



OECD-UNECE seminar on SEEA implementation

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Water accounts at Statistics Canada

Statistics Canada has a mature water statistics program that includes:

- A. Water use feeder surveys
- B. Physical Flow Account on water use
- C. Account on renewable water stocks
- D. Analytical products

Water use: Physical Flow Account and surveys

Background

- In the early 2000s, Canada's prime minister requested the development of a small set of indicators on environmental and sustainable.
- Initial set included an indicator on water quality (data provided by provinces) and later, an indicator on water use.
- Ongoing water surveys were funded through this initiative. These surveys generally started in 2006.
- Data from these surveys is compiled into a Physical Flow Account and is still used as the basis for a national water use indicator published by the federal environmental department.

Roles

Statistics Canada is the main player regarding the development of the water use statistics:

- Collects water use data through surveys, and through the use of administrative data
- Compiles the Physical Flow Account on water use
- Releases detailed data on all of these data products

Environment and Climate Change Canada releases an indicator based on the Physical Flow Account

Water use surveys (all biennial)

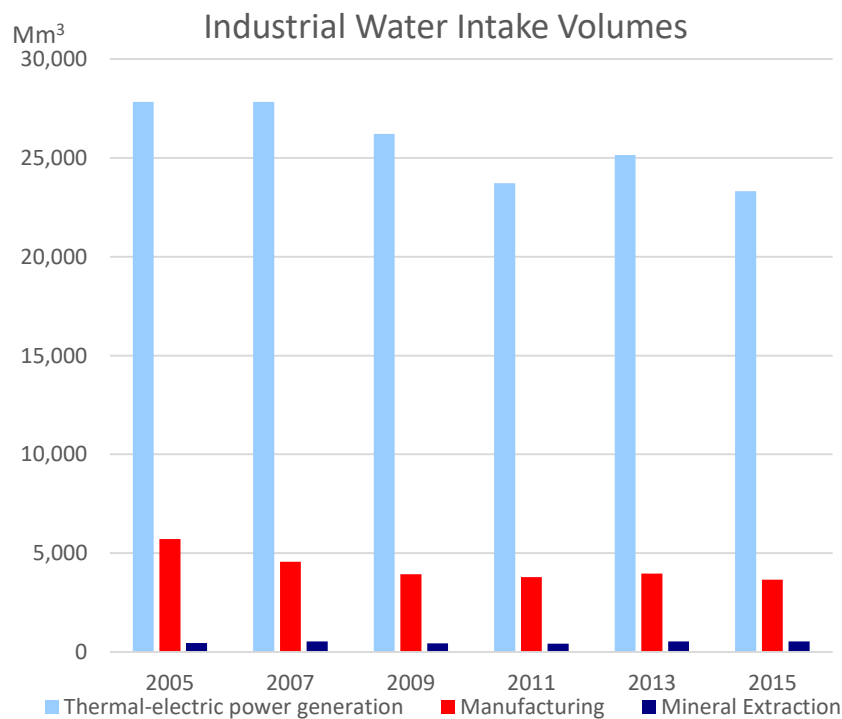
Three surveys on water use from the following sectors:

- Mining,
- Thermal electricity generation,
- Manufacturing
- Agriculture (irrigation)
- Drinking water plants

Survey results are available by province but also by drainage area

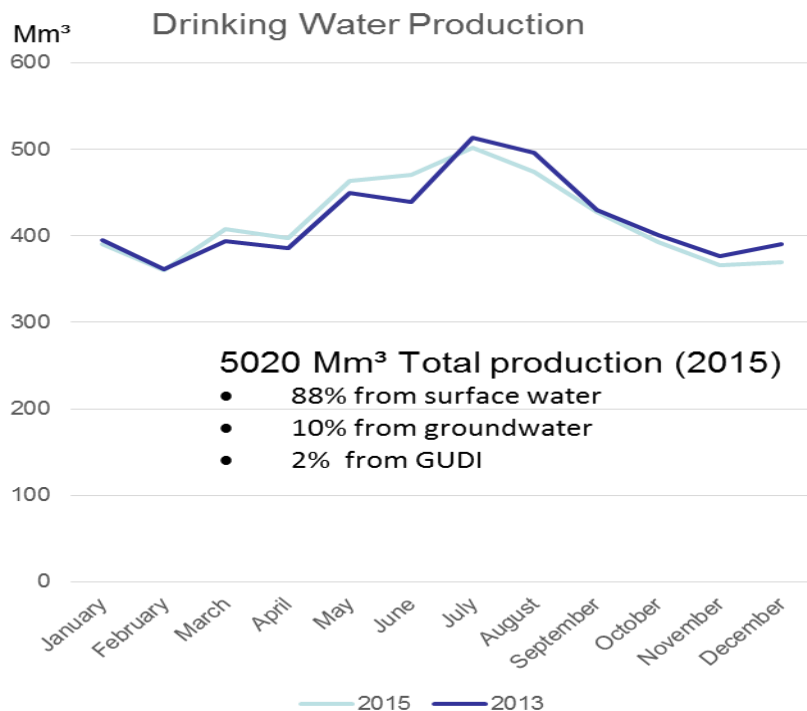
Also collect data on information related to water management, treatment and discharge, etc.

Industrial Water Survey



- 30 billion m³ withdrawn (2015)
 - 85% Thermal electric power
 - 13% Manufacturers
 - 2% Mining
- 8 billion m³ recirculated before discharge
- Total operating and maintenance costs: \$1.8 Billion
 - 42% Water acquisition
 - 15% Water intake treatment
 - 10% Recirculation
 - 33% Water discharge treatment
- 2017 data release – Fall 2019

Survey of Drinking Water Plants



- CESI Water use indicators (2015)
 - Total 447 Lpcd (in decline with stable production & growing pop)
 - Residential 235 Lpcd
- Covers 30.7 million Canadians (systems serving 300+ persons)
- Sector use 50% Residential
- Capital expenditures \$700 million
- O&M costs \$1Billion
- (new) Electronic data collection for 2017 – web based questionnaire
- 2017 data release in Spring of 2019

Feeder surveys: challenges and successes

Challenges

- Surveys take place every two years – might miss the water use impact of particularly dry or wet climate conditions.
- Surveys are complex (lack of financial auxiliary variables, rely on data provided by outside sources).
- Major data gap: oil and gas sector. Use of administrative data has been examined but would need additional resources.

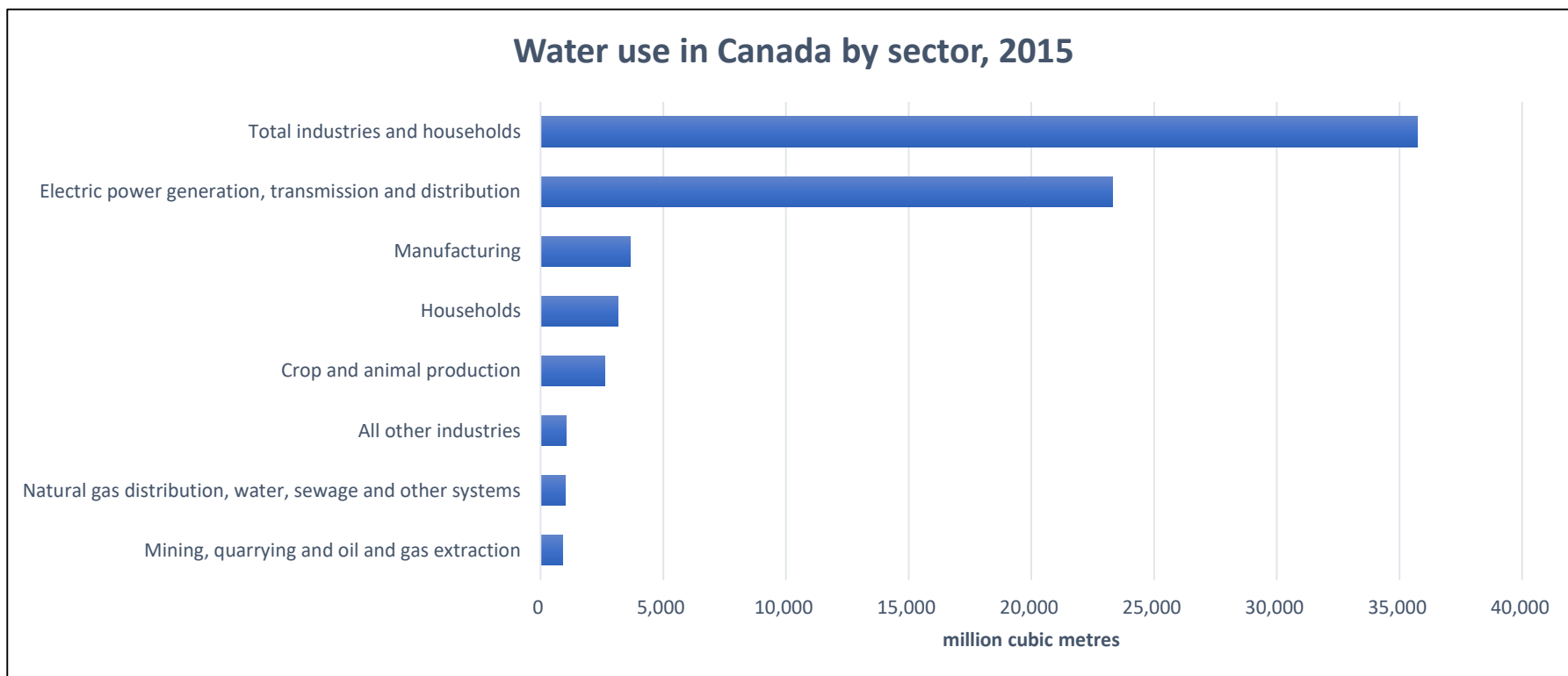
Successes

- Provide a strong national picture of water use in Canada
- Data by drainage region allows for integration with renewable water account.

Physical Flow Account on water use

- Data from the water surveys made this Physical Flow Account possible. First release was in 2009.
- Intensities and final demand are also available.
- Available every two years, mirroring the frequency of the feeder surveys.

Physical Flow Account on Water Use



- Water withdrawals totaled 35,733 million m³ (35.7 km³) in 2015.
- Some of this water was consumed but the majority was returned back to the environment after use.

PFA: Challenges and successes

Challenges

- Biennial frequency to match feeder surveys - not all surveys are in the same reference year.
- Difficult to disaggregate data at a more granular level to allow the production of sub-national estimates.

Successes

- Increasing interest in the account due to the emergence of issues such as the environmental impacts of food waste.
- Uses the Supply-Use Tables to fill in the gaps left by the surveys to allow for an economy-wide picture of water use.



Renewable water stock account



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Background

- Main impetus for the creation of this account was to provide a measure of the stock of **renewable freshwater resources**.
- Adds an important element to Statistics Canada's suite of data on natural capital.
- Integrated data and regular reporting on trends in freshwater in Canada is an emerging concern in the federal government.

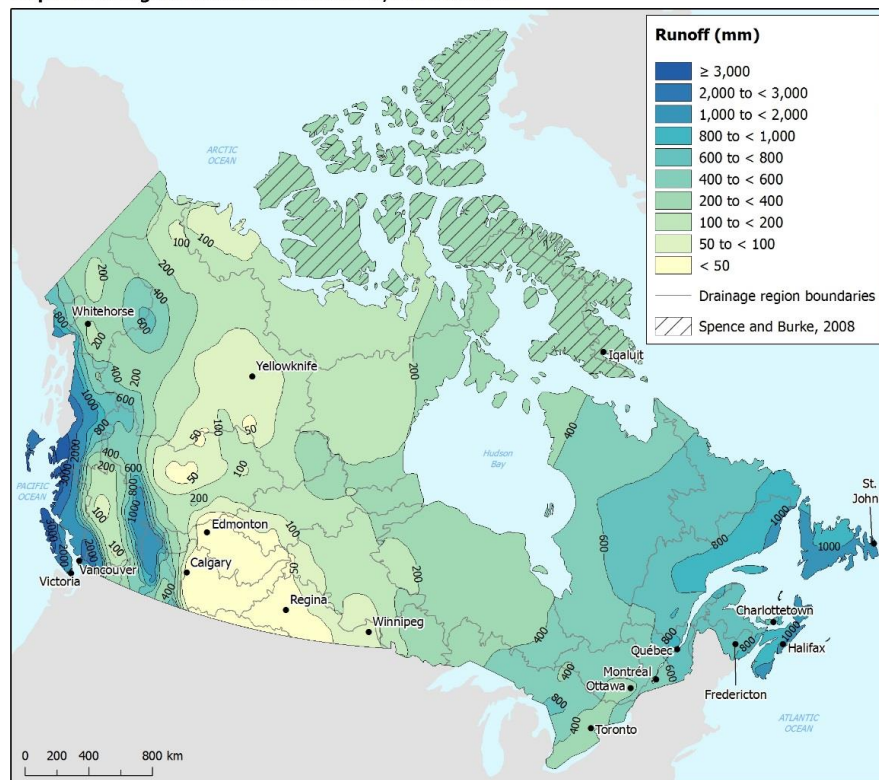
Roles

- Statistics Canada's environmental R&D section identified geospatial modelling as the best way to provide estimates for renewable freshwater resources
- The base data are water-level measurements collected for many years by Environment and Climate Change Canada and the provincial government.
- There has been an ongoing exchange between Statistics Canada and the federal environmental department as this work has evolved.
- First produced as one-off publication in 2010, these data were identified as a program priority. At that time, funding was procured to release these data on an ongoing basis. Releases take place roughly once a year, with updates and/or new geographies.

Average annual run-off

- The average annual water yield—an estimate of Canada's supply of renewable freshwater—was 3,478 km³ from 1971 to 2013.
- This volume is equivalent a depth of 349 mm across the entire country.

Map 2.1 Average annual runoff in Canada, 1971 to 2013

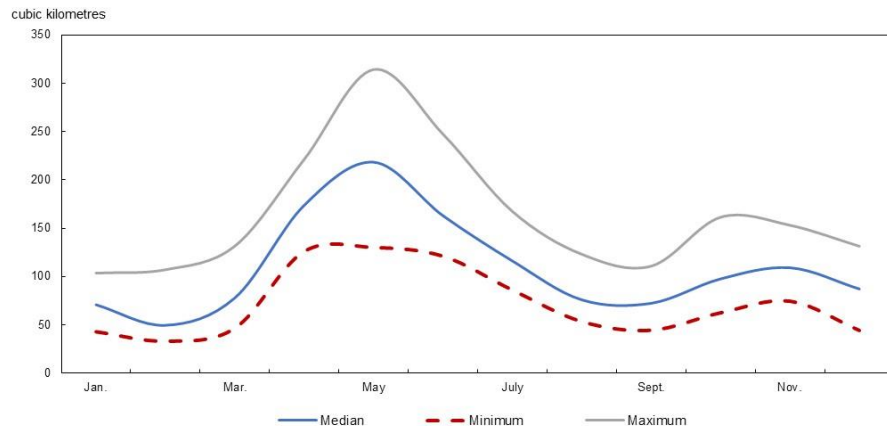


Note: Runoff data were derived from discharge values from hydrometric stations for the period 1971 to 2013, except the Arctic Islands where estimates were taken from Spence and Burke, 2008.

Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2017, special tabulation from Environment and Climate Change Canada, 2015, *Water Survey of Canada, Archived Hydrometric Data (HYDAT)*, www.wsc.ec.gc.ca/hydat/H2O/index_e.cfm?cname=main_e.cfm (December 3, 2015); Spence C., and A. Burke, 2008, "Estimates of Canadian Arctic Archipelago Runoff from Observed Hydrometric Data," *Journal of Hydrology*, Vol. 362, pp. 247–259.

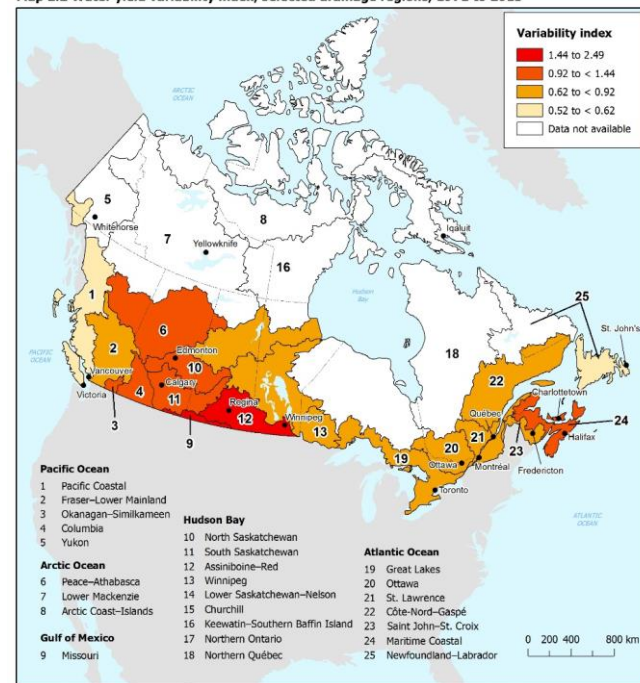
Renewable water resources, southern Canada 1971 to 2013

Chart 2.1
Monthly water yield, southern Canada, 1971 to 2013



- Water yield is most variable in the prairie drainage regions

Map 2.2 Water yield variability index, selected drainage regions, 1971 to 2013



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 5, 7, 8, 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.wsc.ec.gc.ca/hydat/H2O/index_e.cfm?name=main_e.cfm (accessed December 3, 2015)

Challenges and successes

Challenges

- The size of the country and the cost of gauging water flows are such that in parts of the country, measurements are inadequate to create a robust time series
- Water yield is but one measure of interest; the complete asset account would be more useful but is out of reach pending additional resources
- A water quality account is required but has not been produced so far.

Successes:

- First measurements associated with the amount of water renewed annually or monthly
- Renewable water statistics have contributed to Canada's plan on climate change related science.
- Selected geospatial data (e.g., shape files) available through Canada's Federal Geospatial Platform – Open Maps as well as through its own website.



Data integration



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Human Activity and the Environment 2016

Human Activity and the Environment: Freshwater in Canada



Release date: March 21, 2017



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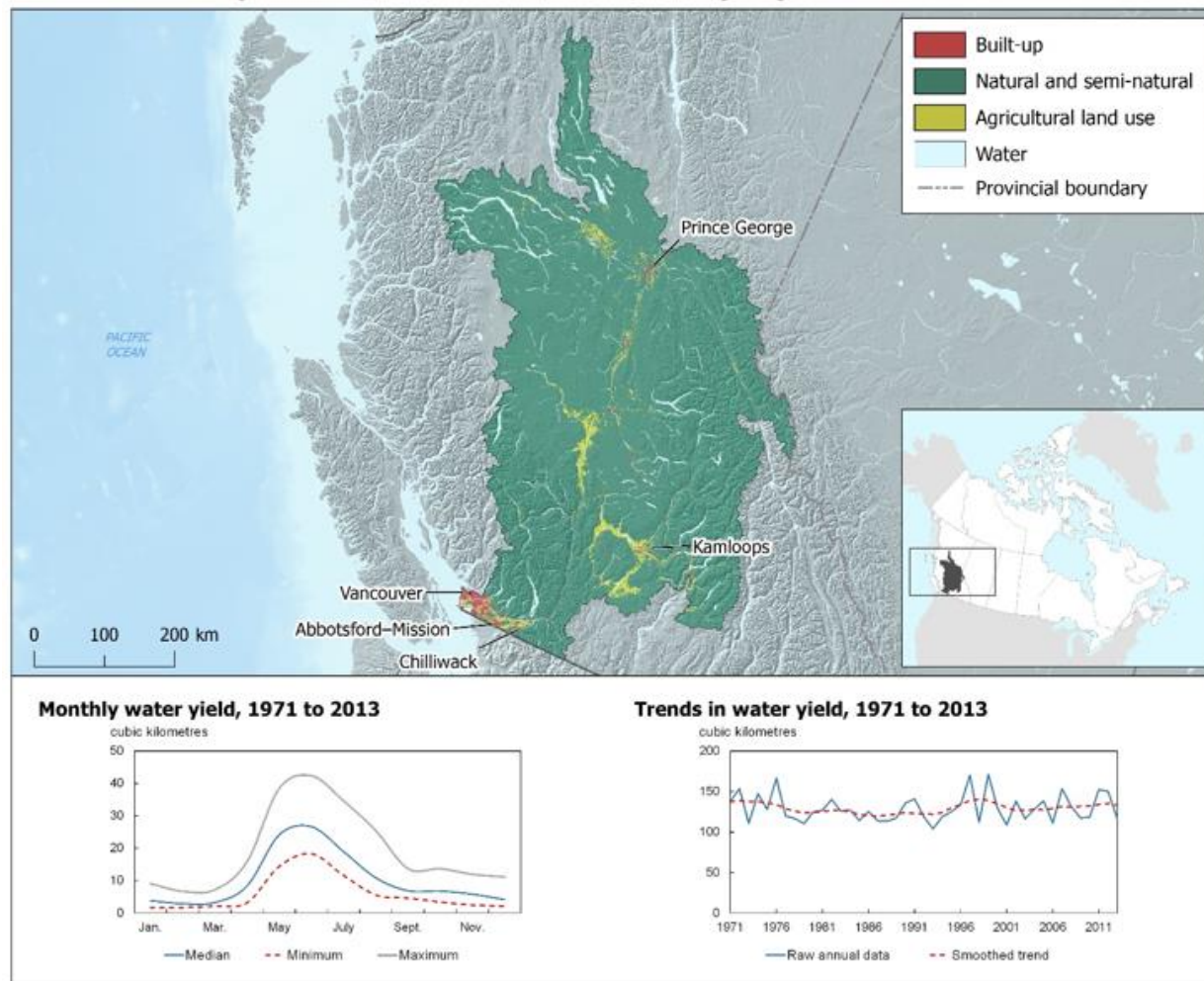
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Human Activity and the Environment on Freshwater (2016)

This edition integrated all of Statistics Canada's water data with some of its socio-economic data.

Included profiles for each of Canada's 25 drainage regions

- Each profile included:
 - Highlight bullets
 - Land use map and chart (from the program's land use/land cover account)
 - Monthly water yield chart
 - Trends in water yield over time chart
 - Tables (3) on water and factors affecting water (land use, land cover, population, water withdrawals, nutrients)

Map 3.3.2**Land use and water yield for the Fraser–Lower Mainland drainage region**



New developments



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Statistics on municipal wastewater (sewage) systems

- Developing new statistical product using administrative data collected under the federal Wastewater Systems Effluents Regulations (WSER) to produce national/provincial estimates for:
 - total effluent volumes
 - volumes and population service by method of treatment
 - Linking WSER records with census of population and other survey data to develop population served estimates (by treatment type etc.)
- Will support reporting for federal and international environmental indicators (e.g., OECD)
- Release 2013, 2014, 2015, 2016 data in spring of 2019



Thank you!



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