

EnviroStats



Spring 2009

Vol. 3, no. 1

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Latest indicators			
Population 2007 to 2008 Percentage change	1.2%	Particulate matter (PM _{2.5}) 2000 to 2006	No significant trend
Gross domestic product, monthly December 2008 Percentage change	-1.0%	Ground-level ozone 1990 to 2006 Median percent change per year	0.7%
Greenhouse gas emissions 2005 to 2006 Percentage change	-1.9%	Natural resource wealth 2007 to 2008 Percentage change	19.0%



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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 <i>Statistics Act</i>
E	use with caution
F	too unreliable to be published

Transportation in the North

Joseph Patrick Dunlavy, Industry Accounts Division, Monica Lipai and Gord Baldwin, Transportation Division

Life in Canada's North can be different than life in the rest of the country and these differences extend to transportation choices and options. Efficient movement of people and goods is needed for society and the economy to function. The usual means of transporting goods and people are not necessarily available in the North due to the harsh climate.

Northern residents have a high propensity to travel by plane and have higher household expenditures for air travel. In Canada, just over a quarter of greenhouse gas emissions come from transportation, with the bulk of the emissions coming from road sources.^{1,2} However, air travel is more greenhouse gas intensive than driving and other types of transport.

Roads and rail less common in the North

One of the more important differences between

International Polar Year

This paper was prepared as a contribution to International Polar Year (IPY), a program of science, research and education focused on the Arctic and the Antarctic, running from March 2007 to March 2009. For further information on the IPY see the IPY Canada website at www.ipycanada.ca.

Canada's northern territories and the rest of the country is the lack of road networks (Table 1). In 2003, approximately 1% of Canada's total road network was in the three territories, and the majority of these roads were unpaved. With only 0.3% of Canada's population living in the North,³ this may not be so surprising, but lack of highway access means that the massive expanse of the Arctic, which covers almost 40% of Canada's landmass, is largely inaccessible by car and truck. Nunavut has fewer road networks than the other territories, again due to the geography of the region and the great distances between small communities. A large portion of Nunavut is composed of islands, although there is a

Table 1
Length of Canada's public road network, 2003

	Two-lane equivalent km			Percentage distribution		
	Paved	Unpaved	Total	Share of total	Paved share	Unpaved share
	thousand km			percent		
Newfoundland and Labrador	10.6	8.6	19.2	1.8	55.2	44.8
Prince Edward Island	4.3	1.8	6.1	0.6	70.5	29.5
Nova Scotia	18.1	9.0	27.1	2.6	66.8	33.2
New Brunswick	19.5	12.0	31.5	3.0	61.9	38.1
Quebec	81.5	63.2	144.7	13.9	56.3	43.7
Ontario	119.8	71.1	190.9	18.3	62.8	37.2
Manitoba	19.3	67.3	86.6	8.3	22.3	77.7
Saskatchewan	29.5	198.7	228.2	21.9	12.9	87.1
Alberta	61.7	164.6	226.3	21.7	27.3	72.7
British Columbia	48.2	22.9	71.1	6.8	67.8	32.2
Yukon	2.2	3.5	5.7	0.5	38.6	61.4
Northwest Territories	0.9	3.6	4.5	0.4	20.0	80.0
Nunavut	0.0	0.3	0.3	0.0	0.0	100.0
Total	415.6	626.6	1,042.2	100.0	39.9	60.1

Source(s):

Transport Canada, 2008, *Transportation in Canada 2007: An Overview, Addendum*, Catalogue no. TP 14816E, p. A85.

1. Transport Canada, 2008, *Transportation in Canada 2007: An Overview*, Catalogue no. TP 14816E, p. 10.
 2. Environment Canada, 2008, *National Inventory Report 1990-2006: Greenhouse Gases Sources and Sinks in Canada*, www.ec.gc.ca/pdb/ghg/inventory_e.cfm (accessed December 10, 2008).

3. Statistics Canada, 2007, *Population and Dwelling Count Highlight Tables, 2006 Census of Population*, Catalogue no. 97-550-XWE2006002.

Table 2
Percentage distribution of Canada's rail network by province and territory, 2007

	percent
Newfoundland and Labrador	1.0
Prince Edward Island	0.0
Nova Scotia	1.5
New Brunswick	2.5
Quebec	13.3
Ontario	28.2
Manitoba	9.2
Saskatchewan	16.3
Alberta	14.1
British Columbia	13.9
Yukon	0.0
Northwest Territories	0.2
Nunavut	0.0

Source(s):

Statistics Canada, CANSIM table 404-0011, accessed March 2, 2009.

Table 3
Domestic shipping—tonnage handled, by territory, 2006

	Total tonnage handled thousand tonnes
Northwest Territories	36.4
Nunavut	153.2

Source(s):

Statistics Canada, Transportation Division, custom tabulation.

significant portion that is part of the mainland as well.

Rail lines are equally scarce in the Arctic as the small northern population is widely dispersed. This, coupled with the climate, makes it difficult to set up the infrastructure needed for rail transport to work efficiently. Of Canada's three northern territories, only the Northwest Territories (N.W.T.) has operating rail lines, accounting for about 0.2% of the total rail lines in Canada (Table 2).

Since northern residents have relatively little access to these two modes of transportation, other means must be used to bring in supplies, move merchandise, and provide for the travel needs of individuals. As such, a greater emphasis is placed on marine and air transport to meet these needs.



Marine transportation

Businesses in the North make use of marine transport services to ship goods, although the three territories are not able to take advantage of this to the same extent. Nunavut has more access to marine transportation than the other two northern territories. Approximately half of the population of the N.W.T. lives in Yellowknife, which does not border on the ocean. Whitehorse in the Yukon, accounts for three-quarters of the territory's population, and no regular marine service is available.

Ports in Nunavut handled over 150 thousand tonnes of cargo from domestic ships in 2006—roughly four times the amount of cargo handled in the N.W.T. (Table 3). In addition to the larger amount of cargo passing through Nunavut's ports, the territory also has a larger number of active ports compared to the N.W.T. There were no cargo shipments reported from the Yukon.

In Nunavut, 98% of the tonnage handled is related to unloading marine cargo. In the Northwest Territories, 32% of the activity is related to unloading cargo, while 68% is for loading cargo.

Approximately 60% of the cargo moving through the N.W.T. goes through Tuktoyaktuk, which is located on the northern shore of the N.W.T. close to the mouth of the Mackenzie River. Cargo movements by ship are more evenly dispersed throughout the various ports in Nunavut, with a large concentration in Iqaluit.

Table 4
Propensity to travel by airplane, 2006

Selected cities	Enplaned and deplaned passengers	Population 2006 ¹	Aviation passenger trips per capita
Territories			
Iqaluit	110,512	6,184	17.9
Yellowknife	281,532	18,700	15.1
Whitehorse	151,765	22,898	6.6
Provinces			
Calgary	11,158,243	1,079,310	10.3
Halifax	3,290,441	372,858	8.8
Kelowna	1,264,943	162,276	7.8
Vancouver	16,200,257	2,116,581	7.7
St. John's	1,156,999	181,113	6.4
Toronto	29,467,559	5,113,149	5.8
Winnipeg	3,590,164	694,668	5.2
Edmonton	5,287,848	1,034,945	5.1
Regina	914,286	194,971	4.7
Saskatoon	1,009,462	233,923	4.3
Moncton	534,002	126,424	4.2
Charlottetown	227,352	58,625	3.9
Ottawa	3,540,530	1,130,761	3.1
Fredericton	228,050	85,688	2.7
Québec City	805,095	715,515	1.1

1. For city populations, Census Agglomerations or Census Metropolitan Area geographies were used.

Source(s):

Statistics Canada, 2008, Table 1.1, *Air Carrier Traffic at Canadian Airports 2006*, Catalogue no. [51-203-X](#).
 Statistics Canada, 2008, *2006 Census Community Profiles*, Catalogue no. [92-591-X](#).

Aviation

People in the territories often rely on aviation when going any considerable distance to, from and between northern destinations due to the absence of other alternatives. Driving is an option in a few regions, such as the area surrounding Whitehorse, but many communities are not linked by roads. To show how much the northern capitals rely on aviation for the movement of people, a comparison between the total number of passengers traveling by air and population is given in Table 4, with selected cities from the provinces presented for comparison.

The number of passengers getting on or off aircraft as a proportion of the city's population is much higher in Iqaluit and Yellowknife than in cities where other modes of transport are readily available. Although it has a population of just over 6,000, Iqaluit had over 110,000 passengers enplane and deplane from its airport in 2006. While the aggregate number of enplaned and deplaned passengers is higher in cities in the south, Iqaluit had the highest ratio of passengers per capita, at 17.9.

The busiest airport in Canada, Toronto's Lester Pearson International, has a ratio of only 5.8 passengers per capita, which approaches that of Whitehorse but is far below that of Iqaluit or Yellowknife. Cities that act as aviation hubs such as Toronto, Halifax, Calgary and Vancouver, tend to have a higher ratio because of the increased number of connecting flights, but even this upward effect does not boost these ratios higher than those found

Table 5
Total aircraft takeoffs and landings, Iqaluit, Whitehorse and Yellowknife, 2003 to 2007

Airports	Class of operation	2003	2004	2005	2006	2007
		number				
Iqaluit	Total, itinerant and local movements	16,136	16,842	16,454	18,654	19,230
	Itinerant movements	15,277	15,467	15,420	16,614	17,400
	Local movements	859	1,375	1,034	2,040	1,830
Whitehorse	Total, itinerant and local movements	23,512	23,984	23,385	27,525	27,692
	Itinerant movements	14,797	15,341	15,366	17,610	18,779
	Local movements	8,715	8,643	8,019	9,915	8,913
Yellowknife	Total, itinerant and local movements	50,802	58,885	56,342	65,969	70,699
	Itinerant movements	40,570	44,096	44,775	54,170	55,045
	Local movements	10,232	14,789	11,567	11,799	15,654

Source(s):

Statistics Canada, CANSIM tables 401-0030 and 401-0023, accessed December 10, 2008

Table 6
Household spending on transportation, Canada and the North, 2005

	Average household expenditure		
	Total transportation	Private transportation	Airplane
	dollars		
Yukon	9,382	7,833	1,296
Northwest Territories	10,438	8,572	1,433
Nunavut	4,612	2,362	1,803
Canada	8,914	8,088	436

Source(s):

Statistics Canada, CANSIM table 203-0007, accessed December 10, 2008.

in Iqaluit and Yellowknife.

The number of takeoffs and landings at airports in Iqaluit, Whitehorse and Yellowknife has increased in recent years (Table 5). Aircraft movements increased for every year, with the exception of 2005, when the number declined slightly.

Table 5 also presents the number of takeoffs and landings broken down by itinerant movements of aircraft, that is, flights with another airport as a destination/origin, and local movements (trips where the same airport serves as the origin and the destination, often flight training). There has been more variability in the local movements than in the itinerant aircraft movements.

Private vehicle use

The Survey of Household Spending shows the impact of lower usage of private vehicles for transportation and greater dependency on air travel. In 2005, average household spending on transportation was higher in the Yukon and the Northwest Territories than the Canadian average (Table 6). The difference is especially large for air travel—households in the three territories spent 3 to 4 times more than the Canadian average.

Nunavut is a bit of an exception with total transportation costs trailing the rest of Canada, in large part due to the smaller average expenditure on private transportation, which includes purchasing and leasing costs for cars and trucks as well as operating costs such as gasoline and insurance. However, Nunavut has very few roads and therefore little reason for expenditures on private automobiles. Household spending on recreational vehicles and associated services, which would

Table 7
Road motor vehicles registrations, Canada and the North, 2007

	Road vehicle registrations	
	number	percent
Yukon	30,035	0.15
Northwest Territories	24,312	0.12
Nunavut	3,529	0.02
Canada	20,593,251	100.00

Source(s):

Statistics Canada, CANSIM table 405-0004, accessed December 10, 2008.

include expenditures on boats, outboard motors, snowmobiles and all-terrain vehicles, are all higher in the Yukon, Nunavut and Northwest Territories than the Canadian average.⁴

The lack of roads is also reflected in the small percentage of the motor vehicles registered in the North. In 2007, the three territories had less than one-half of one percent of the road motor vehicles registered in Canada (Table 7).

Summary

Life in the Arctic requires adjustments to circumstances brought forth by the climate, the geography, and the distances. Transportation services are no different. As is evident from the data, the cold climate as well as the great distances and the thin markets due to small populations, make the construction and maintenance of road or rail infrastructure difficult. Not surprisingly, there is also a lack of road vehicles in the North. Without rail and road options, people rely more on other modes of transportation such as marine and aviation.

Nunavut and the Northwest Territories use marine transportation to deliver cargo, with most of the activity in Nunavut. The Yukon does not register any port activity.

All of the territories use aviation and a large number of people make use of its services. The territories display some of the highest propensities to use aviation travel in Canada relative to the population. The dependence on aviation is reflected in the high average expenditures on airplane transportation by households in the North.

4. Statistics Canada CANSIM Table 203-0010, accessed February 8, 2009.

Production of nitrogen and phosphorus from livestock manure, 2006

Nancy Hofmann, Environment Accounts and Statistics Division

Manure¹ is a by-product of raising livestock and is a source of many valuable nutrients including nitrogen and phosphorus. However, these nutrients can also become a source of pollution, resulting in water contamination and unwanted air emissions.² For instance, an overabundance of nutrients can foster excessive plant and algae growth in water bodies. When these plants die, their decomposition removes dissolved oxygen from the water, making it unsuitable for fish and other forms of aquatic life, a process known as eutrophication.

This article is a follow-up to “[A geographical profile of livestock manure production in Canada, 2006](#)” published in the December 2008 issue of *EnviroStats*. Please refer to the earlier article for information about the methodology, definitions and data sources used here.³

In 2006, Canadian livestock manure contained 1.1 million tonnes of nitrogen and 300 thousand tonnes of phosphorus, up by 17% and 21% respectively from 1981 levels. These increases are a result of increased populations of livestock as well as variations in nutrient output by animal type.

Nutrient production from manure geographically concentrated

Nitrogen and phosphorus production from livestock manure were concentrated in the same general clusters as those for overall manure production reported in the earlier article. These nutrient clusters were located in central and southern Alberta, southwestern Ontario, and south-eastern Quebec (Maps 1 and 2). There were smaller clusters of sub-sub drainage areas (SSDAs)⁴ with high nutrient

production in southern Manitoba and southern British Columbia.

Manure contains varying amounts of organic matter, water and nutrients, but generally includes more nitrogen than it does phosphorus. Larger animals, such as cattle, produce more manure, and thus generate greater amounts of nutrients. However, there are other differences due to livestock type. For example, pig and poultry manure contains relatively more phosphorus than other types of manure.⁵

Overall, beef cows produced the most nitrogen, followed by calves, heifers, milk cows and pigs (Table 1). Pigs produced a greater share of total phosphorus than nitrogen; they generated the second highest amount of phosphorus behind beef cows. Most manure in Alberta was produced by cattle, whereas manure was produced by a wider range of livestock in southern Ontario and Quebec.

Table 1
Total nitrogen and phosphorus content of manure, by livestock type, 2006

	Nitrogen Phosphorus		Nitrogen Phosphorus	
	tonnes		percentage of total	
Beef cows	399,515	108,104	36.4	35.7
Bulls	22,130	5,988	2.0	2.0
Calves	130,755	35,381	11.9	11.7
Goats	1,843	450	0.2	0.1
Heifers	128,819	34,857	11.7	11.5
Horses	22,290	5,275	2.0	1.7
Milk cows	120,667	26,513	11.0	8.7
Pigs	102,568	38,877	9.3	12.8
Poultry	61,080	18,991	5.6	6.3
Sheep	7,874	1,631	0.7	0.5
Steers	100,250	27,126	9.1	8.9
Total	1,097,790	303,194	100.0	100.0

Sources(s):

Agriculture and Agri-Food Canada and Statistics Canada, Environment Accounts and Statistics Division, special tabulations, Census of Agriculture, Census Geographic Component Base, 2006.

1. For the purposes of this study, manure consists of livestock feces and urine.
2. For more information on the impacts of nutrients on the environment please visit *Nutrients and their Impact on the Canadian Environment* by Environment Canada at <http://dsp-psd.pwgsc.gc.ca/Collection/En21-205-2001E-2.pdf>.
3. To summarize, census livestock data were allocated to drainage areas in accordance with procedures developed by Agriculture and Agri-food Canada in collaboration with Statistics Canada's Agriculture Division. Please see: Definitions, Data sources and methods, [8012](#), Census of Agriculture: Environmental Geography Aggregations of Census Farm Units.
4. The SSDA is the smallest unit in the National Hydrological Network of Canada. Drainage areas, also called watersheds

or drainage basins, are areas where all contributing surface waters share the same drainage outlet.

5. K. Buckley and M. Makortoff, 2004, *Phosphorus in Livestock Manures*, www.farmwest.com/index.cfm?method=library_showPage&librarypageid=137 (accessed November 27, 2008).

Livestock in Alberta and Ontario produce the most nutrients

Table 2 lists the top ten nitrogen- and phosphorus-producing SSDAs in Canada. These ten SSDAs were responsible for 17% of the total nitrogen and also total phosphorus produced in livestock manure in 2006. SSDAs in Alberta and Ontario dominated the top ten rankings for total nitrogen and phosphorus production by weight.

However, when manure production is divided by the size of the drainage area to obtain a measure of intensity, in kilograms of manure per hectare, SSDAs in Ontario out rank basins from other provinces (Table 3). Sub-sub-drainage areas vary in

size, with basins found in southern Ontario and Quebec often much smaller than those found elsewhere in the country. For instance, the Maitland SSDA occupies an area of about 260,000 hectares, about one third the size of the Little Bow SSDA which covers an area of almost 800,000 hectares.

Table 2
Sub-sub drainage areas with the highest levels of nitrogen and phosphorus production from manure, 2006

Rank	Sub-sub drainage area	Nitrogen tonnes	Sub-sub drainage area	Phosphorus tonnes
1	Little Bow (Alta.)	24,117	Little Bow (Alta.)	6,592
2	Central Red Deer - Rosebud (Alta.)	23,634	Central Red Deer - Rosebud (Alta.)	6,556
3	Upper Grand (Ont.)	21,943	Upper Grand (Ont.)	6,112
4	Yamaska (Que.)	19,610	Yamaska (Que.)	6,080
5	Headwaters Battle (Alta.)	18,848	Headwaters Battle (Alta.)	5,144
6	Upper Thames (Ont.)	16,946	Upper Thames (Ont.)	5,067
7	Upper Red Deer - Blindman (Alta.)	16,062	Maitland (Ont.)	4,456
8	Central Oldman-Belly (Alta.)	15,163	Upper Red Deer - Blindman (Alta.)	4,400
9	Maitland (Ont.)	15,128	Central Oldman - Belly (Alta.)	4,125
10	Saugeen (Ont.)	14,408	Saugeen (Ont.)	3,960

Source(s):

Agriculture and Agri-Food Canada and Statistics Canada, Environment Accounts and Statistics Division, special tabulations, Census of Agriculture, Census Geographic Component Base, 2006.

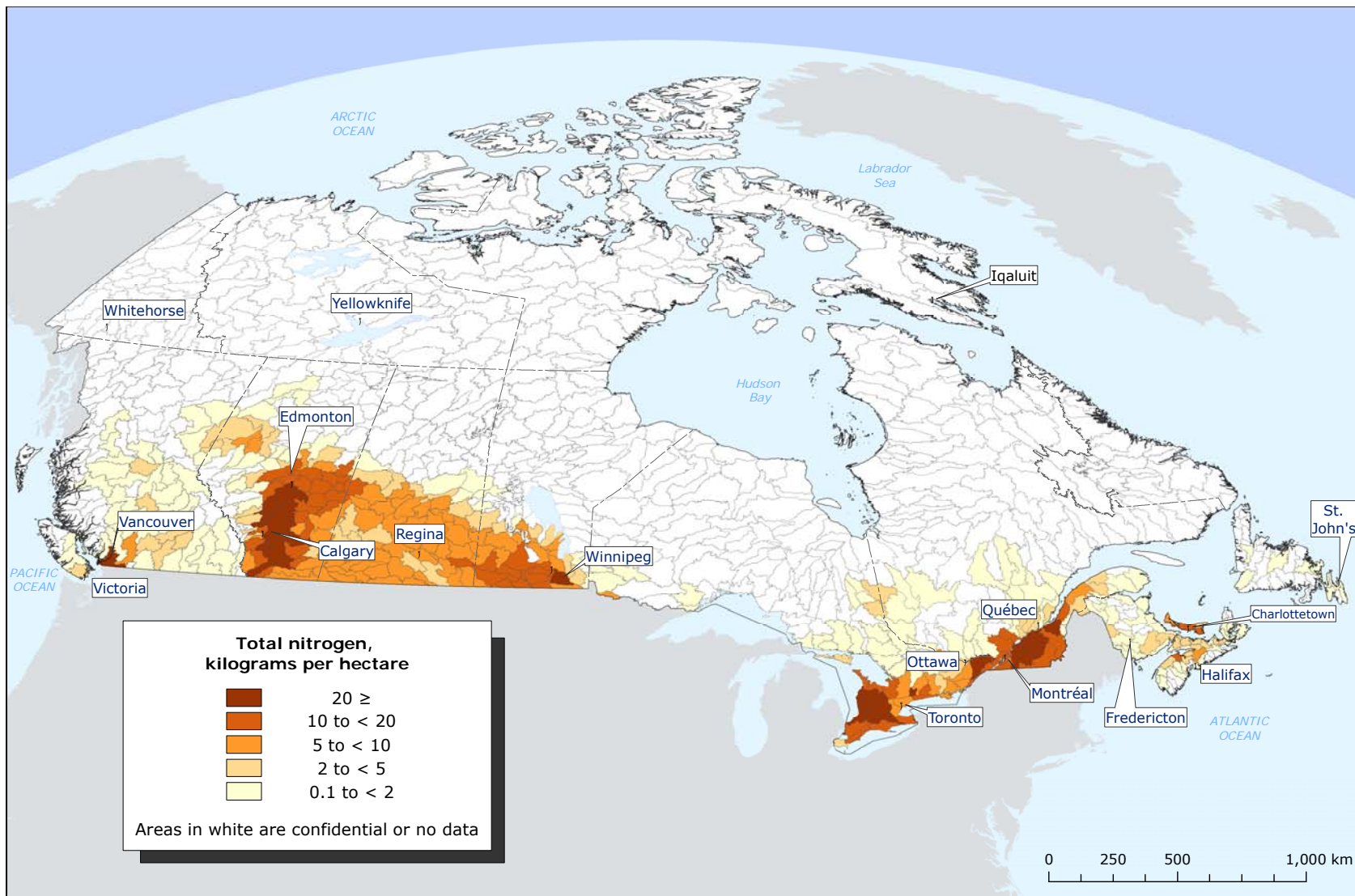
Table 3
Sub-sub drainage areas with the highest intensities of nitrogen and phosphorus production from manure, 2006

Rank	Sub-sub drainage area	Nitrogen kg/ha	Sub-sub drainage area	Phosphorus kg/ha
1	Maitland (Ont.)	58	Maitland (Ont.)	17
2	Upper Thames (Ont.)	56	Upper Thames (Ont.)	17
3	Upper Grand (Ont.)	46	Yamaska (Que.)	13
4	Yamaska (Que.)	42	Upper Grand (Ont.)	13
5	Ausable (Ont.)	39	Ausable (Ont.)	12
6	Saugeen (Ont.)	35	Rat and Tourond (Man.)	11
7	Rat and Tourond (Man.)	33	Saugeen (Ont.)	10
8	Central Oldman-Belly (Alta.)	32	Penetangore (Ont.)	9
9	Penetangore (Ont.)	31	Central Oldman - Belly (Alta.)	9
10	Little Bow (Alta.)	30	Little Bow (Alta.)	8

Source(s):

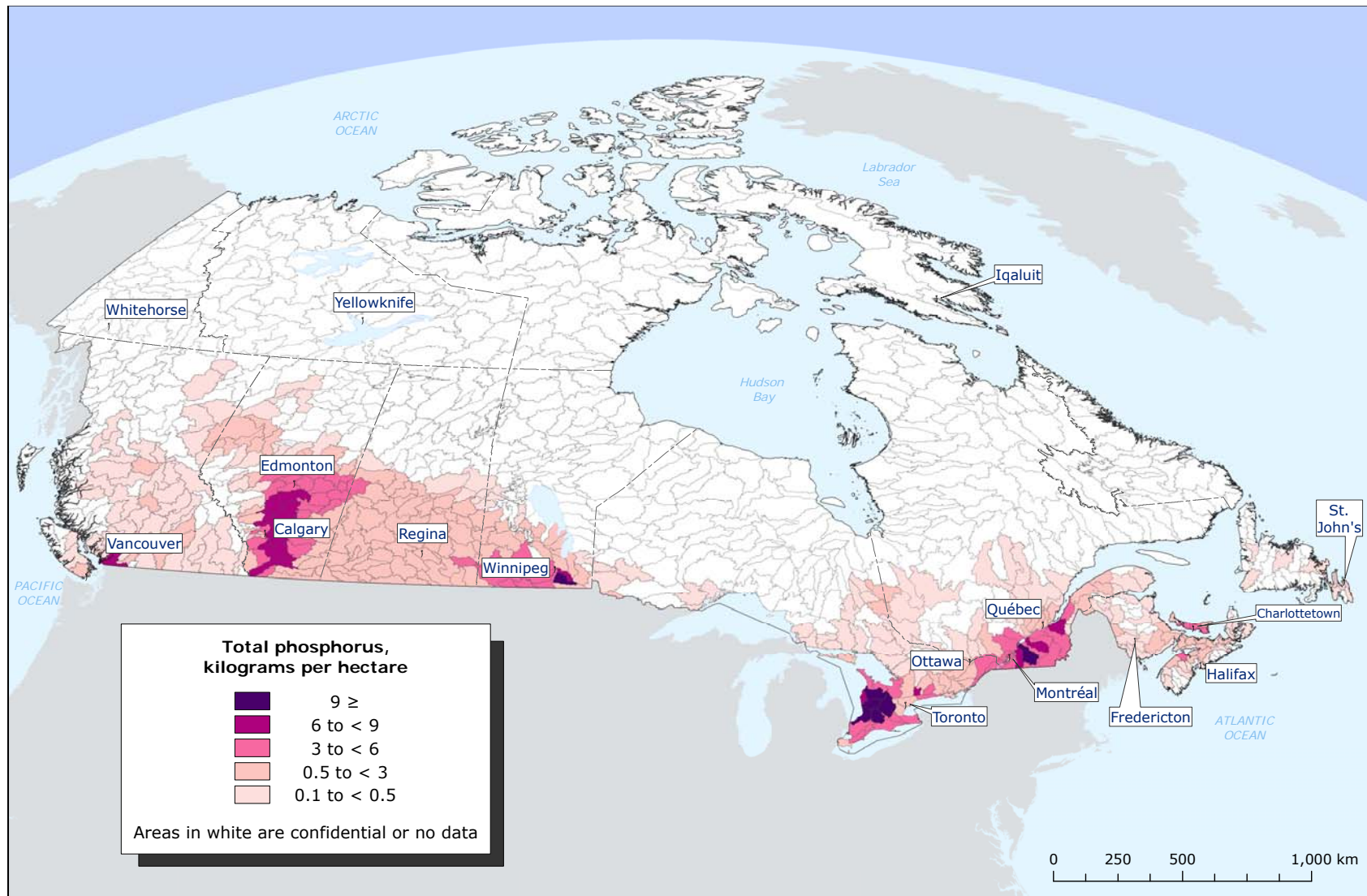
Agriculture and Agri-Food Canada and Statistics Canada, Environment Accounts and Statistics Division, special tabulations, Census of Agriculture, Census Geographic Component Base, 2006.

Map 1
Livestock manure: nitrogen intensity by sub-sub drainage area, 2006



Source(s): Agriculture and Agri-Food Canada and Statistics Canada, Environment Accounts and Statistics Division, special tabulations, Census of Agriculture, Census Geographic Component Base, 2006.

Map 2
Livestock manure: phosphorus intensity by sub-sub drainage area, 2006



Source(s):

Agriculture and Agri-Food Canada and Statistics Canada, Environment Accounts and Statistics Division, special tabulations, Census of Agriculture, Census Geographic Component Base, 2006.

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Environment and sustainable development indicators

Table 1
Population indicators

	2002	2003	2004	2005	2006	2007
Population (number) ¹	31,353,656	31,639,670	31,940,676	32,245,209	32,576,074	32,927,372
Percentage change	1.1	0.9	1.0	1.0	1.0	1.1
Aged 65 and over (percent of total)	12.7	12.8	13.0	13.1	13.3	13.5
Urban (percent of total)	..	..	..	..	80.2	..
Density (per square kilometre)	3.5	3.5	3.5	3.6	3.6	3.7

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.

Source(s):

Statistics Canada, CANSIM table 051-0001, accessed February 5, 2009.

Statistics Canada, 2007, *Population and Dwelling Count Highlight Tables, 2006 Census*, www12.statcan.ca/english/census06/data/popdwel/Tables.cfm (accessed February 5, 2009).

Table 2
Economy indicators

	2002	2003	2004	2005	2006	2007
Gross Domestic Product (million chained 2002 dollars)	1,152,905	1,174,592	1,211,239	1,246,064	1,284,819	1,319,681
Percentage change	2.9	1.9	3.1	2.9	3.1	2.7
Per capita (chained 2002 dollars)	36,771	37,124	37,922	38,643	39,441	40,079
Consumer Price Index (2002 = 100)	100.0	102.8	104.7	107.0	109.1	111.5
Unemployment rate (percent)	7.7	7.6	7.2	6.8	6.3	6.0

Source(s):

Statistics Canada, CANSIM tables 380-0017, 051-0001, 326-0021 and 282-0002, accessed February 5, 2009.

Table 3
Social indicators

	2002	2003	2004	2005	2006	2007
Average household spending ¹ (current dollars)						
Total	59,439	60,088	62,464	65,575	67,736	69,946
Water and sewage	185	202	204	211	221	253
Electricity	993	1,026	1,040	1,070	1,111	1,147
Food	6,553	6,618	6,772	6,978	7,046	7,305
Gasoline and other motor fuels	1,690	1,665	1,854	2,024	2,079	2,223
Personal expenditure on consumer goods and services (million chained 2002 dollars)	655,722	675,443	697,566	723,181	754,179	788,224
Residential waste						
Production per capita (kilograms)	358	..	386	..	399	..
Disposal (tonnes)	8,446,766	..	8,961,583	..	9,238,376	..
Disposal per capita (kilograms)	269	..	281	..	284	..
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 ² (million kilometres)	290,320	286,803	285,164	289,717	296,871	300,203
Asthma (percent of population age 12 and over)	..	8.4	..	8.3	..	..

1. Data on average household spending is based on the Survey of Household Spending (SHS). For information on the difference between the SHS and personal expenditure data please see: Statistics Canada, 2008, *Guide to the Income and Expenditure Accounts*, Catalogue no. [13-017-X](#).

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

Source(s):

Statistics Canada, CANSIM tables 203-0001, 203-0003, 203-0002, 203-0007, 380-0017, 153-0041, 153-0042, 051-0001, 405-0063 and 105-0400, accessed February 5, 2009.

Table 4
Energy indicators

	2002	2003	2004	2005	2006	2007
Primary energy availability (terajoules)	11,163,501	11,478,526	11,527,500	11,307,113	11,176,879	11,654,755
Primary and secondary energy (terajoules)						
Export	9,491,341	9,444,883	9,810,695	9,641,137	9,833,549	10,246,727
Residential consumption	1,286,677	1,338,166	1,313,015	1,296,644	1,243,425	1,344,404
Established reserve, closing stock ¹						
Crude bitumen (million cubic metres)	1,840	1,720	1,660	1,620	3,340	3,500
Crude oil (million cubic metres)	606.1	590.0	603.8	752.3	712.6	..
Natural gas (billion cubic metres)	1,529.6	1,469.5	1,497.5	1,553.7	1,577.7	..
Recoverable reserves, closing stock ¹						
Coal (million tonnes)	4,485.3	4,423.1	4,404.2	4,315.6	4,468.8	4,395.1
Uranium (tonnes)	439,000	429,000	444,000	431,000	423,400	..
Total electricity generation (megawatt hours)	578,728,900	564,218,465	571,291,905	597,810,875	585,097,531	603,572,420
Hydro (percent of total)	59.8	59.0	58.7	60.1	60.0	60.6
Nuclear (percent of total)	12.3	12.5	14.9	14.5	15.8	14.6
Generation from fossil fuel and other fuel combustion (percent of total)	27.9	28.5	26.4	25.4	24.2	24.8
Research and development expenditures						
Private sector R&D in alternative energy (million constant 1997 dollars)	196	204	..	..	..	..

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

Source(s):

Statistics Canada, CANSIM tables 128-0009, 153-0012, 153-0013, 153-0014, 153-0017, 153-0018, 153-0019 and 127-0001, accessed February 5, 2009.

Chiru, Radu, 2006, "Research and Development for New Energy Technologies in the Private Sector," *Analysis in Brief*, Statistics Canada Catalogue no. [11-621-MWE2006050](#).

Table 5
Environment and natural resources indicators

	2002	2003	2004	2005	2006	2007
Total greenhouse gas (GHG) emissions (megatonnes of carbon dioxide equivalent)	717	741	743	734	721	..
GHG emissions per capita (tonnes)	22.9	23.4	23.3	22.8	22.1	..
GHG emissions by final demand						
Total household ¹ (megatonnes of carbon dioxide equivalent)	420	430	418 ^p	..	..	..
Total household per capita (tonnes)	13.4	13.6	13.1 ^p	..	..	..
Direct household ² (megatonnes of carbon dioxide equivalent)	110	113	112 ^p	..	..	..
Indirect household ³ (megatonnes of carbon dioxide equivalent)	310	317	306 ^p	..	..	..
Exports (megatonnes of carbon dioxide equivalent)	268	268	270 ^p	..	..	..
Annual temperature departures, ⁴ Canada (degrees Celsius)	0.6	1.1	0.1	1.7	2.4	0.9
Value of selected natural resources (million current dollars)						
Land	1,013,754	1,095,419	1,227,819	1,358,968	1,506,869	1,675,870
Timber	303,278	297,474	311,771	290,511	275,462	263,459
Subsoil resource stocks	375,276	465,083	566,179	807,913	938,630	1,008,028
Average farm pesticide expenditures (current dollars)	6,228	7,232	7,602	7,792	8,268	8,732
Air quality ⁵						
Ozone (population-weighted, parts per billion)	40	40	36	39	37	..
PM _{2.5} (population-weighted, micrograms per cubic metre)	10	9	9	9	8	..

1. Total household greenhouse gas emissions are the sum of direct plus indirect household greenhouse gas emissions.
2. Direct household greenhouse gas emissions include all greenhouse gas emissions due to energy use in the home and for private motor vehicles.
3. Indirect household greenhouse gas emissions are those business-sector emissions due to the production of the goods and services purchased by households. An estimate of the greenhouse gas emissions from foreign companies due to the production of the imported goods purchased by Canadian households is included.
4. Annual departures from the 1951-1980 temperature normals.
5. 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.

Source(s):

Statistics Canada, CANSIM tables 153-0046, 051-0001, 378-0005, and 002-0044, accessed February 5, 2009.

Environment Canada, 2008, *National Inventory Report: Greenhouse Gas Source and Sinks in Canada, 1990-2006*,

www.ec.gc.ca/pdb/ghg/inventory_report/2006_report/toc-eng.cfm (accessed February 5, 2009).

Environment Canada, 2007, *Climate Trends and Variations Bulletin*, www.msc-smc.ec.gc.ca/ccrm/bulletin/annual07/national_e.cfm (accessed February 5, 2009).

Environment Canada, 2009, *Canadian Environmental Sustainability Indicators 2008 – Air Quality*, www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=B4B7C8F6-1#AIRchart1Edetails (accessed March 17, 2009).

Statistics Canada, Environment Accounts and Statistics Division, Material and Energy Flow Accounts.

Updates

Recent releases

Environment Accounts and Statistics Product Catalogue

Environment Accounts and Statistics Division is Statistics Canada's focal point for the collection, analysis and dissemination of environmental information. This reference guide briefly describes the division's programs, as well as all publications and electronic products offered on a quarterly, annual, biennial and occasional basis.

Released March 19, 2009 (Statistics Canada Catalogue no. [16-257-X](#))

Households and the Environment Survey, 2007

Statistics Canada conducts the Households and the Environment Survey every two years to measure household behaviours with respect to the environment. The survey collects information that can be used to measure changes in environmental practices at the household level. The subjects examined include energy and water conservation, drinking water source and treatment, recycling and waste reduction practices, indoor and outdoor air quality, vehicle use, and the use and disposal of potentially hazardous household substances.

Released February 10, 2009 (Statistics Canada Catalogue no. [11-526-X](#))

Lead, mercury and cadmium levels in Canadians

This article presents preliminary data on blood levels of lead, total mercury, and cadmium in Canadians from the first 8 collection sites of the Canadian Health Measures Survey (CHMS). CHMS data will be used to assess the population for a broad range of environmental chemicals, chronic diseases, nutritional status and infectious diseases. The data will also provide a baseline for emerging trends and enable comparisons with other countries.

Released November 19, 2008 (Statistics Canada Catalogue no. [82-003-X](#))

New developments

Northern Survey Initiatives

Kathryn Stevenson, Labour Statistics Division

Considering the vast land masses of the Canadian north—1.1 million square kilometres in the Northwest Territories, 475,000 sq km in Yukon and 1.9 million sq km in Nunavut—the total population in Canada's territories is small with just over 100,000 people or 0.3% of the total Canadian population. An increasing amount of attention is being paid to the North and it is likely that Canadians will continue to look for more information about the land and the people who live there. Projects related to International Polar Year 2007-2008, the largest-ever international program of science focused on the Arctic and Antarctic regions, provide an opportunity to increase knowledge of the Canadian North.

The Northwest Territories, Yukon and Nunavut face similar challenges related to geography and the distribution of their populations. They also share with the provinces many of the same information needs to support programs and policy development in areas that include the economy, health, social issues and the environment.

Statistics Canada has established a Northern Survey Initiatives position to engage its Territorial counterparts on a range of issues related to conducting household surveys. Data quality, response burden, highlighting data already collected in the North and discussing best practices for collection are all components of the initiative. For more information, please contact labour@statcan.gc.ca.

CANSIM tables and updates

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

The following tables have been added to CANSIM:

CANSIM table 153-0059, Households and the environment survey, use of energy-saving lights, Canada and provinces

CANSIM table 153-0060, Households and the environment survey, use of thermostats, Canada and provinces

CANSIM table 153-0061, Households and the environment survey, radon awareness and testing, Canada and provinces

CANSIM table 153-0062, Households and the environment survey, dwelling's main source of water, Canada and provinces

CANSIM table 153-0063, Households and the environment survey, primary type of drinking water consumed, Canada and provinces

CANSIM table 153-0064, Households and the environment survey, use of fertilizer and pesticides, Canada and provinces

CANSIM table 153-0065, Households and the environment survey, awareness of air quality advisories and their influence on behaviours, Canada and provinces

CANSIM table 153-0066, Households and the environment survey, treatment of drinking water, Canada and provinces