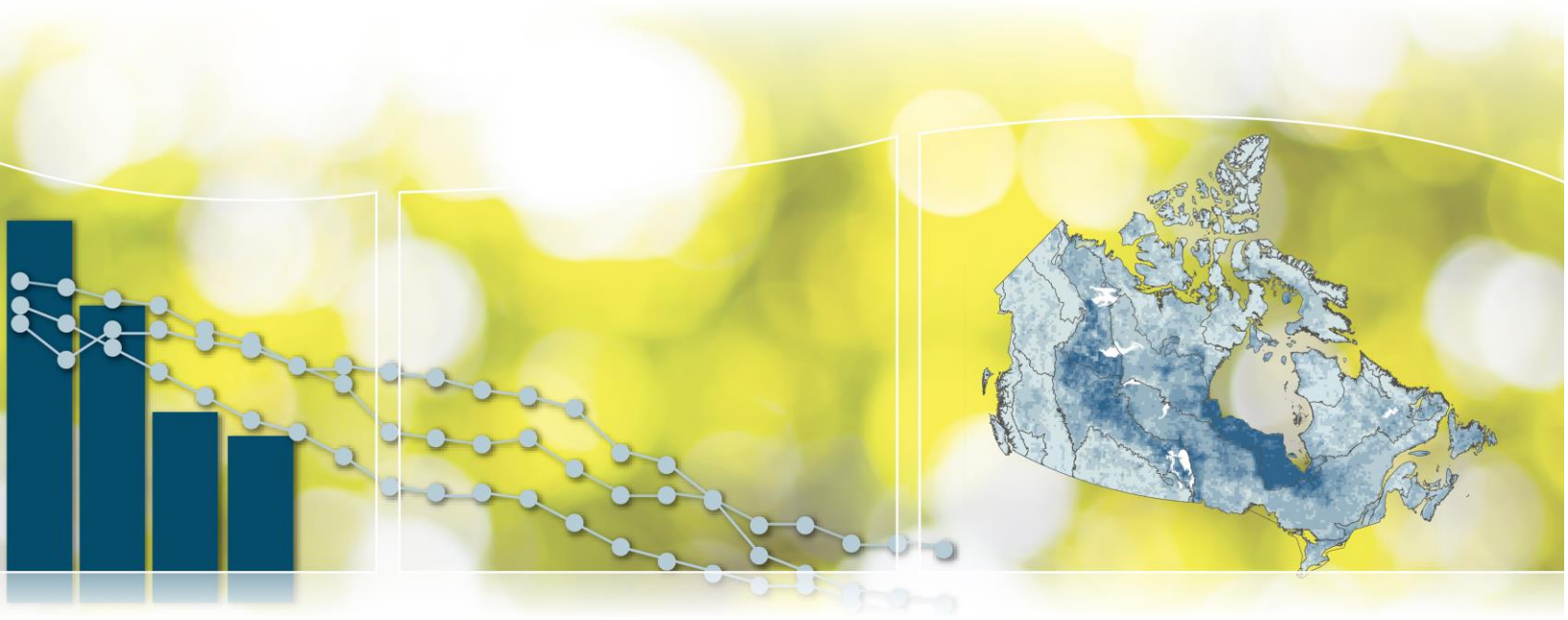
Environment and Climate Change Canada
Environnement et Changement climatique Canada

Canadian Environmental Sustainability Indicators

Releases of harmful substances to water



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Canadian Environmental Sustainability Indicators

Releases of harmful substances to water

May 2019

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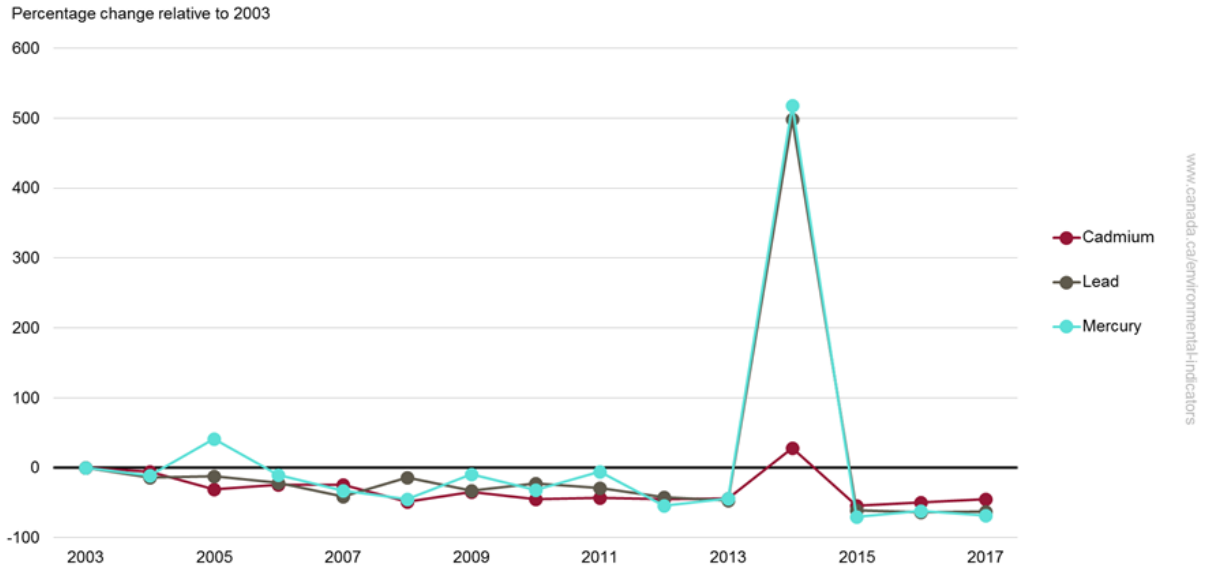
Releases of harmful substances to water

The release of some substances to the environment can harm human health, wildlife and biological diversity. Toxic metals released to water can enter the food web and accumulate in the tissues of living organisms. Exposure to these substances, even in small amounts, can be hazardous to both humans and wildlife. Mercury and its compounds, lead, and inorganic cadmium compounds are listed as toxic[1] under the *Canadian Environmental Protection Act, 1999*. The mercury, lead and cadmium releases to water indicators track facility-based releases of these substances to water.

Key results

- Releases of mercury, lead and cadmium to water were 68%, 62% and 45% lower in 2017 than in 2003, respectively
- In 2014, a significant spill[2] accounted for 92%, 92% and 59% of total releases of mercury, lead and cadmium, respectively

Figure 1. Releases of mercury, lead and cadmium to water, Canada, 2003 to 2017



Data for Figure 1

Note: The indicator reports facility-based releases only. This chart accounts only for the releases to water reported in the National Pollutant Release Inventory based on the inventory reporting criteria for releases of mercury, lead and cadmium and their compounds. These amounts should not be interpreted as comprehensive totals of releases to water of these pollutants in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Most releases of mercury, lead and cadmium to water are from wastewater and waste management effluents. Wastewater treatment plants do not generate mercury, lead or cadmium. Mercury in

[1] Section 64 of the *Canadian Environmental Protection Act, 1999* defines a substance as toxic if it is "entering or may enter the environment in a quantity or concentration or under conditions that (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity; (b) constitute or may constitute a danger to the environment on which life depends; or (c) constitute or may constitute a danger in Canada to human life or health."

[2] On August 4, 2014, a dam securing a tailings pond at the Mount Polley mine in central British Columbia was breached, spilling mining waste into Polley Lake and surrounding waters.

wastewater is usually from industrial discharges to sewers from metal finishing, steel manufacturing and refineries, and effluent from waste landfills. The source of lead and cadmium is typically industrial discharges to sewers.

In 2017, wastewater and waste management releases accounted for 68%, 48% and 45% of total releases of mercury, lead and cadmium, respectively. From 2003 to 2017, releases of mercury, lead and cadmium from this source declined by 73%, 72% and 61%, respectively.

The second largest source of releases of mercury, lead and cadmium in 2017 was the pulp and paper industry. For this source, releases of mercury, lead and cadmium to water decreased by 19%, 44% and 16%, respectively, between 2003 and 2017.

Taken together, reductions in releases from wastewater treatment plants and from the pulp and paper industry were responsible for 89%, 81% and 96% of the total reduction of releases of mercury, lead and cadmium to water, respectively.

Releases of mercury to water

Mercury is released directly to water from sources such as the pulp and paper industry, mining operations and metal processing, and indirectly through wastewater treatment plants. Mercury in wastewater is usually from industrial discharges to sewers from metal finishing, steel manufacturing and refineries, and effluent from waste landfills. Releases of mercury can also occur when a product containing mercury is manufactured, used, recycled and disposed of.[3]

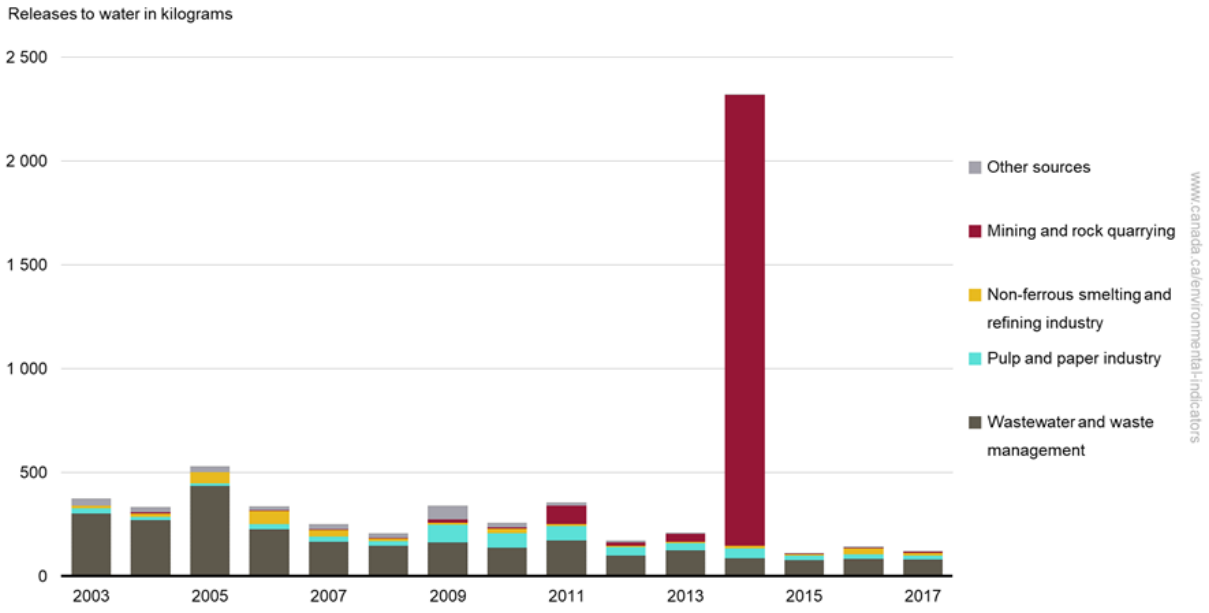
Key results

- Since 2003, mercury releases to water have declined by 68% or 256 kilograms (kg)
- In 2017, national releases totalled 120 kg
    - the largest source was wastewater and waste management, representing 68% (81 kg) of the total
- In 2014, a significant spill[4] accounted for 92% (2 143 kg) of the 2 321 kg of mercury released

[3] The *Products Containing Mercury Regulations*, which came into force in November 2015, prohibit the manufacture and import of mercury or any of its compounds, with some exemptions for essential products that have no technically or economically viable alternatives (such as certain medical and research applications and dental amalgam).

[4] On August 4, 2014, a dam securing a tailings pond at the Mount Polley mine in central British Columbia was breached, spilling mining waste into Polley Lake and surrounding waters.

Figure 2. Mercury releases to water by source, Canada, 2003 to 2017



Data for Figure 2

Note: The indicator reports facility-based releases only. The indicator includes the amount of elemental mercury and mercury in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported mercury releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

In 2017, 3 sectors contributed 94% (113 kg) of total national releases of mercury to water: wastewater and waste management, the pulp and paper industry, and the non-ferrous smelting and refining industry.

The largest reduction in mercury releases to water between 2003 and 2017 was in wastewater and waste management, with a reduction of 222 kg (73%). This decline contributed to 87% of the total decline in mercury releases to water.

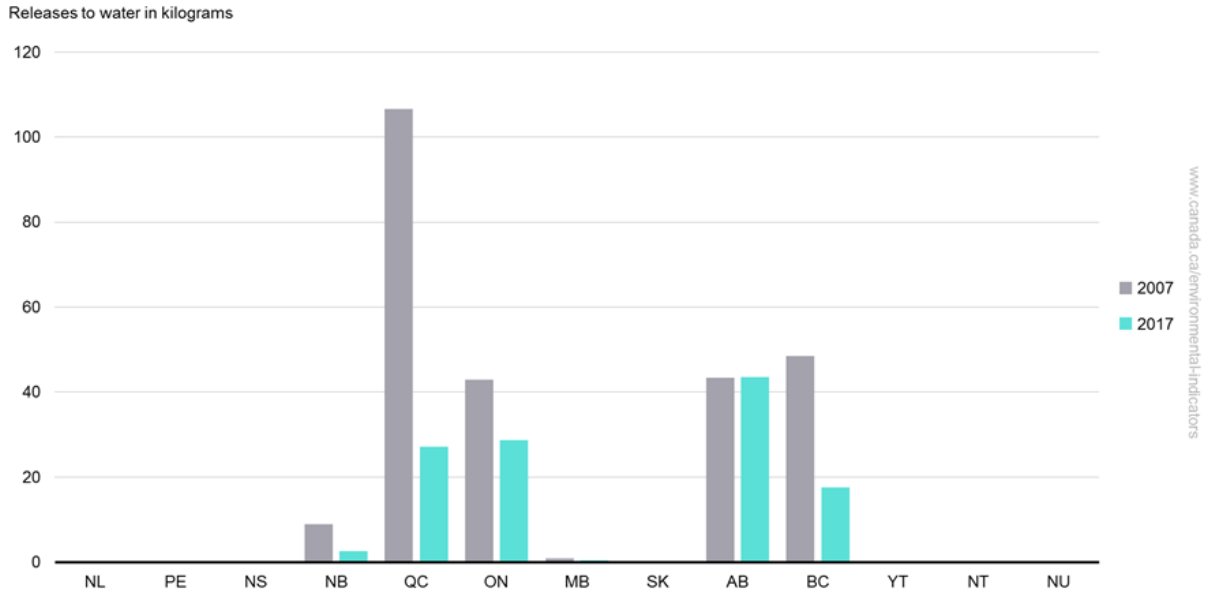
Mercury has significant negative effects on human health and the environment. It persists and bioaccumulates in ecosystems and biota. Exposure of Canadians to mercury poses a particular risk to populations such as indigenous people who rely heavily on the consumption of predatory fish, such as freshwater trout or Arctic char, and traditional food items, including marine mammals.

Releases of mercury to water by province and territory

Key results

- In 2017, Alberta, Ontario and Quebec made up 83% (99 kg) of national mercury releases to water
- Between 2007 and 2017, the largest reduction in releases of mercury to water was from Quebec, which reduced its releases by 75% (79 kg)

Figure 3. Mercury releases to water by province and territory, Canada, 2007 and 2017



Data for Figure 3

Note: The indicator reports facility-based releases only. The indicator includes the amount of elemental mercury and mercury in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported mercury releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Mercury releases to water were highest in Alberta in 2017, accounting for 36% (44 kg) of the national total. It was most commonly released in wastewater effluents.

Quebec had the largest decline in mercury releases between 2007 and 2017. This decline was mostly due to reductions in wastewater and waste management, and the non-ferrous smelting and refining industry. Alberta had a slight increase in releases over this period, as a result of more pulp and paper facilities reporting.

In 2017, wastewater and waste management was the main source of mercury releases to water in Alberta, Ontario, British Columbia, Manitoba and Nova Scotia. The pulp and paper industry was the largest source in New Brunswick. In Quebec, the non-ferrous smelting and refining industry was the main source of releases of mercury to water. In Newfoundland and Labrador and the Northwest Territories, the largest source was mining and rock quarrying.

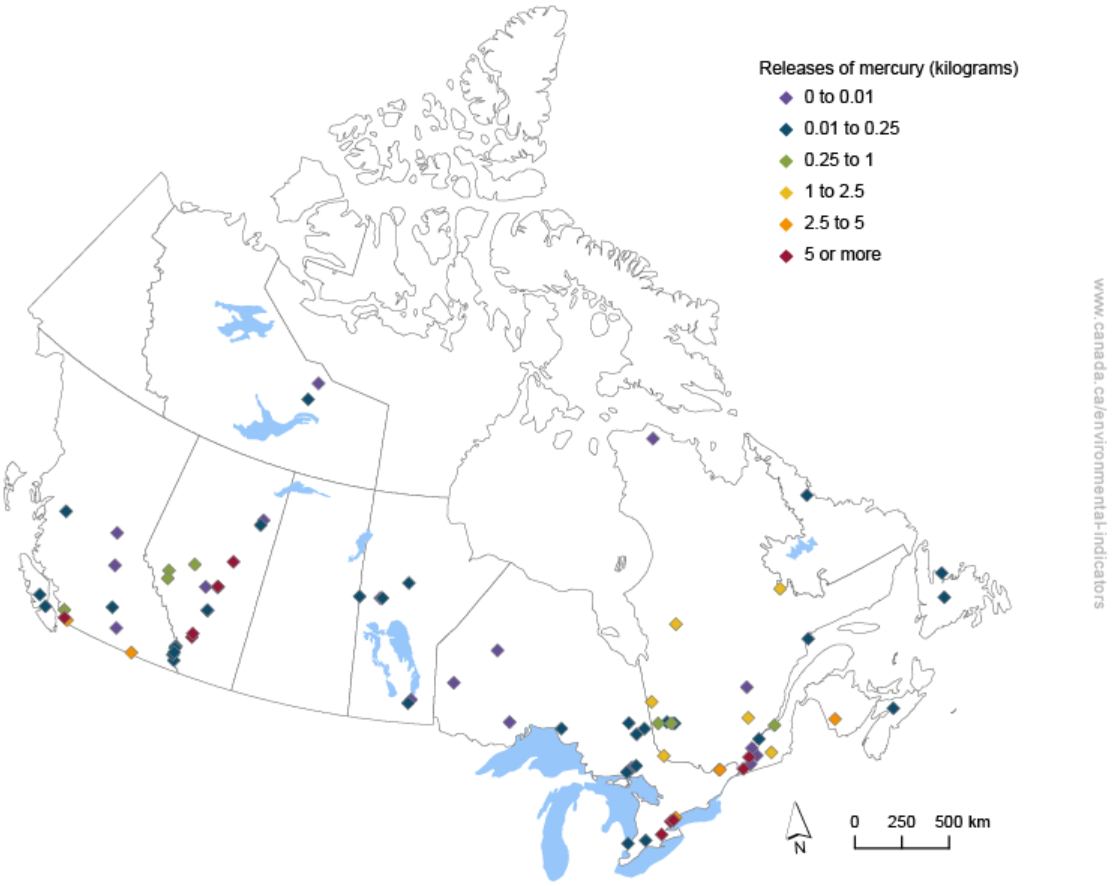
There were no reported mercury releases to water in Prince Edward Island, Saskatchewan, Yukon and Nunavut for 2007 and 2017. In 2007, the Northwest Territories had no reported releases.

Releases of mercury to water from facilities

The National Pollutant Release Inventory provides detailed information on emissions and releases from industrial and commercial facilities that meet its reporting criteria.

The Canadian Environmental Sustainability Indicators provide access to this information through an interactive map. The map allows you to explore releases of mercury to water from individual facilities.

Figure 4. Releases of mercury to water by facility, Canada, 2017



Navigate data using the interactive map

Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory Data Search, 2017 Facility Reported Data.

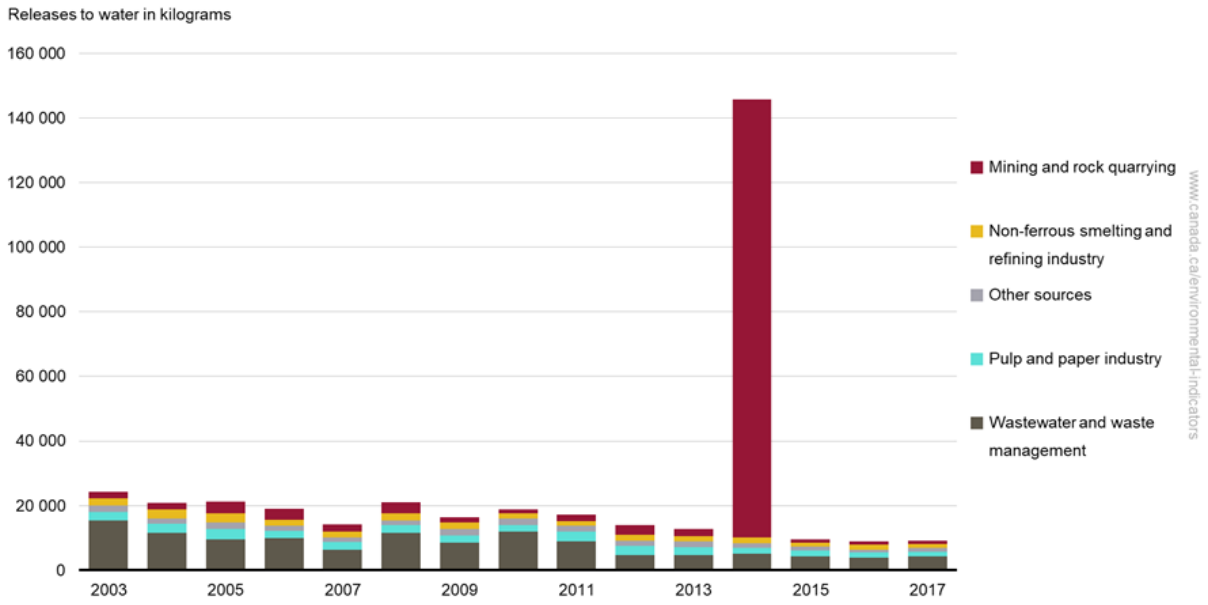
Releases of lead to water

Lead is released directly to water from sources such as the pulp and paper industry, metal processing, mining and rock quarrying, and indirectly through wastewater treatment plants. Lead in wastewater is usually from industrial discharges to sewers. It is also released by natural processes such as rock and soil erosion. Lead can be deposited on land or water surfaces and then build up in soils or sediments.

Key results

- Since 2003, lead releases to water have decreased by 62% or 15 188 kilograms (kg)
- In 2017, national releases totalled 9 150 kg
    - the largest source was wastewater and waste management, representing 48% (4 376 kg) of the total
- In 2014, a significant spill generated 92% (134 235 kg) of the 145 712 kg of lead released[5]

Figure 5. Lead releases to water by source, Canada, 2003 to 2017



Date for Figure 5

Note: The indicator reports facility-based releases only. The indicator includes the amount of elemental lead and lead in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported lead releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

In 2017, about 64% (5 824 kg) of national releases of lead to water came from wastewater and waste management, and the pulp and paper industry.

Wastewater and waste management contributed to a 73% (11 110 kg) reduction in lead releases to water since 2003. The non-ferrous smelting and refining, pulp and paper, and mining and rock

[5] On August 4, 2014, a dam securing a tailings pond at the Mount Polley mine in central British Columbia was breached, spilling mining waste into Polley Lake and surrounding waters.

quarrying industries contributed a further 8% (1 143 kg), 7% (1 135 kg) and 7% (1 044 kg), respectively to the decrease in releases.

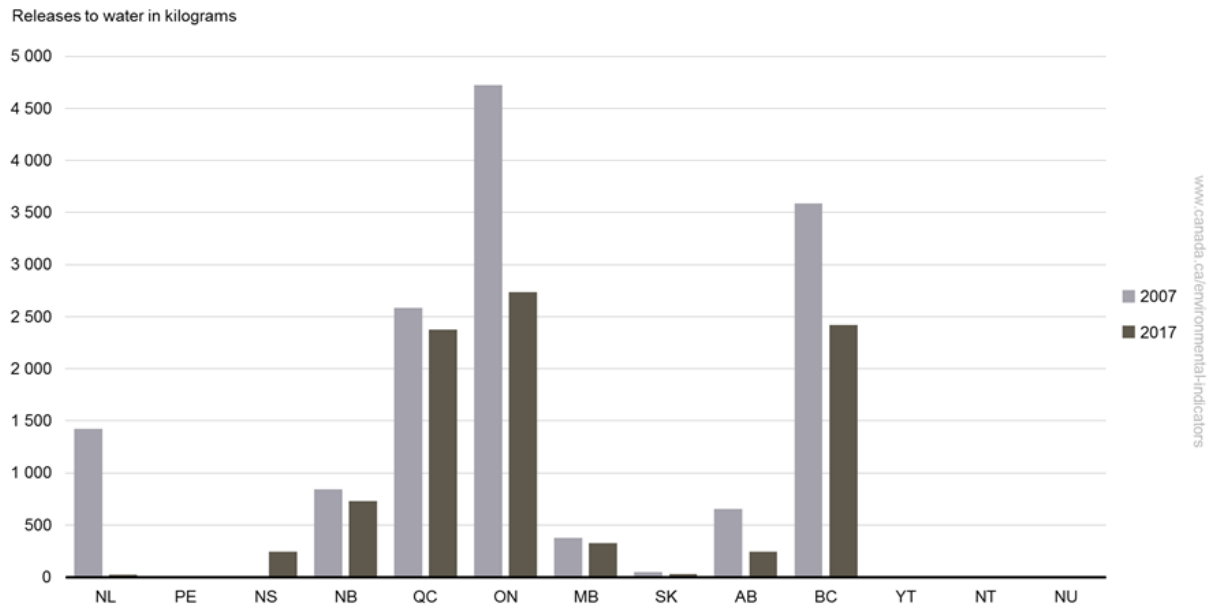
Exposure to lead, even in small amounts, can be hazardous to both humans and wildlife. Fishing tackle containing lead can pose a serious threat to birds if ingested. A single sinker or jig containing several grams of lead is enough to kill a bird. A recent study estimates every year approximately 460 tonnes of lead sinkers and jigs are lost into Canada's lakes and waterways.[6]

Releases of lead to water by province and territory

Key results

- In 2017, Ontario, British Columbia and Quebec made up 82% (7 531 kg) of national lead releases to water
- Between 2007 and 2017
    - the largest reduction in releases of lead to water was from Ontario, which reduced its releases by 42% (1 989 kg)
    - the largest increase in lead releases to water was from Nova Scotia, which had an almost 19-fold (230 kg) increase in releases

Figure 6. Lead releases to water by province and territory, Canada, 2007 and 2017



Data for Figure 6

Note: The indicator reports facility-based releases only. The indicator includes the amount of elemental lead and lead in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported lead releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Lead releases to water were highest in Ontario in 2017, accounting for 30% (2 735 kg) of the national total.

[6] Environment and Climate Change Canada (2018) Study to gather use pattern information on lead sinkers and jigs and their non-lead alternative in Canada. Retrieved on February 18, 2019.

Ontario also had the largest decline in lead releases between 2007 and 2017. This decline was mostly due to reductions in releases from wastewater and waste management, and mining and rock quarrying. Nova Scotia had the largest increase in releases over this period. This increase was the result of reported data for a single wastewater treatment plant.

In 2017, wastewater and waste management was the main source of lead releases to water in Ontario, Quebec, Nova Scotia, Alberta, Saskatchewan and Prince Edward Island. In British Columbia, the largest source was the non-ferrous smelting and refining industry. Mining and rock quarrying was the largest source in New Brunswick, Manitoba, Nunavut and the Northwest Territories. In Newfoundland and Labrador, the largest source was the oil and gas industry.

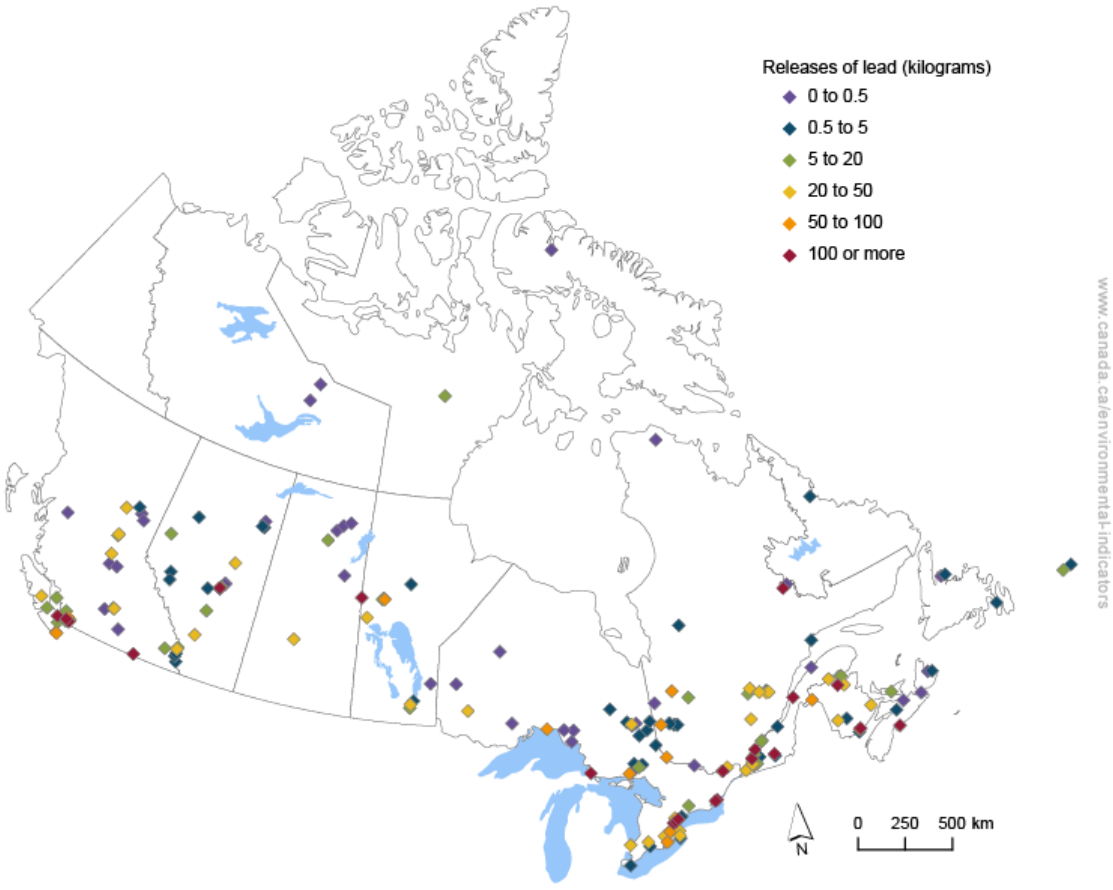
In 2007, there were no reported releases of lead in Prince Edward Island, Yukon, the Northwest Territories and Nunavut. All provinces and territories reported releases in 2017, except for Yukon.

Releases of lead to water from facilities

The National Pollutant Release Inventory provides detailed information on emissions and releases from industrial and commercial facilities that meet its reporting criteria.

The Canadian Environmental Sustainability Indicators provide access to this information through an interactive map. The map allows you to explore releases of lead to water from individual facilities.

Figure 7. Releases of lead to water by facility, Canada, 2017



Navigate data using the interactive map

Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory Data Search, 2017 Facility Reported Data.

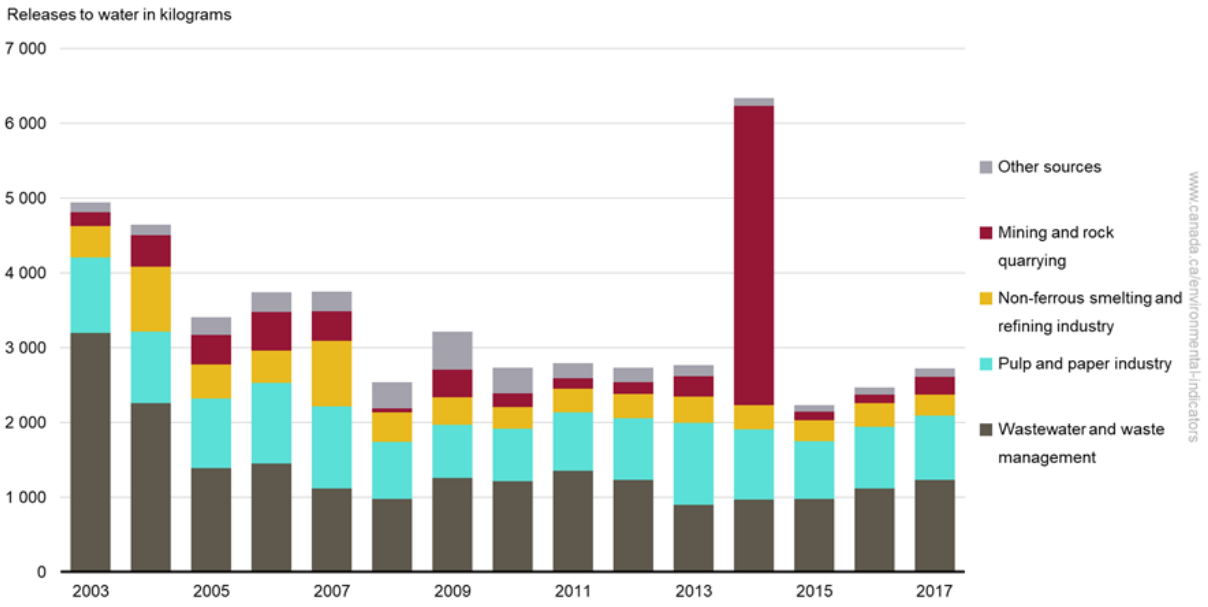
Releases of cadmium to water

Cadmium can be released directly to water from human activities such as non-ferrous smelting and refining, and fuel consumption for electricity or heating, and indirectly through wastewater treatment plants. Cadmium in wastewater is usually from industrial discharges to sewers. Cadmium is a naturally occurring metal. It is used in batteries and in electroplating to protect other metals from corrosion.

Key results

- Since 2003, cadmium releases to water have declined by 45% or 2 218 kilograms (kg)
- In 2017, national releases totalled 2 725 kg
    - the largest source was wastewater and waste management, representing about 45% (or 1 235 kg) of national releases
- In 2014, a significant spill accounted for 59% (3 768 kg) of the 6 340 kg of cadmium released[7]

Figure 8. Cadmium releases to water by source, Canada, 2003 to 2017



Data for Figure 8

Note: The indicator reports facility-based releases only. The indicator includes the amount of elemental cadmium and cadmium in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported cadmium releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

In 2017, 87% (2 371 kg) of cadmium released to water came from wastewater and waste management, the pulp and paper industry, and the non-ferrous smelting and refining industry.

Wastewater and waste management contributed to an 88% (1 960 kg) reduction in cadmium releases to water since 2003. The pulp and paper and non-ferrous smelting and refining industries each contributed an additional 7% (158 kg and 144 kg, respectively) to the total decrease in cadmium.

[7] On August 4, 2014, a dam securing a tailings pond at the Mount Polley mine in central British Columbia was breached, spilling mining waste into Polley Lake and surrounding waters.

Between 2003 and 2017, the largest reduction in releases of cadmium to water was from wastewater and waste management, with a reduction of 61% (1 960 kg).

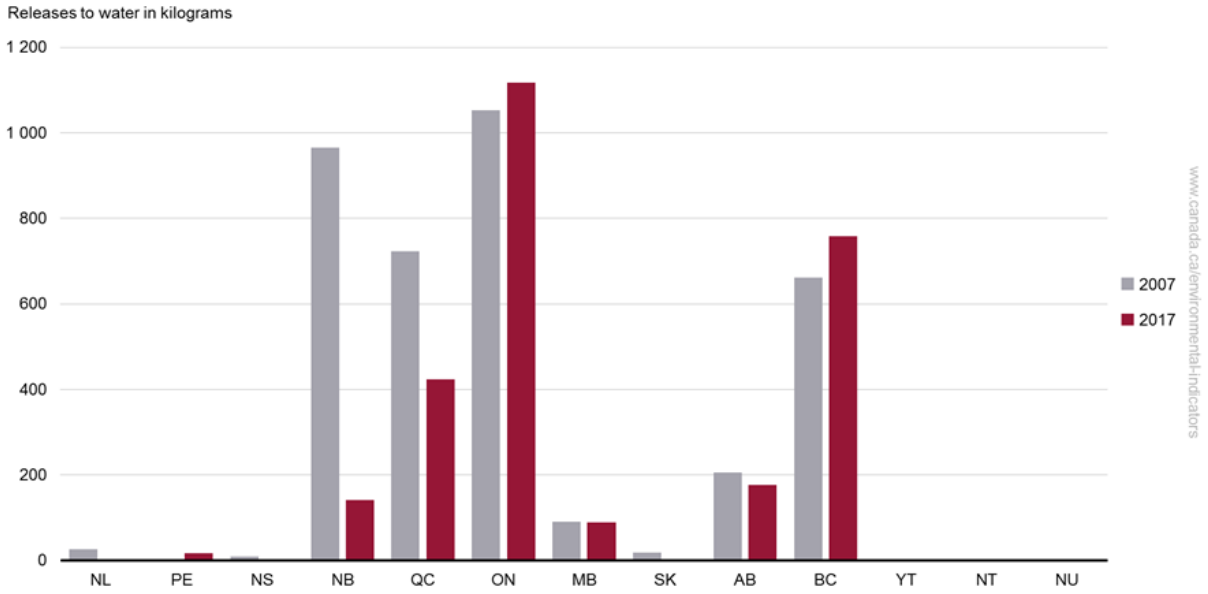
Exposure to cadmium can be hazardous to both humans and wildlife.

Releases of cadmium to water by province and territory

Key results

- In 2017, Ontario, British Columbia and Quebec made up 84% (2 300 kg) of national cadmium releases to water
- Between 2007 and 2017
    - the largest reduction in releases of cadmium to water was from New Brunswick, which reduced its releases by 85% (825 kg)
    - the largest increase in cadmium releases to water was from British Columbia, which had a 15% (97 kg) increase in releases

Figure 9. Cadmium releases to water by province and territory, Canada, 2007 and 2017



Data for Figure 9

Note: The indicator reports facility-based releases only. The indicator includes the amount of elemental cadmium and cadmium in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported cadmium releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Cadmium releases to water were highest in Ontario in 2017, accounting for 41% (1 118 kg) of the national total. Wastewater and waste management was the main source of these releases.

Between 2007 and 2017, New Brunswick had the largest decrease in cadmium releases. This decrease was mostly due to reductions at a non-ferrous smelting and refining facility and within the pulp and paper industry. British Columbia had the largest increase in releases over this period. The increase resulted from larger releases by the pulp and paper industry.

In 2017, wastewater and waste management was the main source of cadmium releases to water in Ontario, Prince Edward Island and Saskatchewan. The pulp and paper industry was the largest source in British Columbia, Quebec, Alberta and New Brunswick, while mining and rock quarrying

was the largest source in Manitoba, the Northwest Territories, Newfoundland and Labrador and Nunavut. In Nova Scotia, the largest source was electric utilities.

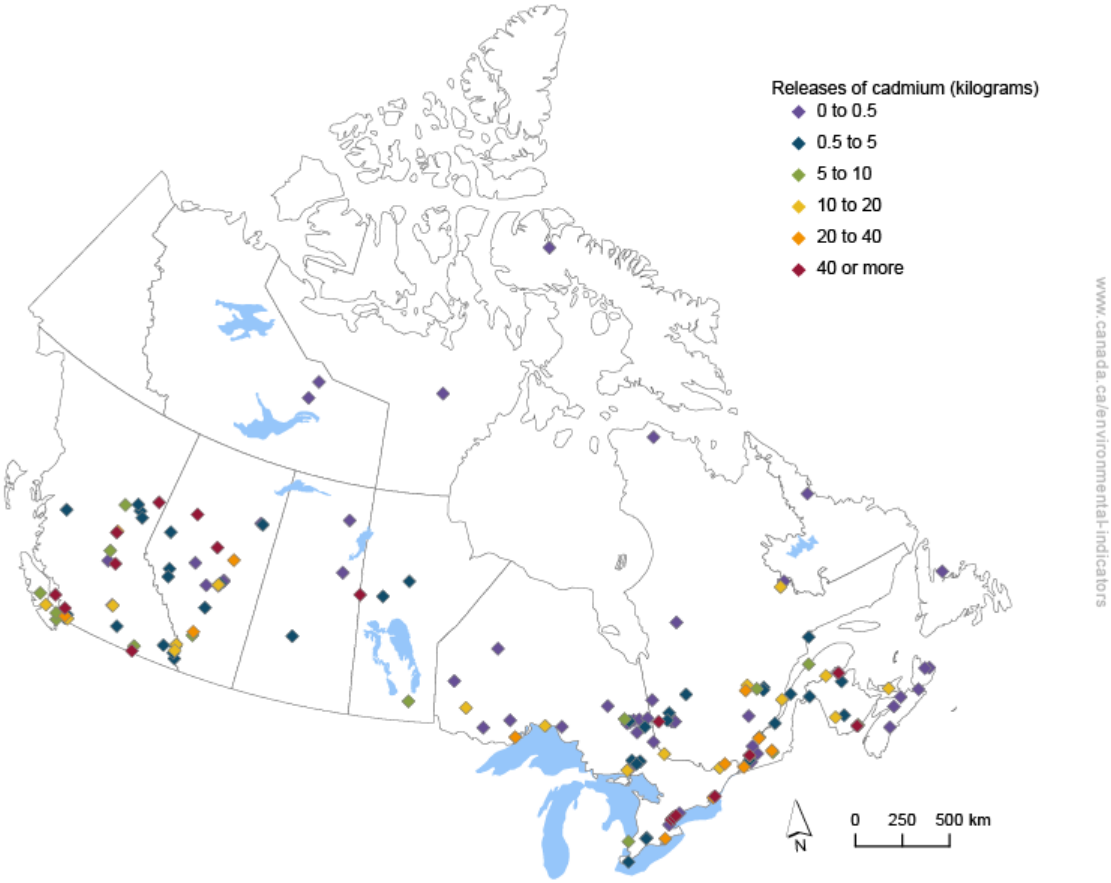
In 2007, there were no reported releases of cadmium in Prince Edward Island, Yukon, the Northwest Territories or Nunavut. All provinces and territories reported releases in 2017, except for Yukon.

Releases of cadmium to water from facilities

The National Pollutant Release Inventory provides detailed information on emissions and releases from industrial and commercial facilities that meet its reporting criteria.

The Canadian Environmental Sustainability Indicators provide access to this information through an interactive map. The map allows you to explore releases of cadmium to water from individual facilities.

Figure 10. Releases of cadmium to water by facility, Canada, 2017



Navigate data using the interactive map

Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory Data Search, 2017 Facility Reported Data.

About the indicators

What the indicators measure

These indicators track facility-based releases to water of 3 substances that are defined as toxic under the *Canadian Environmental Protection Act, 1999*: mercury, lead and cadmium and their compounds. For each substance, data are provided at the national, regional (provincial and territorial) and facility level and by source.

Why these indicators are important

Mercury and its compounds, lead and inorganic cadmium compounds are on the Toxic substances list under Schedule 1 of the *Canadian Environmental Protection Act, 1999*. This means that these substances are "entering or may enter the environment in a quantity or concentration or under conditions that (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity; (b) constitute or may constitute a danger to the environment on which life depends; or (c) constitute or may constitute a danger in Canada to human life or health."

The indicators inform Canadians about releases to water of these 3 substances from facilities in Canada. The Releases of harmful substances to water indicators also help the government to identify priorities and develop or revise strategies to inform further risk management and to track progress on policies put in place to reduce or control these 3 substances and water pollution in general.

Safe and healthy communities

These indicators support the measurement of progress towards the following 2016–2019 Federal Sustainable Development Strategy long-term goal: All Canadians live in clean, sustainable communities that contribute to their health and well-being.

In addition, the indicators contribute to the Sustainable Development Goals of the 2030 Agenda for Sustainable Development. They are linked to the 2030 Agenda's Goal 12: Responsible consumption and production and Target 12.4: "By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment."

Related indicators

The Emissions of harmful substances to air indicators track human-related emissions to air of 3 toxic substances, namely mercury, lead and cadmium, and their compounds. For each substance, data are provided at the national and regional (provincial and territorial) level and by source. Facility and global emissions to air are also provided for mercury.

The Human exposure to harmful substances indicators track the concentrations of 4 substances (mercury, lead, cadmium and bisphenol A) in the Canadian population.

Data sources and methods

Data sources

Data for the indicators and the interactive maps are taken from the normalized dataset of the National Pollutant Release Inventory (the inventory). These indicators include the amount of elemental mercury, lead and cadmium in any compound, alloy or mixture released to water as reported to the inventory based on its reporting criteria as listed in section 5.3 of the Guide to Reporting to the National Pollutant Release Inventory 2018 and 2019 (PDF; 1.50 MB).

More information

The inventory is compiled by Environment and Climate Change Canada (the department), and includes releases reported by industrial, commercial and institutional facilities. It is Canada's legislated, publicly accessible inventory of pollutant releases (to air, water and land), disposals and transfers for recycling. It consists of information reported by facilities to the department under the *Canadian Environmental Protection Act, 1999* (the act). Under the act, owners or operators of facilities that manufacture, process or otherwise use or release one or more of the substances tracked by the inventory and that meet reporting thresholds and other requirements must report their pollutant releases annually.

Estimation of releases to water

Releases to water are estimated or measured through one of the following methods:

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

These measurement methods and estimation techniques are used by the facilities to report their releases (point sources) to the inventory. The Report to the National Pollutant Release Inventory program web page provides information to owners or operators of facilities required to report to the inventory, as well as details on the program's calculation methods.

Data completeness

Because the indicators are derived solely from the inventory's database, they reflect only releases from facilities that met the reporting criteria. As a result, the indicators do not include all releases in Canada. They are limited to the main point sources for each selected toxic substance.

Data timeliness

The data are current up to 2017. The indicators are reported approximately 1.5 years after data collection because of the time required for data validation, analysis and interpretation.

Methods

The indicators are produced by grouping data from the inventory to report on the key sources that contribute to the majority of mercury, lead and cadmium releases to water.

More information

Indicators coverage

Historical data are provided at the national level and by source for the period from 2003 to 2017. The year 2003 was selected as the first year for releases to water because it was the year the inventory updated its reporting criteria for mercury, lead and cadmium. For the regional (provincial/territorial) indicators, releases to water are provided for 2007 and 2017. Releases of mercury, lead and cadmium to water by facility are displayed on the Environmental Indicators interactive maps.

Sources classification

Source descriptions for the indicators were taken from Statistics Canada's North American Industry Classification System. The 4-digit code of the classification system, as reported by the facilities, was used for source classification for the data reported by the inventory. These sources were then classified into the following sources for reporting in the indicators:

- electric utilities
- wastewater and waste management
- manufacturing (except pulp and paper)
- mining and rock quarrying
- miscellaneous
- non-ferrous smelting and refining industry
- oil and gas industry
- ore and mineral industries (except non-ferrous smelting and refining)
- pulp and paper industry

Table 1 shows the allocation of sources of harmful substances reported in the indicators compared with those reported by the inventory.

Table 1. Alignment of sources reported in the Canadian Environmental Sustainability Indicators and the National Pollutant Release Inventory

Sources in the Canadian Environmental Sustainability Indicators	Sources in the National Pollutant Release Inventory (based on the North American Industry Classification System)
Electric utilities	Electric power generation, transmission and distribution
Wastewater and waste management	Water, sewage and other systems
Wastewater and waste management	Waste collection
Wastewater and waste management	Waste treatment and disposal
Wastewater and waste management	Remediation and other waste management services
Manufacturing (except pulp and paper)	Forest nurseries and gathering of forest products
Manufacturing (except pulp and paper)	Sawmills and wood preservation

Sources in the Canadian Environmental Sustainability Indicators	Sources in the National Pollutant Release Inventory (based on the North American Industry Classification System)
Manufacturing (except pulp and paper)	Veneer, plywood and engineered wood product manufacturing
Manufacturing (except pulp and paper)	Petroleum and coal product manufacturing
Manufacturing (except pulp and paper)	Basic chemical manufacturing
Manufacturing (except pulp and paper)	Pesticide, fertilizer and other agricultural chemical manufacturing
Manufacturing (except pulp and paper)	Pharmaceutical and medicine manufacturing
Manufacturing (except pulp and paper)	Other chemical product manufacturing
Manufacturing (except pulp and paper)	Rubber product manufacturing
Manufacturing (except pulp and paper)	Glass and glass product manufacturing
Manufacturing (except pulp and paper)	Cement and concrete product manufacturing
Manufacturing (except pulp and paper)	Forging and stamping
Manufacturing (except pulp and paper)	Spring and wire product manufacturing
Manufacturing (except pulp and paper)	Coating, engraving, cold and heat treating and allied activities
Manufacturing (except pulp and paper)	Other fabricated metal product manufacturing
Manufacturing (except pulp and paper)	Engine, turbine and power transmission equipment manufacturing
Manufacturing (except pulp and paper)	Semiconductor and other electronic component manufacturing
Manufacturing (except pulp and paper)	Electrical equipment manufacturing
Manufacturing (except pulp and paper)	Other electrical equipment and component manufacturing
Manufacturing (except pulp and paper)	Motor vehicle parts manufacturing
Manufacturing (except pulp and paper)	Aerospace product and parts manufacturing
Manufacturing (except pulp and paper)	Other miscellaneous manufacturing
Mining and rock quarrying	Coal mining
Mining and rock quarrying	Metal ore mining
Mining and rock quarrying	Non-metallic mineral mining and quarrying
Miscellaneous	Support activities for water transportation
Miscellaneous	Other professional, scientific and technical services
Miscellaneous	General medical and surgical hospitals
Non-ferrous smelting and refining industry	Non-ferrous metal (except aluminum) production and processing
Oil and gas industry	Oil and gas extraction
Ore and mineral industries (except non-ferrous smelting and refining)	Iron and steel mills and ferro-alloy manufacturing

Sources in the Canadian Environmental Sustainability Indicators	Sources in the National Pollutant Release Inventory (based on the North American Industry Classification System)
Ore and mineral industries (except non-ferrous smelting and refining)	Steel product manufacturing from purchased steel
Ore and mineral industries (except non-ferrous smelting and refining)	Alumina and aluminum production and processing
Ore and mineral industries (except non-ferrous smelting and refining)	Foundries
Pulp and paper industry	Pulp, paper and paperboard mills

For display purposes, sources with smaller releases are sometimes grouped together under the category "Other sources" in the charts of releases by source. The names of the grouped sources are listed in the notes of each chart.

Caveats and limitations

The indicators reflect only facility-based releases to water as reported to the inventory. They do not include estimates of releases from other sources, such as runoff from cities, transboundary pollution or from consumer products in Canada.

Occasional updates and data quality checking can be done after initial release of the inventory's normalized dataset.

The number and composition of facilities that report releases to water to the inventory vary each year. This variation is due to the fact that only facilities that meet or exceed the reporting threshold are required to report. An analysis of how this might affect the apparent trends has not been undertaken.

Facilities reporting to the inventory may use different methods to calculate releases. These methods vary depending on the substance and/or facility, and may also change from year to year.

Resources

References

Environment and Climate Change Canada (2017) Using and interpreting data from the National Pollutant Release Inventory. Retrieved on February 18, 2019.

Environment and Climate Change Canada (2018) Access data from the National Pollutant Release Inventory. September 13, 2018 version. Retrieved on February 18, 2019.

Environment and Climate Change Canada (2018) Study to gather use pattern information on lead sinkers and jigs and their non-lead alternatives in Canada. Retrieved on February 18, 2019.

Related information

NPRI sector overview: Metal ore mining

NPRI sector overview: Wastewater

Annex

Annex A. Data tables for the figures presented in this document

Table A.1. Data for Figure 1. Releases of mercury, lead and cadmium to water, Canada, 2003 to 2017

Year	Mercury (percentage change relative to 2003)	Lead (percentage change relative to 2003)	Cadmium (percentage change relative to 2003)
2003	0	0	0
2004	-11	-14	-6
2005	41	-13	-31
2006	-10	-21	-24
2007	-33	-41	-24
2008	-45	-14	-49
2009	-10	-32	-35
2010	-32	-22	-45
2011	-6	-29	-44
2012	-54	-43	-45
2013	-44	-47	-44
2014	518	499	28
2015	-70	-61	-55
2016	-62	-63	-50
2017	-68	-62	-45

Note: The indicator reports facility-based releases only. This table accounts only for the releases to water reported in the National Pollutant Release Inventory based on the inventory reporting criteria for releases of mercury, lead and cadmium and their compounds. These amounts should not be interpreted as comprehensive totals of releases to water of these pollutants in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.2. Data for Figure 2. Mercury releases to water by source, Canada, 2003 to 2017

Year	Wastewater and waste management (releases to water in kilograms)	Pulp and paper industry (releases to water in kilograms)	Non-ferrous smelting and refining industry (releases to water in kilograms)	Mining and rock quarrying (releases to water in kilograms)	Other sources (releases to water in kilograms)	Total (releases to water in kilograms)
2003	303.4	23.9	14.1	0.2	34.3	375.8
2004	270.3	16.9	13.3	7.1	25.3	333.0
2005	434.2	14.0	53.4	0.2	28.5	530.3
2006	225.7	26.0	61.6	3.1	20.6	337.0
2007	167.1	25.4	31.2	3.9	23.3	251.0
2008	146.8	22.8	10.7	3.2	24.5	208.0

Year	Wastewater and waste management (releases to water in kilograms)	Pulp and paper industry (releases to water in kilograms)	Non-ferrous smelting and refining industry (releases to water in kilograms)	Mining and rock quarrying (releases to water in kilograms)	Other sources (releases to water in kilograms)	Total (releases to water in kilograms)
2009	163.6	83.6	9.4	16.2	65.8	338.7
2010	136.5	70.5	23.3	4.6	21.4	256.2
2011	173.6	68.2	9.3	90.2	13.2	354.4
2012	99.0	43.2	5.7	15.2	9.1	172.2
2013	123.6	34.6	8.5	38.6	6.2	211.5
2014	87.4	47.8	10.4	2 174.4	1.4	2 321.4
2015	77.9	21.7	5.5	5.1	1.6	111.8
2016	83.3	21.0	30.7	3.4	4.1	142.5
2017	81.4	19.3	12.0	6.8	0.7	120.3

Note: Totals may not add up due to rounding. The indicator reports facility-based releases only. The indicator includes the amount of elemental mercury and mercury in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported mercury releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.3. Data for Figure 3. Mercury releases to water by province and territory, Canada, 2007 and 2017

Province or territory	2007 (releases to water in kilograms)	2017 (releases to water in kilograms)
Newfoundland and Labrador	< 0.1	0.1
Prince Edward Island	n/a	n/a
Nova Scotia	n/a	0.2
New Brunswick	8.9	2.6
Quebec	106.5	27.1
Ontario	42.9	28.7
Manitoba	0.9	0.4
Saskatchewan	n/a	n/a
Alberta	43.3	43.6
British Columbia	48.4	17.6
Yukon	n/a	n/a
Northwest Territories	n/a	< 0.1
Nunavut	n/a	n/a
Canada	251.0	120.3

Note: n/a = not available, it indicates that the province or territory has no reported releases. Totals may not add up due to rounding. The indicator reports facility-based releases only. The indicator includes the amount of elemental mercury and mercury in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory

reporting criteria. As a result, the reported mercury releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.4. Data for Figure 5. Lead releases to water by source, Canada, 2003 to 2017

Year	Wastewater and waste management (releases to water in kilograms)	Pulp and paper industry (releases to water in kilograms)	Other sources (releases to water in kilograms)	Non-ferrous smelting and refining industry (releases to water in kilograms)	Mining and rock quarrying (releases to water in kilograms)	Total (releases to water in kilograms)
2003	15 486.5	2 583.0	1 901.7	2 253.9	2 112.9	24 338.1
2004	11 526.4	2 886.4	1 630.2	2 881.1	1 924.9	20 849.1
2005	9 472.4	3 340.5	1 964.1	2 778.4	3 712.7	21 268.0
2006	9 899.8	2 365.4	1 568.8	1 874.6	3 427.8	19 136.3
2007	6 417.4	2 370.8	1 395.0	1 819.4	2 251.7	14 254.4
2008	11 582.8	2 424.5	1 492.5	2 194.1	3 271.5	20 965.5
2009	8 489.6	2 252.7	1 954.3	2 148.8	1 611.0	16 456.4
2010	11 973.3	2 116.5	1 938.1	1 526.6	1 339.1	18 893.6
2011	8 974.8	2 908.8	1 886.3	1 518.9	1 875.8	17 164.7
2012	4 686.2	2 800.8	1 641.5	1 773.6	3 072.0	13 974.0
2013	4 660.3	2 423.3	1 905.9	1 483.6	2 388.7	12 861.9
2014	5 114.7	1 849.4	1 417.6	1 768.1	135 562.2	145 712.0
2015	4 395.9	1 637.9	1 236.7	1 336.7	996.7	9 603.9
2016	3 880.5	1 613.6	855.2	1 524.2	1 045.4	8 918.9
2017	4 376.3	1 447.7	1 146.0	1 111.4	1 069.1	9 150.5

Note: Totals may not add up due to rounding. The indicator reports facility-based releases only. The indicator includes the amount of elemental lead and lead in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported lead releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.5. Data for Figure 6. Lead releases to water by province and territory, Canada, 2007 and 2017

Province or territory	2007 (releases to water in kilograms)	2017 (releases to water in kilograms)
Newfoundland and Labrador	1 425.7	22.9
Prince Edward Island	n/a	12.8
Nova Scotia	13.0	243.3
New Brunswick	845.6	728.9
Quebec	2 585.5	2 374.1
Ontario	4 723.8	2 734.6

Province or territory	2007 (releases to water in kilograms)	2017 (releases to water in kilograms)
Manitoba	373.6	327.5
Saskatchewan	49.6	31.7
Alberta	651.3	243.1
British Columbia	3 586.2	2 421.8
Yukon	n/a	n/a
Northwest Territories	n/a	0.3
Nunavut	n/a	9.4
Canada	14 254.4	9 150.5

Note: n/a = not available, it indicates that the province or territory has no reported releases. Totals may not add up due to rounding. The indicator reports facility-based releases only. The indicator includes the amount of elemental lead and lead in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported lead releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.6. Data for Figure 8. Cadmium releases to water by source, Canada, 2003 to 2017

Year	Wastewater and waste management (releases to water in kilograms)	Pulp and paper industry (releases to water in kilograms)	Non-ferrous smelting and refining industry (releases to water in kilograms)	Mining and rock quarrying (releases to water in kilograms)	Other sources (releases to water in kilograms)	Total (releases to water in kilograms)
2003	3 194.7	1 012.2	426.4	179.8	129.6	4 942.8
2004	2 258.1	957.7	867.8	423.0	136.2	4 642.7
2005	1 390.6	931.1	454.0	400.3	228.8	3 404.7
2006	1 450.8	1 076.4	435.3	514.6	266.9	3 744.0
2007	1 113.3	1 104.2	877.7	395.8	263.8	3 754.8
2008	977.0	766.1	394.8	52.7	346.4	2 536.9
2009	1 259.9	710.4	365.4	367.9	509.3	3 212.8
2010	1 211.2	704.5	289.0	186.3	344.7	2 735.8
2011	1 356.3	777.4	321.5	134.1	201.8	2 791.1
2012	1 231.4	823.4	326.0	155.9	199.6	2 736.4
2013	902.2	1 095.6	352.2	268.0	145.9	2 763.8
2014	968.0	941.5	319.5	4 002.8	107.9	6 339.7
2015	976.7	770.0	287.3	114.7	83.8	2 232.5
2016	1 117.9	827.2	314.1	110.5	103.3	2 473.0
2017	1 234.6	854.3	282.2	237.7	116.4	2 725.2

Note: Totals may not add up due to rounding. The indicator reports facility-based releases only. The indicator includes the amount of elemental cadmium and cadmium in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported cadmium releases to water account for only a portion of the releases of this toxic pollutant to water in Canada. Other sources include electric utilities, manufacturing (except pulp and paper), the oil and gas industry, ore and mineral industries (except non-ferrous smelting and refining) and other

miscellaneous sources. For more details on sources, please consult the Data sources and methods.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

Table A.7. Data for Figure 9. Cadmium releases to water by province and territory, Canada, 2007 and 2017

Province or territory	2007 (releases to water in kilograms)	2017 (releases to water in kilograms)
Newfoundland and Labrador	25.6	0.1
Prince Edward Island	n/a	16.7
Nova Scotia	10.0	1.1
New Brunswick	966.1	141.1
Quebec	723.7	423.3
Ontario	1 053.0	1 118.1
Manitoba	91.3	88.8
Saskatchewan	18.3	0.9
Alberta	206.1	176.7
British Columbia	660.8	758.3
Yukon	n/a	n/a
Northwest Territories	n/a	0.1
Nunavut	n/a	< 0.1
Canada	3 754.8	2 725.2

Note: n/a = not available, it indicates that the province or territory has no reported releases. Totals may not add up due to rounding. The indicator reports facility-based releases only. The indicator includes the amount of elemental cadmium and cadmium in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on the inventory reporting criteria. As a result, the reported cadmium releases to water represent only a portion of the releases of this toxic pollutant to water in Canada.
Source: Environment and Climate Change Canada (2018) National Pollutant Release Inventory.

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