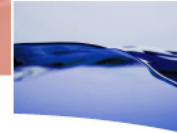




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Data Sources and Methods for the Water Availability Indicator

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1 Introduction

The Water Availability Indicator is a part of the Canadian Environmental Sustainability Indicators (CESI) program (<http://www.ec.gc.ca/indicateurs-indicators/>), which provides data and information to track Canada's performance on key environmental sustainability issues.

2 Description and rationale of the Water Availability indicator

2.1 Description

Based on the Organisation for Economic Cooperation and Development's (OECD) Water Stress Indicator, the Water Availability Indicator compares the amount of fresh water withdrawn from rivers for human use to the volume of water in Canadian rivers (http://www.oecd.org/document/20/0,3746,en_2649_37465_39676628_1_1_1_37465,00.html).

2.2 Rationale

Growing urban populations, economic development and weather variability all put pressure on Canada's freshwater supplies, thus making water availability a concern in some communities. As the proportion of water withdrawn for human activities increases, water availability may be threatened. Identifying threatened regions is important to ensuring an adequate amount of water is available to sustain human populations, economic development and healthy aquatic ecosystems.

3 Data

3.1 Data source

Stream flow data used to calculate water supply were obtained from the Water Survey of Canada's HYDAT database (<http://www.ec.gc.ca/rhc-wsc/default.asp?lang=En&n=9018B5EC-1>). The HYDAT database includes average daily stream-flow in cubic metres per second (m³/s) for a network of 2792 hydrometric stations across Canada. Water-intake data were taken from three surveys: Statistics Canada's Industrial Water Use Survey 2007 (<http://www.statcan.gc.ca/pub/16-401-x/16-401-x2010001-eng.htm>) and Estimation of Water Used in Canadian Agriculture 2001 (Beaulieu et al., 2007) (<http://www.statcan.gc.ca/pub/21-601-m/21-601-m2007087-eng.htm>) as well as Environment Canada's Municipal Water and Wastewater Survey 2006 (<http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=596A7EDF-471D-444C-BCEC-2CB9E730FFF9>).

3.2 Spatial coverage

The Water Availability Indicator is calculated for Canada's 164 sub-drainage areas (SDA).

3.3 Temporal coverage

The Water Availability Indicator is calculated for 2007.

3.4 Data completeness

The data for some sub-drainage areas in the Yukon, Northwest Territories, Nunavut, Labrador and northern portions of British Columbia, Alberta, Saskatchewan, Manitoba and Ontario were merged because of low levels of human activity and the large surface-water supply in the rivers. Some parts of the country were evaluated at the sub-sub drainage area level (Okanagan). Northern Quebec was not evaluated due to a lack of available water flow data. The method used to calculate the Water Availability Indicator is not applicable to parts of northern Canada.

3.5 Data timeliness

There is a time lag between 2007, the year being reported on, and the publication of this indicator. This delay is due to several intertwining factors, including the time required to

collect and verify the raw data, compile the data obtained from all partners at the national level, analyze, review and report the data.

4 Methods

Environment Canada estimated water demand for 2007 for each SDA as the sum of municipal, industrial and agricultural water withdrawals from all flowing water.

Water supply is calculated using stream-flow data collected by the Water Survey of Canada's hydrometric stations. Water supply for 2007 is estimated by extracting water flow (m^3/s) data for the hydrometric station located at the basin outlet. Flow values from the outlet station are considered to be approximately equal to the water supply for the entire basin. Any water consumed in the basin was added to the water supply to estimate all water theoretically available for use. When the most-downstream station's flow did not account for the flow in the entire basin, proportions were used to estimate water supply for the basin.

Environment Canada calculated water availability for 2007 by dividing water demand by water supply for each SDA. All SDAs are assigned one of the OECD's four water availability threat classifications based on the water availability ratio:¹

- Low (less than 10% of available water is withdrawn): low water stress.
- Moderate (between 10% and 20% of available water is withdrawn): water availability becomes a constraint on development and significant investment is needed to provide for adequate water supply.
- Medium (between 20% and 40% of available water is withdrawn): both water supply and water demand need to be managed and conflicts among competing uses will need to be resolved.
- High (more than 40% of available water is withdrawn): severe water stress.

5 Caveats and limitations

5.1 Data gaps

This indicator does not account for the water stock in lakes and groundwater aquifers. As a result, water availability may be underestimated, and the threat to water availability overestimated, for areas relying primarily on lakes, oceans or other water sources to satisfy water demand. Over the long term, areas identified as having a high threat to water availability may deplete their stocks of water in lakes and aquifers.

This indicator uses total water withdrawal by municipal, industrial and agricultural sectors to calculate water demand. While it provides a measure of the amount of water removed from rivers, the indicator does not report how much water is consumed, that is, not released directly back into the river system.

6 References and further reading

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¹ OECD (2009) Managing Water for All: An OECD perspective on pricing and financing. Available from: http://www.oecd.org/document/19/0,3746,en_2649_34285_42289488_1_1_1_1,00.html.

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