



Ecosystem accounting; Measuring extent in Canada



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Statistics Canada



1) Background

Statistique

Canada

Our current focus in ecosystem accounting



outputs a) publications Catalogue no. 16-201-X ISSN 1923-6751 Human Activity and the Environment 2015 The changing landscape of Canadian metropolitan areas Release date: March 22, 2016 Canada Statistics Statistique Canada Canada b) data Table 2 - continued ariables of demand for wetland services, indicators of demand for multiple services, southern Canada, 201 Land in 41,986 34,882 47,332 67,088 55,777 61,880 102,925 10,049 1,027 27,097 687,662 737,398 61,488 73,650 185,393 2,018,645 488,653 4,370 140 8,701 183.3 08G 08H 08J 08K 08K 08K 08K 08N 08N 08O 08P 11A 16.4 21.1 1.3 1.1 3.3 32.6 4.7 0.4 0.1 0.3 0.3 93.7 248.0 734.5 381.0 80.6 390.6 83.4 1,021.5 3.4 44 30 10.1 54 3.1 0.3 84.9 ties of water Meth. Bagey New X. 2019. The Control of C special tabulation, Census of Agricul Time Series 2000-2011, Earth Scien May 8, 2013). Statistics Canada, En c) Maps and infographics An overview of Canada's RESHWATER IN CANADA at Conside's Institution raise from 1971 to 2013 FOREST RESOURCES >>> DID YOU KNOW? 3,478 km³ OW MUCH OF CANADA'S FOREST AREA 104,000 m³ 3.470.690 km 35% 16% 11% WATER USE >>> QUICK FACT -FOREST SPECIES **@**\$

Canada

AGE CLASSES

INCES AFFECT CANADA'S FORESTS?

HARVESTING Crash beyested 7755er 7755er

FOREST FIRES

DEFORESTATION



a) Generic land cover classification



2) Progression on extent using land use and land cover datasets

Land cover Evergreen forest Barrenland Deciduous forest Cropland Mixedwood Built-up Taiga sparse conifer Water Shrubland Other¹ Grassland

b) 2013 – "Measuring ecosystem goods and services" publication



d) 2019 - ecosystem accounts











4) Built up and artificial surfaces

CLI-LU and CLUMP (1971)





4) Converting built-up spatial data to tabular statistics



Land cover and land use, Toronto census metropolitan area-ecosystem (CMA-E), 1971, 1991, 2001 and 2011 square kilometres 7 000 6 0 0 0 5 0 0 0 Forest 4 0 0 0 Water 3 000 2 0 0 0 1 0 0 0 Other 0 1971 1991 2001 2011 1971 1991 2001 2011 1971 1991 2001 2011 Built-up area Arable land Natural and semi-natural land Land cover and land use

Ecosystem asset account, Toronto census metropolitan area-ecosystem , 1971 to 2011										
	Total built-up	area ¹	Arable ²	Natural and						
	Settled	Roads		semi-natural ³						
	square kilometres									
Opening stock 1971	850	418	4 930	<mark>6 615</mark>						
Land lost to settled area			-961	-448						
Balance of change ⁴	1 409	403	-102	-300						
Closing stock 2011	2 260	821	3 867	5 866						





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4) Linear features as artificial surfaces: extent and condition accounts

Asset Extent to -0- ☆ Asset Condition ★ / 10 Asset Condition ★ / 10 Condition



Linear feature density by ecoregion, 2011



Notes: Linear feature density refers to the density of roads, rail lines, electrical transmission lines and cutlines (e.g., from seismic lines and firebreaks), measured in metres of linear features per square kilometre. Other infrastructure such as pipelines are not included. Data are aggregated into 194 ecoregions of Canada (Ecological Land Classification 2017).

Source: Statistics Canada, Environment Accounts and Statistics Division, 2018, special tabulation of Natural Resources Canada, 2012, *CanVec,* Earth Science Sector, Mapping Information Branch, Centre for Topographic Information, <u>www.geogratis.gc.ca</u> (accessed October 9, 2017); Statistics Canada, 2013, "Measuring ecosystem goods and services in Canada," *Human Activity and the Environment,* Catologue no. 16-201-X.

Canada





5) Agricultural extent – farms, arable land and pasture





5) Agriculture extent and condition





Statistics Canada — 16-201-X

Human Activity and the Environment / 35



Human Activity and the Environment

Table 5.4

Livestock manure production and selected nutrients, by drainage region, 2011

	Manure		Nitro	Nitrogen		Phosphorus		Potassium	
	k tonnes	ilograms per hectare of farm area	tonnes	kilograms per hectare of farm area	tonnes	kilograms per hectare of farm area	tonnes	kilograms per hectare of farm area	
Total Pacific Coastal Pracer, Lower Mainland Fraser-Lower Mainland Pacer-Athabasca Lower Mackenzie Missouri North Saskatchewan South Saskatchewan Assimboime-Red Winnipeg Lower Saskatchewan-Nelson Churchil Northerm Outario Northerm Outario Northerm Outario Statu St	151,610,046 536,561 5,367,743 4369,728 4369,728 44,748 14,219 2,706,557 18,800,182 2,201,806 407,040 6,949,515 2,478,209 349,119 349,119 2,105,557 2,478,209 349,119	4,086.8 4,112.9 2,793.7 1,621.8 982.6 1,176.3 2,344.1 1,428.6 2,715.2 1,470.8 2,096.1 3,816.0 3,104.5 5,140.1 4,313.1 7,285.4 4,451.5 2,650.4 3,293.9 7,104.8	925,166 3,750 2,148 45,168 45,168 45,168 44,15,962 200,122 134,874 2,464 41,526 14,581 2,040 877 27,714 109,520 10,403 6,106 17,600 1,615	25.7 27.0 17.2 9.6 5.8 6.9 10.6 13.9 8.6 16.4 8.8 12.3 22.3 19.0 33.2 25.4 45.8 26.3 17.1 20.7 52.2	255,111 969 9,413 725 571 12,215 4,353 30,436 54,549 38,464 682 11,588 3,958 539 236 38,923 7,060 31,119 2,639 1,639 4,589 4,22	66 72 45 1.9 2.6 1.9 3.8 2.5 4.5 2.5 3.3 5.1 9.3 6.5 13.0 6.7 4.6 13.0 6.7 4.6 13.0 6.7 4.6 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0	542,673 2,152 19,224 1,647 1,355 28,074 59,847 88,054 1,453 22,257 80,974 1,453 25,375 9,060 1,243 50,44 7,6908 15,802 58,876 5,844 3,261 9,745 7,63	14.7 14.7 10.3 8.5 6.0 3.8 4.3 6.5 5.2 9.7 5.4 7.7 13.6 10.9 18.4 14.5 24.5 14.8 9.1 11.5 24.6	

Note(s): Drainage regions are part of Statistics Canada's standard drainage area classification. See Statistics Canada, Standards Division, 2009, Standard Drainage Area Classification (SDAC) 2003, www.statcar.gc.ca/subjects-sujets/standard-norme/sddac-ctad/sdac-tad-eng.htm for further details. Source(s): Agniculture and Agni-Food Canada and Statistics Canada, special tabulation, Census of Agriculture, Chesus Geographic Component Base 2011.

6) Natural, semi-natural, forest, wetlands etc..





6) Wetland extent and condition

Distribution of freshwater wetlands, southern Canada, by sub-drainage area





Source(s): Tamocai, C., I.M. Kettles and B. Lacelle, 2011, Peatlands of Canada, Geological Survey of Canada, Open File 6561 (digital database), CD-ROM. Statistics Canada, Environment Accounts and Statistics Division, 2013, special tabulation

Freshwater wetland ecosystem goods and services tables an Activity and the Fi Table 1 Variables for the supply of wetland services, southern Canada ub-drainage area code Variables of demand for wetland services, indicators of demand for individual services, southern Canada, 2011 Peatlan Wetland extent² lecreational and code square kilometres percent of are Saint John and Southern Bay of Fundy Prince Education Informs Bay of Pundy Prince Education Informs Bay of Pundy of Bay Bay of Fundy and Quird S L. Laverence, Nona Social Southeastern Alarias Coren, Nona Social Northeastern Lake Superior Northeastern Lake Superior Wanapite and French, Chatno Eastern Georgian Bay Eastern Georgian Bay Northeastern Lake Erice 01A 01B 01C 01D 01E 01F 41,987 60.653 < 7.5 Average ural land from parcel size natural lan 5,943 21,499 23,222 10,685 from 7.5 to < 15.0 7.5 to < 15.0 7.5 to < 15.0 7.5 to < 15.0 square CV of flow in metres major river kilograms per percent of area square 7.5 to < 15.0 15.0 to < 25.0 7.5 to < 15.0 7.5 to < 15.0 7.5 to < 15.0 51,541 61,283 45,421 19,669 7.5 to < 15 02A 02B 02C 02D 02E 02G 02H 02K 02H 02K 02N 02O 02P 02Q 02R 02Q 02R 02Q Saint John and Southern Bay of Fundy Gulf of St. Lawrence and Northern Bay of Fundy Prince Edward Island Bay of Fundy and Gulf of St. Lawrence, Nova 41,987 60,653 5,943 01A 01B 01C 0.99 1.06 0.67 1.5 0.5 16.8 145 63 818 57.0 88.6 2.3 14 (229 16 215 28,778 33,728 Eastern Lake Furion Northern Lake Erie Lake Ontario and Niagara Peninsula Upper Ottawa Contral Ottawa Lower Ottawa Upper St. Lawrence Saint-Maurice 7.5 to < 15.0 7.5 to < 15.0 15.0 to < 25.0 7.5 to < 15.0 7.5 to < 15.0 7.5 to < 15.0 7.5 to < 15.0 0.75 353 93 cotia 01D 01E 02A 02B 02C 02D 02E 02F 02G 02H 02J 02J 02K 19.9 39.8 38.0 104.2 213.1 57.1 61.7 6.3 0.8 0.3 0.3 35,302 39,336 50,670 40,753 54,719 6,139 42,251 35,600 37,780 13,383 88,072 27,473 21,499 23,222 10,685 51,541 61,283 45,421 19,669 28,778 33,728 35,302 39,370 50,670 30,675 em Atlantic Ocean, Nova Scotia outheastern A ape Breton Isl 7.5 to . Northwestern Lake Superior Northeastern Lake Superior Northeastern Lake Huron 0.2 0.3 5.1 15.8 29.7 7.7 01 38 299 1,361 1,616 554 64 168 15.0 to < 25. 7.5 to < 15. Wanapitei and French, Ontario Eastern Georgian Bay Eastern Lake Huron Northern Lake Erie Central St. Lawrence Lower St. Lawrence Northern Gaspé Penin Saguenay 7.5 to < 15. 7.5 to < 15. 79 387 464 148 404 580 247 9 7.5 to < 1 Lake Ontario and Niagara Peninsula amites, coast iem Newfound < 7.5 15.0 to < 25.0

Winter 2015/2016

Winter 2015/2016

Human Activity and the Environment 2016: Freshwater in Canada



and B. Lacelle, 2005, Peatlands in Canada, Agriculture and Agri-Food Canada, Research Branch, Ottawa (digital database); Environment and Climate Change Canada (ECCC), 2016, Climate Trends and Variations Bulletin—Annual 2015, http://www.ec.gc.ca/sc-cs/default.asp?lang=En&n=7150CD6C-1 (accessed November 3, 2016); ECCC, 2016, Climate Trends and Variations Bulletin-Summer 2015, www.ec.gc.ca/sc-cs/default.asp?lang=En&n=1F942323-1 (accessed November 3, 2016); ECCC, 2016, Climate Trends and Variations Bulletin-Winter 2015-2016, www.ec.gc.ca/sc-cs/default.asp?lang=En&n=55965A8C-1 (accessed November 3, 2016).

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6) Examples of some ecosystem characteristics





calculate the smoothed trends.

Notes: Variability is measured by using a coefficient of variation (CV) that allows the comparison of all months in all years of the 42-year time period. The CV of the water yield data is a measure of the dispersion or variation in the monthly yield values over the period 1971 to 2013 (and 1971 to 2012 for drainage region 1). It is defined as the ratio of the standard deviation of the monthly values to the mean. A higher CV indicates that the monthly data are more variable from year to year. The monthly variability was not calculated for drainage regions 57, 78, 16, 17, 18, or the Labrador portion of 25.

Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2017, based on data from Environment and Climate Change Canada, 2015, Water Survey of Canada, Archived Hydrometric Data (HYDAT), www.ec.gc.ca/rhc-wsc/default.asp?lang=En&n=4EEDS0F1-1 (accessed December 3, 2015). Series, Catalogue no 16-001-M, no. 11; and special tabulations by Statistics Canada, Business Survey Methodology Division to



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- awareness of the limitations of some of the data sources (ie land use and land cover datasets)
- building extent and condition accounts and then service and valuation
- expanding land, water and ecosystem classes
- researching and producing key characteristic data for monitoring change
- researching and producing drivers of change data and analysis
- more time on evaluating data rather than creating data
- completing one time accurately and then building time series





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Thank you, questions ?

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