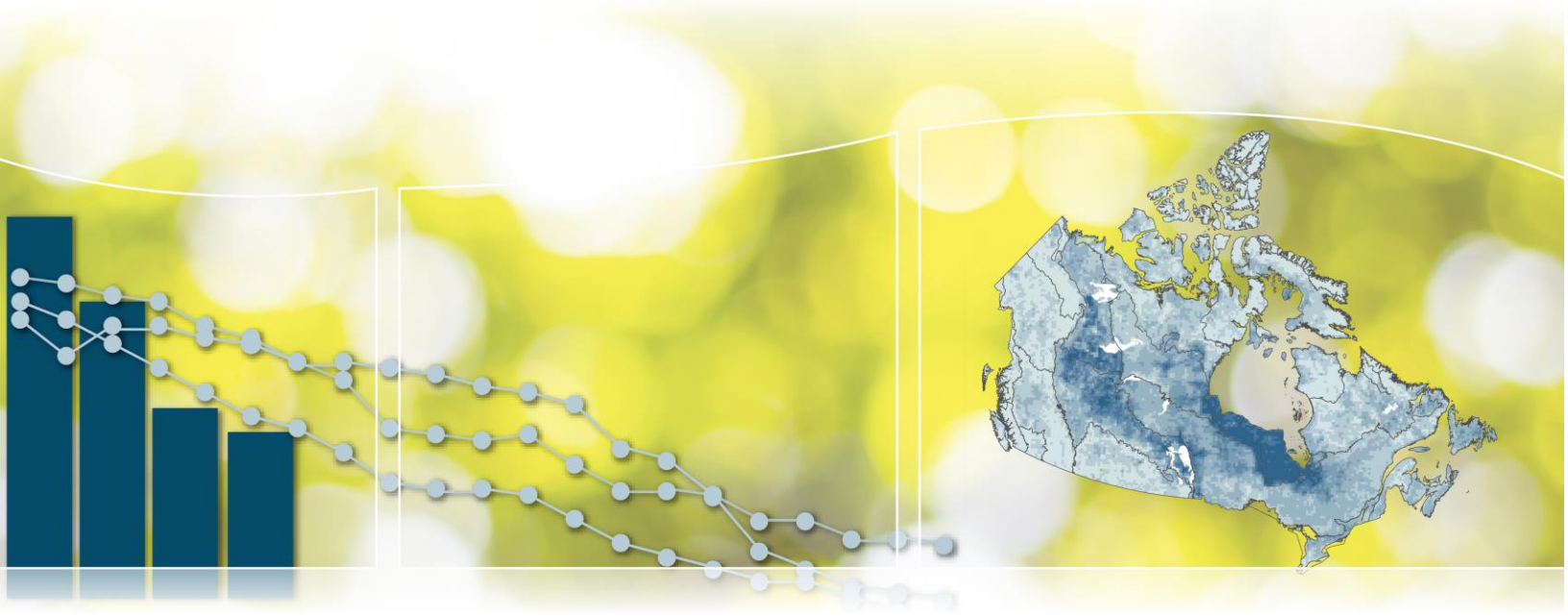
Environment and Climate Change Canada
Environnement et Changement climatique Canada

Canadian Environmental Sustainability Indicators

Releases of harmful substances to water



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Canadian Environmental Sustainability Indicators

Releases of harmful substances to water

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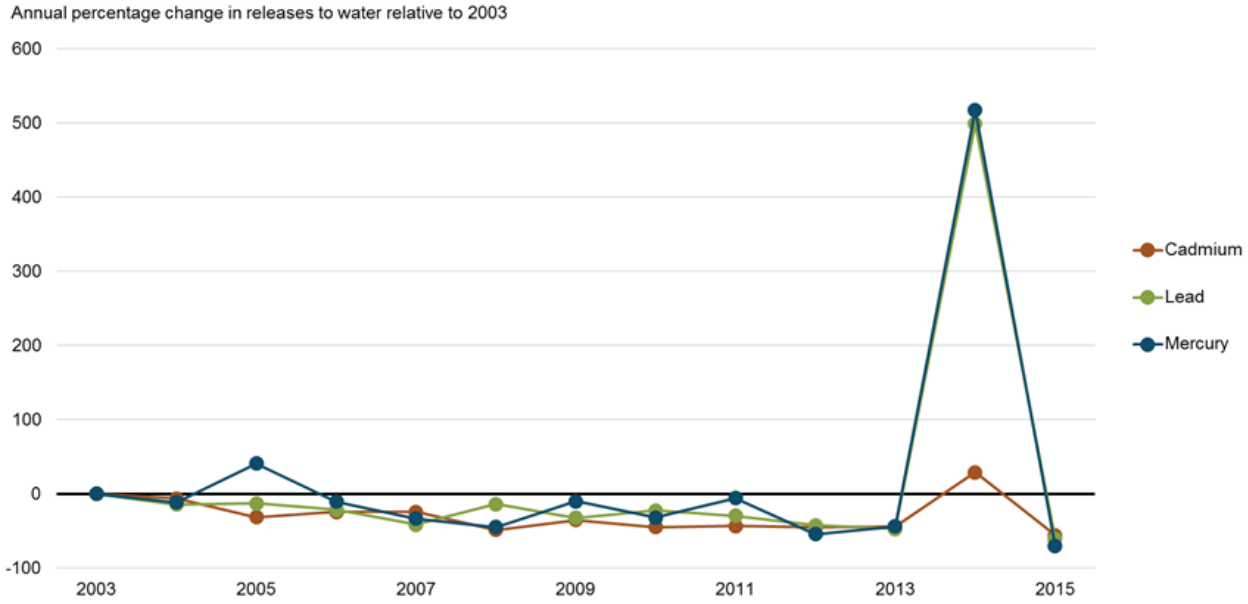
Releases of harmful substances to water indicator

The release of some substances to the environment can harm human health, wildlife and biological diversity. For example, 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. These indicators track human-related releases to water of mercury, lead and cadmium.

Key results

- Releases of cadmium, lead and mercury to water were 55%, 61% and 70% lower in 2015 than in 2003.
- In 2014, a significant spill[1] made up 59%, 92% and 92% of total releases of cadmium, lead and mercury, respectively.

Figure 1. Releases of mercury, lead and cadmium to water, Canada, 2003 to 2015



Data for Figure 1

Note: The indicator reports releases from human activities 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 (2017) 2015 summary report: reviewed facility-reported pollution data.

[1] 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.

Most releases of mercury, lead and cadmium to water come from sewage treatment and waste management (which includes wastewater treatment plants).[2] In 2015, this source made up 69%, 46% and 44% of total releases of these substances, respectively. Between 2003 and 2015, releases of mercury, lead and cadmium from sewage treatment and waste management declined by 74%, 72% and 69%, respectively.

The second largest source of releases of mercury, lead and cadmium in 2015 was the pulp and paper industry. For this source, releases of mercury, lead and cadmium to water decreased by 41%, 37% and 26%, respectively, between 2003 and 2015.

Taken together, reductions in releases from wastewater treatment plants and from the pulp and paper industry were responsible for 89%, 82% and 91% of the total reduction of releases of mercury, lead and cadmium to water, respectively.

Mercury and its compounds, lead, and inorganic cadmium compounds are listed as toxic[3] under the Canadian Environmental Protection Act, 1999.

Releases of mercury to water

Mercury is released directly to water from sources such as the pulp and paper industry, mining operations, metal processing and wastewater treatment plants.[4] Releases of mercury can also occur when a product containing mercury is manufactured, used, recycled and disposed of.[5]

Key results

- Since 2003, mercury releases to water have declined by 70% (0.3 tonnes).
- In 2015, national releases of mercury totalled 0.1 tonnes. The largest source of releases was the sewage treatment and waste management sector,[4] which represented 69% of the total that year.
- Of the 2.3 tonnes of mercury released in 2014, 92% was generated by a significant spill.[6]

[2] Wastewater treatment plants do not generate mercury, lead or cadmium. The source of mercury in wastewater treatment plant effluent is typically dental offices (mercury in dental amalgam discharged to the sewer) and industrial discharges to the sewer from metal finishing, steel manufacturing and refineries. The source of lead and of cadmium is typically industrial discharges to the sewer.

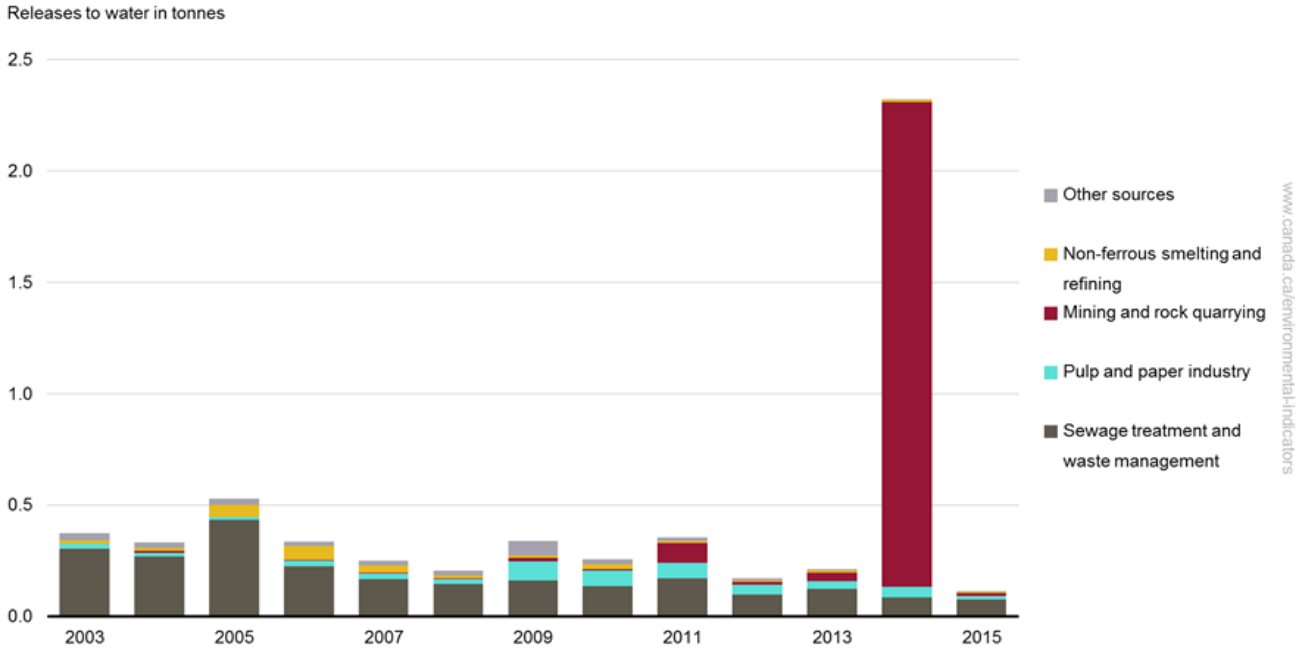
[3] Section 64 of the Canadian Environmental Protection Act, 1999, defines a substance as toxic if it is "entering or may enter the environment in a quantity or concentration or under conditions that (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity; (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."

[4] The sewage treatment and waste management sector includes wastewater treatment plants. Wastewater treatment plants do not generate mercury. The source of mercury in wastewater treatment plant effluent is typically dental offices (mercury in dental amalgam discharged to the sewer) and industrial discharges to the sewer from metal finishing, steel manufacturing and refineries.

[5] The Products Containing Mercury Regulations, which 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), came into force in November 2015.

[6] 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 2015



Data for Figure 2

Note: The indicator reports releases from human activities 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's 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. 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 the sources, please consult the Data sources and methods section.
Source: Environment and Climate Change Canada (2017) 2015 summary report: reviewed facility-reported pollution data.

In 2015, 3 sectors contributed 94% of national total releases of mercury to water: sewage treatment and waste management, the pulp and paper industry and mining and rock quarrying.

The largest reduction in releases of mercury to water between 2003 and 2015 was in the sewage treatment and waste management category, with a reduction of 74% (0.2 tonnes). This decline contributed to 86% of the total decline in mercury releases to water, with declines from the pulp and paper industry and non-ferrous smelting and refining contributing an additional 7%.

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. Mercury and its compounds are listed as toxic[7] under the Canadian Environmental Protection Act, 1999.

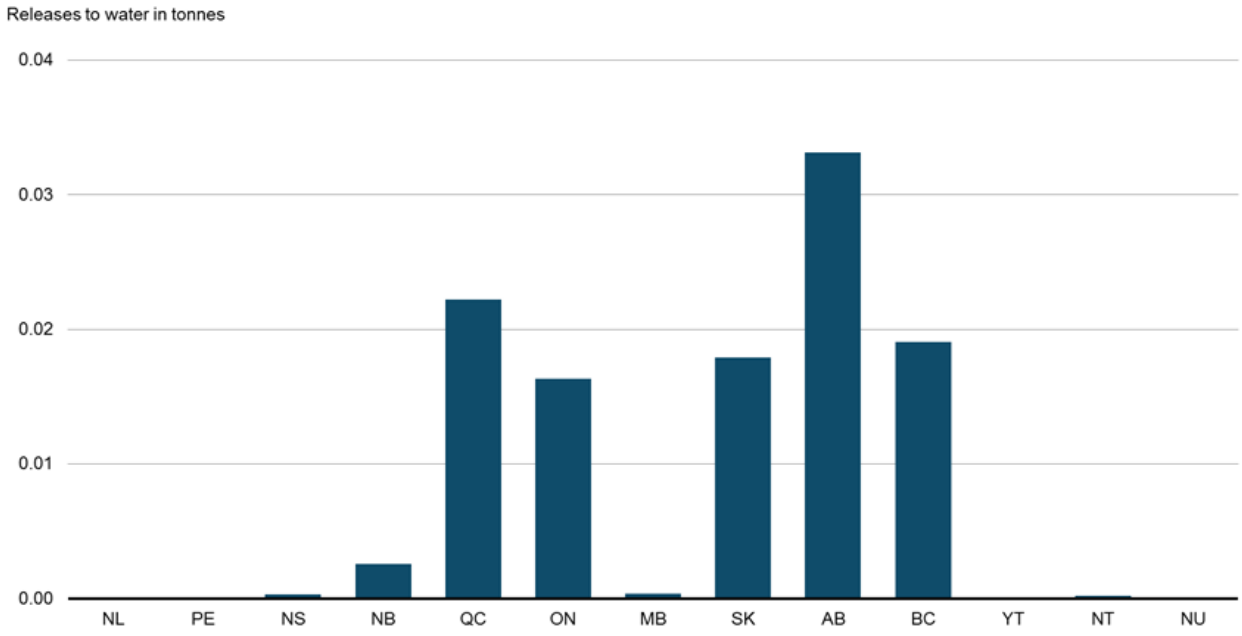
[7] Section 64 of the Canadian Environmental Protection Act, 1999, defines a substance as toxic if it is "entering or may enter the environment in a quantity or concentration or under conditions that (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity; (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."

Releases of mercury to water by province and territory

Key results

- Releases of mercury in Alberta made up 30% of the national total in 2015.
- The second-highest releases were observed in Quebec and represented 20% of the total.
- There were no releases reported in Prince Edward Island, Yukon or Nunavut in 2015.

Figure 3. Mercury releases to water by province and territory, Canada, 2015



Data for Figure 3

Note: The indicator reports releases from human activities 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's 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 (2017) 2015 summary report: reviewed facility-reported pollution data.

Sewage treatment and waste management was the main source of releases of mercury to water in Alberta, British Columbia, Ontario, Manitoba and Nova Scotia. The pulp and paper industry was the largest source of releases of mercury to water in Quebec and New Brunswick. In other provinces and territories (Saskatchewan, the Northwest Territories and Newfoundland and Labrador), the largest source was mining and rock quarrying.

Releases of mercury to water from facilities

Environment and Climate Change Canada's National Pollutant Release Inventory provides detailed information on emissions and releases from industrial and commercial facilities that meet its reporting criteria.[8]

The Canadian Environmental Sustainability Indicators program provides access to this information through an online interactive map. With this map, you can zoom in on local areas and obtain details about releases of mercury to water from individual facilities.

[8] Environment and Climate Change Canada (2017) National Pollutant Release Inventory Data Search – 2015 Facility Reported Data.

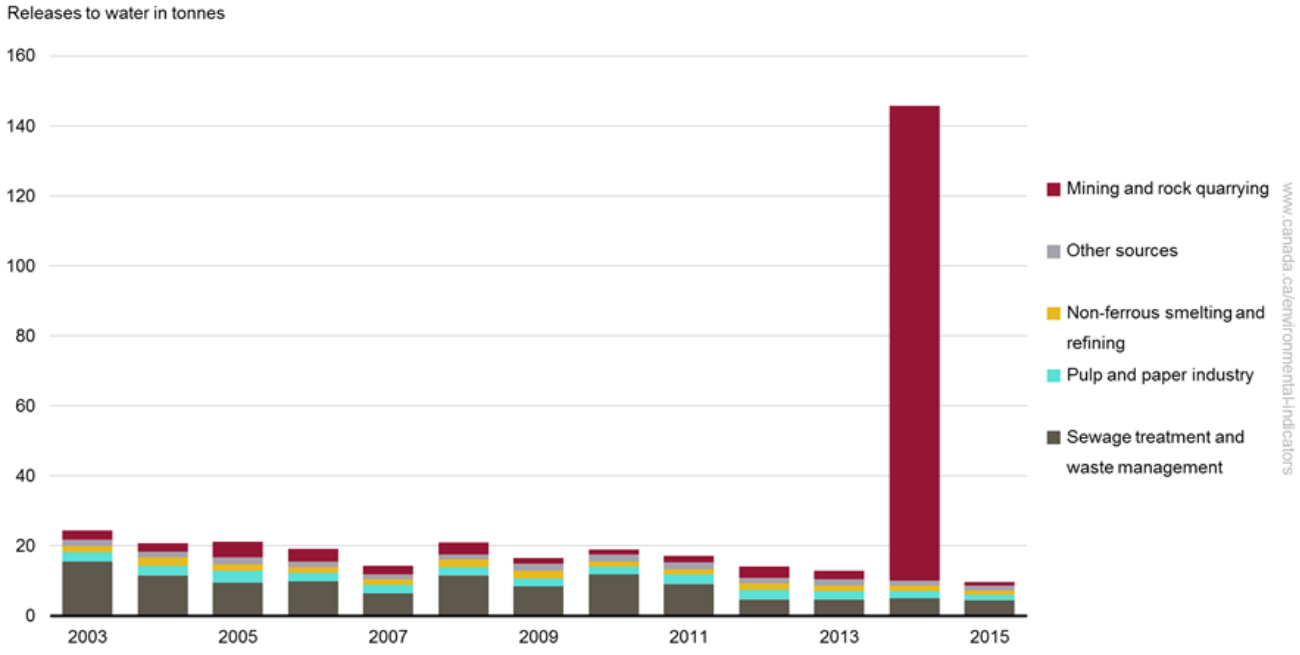
Releases of lead to water

Lead is released directly to water from sources such as the pulp and paper industry, metal processing, mining and rock quarrying and wastewater treatment plants.[9] 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. Exposure to lead, even in small amounts, can be hazardous to both humans and wildlife.

Key results

- Since 2003, lead releases to water have decreased by 61% (or 15 tonnes).
- In 2015, national releases totalled 9.6 tonnes. The largest source of releases was the sewage treatment and waste management sector,[9] representing 46% of the total.
- A significant spill was the source of 92% of the 146 tonnes of lead released in 2014.[10]

Figure 4. Lead releases to water by source, Canada, 2003 to 2015



Data for Figure 4

Note: The indicator reports releases from human activities 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's 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. 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 the sources, please consult the Data sources and methods section.
Source: Environment and Climate Change Canada (2017) 2015 summary report: reviewed facility-reported pollution data.

[9] The sewage treatment and waste management sector includes wastewater treatment plants. Wastewater treatment plants do not generate lead. The source of lead in wastewater treatment plant effluent is typically industrial discharges to the sewer.

[10] 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.

In 2015, about 3 quarters of national releases of lead to water came from sewage treatment and waste management, the pulp and paper industry, and non-ferrous smelting and refining.

The sewage treatment and waste management sector contributed to 75% of the total decline in lead releases to water since 2003. The mining and rock quarrying and pulp and paper industries contributed a further 10% and 7%, respectively to the total decrease in national releases of lead to water.

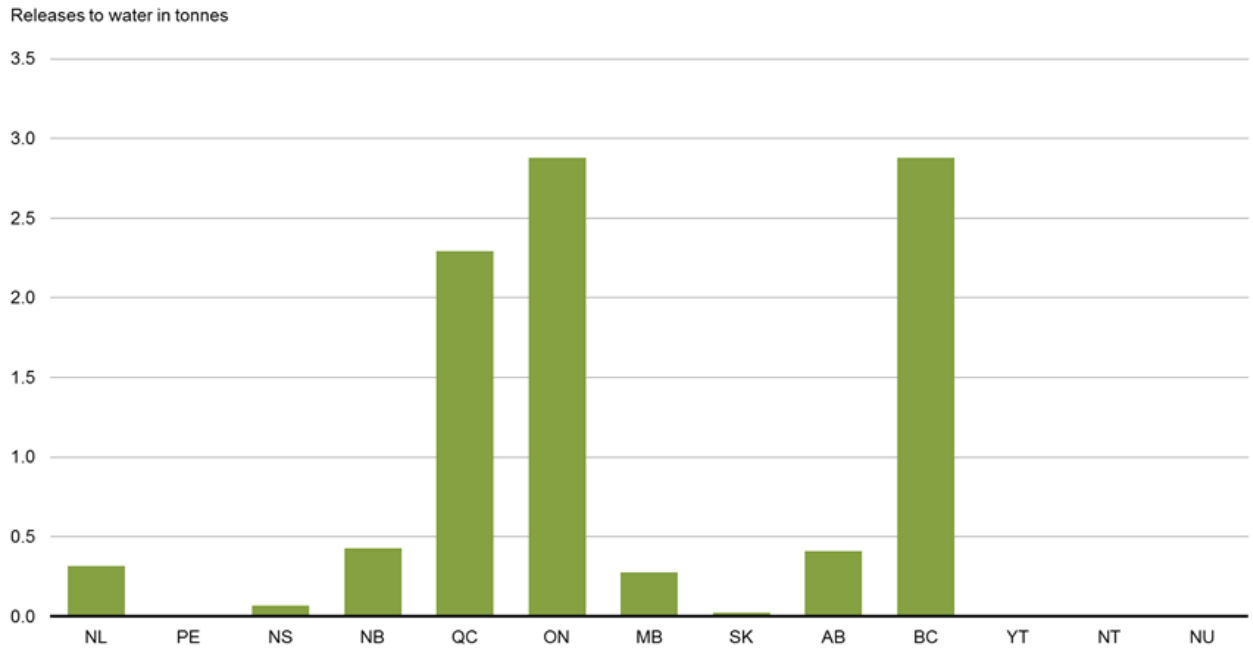
Lead is listed as toxic[11] under the Canadian Environmental Protection Act, 1999.

Releases of lead to water by province and territory

Key results

- In 2015, releases in Ontario and British Columbia amounted to 2.9 tonnes in each province. Combined, releases observed in these 2 provinces made up 60% of total releases that year.
- Releases in Quebec accounted for 24% of the national total.
- There were no releases of lead reported in Yukon in 2015.

Figure 5. Lead releases to water by province and territory, Canada, 2015



Data for Figure 5

Note: The indicator reports releases from human activities 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's 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 (2017) 2015 summary report: reviewed facility-reported pollution data.

[11] 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."

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

Releases of lead to water from facilities

Environment and Climate Change Canada's National Pollutant Release Inventory provides detailed information on emissions and releases from industrial and commercial facilities that meet its reporting criteria.[12]

The Canadian Environmental Sustainability Indicators program provides access to this information through an online interactive map. With this map, you can zoom in on local areas and obtain details about releases of lead to water from individual facilities.

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. Cadmium is a naturally occurring metal. It is used in batteries and in electroplating to protect other metals from corrosion. Exposure to cadmium, which builds up in humans and wildlife, can be hazardous to both.

Key results

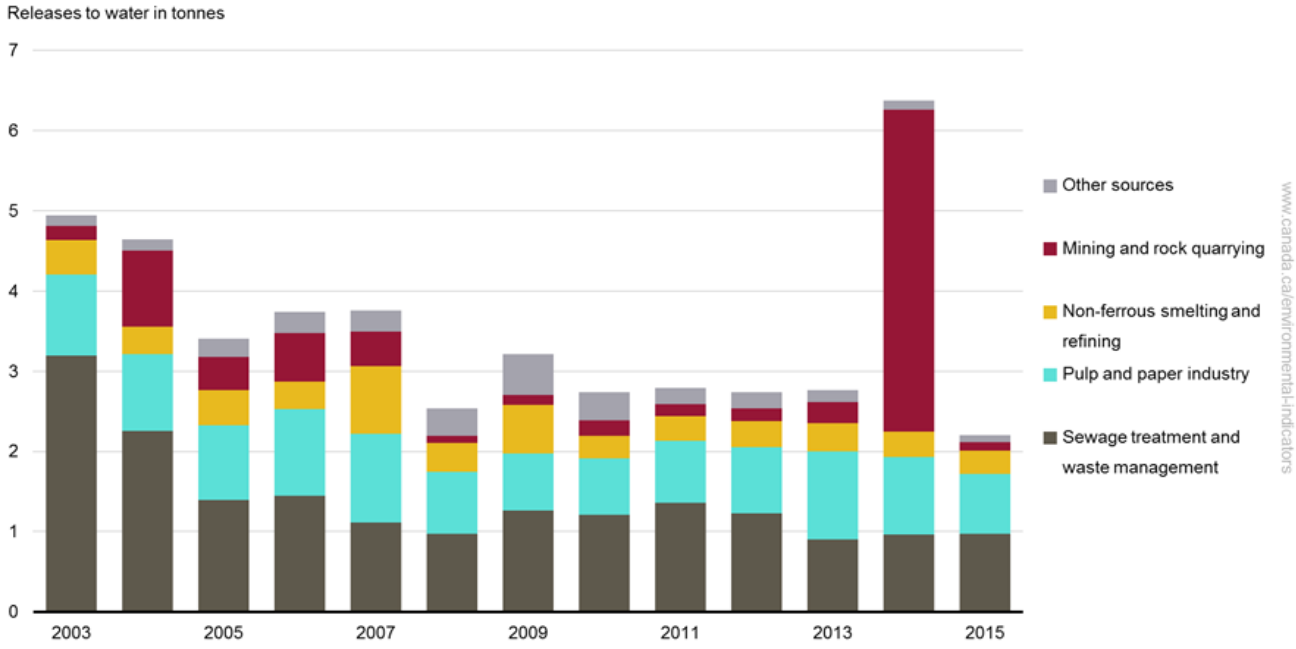
- Since 2003, cadmium releases to water have declined by 55% (or 2.7 tonnes).
- In 2015, national cadmium releases to water totalled 2.2 tonnes. The largest source of releases of cadmium was the sewage treatment and waste management sector.[13] It represented about 44% (or 1.0 tonne) of national releases.
- One (1) significant spill was the source of 59% of the 6.4 tonnes of cadmium released in 2014.[14]

[12] Environment and Climate Change Canada (2017) National Pollutant Release Inventory Data Search – 2015 Facility Reported Data.

[13] The sewage treatment and waste management sector includes wastewater treatment plants. Wastewater treatment plants do not generate cadmium. The source of cadmium in wastewater treatment plant effluent is typically industrial discharges to the sewer.

[14] 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 6. Cadmium releases to water by source, Canada, 2003 to 2015



Data for Figure 6

Note: The indicator reports releases from human activities 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's 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. 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 the sources, please consult the Data sources and methods section.
Source: Environment and Climate Change Canada (2017) 2015 summary report: reviewed facility-reported pollution data.

In 2015, releases of cadmium to water mostly came from sewage treatment and waste management, the pulp and paper industry and non-ferrous smelting and refining, which together accounted for 91% of national total releases.

The sewage treatment and waste management sector contributed to 81% of the total decline in cadmium releases to water since 2003. The pulp and paper and non-ferrous smelting and refining industries contributed an additional 10% and 5%, respectively to the total decrease in cadmium releases to water since 2003.

The largest reduction in releases of cadmium to water between the years 2003 and 2015 was from the sewage treatment and waste management category, with a reduction of 69% (2.2 tonnes).

Inorganic cadmium compounds are listed as toxic[15] under the Canadian Environmental Protection Act, 1999.

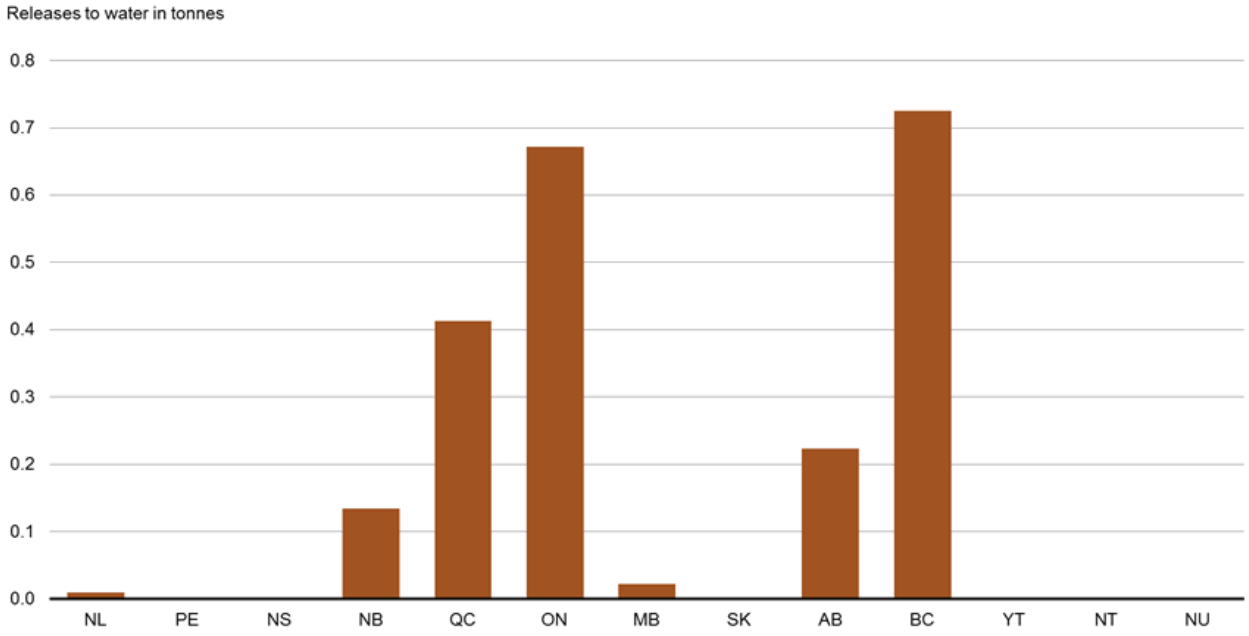
[15] Section 64 of the Canadian Environmental Protection Act, 1999, defines a substance as toxic if it is "entering or may enter the environment in a quantity or concentration or under conditions that (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity; (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."

Releases of cadmium to water by province and territory

Key results

- The largest releases of cadmium to water in 2015 were observed in British Columbia, which accounted for 33% of the national total.
- Ontario accounted for 31% of national releases.
- There were no releases of cadmium reported in Yukon in 2015.

Figure 7. Cadmium releases to water by province and territory, Canada, 2015



Data for Figure 7

Note: The indicator reports releases from human activities 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's 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 (2017) 2015 summary report: reviewed facility-reported pollution data.

Sewage treatment and waste management was the main source of releases of cadmium in Ontario, Alberta, Nova Scotia, Prince Edward Island and Saskatchewan. The pulp and paper industry was the largest source in British Columbia, Quebec and New Brunswick, while mining and rock quarrying was the largest source in other provinces and territories (Manitoba, Newfoundland and Labrador, the Northwest Territories and Nunavut).

Releases of cadmium to water from facilities

Environment and Climate Change Canada's National Pollutant Release Inventory provides detailed information on emissions and releases from industrial and commercial facilities that meet its reporting criteria.[16]

[16] Environment and Climate Change Canada (2017) National Pollutant Release Inventory Data Search – 2015 Facility Reported Data.

The Canadian Environmental Sustainability Indicators program provides access to this information through an online interactive map. With this map, you can zoom in on local areas and obtain details about releases of cadmium to water from individual facilities.

About the indicators

What do the indicators measure

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

Why are these indicators 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 as a result of human activity in Canada. These 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.

What are the 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 toxic substance, emissions to air 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.

Safe and healthy communities

This indicator supports 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.

Data sources and methods

What are the data sources

Data for the indicators and the interactive maps are taken from the National Pollutant Release Inventory - Bulk Data normalized database. The indicators include the amounts released to water of elemental mercury, lead and cadmium in any compound, alloy or mixture reported in the National Pollutant Release Inventory based on its reporting criteria.

More information

The National Pollutant Release Inventory is compiled by Environment and Climate Change Canada, 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 comprises information reported by facilities to Environment and Climate Change Canada 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. Inventory data for facilities are limited to facilities meeting the National Pollutant Release Inventory reporting thresholds for different pollutants.

Estimation of releases to water

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

- continuous emission monitoring systems (CEMS)
- predictive emission monitoring (PEM)
- 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 National Pollutant Release Inventory. Please consult the Reporting to the National Pollutant Release Inventory web page for more details on how these data must be reported by owners or operators of facilities that are required to report to the National Pollutant Release Inventory and on these calculation methods.

Data completeness

Because the Releases of harmful to water indicators are derived solely from the National Pollutant Release Inventory database, they reflect only releases from facilities that met the National Pollutant Release Inventory's 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 2015 as of September 29, 2016. The indicators are reported approximately 1 year after data collection because of the time required for data validation, analysis and interpretation.

How are these indicators calculated

The Releases of harmful substances to water indicators are produced by grouping the data from the National Pollutant Release Inventory in order to report on the key sources that contribute to the majority of releases across the 3 harmful substances: mercury, lead and cadmium.

More information

Indicator coverage

Historical data are provided at the national, provincial/territorial and source level for the period from 2003 to 2015. The year 2003 was selected as the first year for releases to water because that was the year the National Pollutant Release Inventory updated its reporting criteria for mercury, lead and cadmium. The latest year available, 2015, is used for regional releases to water. Releases of mercury, lead and cadmium to water are displayed by facility on the Canadian Environmental Sustainability Indicators' interactive maps.

Sources classification

Source descriptions for the Releases of harmful substances to water indicators were taken from the North American Industry Classification System used by Statistics Canada. The 4-digit code of the classification system, as reported by the facilities, was used for source classification for the data reported by the National Pollutant Release Inventory. These sources were then classified into the following sources for reporting in the indicators:

1. electric utilities
2. sewage treatment and waste management
3. manufacturing (except pulp and paper)
4. mining and rock quarrying
5. miscellaneous
6. non-ferrous smelting and refining
7. oil and gas industry
8. ore and mineral industries (except non-ferrous smelting and refining)
9. pulp and paper industry

Table 1 shows the allocation of sources of harmful substances reported in the Canadian Environmental Sustainability Indicators compared with those reported by the National Pollutant Release 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
Sewage treatment and waste management	Water, sewage and other systems
Sewage treatment and waste management	Remediation and other waste management services
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)	Glass and glass product manufacturing
Manufacturing (except pulp and paper)	Cement and concrete product manufacturing

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)	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
Non-ferrous smelting and refining	Non-ferrous metal (except aluminum) production and processing
Oil and gas industry	Oil and gas extraction
Other ore and mineral industries	Iron and steel mills and ferro-alloy manufacturing
Other ore and mineral industries	Steel product manufacturing from purchased steel
Other ore and mineral industries	Alumina and aluminum production and processing
Other ore and mineral industries	Foundries
Pulp and paper industry	Pulp, paper and paperboard mills

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

What has recently changed

Since the last reporting of the indicators, the classification of releases by source for each of the 3 harmful substances was revised to align with changes made to the Emissions of harmful substances to air indicators.

More information

Reclassification of sources presented in the indicators

A number of changes have been made to the categories used to present information in this version of the indicators. Table 2 shows sectors reported by the National Pollutant Release Inventory that have been reallocated to new sources for this version of the indicator.

Table 2. Changes to sources reported in the indicators and alignment with National Pollutant Release Inventory categories

Sources in the National Pollutant Release Inventory (based on the North American Industry Classification System)	Sources in the previous version of the indicators	Sources in the current version of the indicators
Electric power generation, transmission and distribution	Fuel for Electricity and Heating	Electric utilities
Water, sewage and other systems	Waste	Sewage treatment and waste management
Remediation and other waste management services	Waste	Sewage treatment and waste management
Veneer, plywood and engineered wood product manufacturing	Other Industries	Manufacturing (except pulp and paper)
Petroleum and coal product manufacturing	Other Industries	Manufacturing (except pulp and paper)
Basic chemical manufacturing	Other Industries	Manufacturing (except pulp and paper)
Pesticide, fertilizer and other agricultural chemical manufacturing	Other Industries	Manufacturing (except pulp and paper)
Pharmaceutical and medicine manufacturing	Other Industries	Manufacturing (except pulp and paper)
Other chemical product manufacturing	Other Industries	Manufacturing (except pulp and paper)
Glass and glass product manufacturing	Other Industries	Manufacturing (except pulp and paper)
Cement and concrete product manufacturing	Cement and Concrete Industry	Manufacturing (except pulp and paper)
Forging and stamping	Other Industries	Manufacturing (except pulp and paper)
Spring and wire product manufacturing	Not applicable	Manufacturing (except pulp and paper)

Sources in the National Pollutant Release Inventory (based on the North American Industry Classification System)	Sources in the previous version of the indicators	Sources in the current version of the indicators
Coating, engraving, cold and heat treating and allied activities	Other Industries	Manufacturing (except pulp and paper)
Other fabricated metal product manufacturing	Other Industries	Manufacturing (except pulp and paper)
Engine, turbine and power transmission equipment manufacturing	Other Industries	Manufacturing (except pulp and paper)
Semiconductor and other electronic component manufacturing	Other Industries	Manufacturing (except pulp and paper)
Electrical equipment manufacturing	Other Industries	Manufacturing (except pulp and paper)
Other electrical equipment and component manufacturing	Other Industries	Manufacturing (except pulp and paper)
Motor vehicle parts manufacturing	Other Industries	Manufacturing (except pulp and paper)
Aerospace product and parts manufacturing	Other Industries	Manufacturing (except pulp and paper)
Other miscellaneous manufacturing	Other Industries	Manufacturing (except pulp and paper)
Coal mining	Other Industries	Mining and rock quarrying
Metal ore mining	Other Industries	Mining and rock quarrying
Non-metallic mineral mining and quarrying	Other Industries	Mining and rock quarrying
Support activities for water transportation	Transportation (Road, Rail, Air, Marine)	Miscellaneous
Other professional, scientific and technical services	Fuel for Electricity and Heating	Miscellaneous
Non-ferrous metal (except aluminum) production and processing	Non-ferrous Smelting and Refining	Non-ferrous smelting and refining
Oil and gas extraction	Oil and Gas Industry	Oil and gas industry
Iron and steel mills and ferro-alloy manufacturing	Iron and Steel Industry	Other ore and mineral industries
Steel product manufacturing from purchased steel	Other Industries	Other ore and mineral industries
Alumina and aluminum production and processing	Other Industries	Other ore and mineral industries

Sources in the National Pollutant Release Inventory (based on the North American Industry Classification System)	Sources in the previous version of the indicators	Sources in the current version of the indicators
Foundries	Other Industries	Other ore and mineral industries
Pulp, paper and paperboard mills	Pulp, Paper and Paperboard Industry	Pulp and paper industry

What are the caveats and limitations

These indicators reflect only the anthropogenic releases to water reported by facilities to the National Pollutant Release Inventory. They do not include estimates of releases from other sources in Canada.

Occasional updates and data quality checking can be done after initial release of the National Pollutant Release Inventory - Bulk Data normalized database.

More information

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

Facilities reporting to the National Pollutant Release 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.

Data reported to the National Pollutant Release Inventory by facilities may be updated from time to time by the reporter as new and more up-to-date information is received and reviewed. Small repairs and data cleaning can also occur after initial release. Table 3 summarizes the repairs and additions that were made to the data from the National Pollutant Release Inventory - Bulk Data normalized database during the development of the indicators.

Table 3. Adjustments to data reported in the National Pollutant Release Inventory - Bulk Data normalized database

National Pollutant Release Inventory Identification number	Reporting years	Substances affected	Nature of adjustment
267	2009 to 2010	Cadmium, lead and mercury	Duplicate values were identified and manually removed.
978	2010 to 2014	Cadmium	The NAICS code for the facility was missing and manually added.

National Pollutant Release Inventory Identification number	Reporting years	Substances affected	Nature of adjustment
2238	2011 to 2013	Cadmium, lead and mercury	Releases for this facility rely on data reported in the National Pollutant Release Inventory On-line Facility Data Search for years 2011, 2012 and 2013, as releases from this facility were not included in the National Pollutant Release Inventory - Bulk Data normalized database.
8742	2012	Mercury	Releases for this facility rely on data reported in the National Pollutant Release Inventory On-line Facility Data Search, to reflect adjustments to the data that have not been included in the National Pollutant Release Inventory - Bulk Data normalized database.
23392	2013	Cadmium, lead and mercury	Duplicate values were identified and manually removed.

Resources

References

Environment and Climate Change Canada (2016) National Pollutant Release Inventory Datasets. February 2017 version. Retrieved on March 15, 2017.

Environment and Climate Change Canada (2017) Using and Interpreting National Pollutant Release Inventory Data. Retrieved in March 2017.

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 2015

Year	Cadmium (annual percentage change in releases to water relative to 2003)	Mercury (annual percentage change in releases to water relative to 2003)	Lead (annual percentage change in releases to water relative to 2003)
2003	0	0	0
2004	-6	-11	-14
2005	-31	41	-13
2006	-24	-10	-21
2007	-24	-33	-41
2008	-49	-45	-14
2009	-35	-10	-32
2010	-45	-32	-22
2011	-43	-6	-29
2012	-45	-54	-42
2013	-44	-44	-47
2014	29	518	499
2015	-55	-70	-61

Note: The indicator reports releases from human activities 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 (2017) 2015 summary report: reviewed facility-reported pollution data.

Table A.2. Data for Figure 2. Mercury releases to water by source, Canada, 2003 to 2015

Year	Sewage treatment and waste management (releases to water in tonnes)	Pulp and paper industry (releases to water in tonnes)	Mining and rock quarrying (releases to water in tonnes)	Non-ferrous smelting and refining (releases to water in tonnes)	Other sources (releases to water in tonnes)	Total (releases to water in tonnes)
2003	0.30	0.02	< 0.01	0.01	0.03	0.38
2004	0.27	0.02	0.01	0.01	0.03	0.33
2005	0.43	0.01	< 0.01	0.05	0.03	0.53
2006	0.23	0.03	< 0.01	0.06	0.02	0.34
2007	0.17	0.03	< 0.01	0.03	0.02	0.25

Year	Sewage treatment and waste management (releases to water in tonnes)	Pulp and paper industry (releases to water in tonnes)	Mining and rock quarrying (releases to water in tonnes)	Non-ferrous smelting and refining (releases to water in tonnes)	Other sources (releases to water in tonnes)	Total (releases to water in tonnes)
2008	0.15	0.02	< 0.01	0.01	0.02	0.21
2009	0.16	0.08	0.02	0.01	0.07	0.34
2010	0.14	0.07	< 0.01	0.02	0.02	0.26
2011	0.17	0.07	0.09	0.01	0.01	0.35
2012	0.10	0.04	0.02	0.01	0.01	0.17
2013	0.12	0.03	0.04	0.01	0.01	0.21
2014	0.09	0.05	2.17	0.01	< 0.01	2.32
2015	0.08	0.01	0.01	0.01	< 0.01	0.11

Note: The indicator reports releases from human activities 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's 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. 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 the sources, please consult the Data sources and methods section. Totals may not add up due to rounding.
Source: Environment and Climate Change Canada (2017) 2015 summary report: reviewed facility-reported pollution data.

Table A.3. Data for Figure 3. Mercury releases to water by province and territory, Canada, 2015

Province or territory	Mercury (releases to water in tonnes)
Newfoundland and Labrador	< 0.01
Prince Edward Island	0
Nova Scotia	< 0.01
New Brunswick	< 0.01
Quebec	0.02
Ontario	0.02
Manitoba	< 0.01
Saskatchewan	0.02
Alberta	0.03
British Columbia	0.02
Yukon	0
Northwest Territories	< 0.01
Nunavut	0
Canada	0.11

Note: The indicator reports releases from human activities 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's 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. Totals may not add up due to rounding.
Source: Environment and Climate Change Canada (2017) 2015 summary report: reviewed facility-reported pollution data.

Table A.4. Data for Figure 4. Lead releases to water by source, Canada, 2003 to 2015

Year	Sewage treatment and waste management (releases to water in tonnes)	Pulp and paper industry (releases to water in tonnes)	Non-ferrous smelting and refining (releases to water in tonnes)	Other sources (releases to water in tonnes)	Mining and rock quarrying (releases to water in tonnes)	Total (releases to water in tonnes)
2003	15.49	2.58	1.83	1.90	2.53	24.34
2004	11.53	2.89	2.30	1.63	2.51	20.85
2005	9.47	3.34	1.89	1.96	4.60	21.27
2006	9.90	2.37	1.68	1.57	3.62	19.14
2007	6.42	2.37	1.68	1.39	2.40	14.25
2008	11.58	2.42	2.08	1.49	3.39	20.97
2009	8.49	2.25	2.17	1.95	1.59	16.46
2010	11.97	2.12	1.45	1.94	1.41	18.89
2011	8.97	2.91	1.50	1.89	1.93	17.19
2012	4.69	2.80	1.77	1.64	3.11	14.02
2013	4.66	2.42	1.48	1.91	2.39	12.87
2014	5.11	1.85	1.77	1.42	135.60	145.75
2015	4.40	1.62	1.34	1.24	1.00	9.59

Note: The indicator reports releases from human activities 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's 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. 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 the sources, please consult the Data sources and methods section. Totals may not add up due to rounding.
Source: Environment and Climate Change Canada (2017) 2015 summary report: reviewed facility-reported pollution data.

Table A.5. Data for Figure 5. Lead releases to water by province and territory, Canada, 2015

Province or territory	Mercury (releases to water in tonnes)
Newfoundland and Labrador	< 0.01
Prince Edward Island	0
Nova Scotia	< 0.01
New Brunswick	< 0.01
Quebec	0.02

Province or territory	Mercury (releases to water in tonnes)
Ontario	0.02
Manitoba	< 0.01
Saskatchewan	0.02
Alberta	0.03
British Columbia	0.02
Yukon	0
Northwest Territories	< 0.01
Nunavut	0
Canada	0.11

Note: The indicator reports releases from human activities 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's 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. Totals may not add up due to rounding.
Source: Environment and Climate Change Canada (2017) 2015 summary report: reviewed facility-reported pollution data.

Table A.6. Data for Figure 6. Cadmium releases to water by source, Canada, 2003 to 2015

Year	Sewage treatment and waste management (releases to water in tonnes)	Pulp and paper industry (releases to water in tonnes)	Non-ferrous smelting and refining (releases to water in tonnes)	Other sources (releases to water in tonnes)	Mining and rock quarrying (releases to water in tonnes)	Total (releases to water in tonnes)
2003	15.49	2.58	1.83	1.90	2.53	24.34
2004	11.53	2.89	2.30	1.63	2.51	20.85
2005	9.47	3.34	1.89	1.96	4.60	21.27
2006	9.90	2.37	1.68	1.57	3.62	19.14
2007	6.42	2.37	1.68	1.39	2.40	14.25
2008	11.58	2.42	2.08	1.49	3.39	20.97
2009	8.49	2.25	2.17	1.95	1.59	16.46
2010	11.97	2.12	1.45	1.94	1.41	18.89
2011	8.97	2.91	1.50	1.89	1.93	17.19
2012	4.69	2.80	1.77	1.64	3.11	14.02
2013	4.66	2.42	1.48	1.91	2.39	12.87
2014	5.11	1.85	1.77	1.42	135.60	145.75
2015	4.40	1.62	1.34	1.24	1.00	9.59

Note: The indicator reports releases from human activities 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's 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. 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 the sources, please consult the Data sources and methods section. Totals may not add up due to rounding.
Source: Environment and Climate Change Canada (2017) 2015 summary report: reviewed facility-reported pollution data.

Table A.7. Data for Figure 7. Cadmium releases to water by province and territory, Canada, 2015

Province or territory	Lead (releases to water in tonnes)
Newfoundland and Labrador	0.32
Prince Edward Island	0.01
Nova Scotia	0.07
New Brunswick	0.43
Quebec	2.29
Ontario	2.88
Manitoba	0.28
Saskatchewan	0.02
Alberta	0.41
British Columbia	2.88
Yukon	0
Northwest Territories	< 0.01
Nunavut	< 0.01
Canada	9.59

Note: The indicator reports releases from human activities 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's 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. Totals may not add up due to rounding.
Source: Environment and Climate Change Canada (2017) 2015 summary report: reviewed facility-reported pollution data.

Additional information can be obtained at:

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