeff Fritzsche, Environment Accounts and Statistics Division

Between 1990 and 2005, Canada's total greenhouse gas (GHG) emissions rose 25%, to 747Mt,[1] a level 33% higher than the nation's Kyoto target. Much of the increase in emissions is a result of the extraction, processing, refinement and transportation of oil and gas.[2]

Canadian industry is working to reduce GHG emissions. Overall, businesses spent $955 million on GHG reduction technologies in 2004. This represented a decline of 25% from $1.3 billion in 2002.[3] This reduction was largely due to the completion of major projects in the Oil and Gas Extraction Industry and the substitution of nuclear and hydro energy production for coal-fired generation.

## Capital investment down

Declines in GHG emission reduction expenditures between 2002 and 2004 were reported in 12 of the 16 industries covered by the Survey of Environmental Protection Expenditures. Overall, operating expenditures decreased 10% from $641.0 million to $575.8 million, while capital investments fell 41%, from $640.2 million to $379.3 million (Table 1).

Much of the decline in investments to reduce GHGs was due to decreased expenditures by industries involved in the production and distribution of energy related products.

For example, the Oil and Gas Extraction industry reported $124.8 million in capital expenditures in 2004, down $82.1 million compared to 2002. The Pipeline Transportation industry also reported a steep decline in investments, from $32.0 million in 2002 to $3.1 million in 2004—a 90% reduction.

Respondents indicated that declining expenditures resulted from the completion of large scale projects between 2002 and 2004.

1. One megatonne equals one million tonnes.
2. Environment Canada, 2007, *Canada's 2005 Greenhouse Gas Inventory: A Summary of Trends,* www.ec.gc.ca/pdb/ghg/inventory_report/2005/2005summary_e.cfm (accessed January 8, 2008).
3. The 2002 expenditure estimates related to the reduction of greenhouse gases have been revised. Please see: Statistics Canada, 2008, Catalogue no. 16-001-X, no.5, Ottawa.

### What you should know about this study

This study uses data from the 2002 and 2004 Survey of Environmental Protection Expenditures. The survey, conducted every two years, targets establishments in 16 manufacturing and primary industries, including the Oil and Gas Extraction Industry.

Respondents were asked how much money they spent to reduce their greenhouse gas (GHG) emissions, what types of techniques and tools were used to reduce those emissions, and whether they had put into operation new or significantly improved systems or equipment that reduced GHG emissions between 2002 and 2004.

These new questions were introduced in 2002 in order to collect data on industry's initiatives to reduce GHG emissions.

This change was made possible through five years of funding provided by the Statistical Monitoring of Climate Change Technologies project under the federal government's Action Plan 2000 on Climate Change. The material was developed as part of a multi-departmental Working Group on Climate Change Technologies co-chaired by Industry Canada and Statistics Canada.

This study compares businesses' GHG reduction activities and expenditures by establishment size. Businesses are grouped by the number of employees: small (fewer than 100 employees), medium (100 to 499 employees), large (500 to 999 employees) and very large (more than 999 employees).

The Electric Power Generation, Transmission and Distribution industry also reported lower investments, citing the completion of several major projects. After reporting $119.1 million in 2002, investments shrunk to $21.2 million in 2004, an 82% reduction.

According to Environment Canada, GHG emissions from electricity generation decreased by over 6 Mt due to a reduction in emissions from coal-fired generation and an increase in nuclear and hydro electricity production between 2003 and 2005, despite increasing demand for electricity.[4]

Four industries reported increased investments in 2004. The Wood Products industry was responsible for the largest increase, investing $45.9 million in 2004, a $19.7 million increase over 2002. The Petroleum and Coal Products industry followed, investing $37.1 million compared to $25.3 million in 2002.

4. Environment Canada, 2007, *Canada's 2005 Greenhouse Gas Inventory: A Summary of Trends.*

**Table 1**
**Total operating and capital expenditures on environmental processes and technologies to reduce greenhouse gas emissions by industry, 2002[r] and 2004**

| | Operating expenditures | | Capital expenditures | | **Total** | |
|---|---|---|---|---|---|---|
| | 2002[r] | 2004 | 2002[r] | 2004 | **2002[r]** | **2004** |
| | million dollars | | | | | |
| Logging | 23.3 | 52.0 | 7.1 | 8.5 | **30.4** | **60.5** |
| Oil and Gas Extraction | 8.4 | 23.0 | 206.9 | 124.8 | **215.3** | **147.8** |
| Mining | 19.4 | 38.0 | 8.5 | 10.1 | **27.9** | **48.1** |
| Electric Power Generation, Transmission and Distribution | 128.2 | 75.7 | 119.1 | 21.2 | **247.2** | **96.9** |
| Natural Gas Distribution | 6.2 | 3.5 | 2.9 | 5.2 | **9.1** | **8.7** |
| Food | 21.2 | 8.8 | 14.9 | 23.7 | **36.1** | **32.5** |
| Beverage and Tobacco Products | 1.7 | 1.7 | 6.5 | 3.7 | **8.2** | **5.4** |
| Wood Products | 114.5 | 106.5 | 26.2 | 45.9 | **140.7** | **152.3** |
| Pulp, Paper and Paperboard Mills | 170.6 | 129.8 | 62.6 | 37.2 | **233.3** | **167.1** |
| Petroleum and Coal Products | 3.0 | 1.2 | 25.3 | 37.1 | **28.3** | **38.3** |
| Chemicals | 67.3 | 57.9 | 32.4 | 25.7 | **99.6** | **83.6** |
| Non-Metallic Mineral Products | 6.0 | 11.0 | 22.2 | 8.1 | **28.2** | **19.1** |
| Primary Metals | 13.0 | 34.9 | 46.7 | 5.4 | **59.7** | **40.3** |
| Fabricated Metal Products | 15.6 | 22.4 | 18.3 | 8.7 | **33.9** | **31.1** |
| Transportation Equipment | 33.2 | 6.5 | 8.7 | 10.8 | **41.9** | **17.3** |
| Pipeline Transportation | 9.4 | 3.1 | 32.0 | 3.1 | **41.4** | **6.2** |
| **Total** | **641.0** | **575.8** | **640.2** | **379.3** | **1,281.3** | **955.1** |

**Note:**
Figures may not add up to totals due to rounding.
**Source:**
Environment Accounts and Statistics Division, Survey of Environmental Protection Expenditures, 2002 and 2004.

## Small firms spend the most per employee to reduce greenhouse gas emissions

When comparing GHG expenditures by establishment size, very large establishments spent the most on average (Table 2), while small establishments spent the least.

A different picture emerged when comparing how much was spent per employee. The smallest establishments actually spent the most per employee to reduce GHG emissions in 2004 (Table 3) while the largest companies spent the least.

For the very large establishments, total expenditures made to reduce GHG emissions accounted for approximately one tenth of their total environmental protection expenditures. For small establishments, GHG reduction expenditures formed almost one third of the total environmental protection amount they spent.

While small establishments increased their overall expenditures to reduce GHG emissions by $25 million and large firms increased expenditures by $44 million between 2002 and 2004, medium and very large establishments decreased their expenditures by $188 million and $172 million respectively. The majority of the decline came from reductions in capital spending.

Viewing the trend another way, the average expenditure per establishment declined by $69 thousand for medium-sized businesses and by $1.7 million for very large establishments.

Although small establishments spent the least on GHG reduction initiatives on an individual basis, as a group they actually spent more ($172.9 million) than the largest establishments ($137.6 million) because of their overall larger numbers.

**Table 2**
**Average expenditures made per establishment for greenhouse gas technologies, by establishment size, 2004**

| | Number of employees per establishment | | | | |
|---|---|---|---|---|---|
| | Fewer than 100 (small) | 100 to 499 (medium) | 500 to 999 (large) | More than 999 (very large) | **Total** |
| | thousand dollars | | | | |
| Operating | 56.1 | 122.6 | 409.2 | 633.7 | **118.9** |
| Capital | 23.2 | 70.9 | 404.5 | 583.9 | **78.1** |
| **Total** | **79.3** | **193.5** | **813.7** | **1,217.6** | **197.0** |

**Note:**
Data excludes the pipeline transportation industry.
**Source:**
Environment Accounts and Statistics Division, Survey of Environmental Protection Expenditures, 2004.

**Table 3**
**Expenditures for greenhouse gas technologies per employee, by establishment size, 2004**

| | Number of employees per establishment | | | | |
|---|---|---|---|---|---|
| | Fewer than 100 (small) | 100 to 499 (medium) | 500 to 999 (large) | More than 999 (very large) | **Total** |
| | dollars spent per employee | | | | |
| Operating | 860 | 597 | 605 | 273 | **553** |
| Capital | 356 | 346 | 598 | 252 | **363** |
| **Total** | **1,216** | **943** | **1,202** | **525** | **916** |

**Note:**
Data excludes the pipeline transportation industry.
**Source:**
Environment Accounts and Statistics Division, Survey of Environmental Protection Expenditures, 2004.

Medium-sized establishments spent the most in total at $441.7 million (Table 4).

## Energy conservation activities widespread

Energy conservation is one way businesses are able to reduce their GHG emissions. Almost 6 in 10 businesses used energy conservation techniques or renewable energy technologies in 2004. The likelihood businesses used these processes increased with establishment size.

The most common technology or process used to conserve energy was an energy management or monitoring system. One third of all establishments used these systems to improve energy efficiency (Table 5). However, very large establishments were more than three times more likely to use this method than the smallest firms (65% versus 20%).

**Table 4**
**Total expenditures for greenhouse gas technologies, by establishment size, 2004**

| | Number of employees per establishment | | | | |
|---|---|---|---|---|---|
| | Fewer than 100 (small) | 100 to 499 (medium) | 500 to 999 (large) | More than 999 (very large) | **Total** |
| | million dollars | | | | |
| Operating | 122.3 | 279.8 | 99.0 | 71.6 | **572.7** |
| Capital | 50.6 | 161.9 | 97.9 | 66.0 | **376.3** |
| **Total** | **172.9** | **441.7** | **196.9** | **137.6** | **949.0** |

**Note:**
Data excludes the pipeline transportation industry.
**Source:**
Environment Accounts and Statistics Division, Survey of Environmental Protection Expenditures, 2004.

Waste energy recovery and reuse and the implementation of an energy audit were also popular, with 29% of establishments making use of each of these processes or technologies to conserve energy.[5]

Overall, just over one-quarter of establishments reported that they adopted new systems or had significantly improved old systems or equipment in order to reduce GHG emissions.

These innovative establishments[6] used an average of 3.5 technologies to reduce GHG emissions. In contrast, non-innovative establishments reported using less than half as many technologies on average (1.2 technologies per establishment).

5. Results related to tools and technologies to reduce greenhouse gas emissions are reported values only. No estimation was done for non-response or for the non-surveyed portion of the population.
6. For the purposes of this study, businesses who answered "yes" to this last question were considered innovators, while those that answered "no" were considered non-innovators.

**Table 5**
**Distribution of energy conservation processes and technologies, by establishment size, 2004**

| | Number of employees per establishment | | | | |
|---|---|---|---|---|---|
| | Fewer than 100 (small) | 100 to 499 (medium) | 500 to 999 (large) | More than 999 (very large) | **Total** |
| | percent[1] | | | | |
| Cogeneration | 5 | 9 | 11 | 11 | **8** |
| Alternative fuel systems or equipment | 5 | 8 | 9 | 16 | **8** |
| Fuel substitution | 4 | 10 | 9 | 17 | **8** |
| Waste energy recovery and reuse | 18 | 31 | 41 | 52 | **29** |
| Use of energy management or monitoring systems | 20 | 32 | 48 | 65 | **33** |
| Performed energy audit during the past three years (2002 to 2004) | 17 | 29 | 45 | 54 | **29** |
| Other systems, equipment or employee training | 14 | 23 | 34 | 49 | **25** |
| Renewable energy technologies | | | | | |
| Small, mini- or micro-hydroelectric facility | 0 | 3 | 5 | 10 | **3** |
| Solar energy systems or equipment | 5 | 4 | 7 | 16 | **7** |
| Wind energy systems or equipment | 0 | 0 | 1 | 10 | **1** |
| Biomass energy[2] | 4 | 13 | 12 | 10 | **9** |
| Geothermal | 0 | 0 | 0 | 1 | **0** |
| Other renewable energy systems or equipment | 1 | 1 | 3 | 10 | **2** |
| **Total[3]** | **42** | **60** | **77** | **88** | **59** |
| **Percentage of total employees[4]** | **44** | **61** | **77** | **90** | **75** |

1. Number of establishments that indicated they used the energy conservation process or technology as a percentage of the total number of establishments that provided a response.
2. Examples include energy crops, wood waste and waste-to-energy.
3. Number of establishments indicating they used at least one energy conservation process or technology, as a percentage of the total number of establishments that provided a response.
4. Employment of establishments indicating they used at least one energy conservation process or technology, as a percentage of the total employment of the establishments that provided a response.

**Note:**
This table includes reported data only. This table excludes the 'other manufacturing' and 'pipeline transportation' industry categories.
**Source:**
Environment Accounts and Statistics Division, Survey of Environmental Protection Expenditures, 2004.

# The Canadian Environmental Sustainability Indicators: On population-weighted ground-level ozone

Soheil Rastan and Joe St. Lawrence, Environment Accounts and Statistics Division

The Canadian Environmental Sustainability Indicators (CESI) are a series of indicators published by the federal government so that Canadians better understand the linkage between the economy, the environment and human health. One such indicator is the ground-level ozone exposure indicator. This indicator reflects the trend in population-weighted ozone levels.

This study extends the trend analysis and builds upon the CESI indicator. It presents two additional population-weighted ground-level ozone concentration trends from 1990 to 2005: a trend based on a lower end or 25$^{th}$ percentile of the concentration data and a trend based on an upper end or 75$^{th}$ percentile of the concentration data (see text box for additional information).

From 1990 to 2005 the estimated increase, based on the lower-end of the annual concentration data, was statistically more significant than the estimated increase based on the middle range of the annual concentration data. On the other hand, trend analysis on the upper-end of the concentration data did not reveal any statistically significant increase or decrease.

## What is ground-level ozone?

Ground-level ozone is an air pollutant. It is a highly reactive and unstable compound that reacts with almost anything it comes into contact with—

### What you should know about this study

This study is based on data from *Canadian Environmental Sustainability Indicators (CESI), 2007*. Information on the data sources and methods underlying the ground-level ozone exposure indicator can be found in *Canadian Environmental Sustainability Indicators: Air Quality Indicators: Data Sources and Methods*, Catalogue no. 16-254-X.

Over 250 air quality monitoring stations are located across Canada. Most stations collecting ground-level ozone data are organized under the National Air Pollution Surveillance (NAPS) program. The CESI ozone indicator is an estimate of the trend in population exposure to ground-level ozone. A population-weighted methodology is used to take into consideration the number of people living within 40-km of monitoring stations. Ozone concentration data in larger populated areas are given a higher weight than those in less populated areas to adjust for the differences in populated versus less populated areas.

The 1990 to 2005 ozone indicator is based on population-weighted average concentrations collated from 76 monitoring stations satisfying the CESI inclusion criteria, from April to September when ozone concentrations are relatively higher than in other months of the year. The trend is expressed in terms of an annualized rate of change, both as parts-per-billion per year (ppb/year) and as a percentage change per year, with associated confidence intervals.

**25$^{th}$, 50$^{th}$ and 75$^{th}$ percentiles**

The 25$^{th}$ and the 75$^{th}$ percentile concentrations delineate the data into the lowest quarter, highest quarter, and the middle half of observations during the 180-day warm period, April to September.

The lower end of the spectrum represents days with ozone concentrations that are approximately below 30 ppb. These days have concentrations that are similar to background levels and are referred to in this study as the “good days” of the warm period in terms of ground-level ozone concentrations.

The higher end of the spectrum represents days with ozone concentrations that are approximately above 40 ppb. These days have concentrations that are fairly above those of background levels and are referred to in this study as the “bad days” of the warm period in terms of ground-level ozone concentrations.

The mid range of the spectrum holds both the median point (the 50$^{th}$ percentile) and the mean point. These represent ground-level ozone concentration in an average warm period day. The mid range of the spectrum represents average days with ozone concentrations at around 35 ppb.

**Analysis**

The trend analysis conducted in this study follows the same non-parametric linear regression test used in the 2007 CESI report. The term “significant” in this study refers to *statistical significance*. Reported trends have probability (p) values and confidence intervals (CI). Synthesis and analysis of spatio-temporal and environmental data to examine cause-effect relationships are beyond the scope of this analysis.

mainly other pollutants present in the ambient air including nitrogen oxides ($NO_x$) and volatile organic compounds (VOC). Together these air pollutants result in the formation of smog, especially during the warmer months of the year.

Exposure to ground-level ozone is higher during warm periods than during cold periods of the year. Some of the health risks associated with exposure to ground-level ozone range from minor to severe respiratory problems.

Human activities affect the formation of ground-level ozone; however, ozone is also present in the natural environment at concentrations known as background levels.

## Ozone concentration spectrum

In general, the annual average ozone concentration at Canadian background stations is between 25 and 35 parts-per-billion (ppb), a range similar to background sites in the United States and around the world.[1] Such background levels in ozone concentration represent almost half of the Canada-Wide Standard (CWS) threshold limit for ground-level ozone.[2]

During the warm months of the year from April to September, daily ground-level ozone concentrations vary from as little as 10 ppb to over 100 ppb, depending on temperature, sunlight, wind pattern, $NO_x$ concentrations, and the spatial proximity of the monitoring stations to sources of ozone-forming and depleting pollutants.

In terms of accumulated exposure, days with ozone levels similar to or higher than the 75th percentile[3] carry a higher degree of risk if compared with days that have ozone levels similar to or lower than the 25th percentile.[4]

## The lower end of the data exhibits a more significant upward trend

Conducting a trend analysis on the upper end of the ozone concentration spectrum, the 75th percentile, revealed no statistically significant increase or decrease.[5]

Trend analysis on the mid range, both the mean and the median, of the ozone concentration spectrum, days with ozone concentrations at around 35 ppb, suggested a statistically significant upward trend; an increase of 0.3 ppb/year.[6] This rate is equivalent to an annual average percentage increase of 0.8%.[7]

However, a trend analysis on the lower end of the ozone concentration spectrum, the 25th percentile, suggested a statistically more significant increase of 0.4 ppb/year.[8] This rate is equivalent to an annual average percentage increase of 1.5%.[9] Chart 1 presents the results of the trend analyses on the three concentration spectrums.

## Conclusions

The results of this hypothesis-generating study indicate that as far as the national estimate of population-weighted ground-level ozone concentration is concerned, the good days are getting worse and the bad days remain the same.

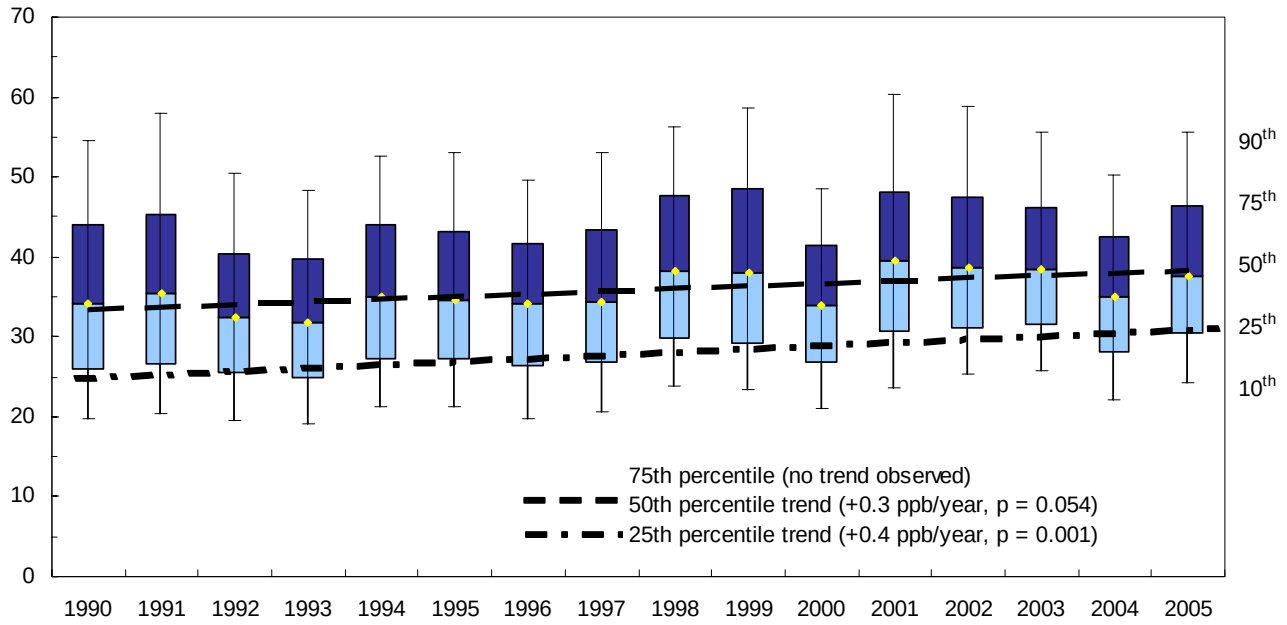
The extent to which rising temperature, on the one hand, and falling NO emissions, on the other hand, has influenced these increasing trends remains to be examined.

Analyzing the influence of such parameters is beyond the scope of this study. Future work could further evaluate the role of some of these factors in influencing the magnitude of our cumulative exposure to ground-level ozone during the warm months of the year.

1. Ian G. McKendry, 2006, *Background Concentrations of $PM_{2.5}$ and Ozone in British Columbia*, *Canada,* Geography / Atmospheric Science, Prepared for the British Columbia Ministry of the Environment, www.env.gov.bc.ca/air/airquality/pdfs/background_pm25_ozone.pdf (accessed April 28, 2008).
2. The Canada-Wide Standard for ground-level ozone is 65 ppb, 8-hour averaging time, achievement to be based on the 4th-highest annual ambient measurement, averaged over 3 consecutive years, by 2010. See Canadian Council of Ministers of the Environment, 2008, *Particulate Matter and Ground-level Ozone,* www.ccme.ca/ourwork/air.html?category_id=99 (accessed April 14, 2008).
3. The 75th percentile of the data represents days with ozone concentrations approximately above 40 ppb.
4. The 25th percentile of the data represents days with ozone concentration approximately below 30 ppb.
5. p = 0.260; 90% CI: -0.1 to 0.5 ppb/year.
6. p = 0.054; 90% CI: 0.1 to 0.5 ppb/year.
7. 90% CI: 0.1% to 1.7%.
8. p = 0.001; 90% CI: 0.2 to 0.5 ppb/year.
9. 90% CI: 0.7% to 1.8%.

**Chart 1**
**The good days are getting worse and the bad days remain the same**

population-weighted ground-level ozone in parts-per-billion, 1990 to 2005, Canada




**Sources:**
Environment Canada, n.d. National Air Pollution Surveillance Program Data, based on hourly ground-level ozone concentration data, 1990 to 2005, www.etc-cte.ec.gc.ca/NAPS/index_e.html (accessed April 30, 2008).
Environment Accounts and Statistics Division, 2007, 40-km population estimates, 1990 to 2005, based on Statistics Canada, Census of Population and Population Estimates Program, special tabulation.

# Canada's ecozones and population change, 1981 to 2006

Doug Trant and Giuseppe Filoso, Environment Accounts and Statistics Division

Ecozones are areas where plants, animals, people, soils, water and climate interact to form distinct ecological systems. There is wide natural diversity in Canada, with 15 broad ecozones dividing the country into areas of common biophysical characteristics (Table 1) (Map 1).

Ecozones are a useful unit for assessing natural assets. They are also useful for monitoring the impact of both natural- and human-sourced stress on the environment. Analyzing socio-economic trends by ecozone provides insight on areas where environmental pressures and related environmental changes may be occurring.

## Population by ecozone

Between 1981 and 2006, Canada's population increased by 30%, growing from 24.3 million to 31.6 million people.[1] Using detailed data from the Census, population density and population change can be calculated for each of Canada's ecozones, effectively linking people to the ecological system that supports them.

Canada's three largest cities, Toronto, Montreal and Vancouver are located in the two most densely populated ecozones, Mixed Wood Plains (08) and Pacific Maritime (13). Populations in these ecozones increased by 36% and 60%, between 1981 and 2006. In absolute terms, populations increased by 4.4 million in the Mixed Wood Plains ecozone and by 1.2 million in the Pacific Maritime ecozone (Table 2).

Over this same time period, trends in Canada's more isolated ecozones varied widely. Population actually dropped by 210 people on the Hudson Plains (15). Conversely, the highest percentage increases in Canada's ecozones (95% and 93%) were observed in the Southern Arctic (3) and Northern Arctic (2) ecozones (Map 2).

1. Statistics Canada, CANSIM Table 153-0037 - Selected population characteristics, Canada, provinces and territories, every 5 years, http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm?Lang=E&RootDir=CII/&CANSIMFILE=CII/CII_1_E.htm (accessed May 5, 2008)

**Table 1**
**Biophysical characteristics of terrestrial ecozones**

| Ecozone code | Terrestrial ecozone | Land area ($km^2$) | Landforms | Vegetation and productivity | Surface materials and soils | Climate and oceanographic characteristics |
|---|---|---|---|---|---|---|
| 1 | Arctic Cordillera | 234,708 | Mountains | Mainly unvegetated; some shrub-herb tundra | Ice; snow; colluvium; rock; cryosols[1] | Extremely cold; dry; continuous permafrost |
| 2 | Northern Arctic | 1,371,340 | Plains; hills | Herb-lichen tundra | Moraine; rock; marine; cryosols[1] | Very cold; dry; continuous permafrost |
| 3 | Southern Arctic | 702,542 | Plains; hills | Shrub-herb tundra | Moraine; rock; marine; cryosols[1] | Cold; dry; continuous permafrost |
| 4 | Taiga Plains | 569,363 | Plains; some foothills | Open to closed mixed evergreen-deciduous forest | Organic; moraine; lacustrine; cryosols;[1] brunisols[2] | Cold; semiarid to moist; discontinuous permafrost |
| 5 | Taiga Shield | 1,122,504 | Plains; some hills | Open evergreen-deciduous trees; some lichen-shrub tundra | Canadian Shield rock; moraine; cryosols;[1] brunisols[2] | Cold; moist to semi-arid; discontinuous permafrost |
| 6 | Boreal Shield | 1,640,949 | Plains; some hills | Evergreen forest; mixed evergreen-deciduous forest | Canadian Shield rock; moraine; lacustrine; podzols;[3] brunisols[2] | Cold; moist |
| 7 | Atlantic Maritime | 192,017 | Hills and coastal plains | Mixed deciduous-evergreen forest stands | Moraine; colluvium; marine; brunisols;[2] podzols;[3] luvisols[4] | Cool; wet |
| 8 | Mixed Wood Plains | 107,017 | Plains; some hills | Mixed deciduous-evergreen forest | Moraine; marine; rock; luvisols;[4] brunisols[2] | Cool to mild; moist |
| 9 | Boreal Plains | 668,664 | Plains; some foothills | Mixed evergreen-deciduous forest | Moraine; lacustrine; organic; luvisols;[4] brunisols[2] | Cold; moist |
| 10 | Prairies | 443,159 | Plains; some hills | Grass; scattered deciduous forest (aspen parkland) | Moraine; chernozems[5] | Cold; semiarid |
| 11 | Taiga Cordillera | 264,213 | Mountains | Shrub-herb-moss-lichen tundra | Colluvium; moraine; rock; cryosols;[1] gleysols[6] | Very cold winters; cool summers; minimal precipitation |
| 12 | Boreal Cordillera | 459,864 | Mountains; some hills | Largely evergreen forest; some tundra; open woodland | Colluvium; moraine; rock; podzols;[3] cryosols[1] | Moderately cold; moist |
| 13 | Pacific Maritime | 196,200 | Mountains; minor coastal plains | Coastal evergreen forest | Colluvium; moraine; rock; podzols;[3] brunisols[2] | Mild; temperate; very wet to cold alpine |
| 14 | Montane Cordillera | 474,753 | Mountains; interior plains | Evergreen forest; alpine tundra; interior grassland | Moraine; colluvium; rock; luvisols;[4] brunisols[2] | Moderately cold; moist to arid |
| 15 | Hudson Plains | 359,546 | Plains | Wetlands; some herb-moss-lichen tundra; evergreen forest | Organic; marine; cryosols[1] | Cold to mild; semiarid; discontinuous permafrost |

**Notes:**
1. Cryosols are frozen soils.
2. Brunisols are soils with minimal weathering.
3. Podzols are acid and well-weathered soils.
4. Luvisols are temperate-region soils with clay-rich sublayers.
5. Chernozems are organically rich, relatively fertile grassland soils.
6. Gleysols are soils developed under wet conditions and characterized by reduced iron and other elements.

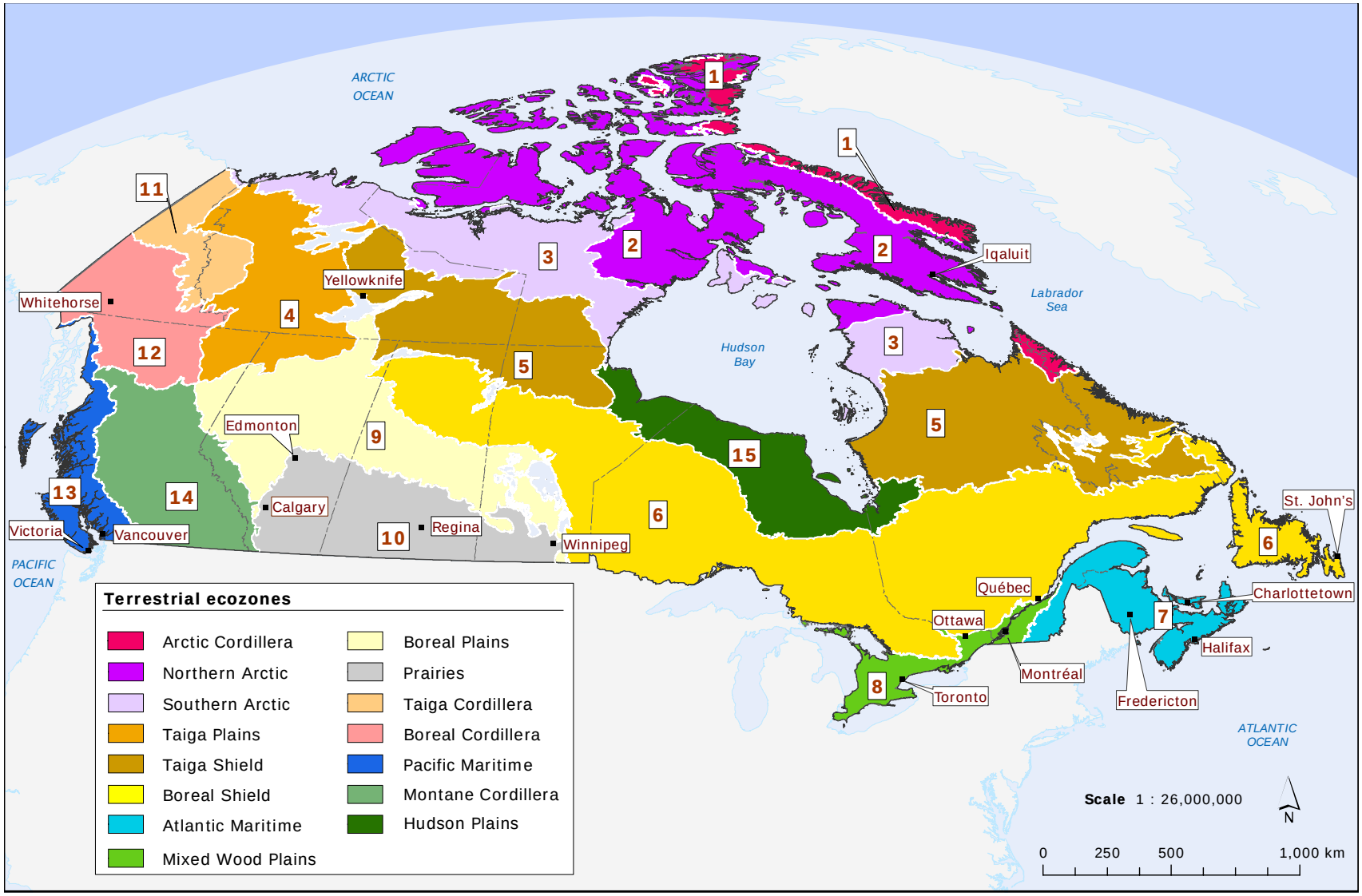
**Sources:**
Environment Canada, 1996, *The State of Canada's Environment Part II: Canadian Ecozones*, www.ec.gc.ca/soer-ree/English/SOER/1996report/Doc/1-1.cfm (accessed June 3, 2008).
Wiken, E.B. *et al.,* 1996, *A Perspective on Canada's Ecosystems: An Overview of the Terrestrial and Marine Ecozones,* Canadian Council on Ecological Areas, Occasional paper, No.14.

**Table 2**
**Population, by terrestrial ecozone, 1981 to 2006**

| Terrestrial ecozone | Ecozone code | Land area | 1981 | 2006 | 1981 to 2006 Absolute change | 1981 to 2006 Percentage change | 1981 | 2006 |
|---|---|---|---|---|---|---|---|---|
| | | | Population | | | | Population density | |
| | code | $km^2$ | number | | | % | persons per 100 square kilometres | |
| Arctic Cordillera | 1 | 234,708 | 821 | 1,293 | 472 | 57.5 | 0.3 | 0.6 |
| Northern Arctic | 2 | 1,371,340 | 11,872 | 22,859 | 10,987 | 92.5 | 0.9 | 1.7 |
| Southern Arctic | 3 | 702,542 | 8,137 | 15,893 | 7,756 | 95.3 | 1.2 | 2.3 |
| Taiga Plains | 4 | 569,363 | 18,358 | 22,225 | 3,867 | 21.1 | 3.2 | 3.9 |
| Taiga Shield | 5 | 1,122,504 | 30,859 | 41,682 | 10,823 | 35.1 | 2.7 | 3.7 |
| Boreal Shield | 6 | 1,640,949 | 2,731,344 | 2,886,412 | 155,068 | 5.7 | 166.4 | 175.9 |
| Atlantic Maritime | 7 | 192,017 | 2,428,735 | 2,554,089 | 125,354 | 5.2 | 1,264.9 | 1,330.1 |
| Mixed Wood Plains | 8 | 107,017 | 12,187,952 | 16,611,643 | 4,423,691 | 36.3 | 11,388.8 | 15,522.4 |
| Boreal Plains | 9 | 668,664 | 673,775 | 812,017 | 138,242 | 20.5 | 100.8 | 121.4 |
| Prairies | 10 | 443,159 | 3,499,494 | 4,514,106 | 1,014,612 | 29.0 | 789.7 | 1,018.6 |
| Taiga Cordillera | 11 | 264,213 | 563 | 411 | -152 | -27.0 | 0.2 | 0.2 |
| Boreal Cordillera | 12 | 459,864 | 26,507 | 32,244 | 5,737 | 21.6 | 5.8 | 7.0 |
| Pacific Maritime | 13 | 196,200 | 2,014,790 | 3,215,775 | 1,200,985 | 59.6 | 1,026.9 | 1,639.0 |
| Montane Cordillera | 14 | 474,753 | 701,014 | 873,498 | 172,484 | 24.6 | 147.7 | 184.0 |
| Hudson Plains | 15 | 359,546 | 8,960 | 8,750 | -210 | -2.3 | 2.5 | 2.4 |

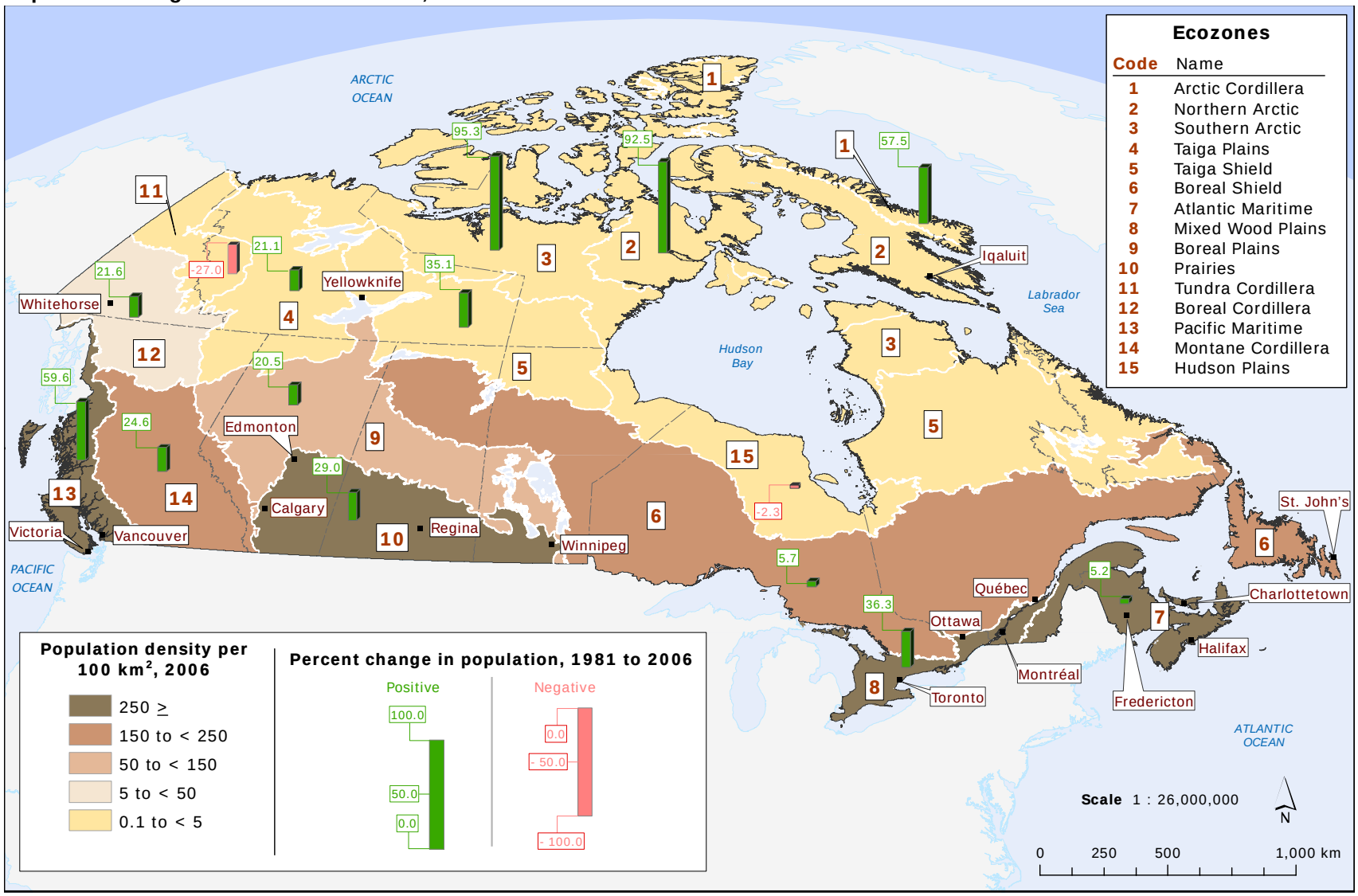
**Source:**
Statistics Canada, Environment Accounts and Statistics Division.

**Map 1**
**Terrestrial ecozones**




**Source:** Wiken, E.B. et al., 1996, A Perspective on Canada's Ecosystems: An Overview of the Terrestrial and Marine Ecozones, Canadian Council on Ecological Areas, Occasional paper, No.14.

**Map 2**
**Population change in Canada's ecozones, 1981 to 2006**




**Source:** Environment Accounts and Statistics Division

# Environment and sustainable development indicators

**Table 1**
**Population indicators**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| Population (number)[1] | 31,021,251 | 31,372,587 | 31,676,077 | 31,995,199 | 32,312,077 | 32,649,482 |
| 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 |

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.

**Sources:** Statistics Canada, CANSIM table 051-0001, http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm?Lang=E&RootDir=CII/&CANSIMFILE=CII/CII_1_E.htm (accessed May 12, 2008).
Statistics Canada, 2007, *Population and Dwelling Count Highlight Tables, 2006 Census*, http://www12.statcan.ca/english/census06/data/popdwell/Tables.cfm (accessed May 12, 2008).
Statistics Canada, 2002, *Tables - Population and Dwelling Counts, 2001 Census*, http://www12.statcan.ca/english/census01/products/standard/popdwell/Tables.cfm (accessed May 12, 2008).

**Table 2**
**Economy indicators**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| Gross Domestic Product (million chained 2002 dollars) | 1,120,146 | 1,152,905 | 1,174,592 | 1,211,239 | 1,246,064 | 1,284,819 |
| Percentage change | 1.8 | 2.9 | 1.9 | 3.1 | 2.9 | 3.1 |
| Per capita (chained 2002 dollars) | 36,109 | 36,749 | 37,081 | 37,857 | 38,563 | 39,352 |
| Consumer Price Index (2002 = 100) | 97.8 | 100.0 | 102.8 | 104.7 | 107.0 | 109.1 |
| Unemployment rate (percent) | 7.2 | 7.7 | 7.6 | 7.2 | 6.8 | 6.3 |

**Sources:** Statistics Canada, CANSIM tables 380-0017, 051-0001, 326-0021 and 282-0002, http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm?Lang=E&RootDir=CII/&CANSIMFILE=CII/CII_1_E.htm (accessed June 10, 2008).

**Table 3**
**Social indicators**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| Average household spending (current dollars) | | | | | | |
| Water and sewage | 190 | 185 | 202 | 204 | 211 | 221 |
| Electricity | 950 | 993 | 1,026 | 1,040 | 1,070 | 1,111 |
| Food | 6,285 | 6,553 | 6,618 | 6,772 | 6,978 | 7,046 |
| Gasoline and other motor fuels | 1,507 | 1,690 | 1,665 | 1,854 | 2,024 | 2,079 |
| Personal expenditure on consumer goods and services (million chained 2002 dollars) | 632,781 | 655,722 | 675,443 | 697,566 | 723,181 | 754,179 |
| Residential waste | | | | | | |
| Production per capita (kilograms) | .. | 358 | .. | 385 | .. | 398 |
| Disposal (tonnes) | .. | 8,446,766 | .. | 8,961,583 | .. | 9,238,376 |
| Disposal per capita (kilograms) | .. | 269 | .. | 280 | .. | 283 |
| Diversion (tonnes) | .. | 2,789,669 | .. | 3,363,803 | .. | 3,744,843 |
| Diversion per capita (kilograms) | .. | 89 | .. | 105 | .. | 115 |
| Diversion rate (percent of waste production) | .. | 25 | .. | 27 | .. | 29 |
| Distance driven by light vehicles[1] (million kilometres) | 283,380 | 290,320 | 286,803 | 285,164 | 289,717 | 296,871 |
| Asthma (percent of population age 12 and over) | .. | .. | 8.4 | .. | 8.3 | .. |

1. Distance driven for vehicles weighing less than 4.5 tonnes, excluding the territories.

**Sources:** Statistics Canada, CANSIM tables 203-0003, 203-0002, 203-0007, 380-0017, 153-0041, 153-0042, 051-0001, 405-0063 and 105-0400, http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm?Lang=E&RootDir=CII/&CANSIMFILE=CII/CII_1_E.htm (accessed June 23, 2008).

**Table 4**
**Energy indicators**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| Primary energy availability (terajoules) | 10,950,393 | 11,163,501 | 11,478,526 | 11,527,500 | 11,307,113 | 11,216,025 |
| Primary and secondary energy (terajoules) | | | | | | |
| Export | 9,305,984 | 9,491,341 | 9,444,883 | 9,810,695 | 9,641,137 | 9,786,984 |
| Residential consumption | 1,239,970 | 1,286,677 | 1,338,166 | 1,313,015 | 1,296,644 | 1,250,283 |
| Established reserve, closing stock[1] | | | | | | |
| Crude bitumen (million cubic metres) | 1,830 | 1,840 | 1,720 | 1,660 | 1,620 | 3,340 |
| Crude oil (million cubic metres) | 644.7 | 606.1 | 590.0 | 603.8 | 752.3 | 712.6 |
| Natural gas (billion cubic metres) | 1,547.8 | 1,529.6 | 1,469.5 | 1,497.5 | 1,553.7 | 1,577.7 |
| Recoverable reserves, closing stock[1] | | | | | | |
| Coal (million tonnes) | 4,555.3 | 4,485.3 | 4,406.4 | 4,666.3 | 4,468.8 | 4,399.3 |
| Uranium (tonnes) | 452,000 | 439,000 | 429,000 | 444,000 | 431,000 | 423,000 |
| Total electricity generation (megawatt hours) | 565,757,322 | 578,728,900 | 564,218,465 | 571,291,905 | 597,248,219 | 585,097,331 |
| 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 |
| Generation from fossil fuel and other fuel combustion (percent of total) | 29.2 | 27.9 | 28.5 | 26.4 | 25.5 | 24.2 |
| Research and development expenditures | | | | | | |
| Private sector R&D in alternative energy (million constant 1997 dollars) | 228 | 196 | 204 | .. | .. | .. |

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

**Sources:** Statistics Canada, CANSIM tables 128-0002, 128-0009, 153-0012, 153-0013, 153-0014, 153-0017, 153-0018, 153-0019 and 127-0001, http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm?Lang=E&RootDir=CII/&CANSIMFILE=CII/CII_1_E.htm (accessed May 12, 2008).
Chiru, Radu, 2006, "Research and Development for New Energy Technologies in the Private Sector," *Analysis in Brief,* Statistics Canada Catalogue no. 11-621-M, Ottawa.

**Table 5**
**Environment and natural resources indicators**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| Greenhouse gas (GHG) emissions (megatonnes of carbon dioxide equivalent) | 710 | 717 | 741 | 743 | 734 | 721 |
| GHG emissions by final demand (megatonnes of carbon dioxide equivalent) | | | | | | |
| Exports | 282 | 268 | 267 | .. | .. | .. |
| Personal consumption | 198 | 206 | 217 | .. | .. | .. |
| Annual temperature departures,[1] 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 | 263,192 |
| Subsoil resource stocks | 396,760 | 375,276 | 465,083 | 558,023 | 817,416 | 818,926 |
| Average farm pesticide expenditures (current dollars) | 6,312 | 6,228 | 7,232 | 7,602 | 7,792 | 7,863[p] |
| Air quality[2] | | | | | | |
| Ozone (population-weighted, parts per billion) | 40 | 40 | 39 | 35 | 38 | .. |
| $PM_{2.5}$ (population-weighted, micrograms per cubic metre) | 9 | 10 | 9 | 9 | 9 | .. |

1. Annual departures from the 1951-1980 temperature normals.
2. 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. Exposure studies indicate that adverse health effects can occur even with low concentrations of these pollutants in the air. Annual data are revised, based on the latest release of the *Canadian Environmental Sustainability Indicators* report.

**Sources:** Statistics Canada, CANSIM tables 378-0005, and 002-0044, http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm?Lang=E&RootDir=CII/&CANSIMFILE=CII/CII_1_E.htm (accessed May 12, 2008).
Environment Canada, 2008, *Canada's 2006 Greenhouse Gas Inventory: A Summary of Trends,* www.ec.gc.ca/pdb/ghg/inventory_report/2006/som-sum_eng.cfm (accessed June 3, 2008).
Environment Canada, 2006, *Climate Trends and Variations Bulletin,* www.msc-smc.ec.gc.ca/ccrm/bulletin/annual06/national_e.cfm (accessed May 12, 2008).
Environment Canada, Statistics Canada and Health Canada, 2007, *Canadian Environmental Sustainability Indicators*, Statistics Canada Catalogue no. 16-251-X, Ottawa.
Statistics Canada, Environment Accounts and Statistics Division, Material and Energy Flow Accounts.

# Updates

## New releases

***Canadian industry's expenditures to reduce greenhouse gas emissions***

This paper describes a revision of the 2002 greenhouse gas emission reduction expenditure estimates made by Canadian business. These estimates were derived from the 2002 Survey of Environmental Protection Expenditures. Included for comparison purposes are 2004 estimates of greenhouse gas reduction expenditures. Additional tables include statistics on the technologies used by industry as well as the obstacles and drivers encountered by industry to reduce greenhouse gas emissions.

Released June 25, 2008 (Statistics Canada Catalogue no. 16-001-M No. 5)

***Waste Management Industry Survey: Business and Government Sectors, 2006***

The report presents results from two surveys: the Waste Management Industry Survey: Business Sector and the Waste Management Industry Survey: Government Sector. Information on the physical quantities of non-hazardous waste disposed and recycled in Canada was gathered from these two surveys. The first survey covered those operations and facilities owned by businesses that provided waste management services while the second covered operations and facilities owned by Canadian local governments and other local bodies engaged in the delivery of waste management services. Information on the employment and financial characteristics of businesses and local governments involved in the supply of these services is also reported.

Released June 23, 2008 (Statistics Canada Catalogue no. 16F0023X)

***Canadian Environmental Sustainability Indicators: Data Sources and Methods***

These reports present details on the data sources and methods underlying the indicators for air quality, greenhouse gas emissions and freshwater quality reported in *Canadian Environmental Sustainability Indicators* (Statistics Canada Catalogue no. 16-251-X).

Air quality indicators: Released June 20, 2008 (Statistics Canada Catalogue no. 16-254-X)

Greenhouse gas emissions indicator: Released June 20, 2008 (Statistics Canada Catalogue no. 16-255-X)

Freshwater quality indicator: Released June 20, 2008 (Statistics Canada Catalogue no. 16-256-X)

***Agricultural Water Use Survey***

The Agricultural Water Use Survey was conducted in March 2008 to gather information on the volumes of water used, irrigation methods and practices, and sources and quality of water used for agricultural purposes on Canadian farms. The data obtained are used to support the *Canadian Environmental Sustainability Indicators* initiative, a partnership between Statistics Canada, Environment Canada, and Health Canada. The information will also be used by Agriculture and Agri-Food Canada to report on the environmental performance of the agriculture sector, and to inform future water use policy and program development to support Canadian irrigators.

Released June 6, 2008. Data are available upon request, please contact environ@statcan.ca. The full report will be released in the fall of 2008.

***Human Activity and the Environment: Annual Statistics 2007 and 2008***

With emphasis on human activity and its relationship to natural systems—air, water, soil, plants and animals—*Human Activity and the Environment* presents a compendium of maps, tables and charts. This information is punctuated with simple analysis and interpretation, which together provide statistical insight into Canada's environment. The feature article in this issue is "Climate change in Canada." The article provides the latest greenhouse gas emission data, an overview of impacts on the environment and concludes with adaptation and mitigation activities underway by governments, businesses and citizens.

Highlights:

Greenhouse gas emissions in Canada increased 25% between 1990 and 2005. Without increases in efficiency, however, the increase in emissions would have been even greater.

Over this same period, the amount of greenhouse gases emitted per unit of economic activity decreased 18%, while energy use increased 23%.

Energy production and consumption are by far the largest source of greenhouse gas emissions in Canada, accounting for more than 80% of emissions in 2005.

Seventy-six percent of the increase in domestic industrial emissions from 1990 to 2003 was due to the production of goods and services for export.

Released April 22, 2008 (Statistics Canada Catalogue no. 16-201-X)

### *Commuting Patterns and Places of Work of Canadians, 2006 Census*

This product examines the journey to work of Canadians and includes data on workplace location, mode of transportation to work and commuting distance between home and work. Data from the 2006 Census show that although the majority of Canadians use their cars to travel to work, more workers are using public transportation for their daily commute.

Released April 9, 2008 (Statistics Canada Catalogue no. 97-561-X)

### *Organic: from niche to mainstream*

This article, part of the 2006 edition of *Canadian Agriculture at a Glance*, provides insight on the rapidly evolving organic food sector of agriculture in Canada. With growing consumer demand and increasing visibility, many organic food products in Canada are being showcased in grocery stores, natural food stores, farmers' markets and in community-supported agriculture projects. For consumers the challenge is to know what "organic" really means. Is it the same as "certified organic"? How large is the market for organic food in Canada and what are farmers doing to address the demand?

Released March 28, 2008 (Statistics Canada Catalogue no. 96-325-X)

### CANSIM tables and updates

CANSIM is Statistics Canada's key socio-economic database.

Data for the year 2006 can now be found in the following tables on CANSIM:

**CANSIM table 153-0041,** Disposal of waste, by source

**CANSIM table 153-0042,** Materials prepared for recycling, by source

**CANSIM table 153-0043,** Materials prepared for recycling, by type

**CANSIM table 153-0044,** Business sector characteristics of the waste management industry

**CANSIM table 153-0045,** Local government characteristics of the waste management industry

## Upcoming releases

### *Survey of Environmental Protection Expenditures, 2006*

This publication will consist of preliminary data from the 2006 Survey of Environmental Protection Expenditures. Estimates of environmental protection expenditures, by industry and province, made by Canadian businesses in response to environmental regulations, conventions or voluntary agreements, will be presented. The estimates will include capital and operating expenditures made for pollution abatement and control, pollution prevention, environmental assessments and audits, and environmental monitoring activities.

Release – Summer 2008 (Statistics Canada Catalogue no. 16F0006X)

## New developments

### *What's next – Survey of Drinking Water Plants*

Terence Nelligan, Environment Accounts and Statistics Division

Statistics Canada is developing a new survey that will collect information from drinking water plants in Canada. This survey is part of a broader initiative of Statistics Canada, Environment Canada and Health Canada to develop national indicators of air quality, greenhouse gas emissions and freshwater quality. These *Canadian Environmental Sustainability Indicators (CESI)* are

intended to provide Canadians with more regular and consistent information on the state of their environment and how it is linked with human activities. As part of this indicators initiative, the Survey of Drinking Water Plants will support the development of a national indicator of source and treated water quality.

In 2007, Statistics Canada requested the inventories of drinking water plants (DWPs) held by the provinces and territories to facilitate a survey of facilities that draw and process raw/source water from the environment and convey treated/finished water for consumption. Excluding systems that supply water to communities with less than 300 people and other regulated systems that service schools, camp grounds, commercial establishments, provincial parks, etc., a survey frame of approximately 2,600 DWPs serving communities of 300 or more people was compiled, the majority being publicly-owned (municipal) systems. With respect to DWPs in First Nations communities, Indian and Northern Affairs Canada (INAC) has agreed to include the survey content in their engineering review of DWPs that will be conducted in 2008 and 2009.

The survey collects detailed information concerning the quantity and quality of raw (source) and treated (finished) water processed by DWPs in Canada. Information concerning the treatment processes used and the associated costs of acquiring and treating raw water is also collected by the survey. The survey covers a three year reporting period (2005 to 2007) in order to support the CESI project and its national water quality indicator. Three years of data will allow parameters sampled at lower frequencies to be available for use in the source and treated water quality indicator pilot being developed by Health Canada. The survey will be run under the authority of the *Statistics Act*. The survey is expected to be mailed out in the spring of 2008 with preliminary data anticipated by the end of 2008 and a report of the results made available by the spring of 2009.

## Socio-economic conference 2008

The Statistics Canada Socio-economic Conference provides an annual forum for empirical research focusing on issues of concern in Canadian public policy. At the May 5-6, 2008 conference there were nine environment-related presentations.

**Getting to 2050: Canada's Transition to a Low-emission Future**
Jill Baker, National Round Table on the Environment and the Economy, Ottawa, Ontario

**Home Heating in Canadian Households**
Gordon Dewis, Environment Accounts and Statistics Division, Statistics Canada

**State of Atlantic Canada Forest Industry: Challenges and Opportunities for Economic Development**
Donald W. Floyd, University of New Brunswick, Saint John, New Brunswick and Rajendra Kumar Chaini, Natural Resources Canada, New Brunswick

**Pesticide Use in Canada: Reducing Pesticide Risks to the Environment and Human Health**
Tim MacDonald, Agriculture and Agri-Food Canada and Martin S. Beaulieu, Agriculture Division, Statistics Canada

**Perceptions of Recreational Fishing Quality in Ontario**
Eric Miller and Helen Ball, Ontario Ministry of Natural Resources, Toronto, Ontario

**Impact of Climate Change on Agriculture and Forestry Dependent Communities**
Christopher Nicholls, Rural Secretariat, Ottawa, Ontario

**Socio-economic Impacts of Forest Pest Disturbances in Canada: Learning from the Mountain Pine Beetle Experience**
Holly Palen, Selina Young and John Hector, Natural Resources Canada, Ottawa, Ontario

**The Canadian Environmental Sustainability Indicators: On a Population Weighted Ground-level Ozone**
Soheil Rastan, Joe St. Lawrence and Lauren Dong, Environment Accounts and Statistics Division, Statistics Canada

**Demographic Profiling of Canada Greenhouse Gas Emissions**
Joe St. Lawrence, Environment Accounts and Statistics Division, Hans Messinger, Industry Accounts Division and Chantal Hicks, Socio-Economic Analysis and Modeling Division, Statistics Canada

The complete program is available on Statistics Canada's website at: www.statcan.ca/english/conferences/socioeconomic2008/index-en.htm. For further information please contact the presenters directly.

***Latest indicators: Natural resource wealth***

Joan Forbes, Environment Accounts and Statistics Division

This new addition to *EnviroStats*' front page set of indicators tracks changes in the estimated dollar values of Canada's non-produced assets, also referred to as natural resource assets. Monetary values of land, timber, energy and mineral resource stocks make up Canada's natural resource wealth.

Not all stocks of timber, energy and mineral resources are included in the measurement. Only the portions of stocks that meet a pre-determined set of criteria are given a value. These estimates are ultimately integrated into an annual national balance sheet table that presents a broader measure of the country's national wealth.

For additional information, please see:

Statistics Canada, 2006, *Concepts, Sources and Methods of the Canadian System of Environmental and Resource Accounts,* Catalogue no. 16-505-G, Ottawa.

Statistics Canada, CANSIM Table 378-0005 – National Balance Sheet, National Wealth Accounts, annual, http://cansim2.statcan.ca/cgi-win/cnsmcgi.pgm?Lang=E&RootDir=CII/&ARRAY_VREL=3780005&PortalID=3764&ResultTemplate=V3764.