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Data Sources and Methods for the Release of Toxic Substances to Water Indicators

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1 Introduction

The Release of Toxic Substances to Water indicators are part of the Canadian Environmental Sustainability Indicators (CESI) program, which provides data and information to track Canada's performance on key environmental sustainability issues.

2 Description and rationale of the Release of Toxic Substances to Water indicator

2.1 Description

The indicators track anthropogenic releases of three toxic substances to water: mercury (Hg), lead (Pb) and cadmium (Cd) and their compounds, reported in kilograms (kg). For each toxic substance, releases are provided at the national and regional (provincial and territorial) level, and by source.

2.2 Rationale

Mercury, lead and cadmium and their compounds are on the List of Toxic Substances under Schedule 1 of the *Canadian Environmental Protection Act*, *1999* (CEPA 1999) (http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&xml=0DA2924D-E77E-2E16-A9D2-95388AD49B21). This means that they are "entering or may enter the environment in a quantity or concentration or under conditions that 1) have or may have an immediate or long-term harmful effect on the environment or its biological diversity, and/or 2) constitute or may constitute a danger to the environment on which life depends, and/or 3) constitute or may constitute a danger in Canada to human life or health."

The indicators inform Canadians about anthropogenic releases of these toxic substances to water by human activity in Canada. The indicators also help the Government to identify priorities and to develop and track progress on strategies and policies put in place to reduce or control water pollution.

3 Data

3.1 Data source

The releases of toxic substances to water indicators reported in CESI are taken from the National Pollutant Release Inventory (NPRI) database, which is compiled by Environment Canada (http://www.ec.gc.ca/inrp-npri/default.asp?lang=en). The NPRI includes releases reported by industrial, commercial and institutional facilities. The indicators include the kilograms of Hg, Pb and Cd, including those released in substances containing Hg, Pb and Cd, reported in the National Pollutant Release Inventory (NPRI) based on the NPRI reporting criteria for releases of these metals and their compounds (http://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=674761CE-1).

3.2 Spatial coverage

The indicators are calculated at the national, and at the provincial and territorial level.

3.3 Temporal coverage

Data from past years are also presented at the national level for all three Release of Toxic Substances to Water indicators for the period from 2003 to 2011. The latest year (2011) is used for regional and source-based releases.

3.4 Data completeness

Because the indicators are derived solely from the NPRI database, they only reflect releases from facilities that met NPRI reporting criteria (http://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=674761CE-1). As a result, the indicators do not include all releases in Canada, but the main point sources for each selected toxic substance.

3.5 Data timeliness

The data are current up to 2011. The indicators are reported approximately two years after data collection because of the time required for data validation, calculation and interpretation.

4 Methods

The indicators were calculated by summing the releases from the NPRI database for Canada, for each source, and for each province and territory for the years reported. Facilities report an estimate of their releases to water to the NPRI using one of the following methods:

- continuous emission/release monitoring systems
- predictive emission/release monitoring
- source testing
- mass balance
- site-specific emission/release factors
- published emission/release factors
- engineering estimates

The source testing technique was the most common release estimation method used in the NPRI for the year 2011. Please consult the “Reporting to the NPRI” Web page for more details on these calculation methods (http://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=F6300E68-1).

Table 1: Number of NPRI facilities reporting Hg, Pb and Cd releases to water, Canada, 2003-2011

Year / Substance	Hg	Pb	Cd
2003	76	164	129
2004	62	172	144
2005	53	163	139
2006	66	163	139
2007	65	182	145
2008	61	180	135
2009	85	191	147
2010	76	193	154
2011	74	188	152
Common*	**22**	**89**	**74**

Note: ** Number of facilities common to all years*

Source descriptions for the indicators were taken from the North American Industry Classification System (NAICS) used by Statistics Canada (http://www.statcan.gc.ca/subjects-sujets/standard-norme/naics-scian/2007/list-liste-eng.htm). The four-digit NAICS code, as reported by the facilities, was used for source classification.

5 Caveats and limitations

Facilities reporting to the NPRI may use different methods to determine how much of a particular substance they release. These methods may vary depending on the substance or the facility and may also change from year to year. The choice of calculation method could affect the reported amount of a particular substance released to water.

Each year, the number and composition of facilities differs. About one third of facilities reporting on Hg and roughly one half of Pb- and Cd-emitting plants are the same across the years of the time series.

These indicators only reflect the releases reported by facilities to the NPRI. They do not estimate or include potential releases from other sources in Canada.

6 References and further reading

6.1 References

Environment Canada (2013) 2011 NPRI Reviewed Facility Data Release. Retrieved in April 2013. Available from: http://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=0AD32A89-1

Environment Canada (2013) Guide for Using and Interpreting National Pollutant Release Inventory (NPRI) Data. Retrieved in July 2013. Available from: http://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B5C1EAB8-1

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