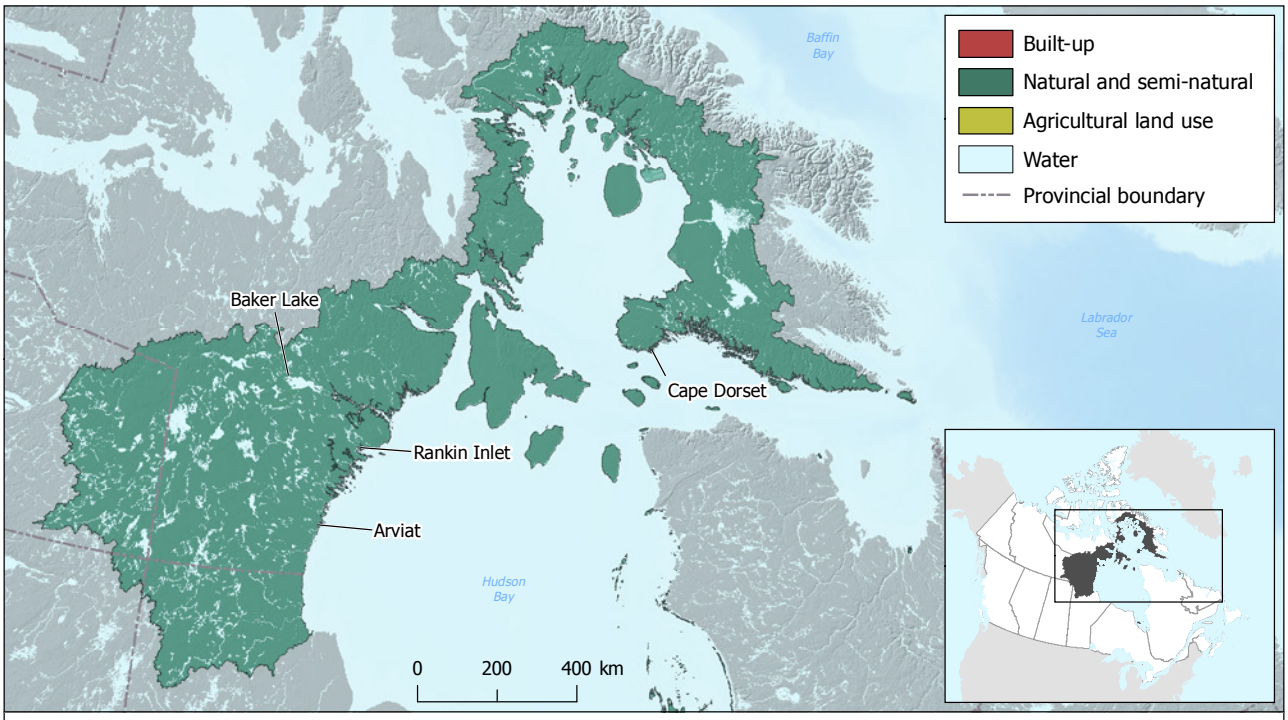
3.16 Keewatin–Southern Baffin Island drainage region

Profile highlights

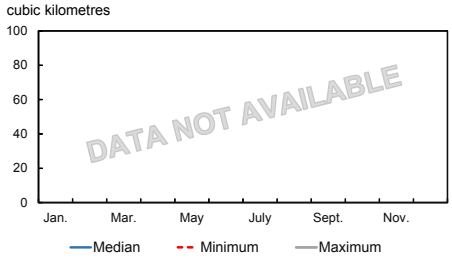
- The Keewatin–Southern Baffin Island drainage region is a large region covering 939,569 km^2 to the west and north of Hudson Bay, virtually all of it natural and semi-natural area.
- The density of linear infrastructure including roads, rail lines and transmission lines was the lowest in the country at 0.5 m/km^2 in 2011.
- The population was 13,968 in 2011, with a population density 0.02 $persons/km^2$, the second lowest in the country.
- Surface freshwater intake from mining and drinking water plants was 3.2 million m^3 in 2013.
- The long-term[1] average annual water yield was 192.0 km^3. The water yield per unit area was 0.20 m^3/m^2, compared to 0.35 m^3/m^2 at the Canada level. Data on the monthly yield and trends over time are not available. Evapotranspiration was the second lowest in the country at 0.13 m^3/m^2.

1 The water yield estimates are 42-year annual averages (1971 to 2013), with the exception of estimates for drainage region 1, which is based on 41 years of data (1971 to 2012); drainage regions 5, 7, 17 and 18 and portions of 8, 16 and 25 (Labrador), which are based on 20 years of data (1976 to 1995); and portions of drainage region 8 and 16, which are based on a 23-year average (1972 to 1994) for the Arctic Archipelago (Spence and Burke, 2008). These different time periods are used due to lower availability of hydrometric data in the North. As well, because there are fewer stations in northern Canada, only the long-term average annual water yield is publishable for these regions—data quality was insufficient to derive the monthly water yield or the change over time.

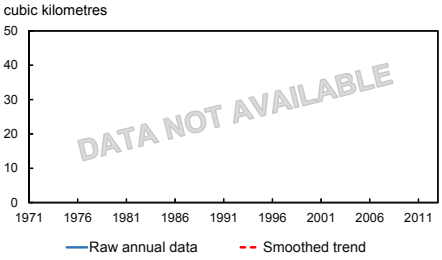
Map 3.3.16
Land use and water yield for the Keewatin–Southern Baffin Island drainage region



Monthly water yield, 1971 to 2013



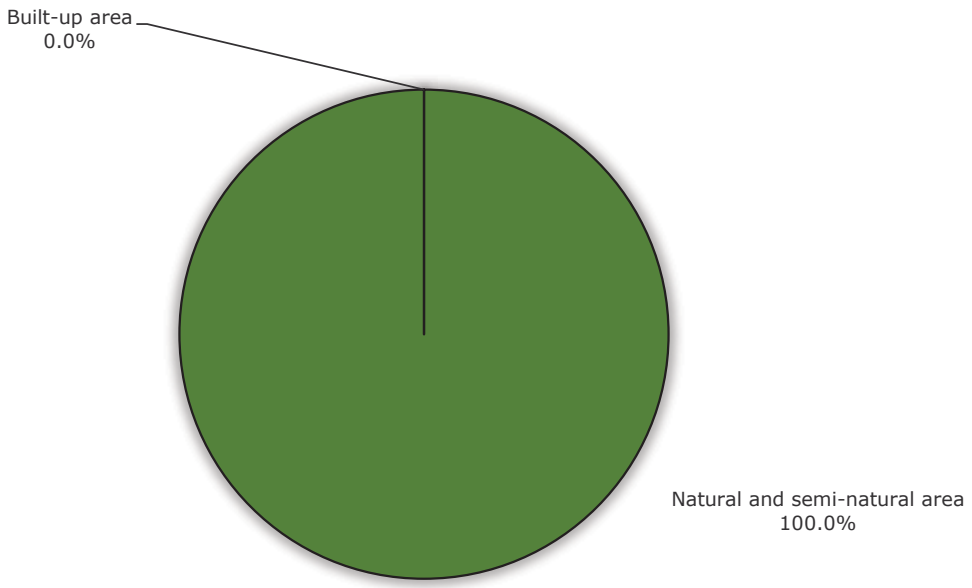
Trends in water yield, 1971 to 2013



Notes: The land use map is derived from remote sensing data products and administrative data sources. Water yield data were derived from discharge values contained in Environment and Climate Change Canada's HYDAT database. Additional information is available in Appendix E.

Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2017, special tabulation from Agriculture and Agri-Food Canada, 2015, *Land Use, 2010,* http://open.canada.ca/data/en/dataset/18e3ef1a-497c-40c6-8326-aac1a34a0dec (accessed September 16, 2015); Natural Resources Canada, 2009, *Land cover, Circa 2000—Vector, Earth Sciences Sector,* http://ftp.geogratis.gc.ca/pub/nrcan_rncan/vector/geobase_lcc_csc/; 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=4EED50F1-1 (accessed December 3, 2015); Statistics Canada, 2010, "Introducing a new concept and methodology for delineating settlement boundaries: A research project on Canadian settlements," *Environment Accounts and Statistics Analytical and Technical Paper Series*, Catalogue no 16-001-M, no. 11; and special tabulations by Statistics Canada, Business Survey Methodology Division to calculate the smoothed trends.

Chart 3.16
Land cover and land use, Keewatin–Southern Baffin Island drainage region, 2011



Notes: Arable land is composed of the cropland, tame or seeded pasture and summerfallow land from the Interpolated Census of Agriculture. Natural and semi-natural land is the residual area remaining after subtracting built-up area, arable land and natural land for pasture from the total area.
Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2017, special tabulation from Agriculture and Agri-Food Canada (AAFC), 2015, *Land Use, 2010*, http://open.canada.ca/data/en/dataset/18e3ef1a-497c-40c6-8326-aac1a34a0dec (accessed September 16, 2015); AAFC and Statistics Canada, special tabulation, Census of Agriculture, Census Geographic Component Base 2011.

Table 3.16.1
Selected land cover and land use statistics, Keewatin–Southern Baffin Island drainage region, 2011

	Total area[1]	Water area[1]	Land area[1]	Built-up area, 2011[2]	Arable land, 2011[3]	Natural land for pasture, 2011[3]	Natural and semi-natural area, 2011[4]	Fertilized area, 2011[3]	Irrigated area, 2011[3]	Barrier density, 2011[5]
	km²			percentage				km²		m/km²
Canada	9,978,923	1,169,561	8,809,362	0.6	4.3	1.5	93.6	249,056	7,665	169.7
Keewatin–Southern Baffin Island	939,569	161,011	778,558	0.0	0.0	0.0	100.0	0	0	0.5

1. Total area includes land and water using the Atlas of Canada 1:1,000,000 scale hydrography base and includes the Canadian portion of the Great Lakes. Water area is calculated from the Canada-wide 1-km² gridded Water Fraction derived from National Topographic Data Base maps.
2. Built-up area estimated for 2011 combines the land use classes for settlements and roads from Agriculture and Agri-Food Canada's *Land Use, 2010*, supplemented with estimates of settlements and roads for northern areas in drainage regions 1, 5, 7, 8, 16, 18 and 25. Additional information is available in Appendix E.
3. Data for arable land, natural land for pasture, fertilized area and irrigated area are taken from the 2011 Interpolated Census of Agriculture, which aggregates data from the Census of Agriculture by soil landscape and drainage area units. Arable land is the sum of cropland, summerfallow and tame and seeded pasture. Other land on farms (e.g., land occupied by farm buildings, wetlands and woodlots) is included as built-up or natural land.
4. Natural and semi-natural land is the residual after subtracting built-up area, arable land and natural land for pasture from the total area.
5. Barriers include roads, rail lines and electrical transmission lines, but excludes other types of infrastructure such as pipelines. Barrier density refers to the density of these roads, rail line and transmission lines, measured in metres of barriers per square kilometre of land.

Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2017, special tabulation from Fernandes, R., G. Pavlic, W. Chen and R. Fraser, 2001, *1-km Water Fraction From National Topographic Data Base Maps, Canada*, Natural Resources Canada, Earth Science Sector, www.geogratis.ca/geogratis/en/option/select.do?id=8C3D34AE-5BD5-A83C-DB8C-895FB4AD86C6 (accessed April 28, 2010); Agriculture and Agri-Food Canada (AAFC), 2015, *Land Use, 2010*, http://open.canada.ca/data/en/dataset/18e3ef1a-497c-40c6-8326-aac1a34a0dec (accessed September 16, 2015); AAFC and Statistics Canada, special tabulation, Census of Agriculture, Census Geographic Component Base 2011; Natural Resources Canada, Earth Sciences Sector, Mapping Information Branch, Centre for Topographic Information, 2012, *CanVec*, www.geogratis.gc.ca (accessed March 1, 2012).

Table 3.16.2
Selected statistics on water supply and demand, Keewatin–Southern Baffin Island drainage region

	Population, 1971	Population, 2011	Density, 1971	Density, 2011	Surface freshwater intake, 2013[1]	Average annual water yield, 1971 to 2013[2]	Water yield per area, 1971 to 2013[2]	Water yield variability index,[3] 1971 to 2013[2]	Average annual evapotranspiration, 1981 to 2010[4]
	persons		persons/km^2		million m^3	km^3	m^3/m^2	monthly CV	m^3/m^2
Canada	21,568,311	33,476,688	2.4	3.8	33,464.7	3,478.2	0.35	1.05	0.23
Keewatin–Southern Baffin Island	7,034	13,968	0.0	0.0	3.2	192.0	0.20	..	0.13

1. Surface freshwater intake aggregates data from the Survey of Drinking Water Plants, 2013 and the Industrial Water Use Survey, 2013, with estimates of agricultural water use for 2013 based on the Agricultural Water Use Survey and the *Alberta Irrigation Information* report. Withdrawals from groundwater, groundwater under the influence of surface water and marine water sources are excluded. Data for water use by the oil and gas industry and households not supplied by a public water provider are also excluded.
2. The water yield estimates are 42-year annual averages (1971 to 2013), with the exception of estimates for drainage region 1, which is based on 41 years of data (1971 to 2012); drainage regions 5, 7, 17 and 18 and portions of 8, 16 and 25 (Labrador), which are based on 20 years of data (1976 to 1995); and portions of drainage region 8 and 16, which are based on a 23-year average (1972 to 1994) for the Arctic Archipelago (Spence and Burke, 2008). For equivalences: 1 km^3 is equal to 1 billion m^3.
3. 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. 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 CV for the Pacific Coastal drainage region is for the period 1971 to 2012. The CV was not calculated for drainage regions 5,7,8,16, 17, 18 and the Labrador portion of 25.
4. Evapotranspiration is taken from a dataset providing estimates of actual evapotranspiration at a 1 km resolution, which is modeled by integrating remote sensing land surface data and gridded climate data. Data exclude the Great Lakes.

Note: The water yield and evapotranspiration statistics are provided to allow comparisons across regions. They are not intended to be used for the purposes of a water budget.

Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2017, special tabulation from the 1971 and 2011 Censuses of Population; Industrial Water Use Survey, 2013; Survey of Drinking Water Plants, 2013; Agricultural Water Use Survey, 2010, 2012 and 2014; Alberta Agriculture and Rural Development, 2014, *Alberta Irrigation Information: Facts and Figures for the Year 2013*, Basin Water Management Branch; 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=4EED50F1-1 (accessed December 3, 2016); Spence, C. and A. Burke, 2008, "Estimates of Canadian Arctic Archipelago runoff from observed hydrometric data," *Journal of Hydrology*, Vol. 362, pp. 247 to 259; Wang, S., Y. Yang, Y. Luo and A. Rivera, 2013, "Spatial and seasonal variations in evapotranspiration over Canada's landmass," *Hydrology and Earth System Sciences*, Vol. 17, no. 9, pp. 3561–3575, doi: 10.5194/hess-17-3561-2013.

Table 3.16.3
Selected indicators of pressures on water quality, Keewatin–Southern Baffin Island drainage region

	Residual soil nitrogen, agricultural land, 2011[1]	Residual soil nitrogen on agricultural land, normalized across the total area of the drainage region, 2011[1]	Risk of phosphorus release from agricultural soils, 2011[1]	Risk of phosphorus release from agricultural soils, normalized across the total area of the drainage region, 2011[1]	Nitrogen emissions, National Pollutant Release Inventory, 2014[2]	Phosphorus emissions, National Pollutant Release Inventory, 2014[2]	Median monthly maximum turbidity, 2013[3]
	kg/ha	kg/km^2	mg/kg		tonnes		nephelometric turbidity units
Canada	23.2	133.4	1.7	0.0	754,011	40,443	..
Keewatin–Southern Baffin Island	…	…	…	…	1,327	0	F

1. Agriculture and Agri-Food Canada produces agri-environmental indicators on residual soil nitrogen (RSN) and the risk of phosphorus release (P-source). The RSN indicator provides an estimate of the amount of nitrogen in agricultural soils, in kilograms per hectare, in 2011. RSN accounts for atmospheric deposition, nitrogen fixation, crop inputs (fertilizer and manure), crop removals (harvesting) and gaseous losses of ammonia, nitrous oxide and nitrogen gas. The P-source is the amount of water extractable phosphorus potentially released from agricultural soils in a given year, in milligrams per kilogram. Agricultural land is taken from the Interpolated Census of Agriculture and includes cropland, summerfallow, tame or seeded pasture and natural land for pasture. It excludes other land (e.g., woodlots, wetlands, land occupied by buildings) on farms.
2. Direct emissions from industrial facilities to air, land and water reported to the National Pollutant Release Inventory in 2014, excluding offshore facilities. For nitrogen, substances include ammonia, nitrate ion in solution, nitric acid and nitrogen oxides. For phosphorous, substances include total phosphorous and yellow phosphorous. Substances are reported in tonnes.
3. Turbidity is a measure of the relative clarity of water measured in nephelometric turbidity units (NTU). Data are for raw surface water sources from drinking water facilities that reported turbidity data for at least 10 months in 2013.

Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2016, special tabulation from Agriculture and Agri-Food Canada (AAFC), 2015, *Agri-environmental Indicator—Residual Soil Nitrogen (RSN)*, http://open.canada.ca/data/en/dataset/3f5acb7c-78e6-4127-8867-ddd70e396476 (accessed September 28, 2016); AAFC, 2015, *Agri-environmental Indicator—Risk of P release in agricultural land (P-Source)*, http://open.canada.ca/data/en/dataset/fc9e5c73-1c1a-47c1-9de4-612569b718fd (accessed September 28, 2016); Environment and Climate Change Canada, 2015, *National Pollutant Release Inventory, Pollution Data and Reports*, www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1 (accessed August 24, 2016); Statistics Canada, 2015, "Source water quality, 2013," Environment Fact Sheets, Catalogue no. 16-508-X.