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CANADIAN ENVIRONMENTAL PROTECTION ACT, 1999



ANNUAL REPORT

for April 2017 to March 2018

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1. Introduction

This annual report provides an overview of the activities conducted and results achieved under the *Canadian Environmental Protection Act, 1999* (CEPA) from April 1, 2017, to March 31, 2018. This report responds to the statutory requirement in Section 342 of the Act to provide annual reports to Parliament on the administration and enforcement of the Act.

CEPA provides authority for the Government of Canada to take action on a wide range of environmental and health risks—from chemicals to pollution to wastes. For the most part, it functions as an enabling statute, providing a suite of instruments and measures for identifying, assessing and addressing risks.

The general steps followed to address each risk can be organized into a management cycle (see Figure 1): information is collected to understand risks and inform decisions; risks are assessed to determine if action is required; risk management instruments are put in place to reduce or eliminate risks to the environment and/or human health; these instruments may require compliance promotion and enforcement; and information is once again collected to monitor progress and determine if additional action is required. At each stage in the cycle, stakeholders are engaged, the public has the opportunity to be involved, the government works closely with provincial, territorial and Indigenous counterparts, and information is reported to the public.

Figure 1: The CEPA management cycle



This report provides information on all stages of the CEPA cycle. Section 2 – “Addressing Key Risks” covers information gathering, research and monitoring, risk assessment, and risk management for toxics, air pollution and greenhouse gases, water quality, and waste. Section 3 – “Administration, Public Participation, and Reporting” covers reporting, stakeholder engagement, public rights and inter-jurisdictional relationships. Section 4 – “Compliance Promotion and Enforcement” describes compliance promotion and enforcement activities.

This report also includes the following mandatory information:

- Section 2 (all subsections) provides examples of the types of research initiatives and their key contributions in the reporting period. Environment and Climate Change Canada and Health Canada scientists published numerous reports, papers, book chapters, articles and manuscripts on subjects related to CEPA.
- Section 3.1 describes the activities of the National Advisory Committee. There were no other committees established under paragraph 7(1) (a) of CEPA during the reporting period.
- Section 3.1 also describes the activities under federal-provincial agreements.
- There were no activities under the international air pollution provisions (Division 6 of Part 7) of CEPA during the reporting period.
- There were no activities under the international water pollution provisions (Division 7 of Part 7) of CEPA during the reporting period.

The online CEPA Registry¹ is a comprehensive source of information about activities taking place under the *Act*, including proposed and existing policies, guidelines, codes of practice, government notices and orders, agreements, permits, and regulations.

1.1. Review of the *Act*

Section 343 of CEPA requires a parliamentary review of the *Act* every five years after its coming into force. The latest review was triggered in 2015, and began in March 2016 when the House of Commons passed a motion designating the Standing Committee on Environment and Sustainable Development (Committee) to undertake a comprehensive review of the provisions and operation of CEPA. Section 343 requires the designated committee to submit a report to Parliament upon completion of its review.

Over the course of its review, the Committee heard from over 50 witnesses and received over 60 separate briefs. Participants included academics, Indigenous groups and First Nations, industry associations, government officials from Environment and Climate Change Canada and Health Canada, and non-governmental organizations. The review focused on several themes such as chemicals management, environmental rights, and enforcement.

On June 15, 2017, the Committee submitted its report, “*Healthy Environment, Healthy Canadians, Healthy Economy: Strengthening the Canadian Environmental Protection Act, 1999*”², to the House of Commons. The Committee’s 87 recommendations ranged from strengthening authorities for controlling pollution, to incorporating the right to a healthy environment into the *Act*, to improving the enforcement of CEPA, to addressing the environmental protection regulatory gap that exists on most First Nations reserves.

Pursuant to Standing Order 109, the Committee requested that the government table a response to its report. The government tabled its response on October 6, 2017³ in which it thanked the Committee for its report, and committed to return with a follow-up report by June 2018 on actions taken and to be taken in response to the Committee’s recommendations.

The government also began discussions with various stakeholders and partners in relation to certain Committee recommendations. For instance, the government held pre-engagement meetings with some First Nations individuals and organizations to begin exploring their preliminary thoughts on key areas of concern around the environmental regulatory gap on reserves. The government also hosted preliminary engagement sessions with stakeholders concerning other Committee recommendations.

1 www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry.html

2 www.publications.gc.ca/site/eng/9.838357/publication.html

3 www.ourcommons.ca/content/Committee/421/ENVI/GovResponse/RP9148698/421_ENVI_Rpt08_GR/421_ENVI_Rpt08_GR-e.pdf

2. Addressing key risks

2.1. Toxic substances harmful to human health or the environment

Parts 4, 5 and 6 of CEPA include specific provisions for data collection, assessment and management for controlling toxic substances. Substances include both chemicals and living organisms (specific information on living organisms begins in section 2.2). For chemicals, the Minister of the Environment and the Minister of Health were required to sort through, or “categorize”, the substances on the original Domestic Substances List (DSL), an inventory of approximately 23,000 substances manufactured in, imported into or used in Canada. The categorization process identified the need for a more detailed assessment of approximately 4,300 substances that:

- were suspected to be inherently toxic to humans or to the environment, and are persistent (take a very long time to break down) or bioaccumulative (collect in living organisms and end up in the food chain); or
- present the greatest potential for exposure to Canadians.

The Chemicals Management Plan Update

The Chemicals Management Plan (CMP)⁴ is a program developed to protect Canadians and their environment from exposure to toxic substances. At its core is a commitment to assess approximately 4,300 substances of potential concern that were already in commerce in Canada during the development of a pre-market new substance notification system under CEPA by 2020. Under the CMP, the government also conducts pre-market assessments of health and environmental effects of approximately 500 substances that are new to Canada each year.

Since the launch of the CMP in 2006, the Government of Canada has:

- addressed 3470 of the 4,363 chemicals identified as priorities for attention by 2020-2021, including draft and final assessments;
- found 457 existing chemicals to be harmful to the environment and/or human health;
- implemented over 90 risk management actions for existing chemicals; and
- received approximately 5,909 notifications for new substances prior to their introduction into the Canadian market, which were assessed and over 291 risk management actions have been taken, when necessary, to manage potential risks to Canadians and their environment.

4 www.canada.ca/en/health-canada/services/chemical-substances.html

2.1.1. Monitoring

Monitoring and surveillance activities are essential to identify and track levels and trends of chemicals in the environment and human exposure to those chemicals. Monitoring activities also support Canada's contribution to international efforts, such as the multilateral cooperation under the Arctic Council's Arctic Monitoring and Assessment Programme and the United Nations Economic Commission for Europe Convention on Long-range Transboundary Air Pollution, and helped Canada fulfill its obligations under the United Nations Environment Programme Stockholm Convention on Persistent Organic Pollutants and the Minamata Convention on Mercury.

A broad range of monitoring activities for chemicals was conducted to support a number of domestic programs including:

- the Chemicals Management Plan;
- the Northern Contaminants Program;
- the Freshwater Quality Monitoring Program;
- the Great Lakes Water Quality Agreement;
- the Great Lakes Herring Gull Contaminants Monitoring Program; and
- the St. Lawrence Action Plan.

The CMP Environmental Monitoring and Surveillance Program involves the collection of data on the concentration of chemical substances in environmental compartments at locations across Canada. Environmental compartments include surface water, sediment, air, aquatic biota and wildlife. Wastewater system influent, effluent and biosolids are also monitored at select locations representing a range of input and treatment system types.

Through the CMP Environmental Monitoring and Surveillance Program, many priority substances have been monitored to provide data for environmental risk assessment and risk management decision making. Priority substances monitored in 2017-2018 included: polybrominated diphenyl ethers (PBDEs), hexabromocyclododecane (HBCD), organophosphate ester and non-PBDE halogenated flame retardants, phthalates, substituted diphenyl amines (SDPAs), perfluorinated compounds and other poly and perfluoroalkyl substances (including PFOS, PFOA and PFCAs), siloxanes, triclosan, bisphenol A (BPA), nonylphenol and its nonylphenol ethoxylates (NP/NPEs), chlorhexidine salts, hindered phenols, thiocarbamates, short chain chlorinated paraffins, and metals, such as mercury, cadmium, cobalt and selenium and a selection of priority Rare Earth Elements.

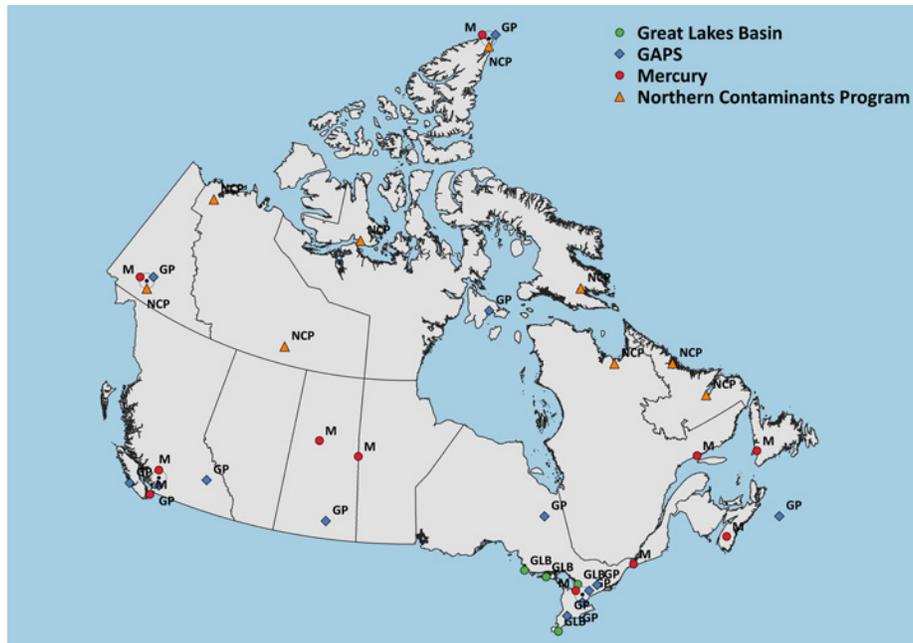
As an example, a retrospective analysis of the concentration of polychlorinated naphthalenes in gulls, fish and sediment of the lower Great Lakes revealed a consistent decrease in biota from 1980 (when its use was banned) until 1995. There was an unexpected spike in concentrations in biota in Detroit River and western Lake Erie in 1995 that persisted until 2005, after which it resumed a declining trend. This spike in biota was associated with sediment remediation activities involving dredging in the Detroit River at that time.

In 2017–2018, several research and monitoring activities and studies on wildlife and fish were completed and published in the scientific literature. These studies included temporal and pan-Canadian monitoring trends of organophosphate esters (OPEs), PFASs, PBDEs, and volatile cyclic organosiloxanes in species of gulls, European starlings, Peregrine falcons and Lake Trout.

ECCC monitors hazardous airborne chemicals through the Great Lakes Monitoring Program, the Global Atmospheric Passive Sampling network (GAPS), and the atmospheric component of the Northern Contaminants Program (NCP) (Figure 2). Air and precipitation monitoring in the Great Lakes Basin measures persistent organic pollutants (POPs), other priority chemicals and trace metals to determine the atmospheric loadings of these substances to the Great Lakes. GAPS uses cost-effective and simple passive air samplers designed by ECCC scientists to collect data. The atmospheric component of NCP conducts long-term monitoring of POPs and other priority chemicals in the Canadian Arctic to evaluate trends and to assess the influence of long-range atmospheric transport.

ECCC also monitors similar suites of bioaccumulative chemicals in the eggs of a wildlife sentinel species as part of the Great Lakes Herring Gull Contaminants Monitoring Program, where eggs have been collected annually for 45 years.

Figure 2: Map of hazardous air pollutant monitoring sites



Regulated Halogenated Flame Retardants (HFRs) Declining in the Great Lakes Basin

Organic pollutants have been monitored in the atmosphere of the Great Lake Basin (GLB) since the 1990s in support of the Canada-United States Great Lakes Water Quality Agreement and to determine the effectiveness of source reduction measures and factors influencing air concentrations. Research by ECCC scientists shows an overall decline of atmospheric concentrations of regulated halogenated flame retardants (HFRs) in the Canadian Great Lakes Basin, indicating that pollution controls appear to be effective. Air samples were collected between 2005 and 2014 at three Ontario locations (Burnt Island, Egbert and Point Petre) and analyzed for polybrominated diphenyl ethers (PBDEs) and several other HFRs. The results indicate that atmospheric PBDE concentrations in the Canadian Great Lakes Basin are slowly decreasing, although at different rates depending on location. These patterns and the production of emerging chemicals require continued monitoring to ensure regulatory efforts are still working.

For decades, PBDEs were some of the most widely-used flame retardants in household and commercial products. Due to their bio-accumulative, persistent, toxic properties and long-range atmospheric transport potential, they are considered to be a risk to human health and wildlife and are regulated in Canada and globally by chemical control initiatives.

HC continued analysis and publication of biomonitoring results from the Maternal-Infant Research on Environmental Chemicals (MIREC) Research Platform. In 2017-2018, two MIREC peer-reviewed journal articles were published including biomonitoring results for dioxins/furans and polychlorinated biphenyls (PCBs) in human milk, and tobacco metabolites in pregnant women and infants. The MIREC Research Platform was extended to measure additional chemicals such as glyphosate, additional phthalates, bisphenol A substitutes/analogues, organophosphate (OP) flame retardants and the organic solvents N-Methyl-2-pyrrolidone and N-Ethyl-2-pyrrolidone in biobanked maternal urine samples.

HC's human biomonitoring (HBM) efforts continued in 2017–2018 with the Canadian Health Measures Survey (CHMS), measuring environmental chemical exposures in blood and urine of a nationally representative sample of Canadians aged 3 to 79. During this period, laboratory analyses of 54 environmental chemicals in blood and/or urine samples collected as part of CHMS cycle 4 (2014–2015) were completed and the results were reported in the *Fourth Report*

on *Human Biomonitoring of Environmental Chemicals in Canada*⁵ published in August 2017. In addition, sample collection for cycle 5 was completed in December 2017, and sample collection for cycle 6 began in January 2018. The selection and prioritization of chemicals to be included in cycles 7 and 8 (2020–2023) continued, and the development of new laboratory analytical methods was undertaken.

Also, the reference laboratories were engaged in the development of analytical methods for the measurement of selected chemicals (e.g. pesticides such as glyphosate and DEET, chemicals used as UV blockers, OP flame retardants, 2-mercaptobenzothiazole (MBT), etc.) to be measured in cycle 7. In 2017–2018, the first set of Canadian reference values (RV₉₅) for non-persistent organic pollutants were developed and published as a peer-reviewed journal article.

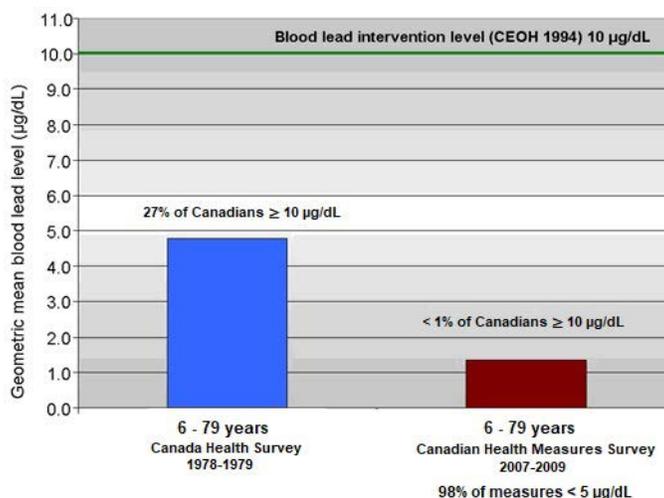
During the same period, CHMS data also contributed to the Proposed Reevaluation Decisions for the pesticides lambda-cyhalothrin and permethrin, the Final Screening Assessment Reports (FSAR) for selenium and its compounds, and cobalt & cobalt containing substances, the Draft Screening Assessment Report (DSAR) of phthalate substance grouping, and the public consultation document on uranium and copper in drinking water.

Monitoring activities continued to focus on human exposure to contaminants through indoor air and blood for the measurements of various Volatile Organic Compounds (VOCs). Furthermore, a scientific paper on exposure to parabens in maternal urine and breast milk and associations with use of personal-care products was published based on the Plastics and Personal-care Product use in Pregnancy (P4) Study.

Trends in blood lead levels from the Canadian Health Measures Survey

Nationally representative biomonitoring data on lead collected as part of Canadian Health Measures Survey (CHMS) Cycle 1 (2007-09) served as an important tool in determining the efficacy of regulatory interventions (e.g. successful phase-out of lead in gasoline, lead-based paints and lead-solder in food cans etc.) to reduce Canadians’ exposure to lead, as part of developing the Risk Management Strategy for Lead (2013). The analysis showed a 70% decline in lead concentrations measured in Canadians aged 6-79 years as part of the Canada Health Survey (1978-1979) to levels measured in CHMS Cycle 1 (2007-2009) (see Figure 3, adapted from the Risk Management Strategy for Lead, February 2013⁶).

Figure 3: Decreasing blood lead levels in Canadians

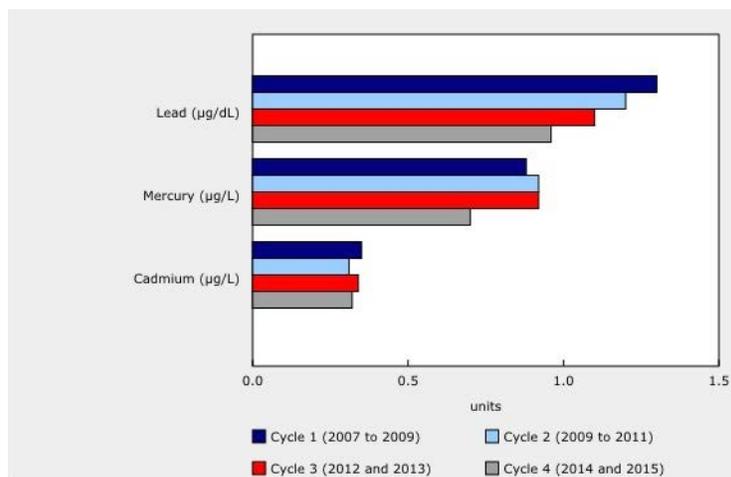


5 www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/environmental-contaminants/fourth-report-human-biomonitoring-environmental-chemicals-canada.html

6 www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/environmental-contaminants/risk-management-strategy-lead.html

The decade of national biomonitoring under CHMS (2007-2015) has helped to establish the declining trend in the blood concentrations of lead (see Figure 4), with the average concentration for 6 to 79 years declining from 1.3 µg/dL in Cycle 1 (2007 to 2009) to 0.96 µg/dL in Cycle 4 (2014 and 2015), further highlighting the efficacy of risk management measures for lead. Average cadmium levels have also declined from 0.35 µg/L to 0.32 µg/L over the same time period. However, there has been no significant change in blood mercury levels for Canadians over this period.^{7,8}

Figure 4: Average concentrations of selected environmental chemicals in Canadian population aged 6 to 79 years, Canadian Health Measures Survey, Cycle 1 (2007 to 2009) to Cycle 4 (2014 to 2015)



1. Concentrations are presented as a geometric mean.
2. Lead, mercury and cadmium were measured in blood.
3. For the purpose of total population comparisons, only values from participants aged 6 to 79 years were included, as participants under the age of 6 years were not included in cycle 1 (2007 to 2009).
4. The average blood mercury concentration is for the 20 to 79 age group only. The concentration for the 3 to 19 age group was too often below detectable limits to be included in the calculation.

Source(s): Statistics Canada, Canadian Health Measures Survey.

Both ECCC and HC contribute to the Northern Contaminants Program (NCP) led by Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC). HC partners with CIRNAC on the human health component of the NCP, which addresses concerns about human exposure to elevated levels of contaminants in wildlife species important to the traditional diets of northern Indigenous peoples. In 2017–2018, HC supported five HBM and health projects under the NCP. These projects addressed exposure to contaminants and links to country foods and nutritional status in multiple northern regions (Yukon, Northwest Territories, Nunavik), the development and evaluation of health communication tools, and dissemination of research models to stakeholders.

ECCC has been a major contributor in monitoring abiotic media, aquatic biota and wildlife, as well as Arctic ecosystem health. ECCC monitors wildlife at numerous sites across the Canadian Arctic on a biennial or annual basis under the NCP, for a large suite of legacy and new Chemicals of Emerging Arctic Concern (CEACs), as well as metals including mercury. As a result ECCC scientists were able to co-lead and substantially contribute to the AMAP’s 2016 report on CEACs (published on December 29, 2017).⁹

7 Statistics Canada, 2017. Blood concentrations of lead, mercury and cadmium in the Canadian population. The Daily, Release date: Thursday, August 24, 2017. Statistics Canada catalogue no. 11-001-X www150.statcan.gc.ca/n1/en/daily-quotidien/170824/dq170824c-eng.pdf?st=uRnSc-hF

8 Health Canada, 2017. Fourth Report on Human Biomonitoring of Environmental Chemicals in Canada; Results of the Canadian Health Measures Survey Cycle 4 (2014-2015) www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/environmental-contaminants/fourth-report-human-biomonitoring-environmental-chemicals-canada.html

9 www.amap.no/documents/doc/amap-assessment-2016-chemicals-of-emerging-arctic-concern/1624

Trends for persistent organic pollutants in the Canadian Arctic

Human biomonitoring in the Canadian Arctic Nunavik region has provided trends data for many persistent organic pollutants, including organochlorine compounds which have decreased by an average of 80% in pregnant Inuit women over the last 20+ years of monitoring (between the years of 1992 and 2013) (see Figures 5 and 6, adapted from the Canadian Arctic Contaminants Assessment Report Human Health Assessment 2017)¹⁰.

Figure 5: Geometric mean concentrations for six persistent organic pollutants in pregnant Inuit women from Nunavik over the period 1992-2013

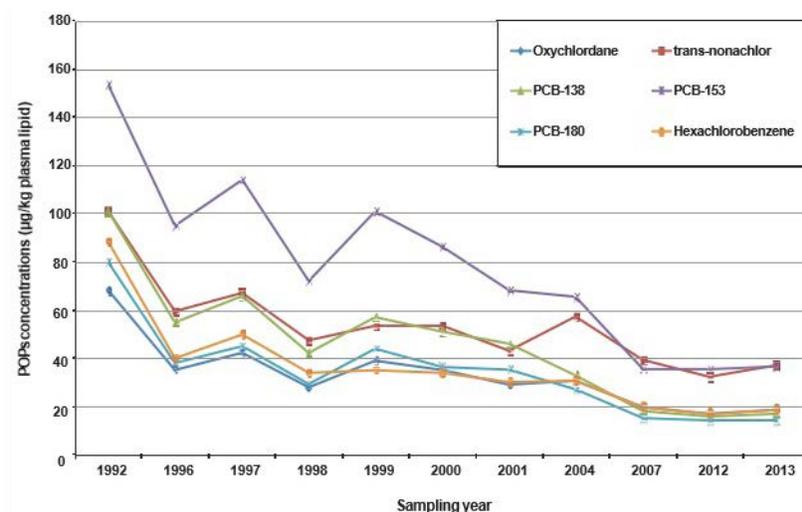
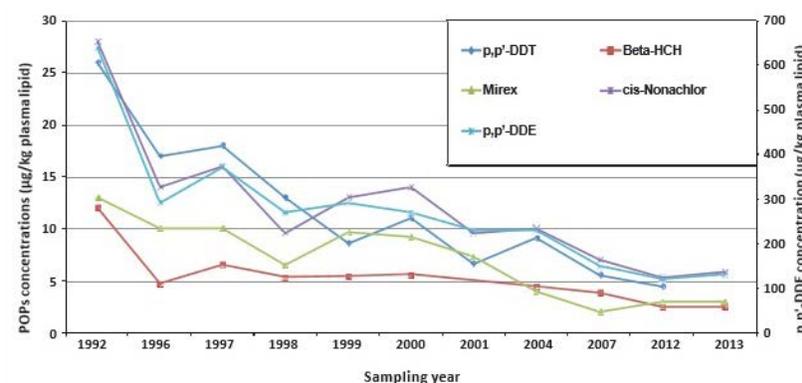


Figure 6: Geometric mean concentrations for five persistent organic pollutants in pregnant Inuit women from Nunavik over the period 1992-2013 (p,p'-DDE is shown on the secondary axis)



¹⁰ Government of Canada, 2017. Canadian Arctic Contaminants Assessment Report Human Health Assessment 2017. (www.science.gc.ca/eic/site/063.nsf/eng/h_97658.html) Indigenous and Northern Affairs.

Persistent Organic Pollutants in Canadian Polar bears

ECCC conducted core monitoring of Persistent Organic Pollutants (POPs) in polar bears in the Canadian Arctic with a focus on animals from Hudson Bay subpopulations. Chemical screening was carried out for a large and complex suite of 295 legacy and Chemicals of Emerging Arctic Concern (CEAC) POPs. A total of 210 POPs were detected with some frequency in all fat or liver samples.

Time trends for PBDE concentrations (in fat) showed an increase up to 2010 for western and southern Hudson Bay bears, but after 2010 levels gradually decreased until 2016. In liver samples collected from 2010 to 2017, PFOS concentrations were in the >1000 ng/g (wet weight (ww)) range for southern Hudson Bay bears, and western bears were in the <1000 ng/g ww range. As of 2017, there continues to be no obvious increasing or decreasing trends for PFOS and other PFASs.

These trends in polar bears are illustrating the effectiveness of international regulatory action via the Stockholm Convention to reduce POPs, as both PBDEs and PFOS were added to this convention in 2009.

2.1.2. Research

ECCC and HC conduct a wide range of research to help inform assessments of the risks associated with toxic substances to human health or the environment. This research is designed primarily to fill data gaps in risk assessments; to develop novel methods and approaches to improve risk assessment; to evaluate the impact of toxic substances, complex environmental mixtures, and other substances of concern on the environment and human health; determine the extent of ecological and human health exposure to contaminants; and investigate the effects of chemicals on endocrine systems. In addition, HC undertakes research to support the development of regulations, guidelines and air quality objectives with the goal of reducing population exposures to pollutants and improving human health.

During 2017-2018, research on chemicals was carried out by both departments under a number of programs, including the CMP, the NCP, the Strategic Technology Applications of Genomics in the Environment Program, Genome Canada and the Great Lakes Action Plan.

ECCC RESEARCH

Research projects were carried out by ECCC under the CMP on long-term trends, sources, atmospheric process and environmental fate, as well as continued development and evaluation of monitoring and modelling methodologies related to a number of subjects, including flame retardants, persistent organic pollutants (POPs), polycyclic aromatic compounds (PACs), poly- and perfluoroalkyl substances (PFAS), and mercury.

- Flame retardant research included investigating levels globally and regionally, assessing long term trends, and assessing levels in indoor dust.
- Persistent organic pollutants research assessed atmospheric levels in the Southern Hemisphere and the Antarctic.
- Research was conducted into emissions, atmospheric concentrations, and deposition of polycyclic aromatic compounds (PACs) particularly in the Canadian Athabasca oil sands region.
- Atmospheric concentrations and trends of poly- and perfluoroalkyl substances were evaluated.
- Mercury related research included studying and modelling how it disperses and cycles in the atmosphere, deposition of atmospheric mercury on snow and forests, and variation of mercury bioaccumulation by location.

Specific research conducted by ECCC researchers during 2017-18 included the following.

- The metabolic fate of **organophosphate ester (OPE) flame retardants and plasticizers** was assessed in *in vitro* liver assays based on bird (herring gull), mammal (polar bears and ringed seals) and fish (Lake Trout) model species. For 6 to 10 OPEs generally rapid metabolism occurred but was dependent on the species and the type of OPE. This information is important as it explains factors that can affect the bioaccumulation of OPEs in exposed biota.
- Assessments of the effects of 10 priority **organic flame retardants (OFRs)** using a high-throughput, avian, toxicogenomics assay were conducted. Results from this work indicated the need to prioritize 2 of the 10 OFRs for whole animal assessment follow-up. For example, the toxicity of TPHP was further evaluated in whole animal tests of Japanese quail.
- A tiered approach to toxicity testing was also utilized to screen for effects of **BPA replacement alternative compounds** and contributes further information regarding the utility of new approach methodologies (NAMs) for chemical regulation. The use of NAMs is even more pressing currently given the international push to reduce/replace animal utilization in chemical testing. Canada is in a good position to emerge as a leader in this new era of toxicity testing. A collaborative opportunity between HC, ECCC and the Canadian Centre for Alternatives to Animal Methods (CCAAM)/Canadian Centre for the Validation of Alternative Methods (CaCVAM) was established in 2017-2018 to enhance the incorporation of NAMs into risk assessment.
- Understanding of the occurrence and fate of specific **pharmaceuticals** in Canadian wastewater treatment systems, the understanding of ecotoxicity of specific pharmaceuticals, and bioinformatics tools in risk assessments of substances in personal care products were also pursued.
- Soil effects data on 4 lanthanide **rare earth elements (REE)**: Praseodymium (Pr) and Samarium (Sm), Neodymium (Nd) and Yttrium (Y) was obtained. Specifically, effects data was derived using natural boreal forest soil and test organisms (soil invertebrates and indigenous microorganisms) representative of the Canadian boreal ecozones. Testing to date indicates the 4 REE are not significantly toxic to the test organisms.
- Effects of **substituted phenyl amines (SPAs)** were assessed in several invertebrates and fish, and comparisons made to concentrations of SPAs downstream of municipal wastewater discharges.
- The fate of **nanomaterials** such as cerium oxide and silver nanoparticles in natural waters and their toxicity in exposed fish were assessed. Detection of silver nanoparticles and transformation products was performed in Canadian municipal wastewater effluents as the targeted source.
- The toxic potencies of **benzotriazoles and benzothiazoles** to fish cell lines were also completed and published. Acute and chronic amphibian toxicity tests were completed in 2017-2018 to determine concentrations that induced mortality (LC50) and sublethal effects (e.g., growth, developmental rate, sex differentiation) of priority list benzotriazoles, hindered phenols and an organophosphate brominated flame retardant. Exposures were conducted using a laboratory model amphibian species (*Silurana tropicalis*) and two Canadian native amphibian species (*Lithobates sylvaticus* and *L. pipiens*). Bioaccumulation and metabolomics profiles for *L. pipiens* were also assessed after chronic exposure to these compounds. In general, overt toxicity was not detected at maximum water solubility concentrations for the benzotriazole or organophosphate brominated flame retardant. However, LC50 values were obtained for some of the hindered phenols. Further, the benzotriazole was detectable in liver and whole body tissue samples of the tadpoles with some alteration in metabolomics profiles.

Under the CMP in 2017–2018, ECCC scientists published approximately 60 research papers related to these and other projects. Examples of these publications include:

- Substituted Diphenylamine Antioxidants and Benzotriazole UV Stabilizers in Aquatic Organisms in the Great Lakes of North America: Terrestrial Exposure and Biodilution.¹¹
- Transcriptional and cellular effects of benzotriazole UV stabilizers UV-234 and UV-328 in the freshwater invertebrates *Chlamydomonas reinhardtii* and *Daphnia magna*.¹²
- Waste-water treatment plants are implicated as an important source of flame retardants in insectivorous tree swallows (*Tachycineta bicolor*).¹³

HEALTH CANADA RESEARCH

HC funded 26 new CMP research projects in 2017-2018. These projects address departmental and international priorities and cover a number of subjects such as characterization of nanomaterials, toxicological response to nanomaterials, carcinogenic potential of chemicals, genetic toxicity assessment, hazard characterization and identification of biotechnology microbes (see further details in 2.2.1). Research projects addressed knowledge gaps on: 1) the effects of exposure of substances to humans and the environment, 2) identification and characterization of sources, pathways and levels of exposure, and 3) the development of tools (see further details for water in 2.4.2), testing and analytical methodologies.

Recommendations to reduce label rate applications listed on specific pesticide products (i.e., Reward Aquatic herbicide) was shared with Health Canada's Pest Management Regulatory Agency (PMRA) for their re-evaluation assessments of this registered pesticide. Data on the effects of neonicotinoids on frogs, amphipods and grasshoppers was also shared with PMRA for their re-evaluation of specific neonicotinoids, where aquatic and terrestrial invertebrates were found to be more sensitive to the toxic effects of particular neonicotinoids than frogs during their aquatic life-stage.

2.1.3. Information gathering

Mandatory surveys (or information gathering notices) issued under section 71 of CEPA request information needed to support risk assessment or risk management activities. Three mandatory surveys were published this year. Two separate notices were published on April 1, 2017 to collect information on commercial activities in Canada to inform decision-making for risk management of numerous substances.^{14,15} A third notice was published on September 23, 2017 to collect information on the commercial status of certain micro-organisms to inform risk management activities.¹⁶

Voluntary information gathering activities were conducted on a total of 17 organic groupings, one inorganic grouping and five individual substances to inform risk assessments. In addition, a voluntary survey was issued seeking additional information to inform the commercial status of Bisphenol A (BPA) and certain other bisphenols in Canada.

11 <https://pubs.acs.org/doi/10.1021/acs.est.7b05214>

12 <https://setac.onlinelibrary.wiley.com/doi/full/10.1002/etc.3908>

13 www.sciencedirect.com/science/article/pii/S0045653517320052?via%3Dihub

14 <http://gazette.gc.ca/rp-pr/p1/2017/2017-04-01/html/notice-avis-eng.html#nd1>

15 <http://gazette.gc.ca/rp-pr/p1/2017/2017-04-01/html/notice-avis-eng.html#nd2>

16 <http://gazette.gc.ca/rp-pr/p1/2017/2017-09-23/html/notice-avis-eng.html#ne1>

2.1.4. Risk assessment activities

NEW SUBSTANCES RISK ASSESSMENT

Substances that are not on the Domestic Substances List (DSL) are considered to be new to Canada and require notification to the government prior to beginning commercial activity in Canada. In 2017-2018, 392 new substance notifications were received pursuant to section 81 of CEPA and the *New Substances Notification Regulations* (Chemicals and Polymers). Some of these notifications include substances in products regulated under the *Food and Drugs Act* (FDA), and to nanomaterials and substances that have the potential to be manufactured in the nanoscale.

During 2017-2018, a total of 151 waivers of information requirements were granted and published in the *Canada Gazette*, for new chemical and polymer substances.

Substances in products regulated under the *Food & Drug Act* are subject to the new substances provisions in CEPA for examination of potential risks to the environment and indirect exposure to humans. For new substances in products regulated under the FDA, 76 notifications for chemical/polymer substances and living organisms were received in 2017-2018.

EXISTING SUBSTANCES ASSESSMENT

ECCC and HC conduct risk assessments or screening assessments to determine whether existing substances meet or are capable of meeting any of the criteria set out in section 64 of CEPA which defines toxicity under the Act. Screening assessment reports are published in draft form on the Chemical Substances website, and the Ministers of the Environment and of Health publish a notice in the *Canada Gazette*, Part I to indicate that the draft assessments are available for public comment. Interested parties can submit written comments during a 60-day public comment period. After taking into consideration comments received, the Ministers publish final assessment reports.

During 2017-2018, the Minister of Health and the Minister of the Environment:

- published 27 draft screening assessment reports covering 402 substances.
- published 16 final screening assessment reports covering 209 substances.
- concluded that, of the 611 substances assessed, 32 meet or are proposed to meet one or more of the criteria set out in section 64 of CEPA.
- published one Science Approach Document covering 14 substances with low human health hazard potential.¹⁷

¹⁷ www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/low-human-health-hazard-sciad.html

Table 1: Summary of existing substance assessment decisions published from April 2017 to March 2018
 (note that information on assessments of living organisms is included in section 2.2 of this report).
 (NFA – No Further Action)

Substances (and Number of Substances)	Meet s. 64 Criteria	Proposed Measure	Publication Date of Draft Notice*	Publication Date of Final Notice*
Phenacetin (1)	No	NFA	April 15, 2017	
EDTA and its Salts Group (4)	No	NFA	April 29, 2017	
Cobalt-containing Substance Grouping (57)	Yes	Add to Schedule 1	December 6, 2014	May 27, 2017
Rapid screening of substances with limited general population exposure (171)	No	NFA	June 10, 2017	
74 Substances identified as being of low concern (74)	No	NFA	June 17, 2017	
Methylenediphenyl Diisocyanate and Diamine (MDI/MDA) Substance Grouping (7)	Yes	Add to Schedule 1	August 16, 2014	June 10, 2017
Thiols Group (4)	No	NFA	July 22, 2017	
Arenes Group (2)	No	NFA	July 22, 2017	
Sector-specific Inorganic UVCBs Group (57)	No	NFA	July 22, 2017	
Chlorhexidine and its salts (4)	Yes	Add to Schedule 1	August 19, 2017	
Asphalt and oxidized asphalt (2)	No	NFA	June 4, 2016	August 26, 2017
Distillate aromatic extracts (3)	No	NFA	June 4, 2016	August 26, 2017
Hydrogen sulfide (H ₂ S), sodium sulfide (Na(SH)) and sodium sulfide (Na ₂ S) (3)	No	NFA	September 9, 2017	
Acrylates and Methacrylates Group (6)	No	NFA	September 23, 2017	
Eugenol and Isoeugenol Derivatives Group (2)	No	NFA	September 30, 2017	
Stilbenes Group (2)	No	NFA	September 30, 2017	
Phthalate Substance Grouping (16)	Yes	Add to Schedule 1	October 7, 2017	
Chloral hydrate (1)	No	NFA	December 17, 2016	October 7, 2017
Alkyl Sulfates and α-Olefin Sulfonate Group (4)	No	NFA	December 10, 2016	October 21, 2017
Alkyl Aryl Phosphites Group (2)	No	NFA	October 28, 2017	
Mitotane, BAPP, Sclareol (3)	Yes	Add to Schedule 1	July 6, 2013	October 28, 2017
Heterocycles Group (4)	No	NFA	November 11, 2017	
Acetic Anhydride (1)	No	NFA	January 28, 2017	November 11, 2017
2-MBS (1)	No	NFA	February 11, 2017	November 18, 2017
Poly(bios) Group (5)	No	NFA	November 18, 2017	
Short-chain alkanes (5)	No	NFA	January 28, 2017	November 25, 2017

Substances (and Number of Substances)	Meet s. 64 Criteria	Proposed Measure	Publication Date of Draft Notice*	Publication Date of Final Notice*
Trimellitates Group (3)	No	NFA	December 2, 2017	
Aliphatic Diesters Group (1)	No	NFA	December 2, 2017	
Carboxylic Acid Anhydrides Group (3)	No	NFA	December 9, 2017	
Substituted Diphenylamine Substance Grouping (14)	No	NFA	December 10, 2016	December 9, 2017
Selenium-containing Substance Grouping (29)	Yes	Add to Schedule 1	July 18, 2015	December 16, 2017
Formic Acid and Formates Substance Group (4)	No	NFA	December 31, 2016	December 16, 2017
Approach for a Subset of Petroleum Substances Prioritized during Categorization (83)			N/A	December 30, 2017
Carboxylic Acids Group (4)	No	NFA	December 30, 2017	
Benzoates Group (9)	No	NFA	December 30, 2017	
Sulfurized lard oil (1)	No	NFA	February 4, 2017	January 13, 2018
Thiocarbamates Group (2)	Yes	Add to Schedule 1	February 3, 2018	
Cyanides (10)	Yes	Add to Schedule 1	February 10, 2018	
Fatty Amides Group (3)	No	NFA	February 24, 2018	
Isophorone diisocyanate (1)	No	NFA	March 3, 2018	
Seven Hydrocarbon-based substances (7)	No	NFA	March 10, 2018	
4-Vinylcyclohexene (4-VCH) (1)	No	NFA	February 25, 2017	March 10, 2018
Epoxy Resins Group (4)	No	NFA	March 24, 2018	

* The dates are those on which the draft and final notices were published in the *Canada Gazette*, Part I.

Along with the results of the screening assessment, the Ministers must publish in the *Canada Gazette* their final decision by choosing one of the following three “measures”: recommending to the Governor in Council the addition of the substance to Schedule 1 of CEPA (the List of Toxic Substances); adding it to the Priority Substances List for further assessment; or proposing no further action in respect of the substance.

Ministers may recommend the addition of a substance to Schedule 1 of CEPA if a screening assessment shows that a substance meets one or more of the criteria set out in section 64 of CEPA. The Governor in Council may then approve an order specifying its addition to Schedule 1. The decision to recommend adding a substance to Schedule 1 obliges the Ministers to develop a “regulation or instrument respecting preventive or control actions” within specific time periods.

The substances or groups of substances that the Ministers proposed to be added to Schedule 1 of CEPA in 2017-2018 are listed in Table 2.

Table 2: Orders proposing adding substances to Schedule 1 of CEPA 1999 from April 2017 to March 2018

Substance	Draft Order
Disperse Yellow 3 (1)	April 1, 2017
Liquefied Petroleum Gases (2)	April 1, 2017
MDIs (5)	June 17, 2017
Cobalt and Soluble Cobalt Compounds	June 24, 2017
Mitotane (1)	November 11, 2017
Selenium and its Compounds	February 17, 2018

The substances or groups of substances that were added to Schedule 1 in 2017–2018 are listed in Table 3.

Table 3: Orders adding substances to Schedule 1 of CEPA 1999 from April 2017 to March 2018

Substance	Final Order
Fuel Oil No. 2 (1)	June 14, 2017
Natural Gas Condensates	February 21, 2018

Substances in products regulated under the FDA between 1987 and 2001 that are on the administrative *Revised in Commerce List* (~2600), were prioritized in 2016 and substances found to be listed on the DSL were removed from the *Revised in Commerce List*. A subset of higher priority substances (~675) were subject of a section 71 inventory update in 2017 in order to gather information on their commercial status and quantities in use. Substances identified for further consideration are being assessed to determine whether they meet or are capable of meeting any of the criteria set out in section 64 of CEPA.

2.1.5. Risk management activities

In general, when a draft risk assessment proposes a conclusion that the substance is “toxic” under CEPA, a risk management scope document is developed under the CMP and published at the same time as the draft assessment report. Risk management scopes are used as discussion documents to engage stakeholders on potential risk management actions. A scope briefly describes the health or environmental concern, the activities potentially impacted and the type of risk management actions being considered. In 2017-2018, risk management scope documents were published for the following five substances:

- B79P (1,2-benzenedicarboxylic acid, benzyl C7-9-branched and linear alkyl esters)¹⁸
- DEHP (1,2-benzenedicarboxylic acid, bis(2-ethylhexyl) ester)¹⁹
- Chlorhexidine and its salts²⁰
- Cyanides²¹
- Thioperoxydicarbonic diamide $[(\text{H}_2\text{N})\text{C}(\text{S})]_2\text{S}_2$, tetramethyl [TMTD]²²

18 www.ec.gc.ca/ese-ees/D2B9F7BB-F9A7-484D-A1C7-78AE05F6BCBA/RM%20Scope%20-%20B79P%20-%20EN.pdf

19 www.ec.gc.ca/ese-ees/E00E9A1F-30D3-4607-9671-4EED2D50A939/RM%20Scope%20Phthalates%20DEHP.pdf

20 www.ec.gc.ca/ese-ees/F9A9B4FE-6F84-4F5A-9539-4CC3A92F8F57/RM%20Scope%20Chlorhexidine%20Moiety_En.pdf

21 www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/risk-management-scope-cyanides.html

22 www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/risk-management-thioperoxydicarbonic-diamide.html

Similar to the risk management scopes, when the final screening assessment report concludes that a substance is “toxic” under CEPA and proposed for addition to Schedule 1 of the Act, a risk management approach document is developed and published at the same time as the final risk assessment report. The risk management approach document provides a more detailed description of the risk management being considered. Under the CMP a wide range of risk management instruments are used, including regulations, pollution prevention planning notices, environmental performance agreements, guidelines, codes of practice and significant new activity notification provisions. These instruments can address any aspect of the substance’s life cycle, from the research and development stage through manufacture, use, storage, transport and ultimate disposal or recycling.

In 2017–2018, risk management approach documents were published for the following five substances:

- Selenium and its compounds²³
- Mitotane²⁴
- MDIs (methylenediphenyl diisocyanates)²⁵
- Subset of Petroleum Substances Prioritized during Categorization²⁶
- Cobalt and Soluble Cobalt Compounds²⁷

REGULATIONS

Final Regulations

In June 2017, the final *Microbeads in Toiletries Regulations* were published to prohibit the manufacture, import, and sale of toiletries used to exfoliate or cleanse that contain plastic microbeads, including non-prescription drugs and natural health products. As of January 1, 2018, the first phase of prohibitions came into effect with the prohibition of the manufacture and import of certain toiletries that contain plastic microbeads.

In October 2017, the *Regulations Amending the Ozone-depleting Substances and Halocarbon Alternatives Regulations* were published in *Canada Gazette* Part II and will control HFCs through the phase-down of consumption of bulk HFCs complemented by controls on specific products containing or designed to contain HFCs, including refrigeration and air-conditioning equipment, foams and aerosols.

Proposed Regulations

On January 6, 2018, the proposed *Prohibition of Asbestos and Asbestos Products Regulations* and related amendments to the *Export of Substances on the Export Control List Regulations* were published in *Canada Gazette*, Part I. The final regulations and related amendments are expected to be published by the end of 2018 and would prohibit the manufacture of products containing asbestos as well as the import, sale, use and export of asbestos and products containing asbestos, with certain specific exemptions.

On March 31, 2018, ECCC published proposed amendments to the *Concentration of Phosphorus in Certain Cleaning Products Regulations*. The amendments would align the Regulations with the requirements of the World Trade Organization’s Agreement on Trade Facilitation by exempting goods in transit; clarify language of the regulatory text; and provide consistency and standardization of the laboratory accreditation provisions with other regulations under CEPA.

23 www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/rm-approach-selenium.html

24 <http://ec.gc.ca/ese-ees/default.asp?lang=En&n=BFDBE0F7-1>

25 www.ec.gc.ca/ese-ees/default.asp?lang=En&n=E05194C1-1

26 www.canada.ca/en/health-canada/services/chemical-substances/chemicals-management-plan-3-substances/approach-subset-petroleum-substances.html

27 www.ec.gc.ca/ese-ees/76A948B0-C9B7-4861-AE1A-B78BB02C1835/RMA%20Cobalt%20EN%20FINAL%20with%20reviewed%20CBI%20Table.pdf

Consultations

In July 2017, a consultation document was published to inform stakeholders and to solicit comments on key elements of the proposed regulatory approach for the development of regulations respecting formaldehyde in composite wood products. The purpose of the proposed regulations is to reduce emissions of formaldehyde in indoor air to supplement other risk management measures in place for formaldehyde.

In September, 2017, ECCC sent stakeholders a consultation document describing proposed amendments to the *Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations*. The proposed Amendments will fulfill commitments made to the Standing Joint Committee for the Scrutiny of Regulations (SJCSR) and will also clarify the regulatory text and incorporate new requirements based on comments from industry and other stakeholders, and lessons learned from administering the Chromium Regulations.

On February 1, 2018, ECCC published a consultation document outlining proposed amendments to the *Products Containing Mercury Regulations* for a 60-day comment period. The objective of the amendments would be to align the Regulations with the requirements of the Minamata Convention, an international treaty which Canada ratified in April 2017. Other amendments were proposed that would phase out certain products and align with recent industry standards and international regulatory initiatives.

REGULATORY ADMINISTRATION

The *Federal Halocarbon Regulations, 2003* reduce and prevent emissions of halocarbons to the environment from refrigeration, air conditioning, fire extinguishing and solvent systems that are located on aboriginal or federal lands or are owned by federal departments, boards and agencies, Crown corporations, or federal works and undertakings. In 2017-2018, 12 permits to charge a fire-extinguishing system with a halocarbon were issued by the Minister of Environment under these Regulations.

The *Ozone-depleting Substances and Halocarbon Alternatives Regulations* is the main instrument that implements Canada's obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol), including the Kigali Amendment to phase down HFCs. These regulations control the export, import, manufacture, sale and certain uses of ozone-depleting substances and hydrofluorocarbons as well as certain products containing or designed to contain them. In 2017-2018, approximately 140 permits were issued under these Regulations.

EXPORT CONTROL LIST

The Export Control List in Schedule 3 of CEPA includes substances whose export from Canada is controlled because their use in Canada is prohibited or restricted, or because they are subject to an international agreement that requires notification or consent of the country of destination before the substance is exported from Canada, such as the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention). CEPA requires exporters to submit prior notice of export with respect to substances on the Export Control List.

- In 2017-2018, 48 prior notices of export were submitted to the Minister of the Environment and one permit was issued by the Minister.
- A proposed order amending the Export Control List (Schedule 3 to the Act) was published in the *Canada Gazette*, Part I on January 6, 2018, to list all forms of asbestos.

ENVIRONMENTAL QUALITY GUIDELINES

Environmental quality guidelines provide benchmarks for the quality of the ambient environment as required under section 54. They may be developed nationally through the Canadian Council of Ministers of the Environment (CCME) as Canadian Environmental Quality Guidelines (CEQGs) or federally under section 54 of CEPA as Federal Environmental Quality Guidelines (FEQGs).²⁸

Table 4 lists the CEQGs that were published or being developed nationally through CCME in 2017-2018. Table 5 lists the seven FEQGs for various CMP substances that ECCC finalized in 2017-2018 and the substances for which FEQGs are under development (Table 5).

²⁸ www.canada.ca/en/health-canada/services/chemical-substances/fact-sheets/federal-environmental-quality-guidelines.html#a6

Table 4: Canadian Environmental Quality Guidelines under development or finalized in 2017-2018

Environmental Compartment	Finalized	Under Development
Water		Zinc Manganese
Soil	Zinc*	Perfluorooctane sulfonate (PFOS) Perfluorooctanoic Acid (PFOA)
Groundwater		Guidelines for n = 100 substances
Soil Vapour		Guidelines for n = 100 substances

*Published on CCME website June 12, 2018

Table 5: Federal Environmental Quality Guidelines in 2017-2018

Environmental Compartment	Finalized	Under Development
Water	Cobalt * Triclosan**	Bisphenol A (BPA) Hexavalent Chromium Perfluorooctane Sulfonate (PFOS) Copper Iron Lead Quinoline Strontium Aluminum D4 Siloxane
Sediment	Bisphenol A (BPA)	D4 Siloxane
Fish Tissue	Perfluorooctane Sulfonate (PFOS)	D4 Siloxane
Wildlife Diet	Bisphenol A (BPA) Perfluorooctane Sulfonate (PFOS)	Selenium D4 Siloxane
Bird Egg	Perfluorooctane Sulfonate (PFOS)	Selenium
Soil		Quinoline
Groundwater		Quinoline

*Published in *Canada Gazette* May 2017;

**Published in *Canada Gazette* Dec 2017.

CODES OF PRACTICE

The provisions within Part 3 of CEPA (Information Gathering, Objectives, Guidelines and Codes of Practice)²⁹ require the Minister of the Environment and the Minister of Health to publish codes of practice.

²⁹ www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/guidelines-objectives-codes-practice/codes-of-practice.html

In 2017-2018, ECCC repealed the *Code of Good Operating Practice for Vinyl Chloride and Polyvinyl Chloride Manufacturing Operations* following the repeal of the *Vinyl Chloride Release Regulations, 1992 (VCRR)*. With the repealing of the VCRR, the Code was no longer useful and was redundant with provincial regulation and the federal *Environmental Emergency Regulations*.

In 2017–2018, ECCC reviewed the voluntary annual Report on Continuous Implementation of the Code of Practice for the Management of Tetrabutyltin in Canada submitted by the one facility that is subject to the Code. The Department's review indicated that the facility had continued to implement the procedures and practices identified in the Code of Practice that was put in place in 2011.

POLLUTION PREVENTION PLANNING NOTICES

The provisions in Part 4 of CEPA (Pollution Prevention) allow the Minister of the Environment to issue a Notice to require designated persons to prepare, implement and report on pollution prevention (P2) plans for toxic substances. Pollution Prevention Planning Notices provide the flexibility for industry to determine the best methods within their processes and activities to meet the risk management objective within the Notice.

On December 13, 2017, ECCC published a consultation document³⁰ outlining the key elements of a proposed Pollution Prevention (P2) Planning Notice for triclosan for a 60-day comment period. The P2 Notice would apply to manufacturers and importers of cosmetics, natural health products, drugs, and cleaning products containing triclosan. The objective would be to reduce the quantity of triclosan used in or imported into Canada by 30% from the base year and by 95% for uses beginning after the publication of the Final Notice.

On March 24, 2018, ECCC published, in the *Canada Gazette*, Part I, a *Proposed notice requiring the preparation and implementation of pollution prevention plans in respect to toluene diisocyanates (TDIs)*. On final publication, this Notice will replace the P2 Planning Notice for the Polyurethane and other foam sector (except polystyrene) in respect of toluene diisocyanates (TDIs) published on November 26, 2011. The new Notice will streamline testing and administrative requirements while broadening the coverage to any facility that releases more than 100 kg annually.

In Progress

- In April 2017, ECCC published the 2015 progress report summarizing the performance of the P2 Planning Notice in respect of specified toxic substances released from base metals smelters and refineries and zinc plants. Results indicate that the implementation of P2 plans has reduced toxic substances releases to the environment from the base year of 2005 and most factors to consider listed in the Notice have either been met or are being achieved. The Notice is still in effect for 3 facilities which were granted a three-year extension to December 2018 to implement their P2 plans.
- A P2 Planning Notice published in 2012 to reduce industrial releases of cyclotetrasiloxane, octamethyl- (siloxane D4) to the aquatic environment required the preparation and implementation of a P2 plan by June 2016, followed by an additional year of monitoring to be completed by June 2017. As of the end of the 2017-2018 administrative period, five of the facilities had declared that they had met the reduction target as a result of implementing their P2 plan, while the sixth facility had indicated that, despite significant reductions in its D4 releases after fully implementing its P2 plan, it had not managed to meet the risk management objective of the Notice.

Final Reports

- In April 2018, ECCC published a final performance report on the implementation of the Notice Requiring the Preparation and Implementation of Pollution Prevention Plans with Respect to Bisphenol A in Industrial Effluents.³¹ Key findings of the report included that there were significant reductions of the use (99%), the amount sent to off-site wastewater systems, and in the average effluent concentrations of Bisphenol A.

30 www.canada.ca/en/environment-climate-change/services/pollution-prevention/planning-notices/performance-results/triclosan-overview.html

31 www.canada.ca/en/environment-climate-change/services/pollution-prevention/planning-notices/performance-results/bisphenol-a-industrial-effluents-overview/report.html

Overall effectiveness of P2 Notices

P2 Notices can be effective at changing behavior and achieving results to help protect the environment and human health. ECCC developed a report³² summarizing the results and effectiveness of 10 completed P2 Notices.

These 10 notices required that 563 facilities prepare and implement P2 plans to reduce environmental releases of 21 toxic substances; of those that implemented P2 plans, 92% were successful in achieving the risk management objective. Many of the facilities that did not meet the objectives were still able to achieve considerable reductions. These results helped contribute to the overall reduction of pollution into the environment since 2003.

ENVIRONMENTAL PERFORMANCE AGREEMENTS

An Environmental Performance Agreement (EPA)³³ is negotiated around the key principles and design criteria outlined in ECCC's Policy Framework for EPAs. Results from EPA's are posted online.³⁴

New Signed Agreements

In 2017-2018, 3 different *Environmental Performance Agreements* were signed with 10 companies to reduce various air pollutants (see Industrial sector emission requirements under section 2.3.3).

Active Agreements

In 2017–2018, under the *Environmental Performance Agreement 2015–2020 Respecting the Use of Tin Stabilizers in the Vinyl Industry*³⁵, a verification team consisting of the Vinyl Institute of Canada and ECCC representatives conducted reverification of four facilities to determine whether the practices and procedures identified in the *Guideline for the Environmental Management of Tin Stabilizers in Canada* are being implemented. The consolidated annual report was submitted to Environment and Climate Change Canada in September, 2017. The report indicates that all participating facilities have fully implemented the practices as outlined in the Guideline.

Overall Effectiveness of Environmental Performance Agreements

A report summarizing the results of 13 *Environmental Performance Agreements* completed since the implementation of the *Policy Framework for Environmental Performance Agreements*³⁶ in 2001 was prepared by ECCC.

Over 175 companies/facilities participated in these 13 Environmental Performance Agreements to manage risks from selected pollutants, including substances deemed toxic. The analysis of the overall effectiveness of these agreements showed them to be successful instruments in managing risks. The primary objectives were fully met in 77% of agreements, partially met in 8% and not met in 15%, though they still had positive impacts and results. The commitment shown by industry to reduce risks to the environment and human health is evident in the results achieved through agreements completed to date and continues to be seen in agreements that are currently active.

32 www.canada.ca/en/environment-climate-change/services/pollution-prevention/planning-notices/effectiveness-design/overall-effectiveness.html

33 www.canada.ca/en/environment-climate-change/services/environmental-performance-agreements/list.html

34 www.canada.ca/en/environment-climate-change/services/environmental-performance-agreements/results.html

35 www.canada.ca/en/environment-climate-change/services/environmental-performance-agreements/results/tin-stabilizers-vinyl-industry-overview.html

36 www.canada.ca/content/dam/eccc/migration/main/epe-epa/564c0963-955a-428d-822a-d6856dba2e20/2001-06-20final-20eng.pdf

OTHER RISK MANAGEMENT TOOLS

Significant New Activity requirements

A Significant New Activity (SNAc) requirement is applied when a substance has been assessed and there is a suspicion that new activities may pose a risk to human health and/or the environment. When it is applied, any major changes in the way the substance is used must be reported to the government. This ensures that departmental experts can evaluate whether the new use of a substance poses a new or increased risk to human health or the environment, and determine if risk management should be considered as a result of the new use.

ECCC and HC continued with their review of all SNAc notices and orders in force to ensure consistency with current policies. SNAc notices and orders being reviewed include those in groups of similar chemistry (e.g., nanomaterials) or common elements (e.g., notices and orders with consumer product references). SNAc review groups include:

- aromatic azo- and benzidine-based substances;
- nanomaterials;
- new and existing substances - consumer product;
- high hazard substances, not in commerce substances; and
- remaining new and existing substances.

As a result of the review, SNAc notices or orders may be rescinded, amended or left unchanged. More information on the SNAc review is available online.³⁷

In 2017–2018 under CEPA:

- the Minister of the Environment issued 7 SNAc Notices for new substances (Table 6)
- 33 SNAc Notices and Orders were rescinded (Table 7)
- 4 SNAc Notices of Intent were issued for existing substances (Table 8)
- 8 Notices of Ministerial Conditions for new substances (Table 9)

Table 6: Significant New Activity Notices for new substances from April 2017 to March 2018

Substance	Publication Date ^a
1,1'-biphenyl, bis(1-methylethyl)- (CAS RN 69009-90-1)	June 24, 2017
Ethanol, 2,2',2''-nitrilotris-, compd. with α,α' -[[[4-[[4-[2-[1-(2-chloro-5-sulfophenyl)-dihydro-methyl-oxo-1H-heteromonocycle-4-yl]diazanyl]phenyl]methyl]phenyl]imino]di-2,1-ethanediy]]bis[ω -hydroxypoly(oxy-1,2-ethanediy)] (1:1) (CAN 19208-6)	December 2, 2017
Quaternary ammonium compounds, benzylalkyldimethyl, salts with bentonite (CAN 19227-5)	December 30, 2017
Quaternary ammonium compounds, dialkyldimethyl, salts with bentonite (CAN 19215-3)	December 30, 2017
Quaternary ammonium compounds, bis(derivative oil alkyl)dimethyl, salts with smectite group minerals (CAN 19216-4)	December 30, 2017
Quaternary ammonium compounds, benzylalkyldimethyl, salts with smectite group minerals (CAN 19217-5)	December 30, 2017
Quaternary ammonium compounds, dialkyldimethyl, salts with smectite group minerals (CAN 19218-6)	December 30, 2017

^a The dates are those on which the Final Notices or Orders were published in the *Canada Gazette*, Part I.

37 www.canada.ca/en/health-canada/services/chemical-substances/chemicals-management-plan/initiatives/significant-new-activity-orders-notices/review-groups.html

Table 7: Significant New Activity Notices and Orders rescinded between April 2017 and March 2018

Substance	Publication Date ^a
Acetamide, N-[2-[(2-bromo-6-cyano-4-nitrophenyl)azo]-5-(diethylamino)phenyl]- (CAS RN 2537-62-4)	July 12, 2017
Carbamic acid, [4-[[4-[(4-hydroxyphenyl)azo]-2-methylphenyl]azo]phenyl]-, methyl ester (CAS RN 6465-02-7)	July 12, 2017
Propanenitrile, 3-[[4-[(4-nitrophenyl)azo]phenyl][2-[(phenylamino)carbonyloxy]ethyl]amino]- (CAS RN 15958-27-7)	July 12, 2017
Propanenitrile, 3-[4-[(5-nitro-2-thiazolyl)azo](2-phenylethyl)amino]- (CAS RN 19745-44-9)	July 12, 2017
Benzonitrile, 2-[[4-[(2-cyanoethyl)(2-phenylethyl)amino]phenyl]azo]-5-nitro- (CAS RN 24610-00-2)	July 12, 2017
Propanenitrile, 3-[[4-[(6,7-dichloro-2-benzothiazolyl)azo]phenyl]ethylamino]- (CAS RN 25150-28-1)	July 12, 2017
Propanenitrile, 3-[[4-[(4,6-dibromo-2-benzothiazolyl)azo]phenyl]ethylamino]- (CAS RN 28824-41-1)	July 12, 2017
Benzenamine, 4-[(2-chloro-4-nitrophenyl)azo]-N-ethyl-N-(2-phenoxyethyl)- (CAS RN 31030-27-0)	July 12, 2017
Propanenitrile, 3-[[2-(acetyloxy)ethyl][4-[(5,6-dichloro-2-benzothiazolyl)azo]phenyl]amino]- (CAS RN 33979-43-0)	July 12, 2017
Propanenitrile, 3-[[4-[(5,6-dichloro-2-benzothiazolyl)azo]phenyl]methylamino]- (CAS RN 41362-82-7)	July 12, 2017
Acetamide, N-[2-[(2-bromo-4,6-dinitrophenyl)azo]-4-methoxy-5-[(phenylmethyl)-2-propenylamino]phenyl]- (CAS RN 42852-92-6)	July 12, 2017
Acetamide, N-[2-[(2-cyano-6-iodo-4-nitrophenyl)azo]-5-(diethylamino)phenyl]- (CAS RN 55252-53-4)	July 12, 2017
Acetamide, N-[2-[(2,6-dicyano-4-nitrophenyl)azo]-5-(dipropylamino)phenyl]- (CAS RN 56532-53-7)	July 12, 2017
3-Pyridinecarbonitrile, 5-[(2-cyano-4-nitrophenyl)azo]-2-[(2-hydroxyethyl)amino]-4-methyl-6-[[3-(2-phenoxyethoxy)propyl]amino]- (CAS RN 61799-13-1)	July 12, 2017
1(2H)-Quinolineethanol, 6-[(2-chloro-4,6-dinitrophenyl)azo]-3,4-dihydro-2,2,4,7-tetramethyl- (CAS RN 63133-84-6)	July 12, 2017
Acetamide, N-[5-(dipropylamino)-2-[[5-(ethylthio)-1,3,4-thiadiazol-2-yl]azo]phenyl]- (CAS RN 63134-15-6)	July 12, 2017
3-Pyridinecarbonitrile, 5-[(2-cyano-4-nitrophenyl)azo]-6-[(2-hydroxyethyl)amino]-4-methyl-2-[[3-(2-phenoxyethoxy)propyl]amino]- (CAS RN 63833-78-3)	July 12, 2017
Carbamic acid, [2-[(2-chloro-4-nitrophenyl)azo]-5-(diethylamino)phenyl]-, 2-ethoxyethyl ester (CAS RN 68214-66-4)	July 12, 2017
Propanenitrile, 3-[[2-(acetyloxy)ethyl][4-[(2-chloro-4-nitrophenyl)azo]-3-methylphenyl]amino]- (CAS RN 68516-64-3)	July 12, 2017
Acetamide, N-[2-[(2-bromo-4,6-dinitrophenyl)azo]-5-[(2-cyanoethyl)-2-propenylamino]-4-methoxyphenyl]- (CAS RN 68877-63-4)	July 12, 2017
1-Naphthalenamine, 4-[(2-bromo-4,6-dinitrophenyl)azo]-N-(3-methoxypropyl)- (CAS RN 70660-55-8)	July 12, 2017
Benzonitrile, 2-[[4-[[2-(acetyloxy)ethyl]butylamino]-2-methylphenyl]azo]-3-bromo-5-nitro- (CAS RN 72828-63-8)	July 12, 2017
1,3-Benzenedicarbonitrile, 2-[[4-[[2-(acetyloxy)ethyl]butylamino]-2-methylphenyl]azo]-5-nitro- (CAS RN 72828-64-9)	July 12, 2017
2,4,10-Trioxa-7-azaundecan-11-oic acid, 7-[4-[(2,6-dichloro-4-nitrophenyl)azo]-3-methylphenyl]-3-oxo-, methyl ester (CAS RN 73003-64-2)	July 12, 2017
3-Pyridinecarbonitrile, 5-[(9,10-dihydro-9,10-dioxo-1-anthracenyl)azo]-2,6-bis[(2-methoxyethyl)amino]-4-methyl- (CAS RN 73398-96-6)	July 12, 2017
Acetamide, N-[4-chloro-2-[2-(2-chloro-4-nitrophenyl)azo]-5-[(2-hydroxy-3-phenoxypropyl)amino]phenyl]- (CAS RN 79542-46-4)	July 12, 2017

Substance	Publication Date ^a
Acetamide, N-[2-[(2-bromo-6-cyano-4-nitrophenyl)azo]-5-(dipropylamino)phenyl]- (CAS RN 83249-47-2)	July 12, 2017
Benzonitrile, 3-bromo-2-[[4-(diethylamino)-2-methylphenyl]azo]-5-methyl- (CAS RN 83249-49-4)	July 12, 2017
Methanesulfonamide, N-[2-[(2-bromo-6-cyano-4-methylphenyl)azo]-5-(diethylamino)phenyl]- (CAS RN 83249-53-0)	July 12, 2017
Methanesulfonamide, N-[2-[(2-bromo-6-cyano-4-methylphenyl)azo]-5-(dipropylamino)phenyl]- (CAS RN 83249-54-1)	July 12, 2017
3-Pyridinecarbonitrile, 1-butyl-5-[[4-(4-chlorobenzoyl)-2-nitrophenyl]azo]-1,2-dihydro-6-hydroxy-4-methyl-2-oxo- (CAS RN 90729-40-1)	July 12, 2017
Propanenitrile, 3-[[2-(acetyloxy)ethyl][4-[(6,7-dichloro-2-benzothiazolyl)azo]phenyl]amino]- (CAS RN 127126-02-7)	July 12, 2017
Ethanol, 2-[[4-[(2,6-dichloro-4-nitrophenyl)azo]phenyl]methylamino]- (6232-56-0)	July 12, 2017

^a The dates are those on which the final notices or orders were published in the *Canada Gazette*, Part I or Part II.

Table 8: Significant New Activity Notices of Intent for existing substances from April 2017 to March 2018

Substance	Publication Date
Benzenamine, 4,4'-methylenebis- (CAS RN 101-77-9)	June 10, 2017
Formaldehyde, polymer with benzenamine (CAS RN 25214-70-4)	June 10, 2017
Ethanol, 2-(2-methoxyethoxy)- (CAS RN 111-77-3)	November 25, 2017
Benzenamine, 4,4'-[(1-methylethylidene)bis(4,1-phenyleneoxy)]bis- (CAS RN 13080-86-9)	October 28, 2017

CONDITIONS AND PROHIBITIONS ON NEW SUBSTANCES

When the assessment of a new substance identifies a risk to human health or the environment, CEPA empowers the Minister of the Environment to intervene prior to or during the earliest stages of its introduction into Canada. In this case, there are three actions that may be taken. The Minister may:

- a. permit the manufacture or import of the substance subject to specified conditions; or
- b. prohibit the manufacture or import of the substance; or
- c. request additional information considered necessary for the purpose of assessment. The notifier shall not manufacture or import the substance until supplementary information or test results have been submitted and assessed.

Table 9: Notices of Ministerial Conditions for new substances from April 2017 to March 2018

Substance	Publication Date*
bentonite, lanthanian, (CAS RN 302346-65-2)	04-Nov-17
Iron(1+), chloro[dimethyl 9,9-dihydroxy-3-methyl-2,4-di(2-pyridinyl-kN)-7-[(2-pyridinyl-kN)methyl]-3,7-diazabicyclo[3.3.1]nonane-1,5-dicarboxylate-kN3,kN7]-, chloride (1:1) (CAS RN 478945-46-9)	30-Sep-17
Fatty acids, tall-oil, reaction products with bisphenol A, epichlorohydrin, glycidyl tolyl ether and triethylenetetramine (CAS RN 186321-96-0)	21-Oct-17
Iron(1+), chloro[dimethyl 9,9-dihydroxy-3-methyl-2,4-di(2-pyridinyl-kN)-7-[(2-pyridinyl-kN)methyl]-3,7-diazabicyclo[3.3.1]nonane-1,5-dicarboxylate-kN3,kN7]-, chloride (1:1) (CAS RN 478945-46-9)	02-Sep-17
Benzene, 1,1'-(1,2-ethanediyl)bis[2,3,4,5,6-pentabromo- (CAS RN 84852-53-9)	14-Oct-17
Bisphenol dicyanate (CAN 10841-5)	29-Jul-17
Benzene, 1,1'-(1,2-ethanediyl)bis[2,3,4,5,6-pentabromo- (CAS RN 84852-53-9)	28-Apr-18
Benzoic acid, 2-benzoyl-, methyl ester (CAS RN 606-28-0)	17-Jun-17

* The dates are those on which the notices were published in the *Canada Gazette*.

2.2. Living organisms

Products of biotechnology that are living organisms are regulated for health and safety purposes by a variety of federal departments and agencies across the government. For example, the Canadian Food Inspection Agency is an important regulator of crop plants and micro-organisms used in animal feeds. CEPA sets the federal standard for assessment and risk management of new and existing living organisms. Other Canadian legislation meeting the CEPA standard is listed in Schedule 4 of CEPA. Living organisms imported or manufactured for a use regulated under a Schedule 4-listed *Act* are exempted from the New Substances provisions in CEPA. Living organisms manufactured or imported for a use not covered by Schedule 4-listed *Acts* are regulated under CEPA. These include naturally occurring and genetically modified organisms (such as bacteria, fungi, viruses, and higher organisms such as fish or pigs) used for various environmental, industrial and commercial purposes.

CEPA establishes an assessment process for living organisms that are new animate products of biotechnology, which mirrors provisions in Part 5 of CEPA respecting new substances that are chemicals or polymers. In addition, paragraph 74(b) of the *Act* requires that all living organisms on the DSL (about 68 existing micro-organisms) undergo a screening assessment to determine whether the living organism is toxic or capable of becoming toxic.

2.2.1. Research

Government research on living organisms focuses on developing novel and contemporary methods for determining the hazardous characteristics and the pathogenicity potential of various existing and emerging biotechnology microbes in order to support regulatory risk assessments. The research is jointly coordinated between regulators at HC and ECCC and has resulted in seven screening assessment reports.

In addition, research in 2017-2018 continued on a number of subjects, including: investigating differences in virulence between opportunistic pathogens and closely related microbes considered for biotechnology; development of animal models to distinguish opportunistic pathogens from those that can be used safely for biotechnology; studying how microbial mixtures affect pathogenicity; advancing cell-based immunology/toxicology methods to reduce animal usage; and developing methods for the analysis of microbial whole genome data towards hazard characterization, as well as home dust microbiome analysis towards Canadian exposure assessments of biotechnology microbes. Current successful methods for assessing viability of microorganisms have been developed, including whole-transcriptome sequencing (i.e. looking at the ribonucleic acid (RNA)) and adding a chemical to an active microbial community where the chemical selectively distinguishes deoxyribonucleic acid (DNA) from live and dead cells.

2.2.2. Risk assessment activities

RISK ASSESSMENT OF NEW ANIMATE PRODUCTS OF BIOTECHNOLOGY

During 2017–2018, 27 notifications of new animate products of biotechnology were received and of those, 21 were assessed as new animate products under the *New Substances Notification Regulations (Organisms)*. All notifications that were accepted as new animate products were assessed within the statutory assessment period.

Also during 2017–2018:

- 17 pre-notification consultations were held to help companies better understand the notification requirements for their specific organism before submitting a Notification, and
- 28 waivers of information requirements for new living organisms were granted and published in the *Canada Gazette*.

RISK ASSESSMENT OF EXISTING ANIMATE PRODUCTS OF BIOTECHNOLOGY

ECCC and HC jointly perform the screening assessment of micro-organisms listed on the DSL. In 2017–2018, a draft screening assessment for one micro-organism was published in the *Canada Gazette*, Part I for a 60-day public comment period. Final screening assessments for 8 micro-organisms were also published in the *Canada Gazette*, Part I (see Table 10). None of these organisms met the criteria in section 64 of the Act, therefore no further action was proposed.

Table 10: Summary of existing living organisms assessment decisions published from April 2017 to March 2018

Assessment	Publication Date Draft	Publication Date Final
<i>Arthrobacter globiformis</i> strain ATCC 8010		February 24, 2018
<i>Cellulomonas biazotea</i> strain ATCC 486		February 24, 2018
<i>Bacillus megaterium</i> strain ATCC 14581		February 24, 2018
<i>Trichoderma reesei</i> strain ATCC 74252		February 24, 2018
<i>Bacillus circulans</i> strain ATCC 9500		February 24, 2018
<i>Chaetomium globosum</i> strain ATCC 6205		February 24, 2018
<i>Micrococcus luteus</i> strain ATCC 4698		February 24, 2018
<i>Bacillus thuringiensis</i> strain ATCC 13367	April 29, 2017	March 3, 2018
<i>Enterobacter aerogenes</i> strain ATCC 13048		March 24, 2018

* The dates are those on which the notices were published in the *Canada Gazette*.

2.2.3. Risk management activities

SIGNIFICANT NEW ACTIVITY REQUIREMENTS

While, no SNAc Notices of Intent were issued for new living organisms, in February 2018, a Notice of Intent applying the SNAc provisions to one existing living organism was published (Table 11).

Table 11: Significant New Activity Notices of Intent and Orders for existing living organisms from April 2017 to March 2018

Assessment	Number of Strains	Notice of Intent*	Final Order*
<i>Trichoderma reesei</i> strain ATCC 74252	1	February 24, 2018	TBD

* The date is that on which the Notices of Intent and Final Orders were published in the *Canada Gazette*, Part I or Part II, respectively.

2.3. Air pollutants and greenhouse gases

Outdoor air pollutants and greenhouse gases (GHGs) originate from numerous domestic sources, such as industry and transportation, as well as transboundary transport of air pollution from other countries.

2.3.1. Monitoring

Monitoring and reporting activities are important for identifying and tracking levels and trends related to air pollutants that impact both the environment and human health.

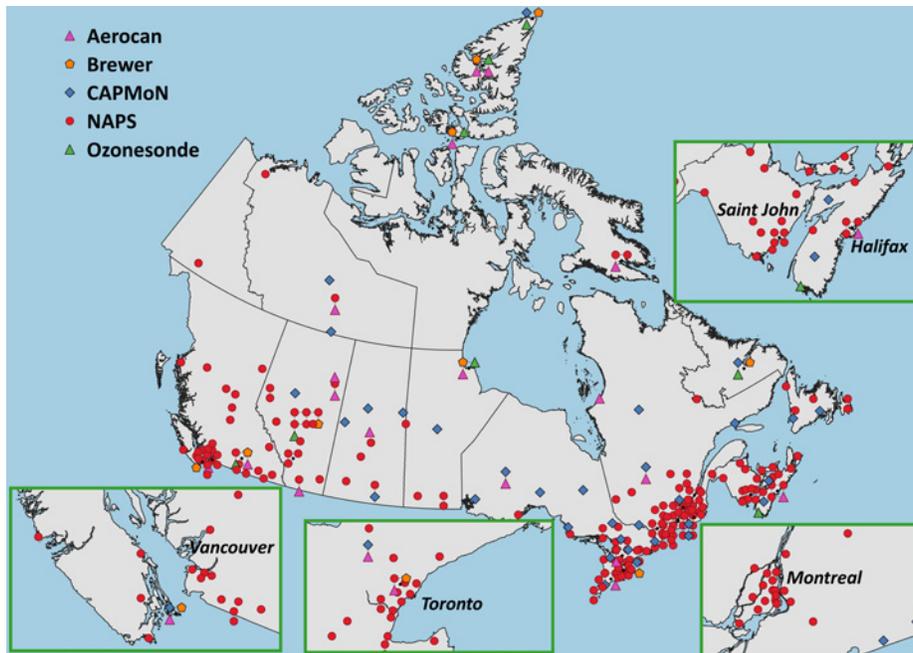
Ambient (outdoor) air quality monitoring informs air quality management in Canada, including the evaluation of progress relative to the Canadian Ambient Air Quality Standards. The data is used for validation of numerical air quality prediction models, for evaluating the benefits and effectiveness of control measures, as well as for assessments of the impact of air pollution on Canadians and the environment.

ECCC monitors ambient air quality across the country through two complementary networks known as the National Air Pollution Surveillance (NAPS) program and the Canadian Air and Precipitation Monitoring Network (CAPMoN) (Figure 7). NAPS is managed by ECCC via a cooperative agreement with the provinces, territories and two municipalities in order to provide long-term air quality data from populated regions of Canada. CAPMoN provides information on regional patterns and trends of atmospheric pollutants in both air and precipitation at rural and remote sites.

Additional air pollutant monitoring carried out by ECCC includes AEROCAN, a member of NASA's global AERONET satellite network, which takes optical readings of solar radiation in order to measure atmospheric aerosols. The Canadian Brewer Spectrophotometer Network measures total column ozone and spectral UV radiation, providing long-term stratospheric ozone data. The Canadian Ozonesonde Network measures vertical column ozone from ground level up to 36 km altitude by launching weekly ozonesondes affixed to balloons, providing long-term ozone data.

During 2017–2018, research was carried out by ECCC under the Climate Change, Air Pollution and Oil Sands Monitoring programs.

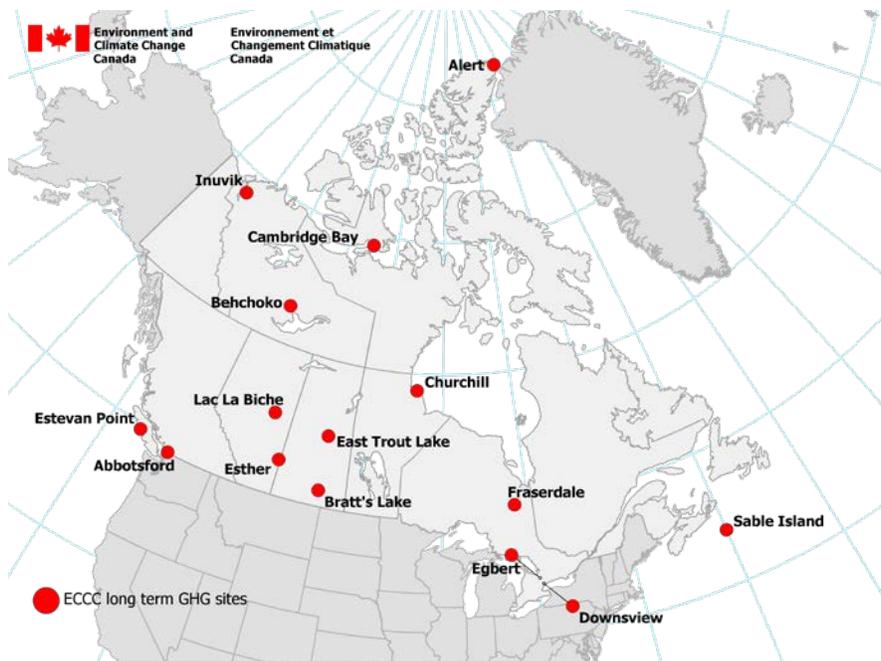
Figure 7: Map of air pollutant monitoring sites



* Some NAPS sites may not be visible in places where they are close together.

The Canadian Greenhouse Gas Monitoring Program³⁸ includes observations of carbon dioxide and other GHGs from 16 long-term measurement sites across Canada (Figure 8). Among the sites is the Alert Global Atmosphere Watch Observatory. Alert serves as one of three global GHG inter-comparison sites to ensure consistent measurement of carbon dioxide (CO₂) and other greenhouse gas concentrations across the world.

Figure 8: Canadian Greenhouse Gas Measurement Program monitoring sites



38 www.canada.ca/en/environment-climate-change/services/climate-change/science-research-data/greenhouse-gases-aerosols-monitoring/canadian-greenhouse-gas-measurement-program.html

Measurements of atmospheric CO₂ and CH₄ at Alert, Nunavut

Measurements of atmospheric CO₂ began in March 1975 at Alert, Nunavut (Figure 9). The seasonal decline in late May to early June is due to the transport of air from southern latitudes that is depleted in CO₂ from photosynthetic uptake. The annual average CO₂ values at Alert in 2017 was 407.7 parts per million (ppm). The annual average CO₂ values at Alert in 2015 and 2016 were 402.1 ppm and 404.3 ppm; 2015 was the first year in which the annual mean exceeded 400 ppm. The annual average CO₂ values were 399.7 and 397.9 ppm in 2013 and 2014, respectively.

In addition to CO₂, ECCC also conducts measurements of atmospheric methane (CH₄), which began in August 1985 at Alert, Nunavut (Figure 10). The annual average CH₄ value at Alert in 2017 was 1934.2 parts per billion (ppb). The rate of annual increase in CH₄ concentrations steadily declined since the late 1980s and hovered around zero from 1999 to 2006, reflecting a near global balance between emissions and removal by atmospheric chemical processes. However, since 2007, CH₄ has increased every year on average by 6 ppb per year.

Figure 9: Atmospheric carbon dioxide measured at Alert, Nunavut

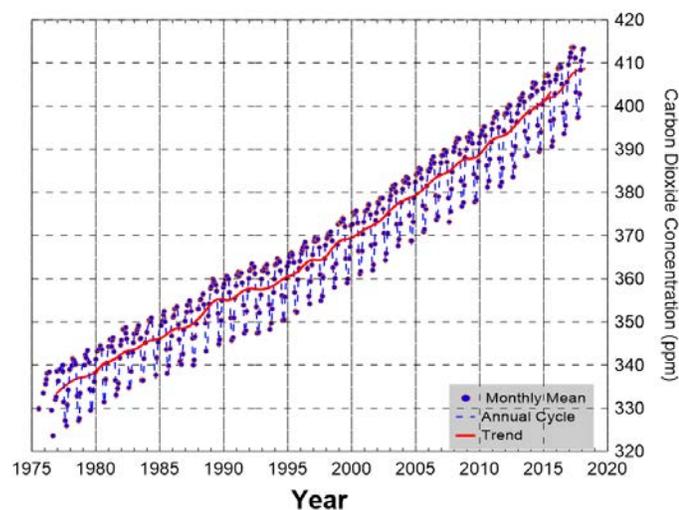
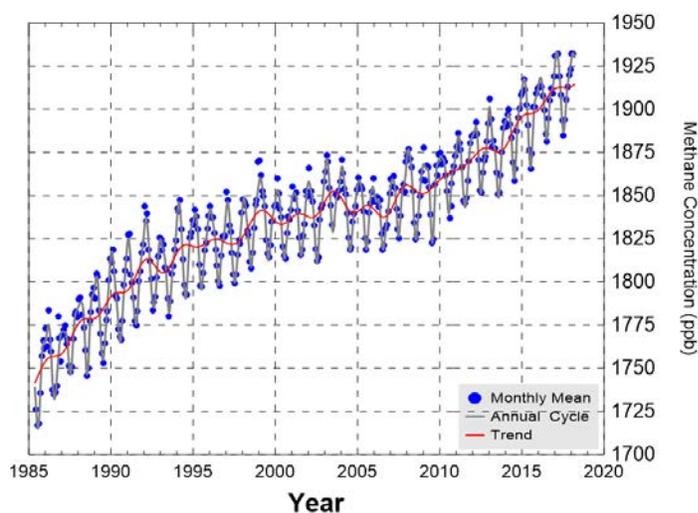


Figure 10: Atmospheric methane measured at Alert, Nunavut



ECCC makes its atmospheric monitoring data available to the public through national and international databases, including the Government of Canada Open Data Portal; World Meteorological Organization (WMO); World Data Centres for GHGs; WMO World Data Centre for Precipitation Chemistry; and the WMO World Ozone and Ultraviolet Data Centre, which is operated by the Meteorological Service of Canada.

Quantifying carbon dioxide (CO₂) emissions from individual power plants from space

Burning coal for electricity generation accounts for more than 40% of anthropogenic global CO₂ emissions. Improved methods of quantifying emissions are needed at all spatial scales from the national level down to the level of individual power plants.

A study³⁹ led by ECCC provided the first detection and quantification of CO₂ emissions from individual facilities using space-based observations, and has yielded daily emission estimates for coal power plants with reasonable accuracy and precision. While NASA's Orbiting Carbon Observatory 2 (OCO-2) satellite was not designed for monitoring power plant emissions, this study showed that in select cases, CO₂ observations from OCO-2 can be used to quantify daily CO₂ emissions from individual mid- to large-sized coal power plants by fitting the data to a simple plume model. When using this methodology, the emission estimates for United States power plants were within 17% of the actual reported daily emission values.

39 <https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1002/2017GL074702>

These results have implications for broader monitoring, reporting and verification of CO₂ emissions. A constellation of future CO₂ imaging satellites, with a design optimized for point sources, could be used to monitor CO₂ emissions from individual fossil fuel burning power plants, thus providing another source of relevant information to guide strategic action.

2.3.2. Research

Air quality research efforts help quantify priority air pollutants and determine trends, improve and validate air quality predictions both in the near term and into the future within the national and global context, as well as enhance understanding of the impacts of air pollutant sources on Canadians and the environment. The research also tackles emerging issues and underpins and informs evidence-based policy decision-making, to help ensure policymakers focus their efforts appropriately.

Ongoing research by ECCC continued on a wide range of topics related to air pollution, GHGs, and short lived climate pollutants. This included reported research results on topics such as ammonia, nitrogen oxides (NO_x), sulphur dioxide (SO₂), volatile organic compounds (VOCs), acidic emissions and deposition, tropospheric and stratospheric ozone, particulate matter and aerosols, and air pollutants in the transportation sector. It also included improving understanding of GHG sources and sinks; utilizing surface and satellite GHG observations; characterization and measurement of atmospheric aerosols, including black carbon; and measuring the impact of ship emissions in the Arctic environment. ECCC scientists published approximately 80 research papers related to air pollutants and GHGs in peer-reviewed scientific journals in 2017-18.

Research on nitrogen compounds (ammonia and nitrogen oxides) included measurement of dry deposition from satellite observations, and evaluation of sources of ammonia including in the Canadian oil sands. Sulphur dioxide research focused on satellite measurements, including changes in ground level SO₂ over North America and evaluating the consistency of satellite and surface measurements with reported emissions.

Volatile and semi-volatile organic compounds research included improvements to the methodology of monitoring using passive samplers, and a study of the contribution to VOC emissions from natural chemical activity at the surface of the Arctic seas.

Studies were completed of emissions and secondary formation in the atmosphere of gaseous organic acid in the Athabasca oil sands region. Another study assessed long-term trends in acidic air concentrations and wet deposition at rural sites across Canada.

Transport sector air pollution research included characterization of the impacts of fuel composition and altitude on emissions from a turbojet engine, and the effects of biodiesel fuels on particulate matter emissions from light duty diesel engines.

ECCC scientists also contributed to a number of studies of the health effects of exposure to air pollution. Two studies with Statistics Canada looked at the health effects (e.g. skin cancer) of exposure to ambient ultraviolet radiation.

In 2017–2018, HC continued to conduct research on human exposure to indoor and outdoor air pollutants and their health impacts in order to guide actions to address air pollution by governments, industries, other organizations and individuals. HC scientists published approximately 47 articles in peer reviewed scientific journals and contributed to many other publications. These addressed issues such as the emissions of air pollutants from transportation and industrial sectors and their impact on ambient air quality and on respiratory disease, cardiovascular disease, cancer, pregnancy outcomes, and dementia. Others studies investigated determinants of air pollution exposure in various environments and provided information of use to local air quality management and population health studies.

More than 25 HC research projects on air quality were ongoing in 2017-18 and will generate information that can be used to support regulatory decisions. They include new approaches to measuring the concentration-response functions, and the influence of extreme temperatures on air pollution and on population health outcomes.

In November 2017 Health Canada published:

Health Impacts of Air Pollution in Canada: An estimate of premature mortalities; which estimated that 14,400 deaths per year in Canada were attributable to air pollution from human activity. This estimate was calculated using the Air Quality Benefits Assessment Tool developed and maintained by HC.

Human Health Risk Assessment for Gasoline Exhaust: A comprehensive review and analysis of the potential adverse health effects associated with gasoline fuel use in Canada. Among the conclusions of the report was an estimated total societal cost of \$7.3 billion for calendar year 2015 associated with on-road and off-road gasoline emissions.

2.3.3. Risk management activities

Different instruments are available under the authorities provided by CEPA to limit and reduce emissions of air pollutants and greenhouse gases from vehicles, engines and fuels, consumer and commercial products, and industrial sectors, as well as for establishing national ambient air quality objectives to drive air quality improvements. However, cooperation among governments in Canada has been key in managing air pollution.

The Air Quality Management System (AQMS), agreed by federal, provincial and territorial environment ministers in 2012, provides a comprehensive approach to reducing pollution and improve the health of Canadians and the environment. The AQMS includes: 1) Canadian Ambient Air Quality Standards (CAAQS); 2) local air zones and regional airsheds; 3) industrial emission requirements for major industries; 4) an intergovernmental working group for enhanced collaboration and the reduction of emissions from mobile sources, and; 5) reporting to Canadians on the state of the air.

CAAQS are environment and health standards for specific air pollutants that provide the drivers for air quality management actions across the country. ECCC leads the process under the Canadian Council of Ministers of the Environment to develop, review and amend CAAQS. In November 2017, federal, provincial and territorial ministers of environment announced new CAAQS for nitrogen dioxide (NO₂) and sulphur dioxide (SO₂).

CEPA provides authorities to establish CAAQS as environmental quality objectives to be met across the country and to develop and administer regulatory and non-regulatory instruments to reduce the releases of air pollutants and GHGs.

During 2017-18 work to review the CAAQS for ozone (O₃) was completed.

INDUSTRIAL SECTOR EMISSION REQUIREMENTS

Multi-Sector Air Pollutants Regulations

In 2016, the *Multi-Sector Air Pollutants Regulations* (MSAPR) came into force. The MSAPR establish nationally consistent industrial emissions requirements and limits nitrogen oxide (NO_x) emissions from large industrial boilers and heaters as well as from stationary spark-ignition engines, used in several industrial sectors, that burn gaseous fuels (such as natural gas). The MSAPR also limit NO_x and SO₂ emissions from kilns at cement manufacturing facilities. The MSAPR will contribute significantly to reducing emissions that contribute to smog and acid rain, including 2,000 kilotonnes of NO_x emission reductions in the first 19 years.

As part of the MSAPR requirements, classification reports for boilers and heaters, initial registration, as well as the first annual compliance reports for modern engines were due to ECCC in 2017.

Also as part of the MSAPR requirements, all regulated cement facilities were to install, before January 1, 2018, continuous emission monitoring equipment (CEMS) on their equipment and record NO_x and SO₂ emissions for annual reporting to ECCC by June of the following year.

Guidelines

In November 2017, final Guidelines for reducing nitrogen oxide (NO_x) emissions from natural gas-fueled stationary combustion turbines were published. The Guidelines are available online.⁴⁰

Environmental Performance Agreements

On November 13, 2017, ECCC, the Aluminium Association of Canada and the three aluminium companies operating in Canada signed the Performance Agreement Concerning Air Pollutants from the Aluminium and Alumina Sector⁴¹ to implement the industrial emissions requirements developed for this sector. The agreement is in effect until December 31, 2025.

On January 5, 2018, ECCC, the Iron Ore Company of Canada, and ArcelorMittal Mining Canada G.P. signed the Performance Agreement Concerning Air Pollutants from the Iron Ore Pellet Sector⁴² to implement the industrial emissions requirements developed for this sector. The agreement is in effect until June 1, 2026.

On January 5, 2018, ECCC and five companies signed company specific Performance Agreements Concerning Air Pollutants⁴³ to implement the industrial emissions requirements developed for the Base Metals Smelting sector. These agreements are in effect until December 31, 2025.

Code of Practice

On September 9, 2017, ECCC published, in the *Canada Gazette*, Part I, the *Code of Practice for the Management of PM_{2.5} Emissions in the Potash Sector in Canada*. This Code of practice describes operational activities and associated environmental concerns relating to emissions of fine particulate matter (PM_{2.5}) from facilities in the potash sector in Canada. The recommended practices in the Code include the development and implementation of best practices to control and minimize emissions of PM_{2.5}. These recommended practices can be used by the potash industry, regulatory agencies, and the general public as sources of technical and policy guidance.

Pollution Prevention Planning Notice

On May 6, 2017, ECCC published, in the *Canada Gazette* Part 1, a Pollution Prevention Planning Notice Requiring the preparation and implementation of pollution prevention plans in respect of specified toxic substances released from the iron, steel and ilmenite sector. The objectives of this Pollution Prevention Planning Notice are to achieve and maintain the industrial emissions requirements developed through the Air Quality Management Systems air emission targets for NO_x and SO₂ and to implement best practices to reduce fugitive VOC emissions.

OIL AND GAS SECTOR EMISSION REQUIREMENTS

Methane

Methane is a potent GHG, with a global warming potential 25 times greater than carbon dioxide. The federal government has committed to reduce methane emissions by 40-45 percent by 2025. In 2017-2018, ECCC consulted extensively with provinces, territories, industry, environmental non-governmental organizations (ENGOS) and Indigenous peoples to develop robust and cost-effective regulations.

In May 2017, the proposed *Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector)* were published in *Canada Gazette* Part I and would introduce control measures (facility and equipment level standards) to reduce fugitive and venting emissions of hydrocarbons, including methane, from the oil and gas sector.

Volatile Organic Compounds (VOCs)

Volatile organic compounds are primary precursors to the formation of ground-level ozone and particulate matter, which are the main constituents of smog. Smog is known to have adverse effects on human health and the environment. In addition, some VOCs such as 1,3-butadiene, benzene and isoprene are known to be carcinogenic.

40 www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/guidelines-objectives-codes-practice/reduction-nitrogen-oxide-combustion-turbines-guidelines.html

41 www.canada.ca/en/environment-climate-change/services/environmental-performance-agreements/aluminum-alumina-sector-overview/aluminium-alumina-agreement.html

42 www.canada.ca/en/environment-climate-change/services/environmental-performance-agreements/iron-ore-pellet-sector-overview.html

43 www.canada.ca/en/environment-climate-change/services/environmental-performance-agreements/base-metal-smelters-overview.html

On May 27, 2017, ECCC and HC published the proposed *Regulations Respecting Reduction in the Release of Volatile Organic Compounds (Petroleum Sector)* in *Canada Gazette*, Part I, for a 60-day comment period. The proposed regulations address releases of VOCs, including petroleum and refinery gases, from petroleum refineries, upgraders and certain petrochemical facilities. Key elements of the proposed regulations included a leak detection and repair program, preventive equipment requirements and fence-line monitoring.

ELECTRICITY SECTOR EMISSIONS REQUIREMENTS

In November 2017, ECCC's proposed regulatory initiative to develop air emission standards for new stationary diesel (compression-ignition) engines was included in ECCC's 2018-2020 Forward Regulatory Plan. These regulations are being developed under CEPA as part of the pan-Canadian efforts to reduce reliance on diesel and the department's efforts to address short-lived climate pollutants and air pollutants.

On February 17, 2018, ECCC published in the *Canada Gazette*, Part I, proposed amendments to the *Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations*. The proposed amendments would require all coal-fired electricity generating units to comply with a carbon dioxide emissions performance standard at the end of their useful life as specified by the existing coal-fired electricity regulations, or by the end of 2029, whichever comes first. The purpose of the amendments is to accelerate the phase-out of traditional coal-fired electricity.

To support the transition away from coal towards cleaner sources of generation, the Government published the proposed *Regulations Limiting Carbon Dioxide Emissions from Natural Gas-fired Generation of Electricity*, on February 17, 2018. The proposed regulations for natural gas-fired electricity have been designed to ensure that new natural gas-fired electricity generation uses efficient technology, while providing flexibility for new units to meet electricity system demand and incorporate variable renewables, like wind and solar.

For coal units that convert to run on natural gas, the proposed regulations would encourage companies to convert their coal units to natural gas ahead of their end-of-life under the amended coal regulations, while also providing assurance that higher emitting coal-to-gas converted units will be phased out more rapidly than better performers.

TRANSPORTATION SECTOR EMISSION REQUIREMENTS

ECCC implements six vehicle and engine regulations and nine fuel regulations under CEPA.

ECCC and the U.S. Environmental Protection Agency continued to collaborate closely under the framework of the Canada U.S. Air Quality Committee towards the development of aligned vehicle and engine emission standards, related fuel quality regulations and their coordinated implementation.

Greenhouse gas emissions regulations

In 2017-2018, ECCC conducted extensive consultations with stakeholders on the proposed amendments to the *Heavy-duty Vehicle and Engine Greenhouse Gas Emission*, the *Passenger Automobile and Light Truck Greenhouse Gas Emission* and the *On-Road Vehicle and Engine Emission regulations* and worked toward finalizing the amendments in spring 2018.

Air pollutant emission regulations

On October 4, 2017, ECCC published final amendments to the *Off-Road Small Spark-Ignition Engine Emission Regulations*, in the *Canada Gazette*, Part II. The regulations will decrease exhaust and evaporative emissions of air pollutants from off-road engines using a spark plug, or other sparking device, and producing no more than 19 kW of power. The more stringent standards for air pollutant emissions apply to 2019 and later model year small spark-ignition engines.

Regulatory administration of the transportation regulations

ECCC administers a compliance program under the transportation and fuels regulations. This includes processing of regulatory reports, importation declarations, managing defects and recalls and testing of selected vehicles and engines to verify compliance with the regulations.

Some of the transportation regulations require companies to submit annual reports documenting fleet performance, the quantity of products or fuel quality parameters. During 2017-2018, the department received over 250 regulatory reports for vehicles and engines and over 630 reports for fuels.

In 2017-2018, ECCC processed about 482 Canada-unique⁴⁴ submissions and almost 1400 importation declarations for vehicles and engines. Additionally, the department processed 59 notices of defect and recall notifications covering over 180,000 vehicles and engines. Of those, ECCC influenced 16 notices of defect covering over 90,000 vehicles and engines. ECCC also began posting basic information summarizing notices of defect and other company notifications submitted to the department on the Government of Canada's Open Data portal.⁴⁵

Additionally, during this period, an update to the Department's Vehicle and Engine Emissions Reporting Registry (VEERR), an electronic online system designed for automobile manufacturers to submit their annual compliance report, was completed. The department hosted three webinars with automobile companies to provide guidance related to the system updates.

The regulatory administration of the transportation regulations is supported by ECCC laboratory emissions testing on vehicles, and engines and fuel quality testing in order to verify compliance with the regulations. Occasionally, private laboratories will be used by ECCC to conduct testing. In 2017-2018, the department conducted testing on 86 vehicles and engines. During 2017-2018, ECCC responded to almost 1500 inquiries regarding the vehicles and engines regulations and almost 230 regarding the fuels regulations.

In 2017-2018, ECCC continued to expand its capacity to verify compliance with the transportation sector's emission regulations, including identifying devices to defeat the emission regulations. The expanded program increases opportunities to identify non-compliant regulatees and take enforcement action where required.

During 2017-2018, the department also published fleet average NO_x performance reports for the 2014, 2015 and 2016 model year light-duty vehicle fleets and the 2011 to 2015 model year light-duty vehicle GHG performance reports. Those reports⁴⁶, compiled from the annual compliance reports submitted by automobile companies, document the overall fleet performance for each of the specified model years.

More information on ECCC's vehicle, engine and fuel regulations is available online.⁴⁷

FUELS REGULATIONS

In March 2018, ECCC published proposed *Regulations Amending the Contaminated Fuel Regulations*. The proposed Amendments would ensure consistency with Canada's international obligations under the World Trade Organization (WTO) Agreement on Trade Facilitation by exempting contaminated fuel from prohibition when it is in transit through Canada, where there is written evidence establishing that the fuel is in transit.

Starting January 1, 2017, the sulphur limits under the *Sulphur in Gasoline Regulations* were adjusted downwards according to schedule. For those companies that have elected to apply a pool average, the limit decreased from 30 mg/kg to 10 mg/kg, and for those companies that do not apply a pool average, the limit decreased from 40 mg/kg to 14 mg/kg. The sulphur compliance unit trading system also came into effect for the duration of the 2017 to 2019 compliance periods.

In December 2017, ECCC published proposed *Regulations Amending the Regulations Prescribing Circumstances for Granting Waivers Pursuant to Section 147 of the Act*. The proposed Amendments would simply make administrative changes, and would have no impact on stakeholders.

44 A Canada-unique vehicle or engine is a vehicle or engine that is specifically listed on a United States Environment Protection Agency (EPA) certificate and sold in Canada, but not sold in the United States; or a vehicle or engine that is not specifically listed on an EPA certificate.

45 Information is available on the Open Data portal at: <https://open.canada.ca/data/en/dataset/86d91f04-c564-4f53-8150-2ce95952eebe>

46 These reports can be accessed from the CEPA Registry at: for NO_x performance reports - www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/fleet-average-emission-performance-vehicles.html; for GHG performance reports - www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/greenhouse-gas-emissions-performance-2011-2015.html.

47 www.canada.ca/en/environment-climate-change/services/air-pollution/sources/transportation.html

CLEAN FUEL STANDARD

In support of the Pan-Canadian Framework on Clean Growth and Climate Change, the government is developing a Clean Fuel Standard that will reduce the carbon intensity of the liquid, gaseous and solid fuels used in transportation, industry, homes and buildings. The overall objective is to achieve 30 megatonnes of annual reductions in GHG emissions by 2030 and incentivize the use of lower carbon fuels, and alternative energy sources and technologies.

In 2017, consultations were held following the release of a discussion paper that led to the publication of a regulatory framework in December, 2017. Regulatory design consultations were launched in January 2018 with the formation of a Multi-Stakeholder Consultative Committee and a Technical Working Group. ECCC also held bilateral meetings with Indigenous peoples on the development of the Clean Fuel Standard.

CONSUMER AND COMMERCIAL PRODUCTS

ECCC has been targeting the reduction of emissions of Volatile Organic Compounds (VOCs) from consumer and commercial products. VOCs are a contributing factor in the creation of air pollution. Control measures have been developed that set VOC content limits in some products, which in turn reduce their emissions. The ECCC VOC in Products laboratory conducts testing in order to verify compliance with the regulations. In 2017–2018, the Department completed testing on 123 products including architectural coatings and automotive refinishing products.

In 2017-2018, ECCC furthered the development of the proposed *Volatile Organic Compound (VOC) Concentration Limits for Certain Products Regulations*. The proposed Regulations would establish VOC concentration limits for 130 product categories including personal care, automotive and household maintenance products; adhesives, adhesives removers, sealants and caulks; and other miscellaneous products.

INDOOR AIR QUALITY

In addition to the penetration indoors of outdoor pollutants, indoor air can be contaminated by emissions from building materials, products, and activities inside the home, and by the infiltration of naturally occurring radon from the soil under the building.

The Residential Indoor Air Quality Guidelines⁴⁸ summarize the health risks posed by specific indoor pollutants, based on a review of the best scientific information available at the time of the assessment.

On July 22, 2017, the Minister of Health published a Residential Indoor Air Quality Guideline for acetaldehyde in the *Canada Gazette*, Part I. HC also published a report on *Indoor Air Reference Levels for Chronic Exposure to Volatile Organic Compounds*⁴⁹ and supported the British Columbia Centre for Disease Control in developing a Carbon Monoxide Monitoring and Response Framework in Long-term Care Facilities.

In March, 2018 HC published a guidance document entitled *Ventilation and the Indoor Environment*⁵⁰ to assist Canadians in applying strategies to maintain indoor air quality.

48 www.canada.ca/en/health-canada/services/air-quality/residential-indoor-air-quality-guidelines.html

49 www.canada.ca/en/health-canada/services/publications/healthy-living/indoor-air-reference-levels-chronic-exposure-volatile-organic-compounds.html

50 www.canada.ca/en/health-canada/services/publications/healthy-living/ventilation-indoor-environment.html

2.4. Water quality

Water quality is affected in many ways, including by nature's own patterns. The water quality of rivers and lakes changes with the seasons and geographic areas, even when there is no pollution present. It is also affected by human development, including by the release of human wastes, animal wastes and chemical substances into the environment.

Water quality is a shared responsibility with provinces and territories. In addition to CEPA, the federal government addresses water quality under other statutes, such as the *Fisheries Act*. Work on water quality under CEPA includes monitoring, scientific research, and leadership on the development of guidelines for water quality.

2.4.1. Monitoring

ECCC's Fresh Water Quality Monitoring program continues to implement a risk-based adaptive management framework in conjunction with statistical power analyses to better target monitoring activities to the risks of contaminants and human activities in Canadian watersheds. The approach has been used to optimize monitoring locations and adjust monitoring frequencies relative to the environmental risks and to report on changes in environmental condition.

In 2017–2018, ECCC scientists continued to participate in the development of management options for remediation of contaminated sediments in Great Lakes Areas of Concern, including Hamilton Harbour and the St. Clair River. The remediation project for Hamilton Harbour has now proceeded to implementation.

In addition to data collection and reporting on a wide range of environmental issues, monitoring efforts in 2017–2018 included continued upgrades to monitoring technologies and improved data reporting and database infrastructure.

2.4.2. Research

Both ECCC and HC continued their water quality research activities.

ECCC's research related to water quality included:

- method development for analytes in wastewater treatment plant influent and effluent;
- assessing the environmental fate of substituted phenylamine antioxidants (SPAs);
- investigating organophosphorus flame retardants in a variety of environmental compartments;
- biotoxins identification in algal blooms in the St. Lawrence River;
- analytical methods development for the identification of degradation products from pharmaceuticals in surface waters;
- studying multiple biological impacts of municipal effluents on wild fish in the St. Lawrence River;
- studying the toxicity of pesticides to non-target freshwater species;
- investigating the occurrence, distribution and fate of musk compounds and the emerging anti-cancer cytostatic substances in wastewater treatment plant influent, effluent and biosolids; and
- assessing bioaccumulation and toxicity of dysprosium and palladium under varying water quality parameters.

In 2017–2018, two peer-reviewed journal articles were published on the potential contamination of drinking water by chlorine, the most common disinfectant, and on the occurrence of an emerging class of disinfection by-products in Canadian water supplies. HC has also initiated a new research project aiming to optimize the design of parameters for cost-effective future national drinking water surveys. HC generated water data that were used for the development of many Screening Assessment Reports.

2.4.3. Risk management activities

HC works in collaboration with the provinces and territories to establish priorities used to develop the Guidelines for Canadian Drinking Water Quality and their technical documents. Health-based guidelines are developed for drinking water contaminants that are found or expected to be found in drinking water supplies across Canada at levels that could lead to adverse health effects. The Guidelines for Canadian Drinking Water Quality are used by all provinces and territories as a basis to establish their own regulatory requirements regarding the quality of drinking water in their jurisdictions.

HC has been modernizing its drinking water program, in order to increase openness and transparency and further engage stakeholders, including the Canadian public. New or updated Guidelines are now being published in the Canada Gazette Part I, while the technical document continues to be published on Health Canada’s website. Priorities for guideline development are established every four years, using exposure information from federal, provincial and territorial sources and up-to-date science, as well as taking into consideration jurisdictional needs. As part of the drinking water program’s modernization efforts, the process for prioritizing the development and review of guidelines was updated in 2017. The results of the prioritization process will form the basis for the five-year work-plan for the Federal-Provincial-Territorial Committee on Drinking Water (CDW). A summary of the process is available online.⁵¹

To keep abreast of new scientific studies and reviews that could help inform the development of the guidelines, HC continually reviews updates to standards and guidelines respecting the quality of drinking water from leading international agencies, including:

- United States Environmental Protection Agency (U.S. EPA);
- World Health Organization (WHO);
- Australia National Health and Medical Research Council (ANHMRC); and
- European Union (EU).

It was determined that for 2017-2018, there were no updates that should be considered for the development of a new guideline or an update to an existing one.

In addition to reviewing foreign agencies’ guidelines and standards related to drinking water quality for the purposes of priority setting, Guidelines being developed or updated are also subject to an international comparison. As part of its ongoing guideline review process, Health Canada continues to monitor new research and recommend any change to the guidelines that is deemed necessary. Table 12 lists the guidelines that were completed or in progress in 2017–2018, each of which contains international considerations.

Table 12: Guideline Documents for Canadian Drinking Water Quality from April 2017 to March 2018

Finalized	Underwent Public Consultation	In Progress
Enteric Protozoa	Uranium	Strontium
PFOS	Enteric Viruses	1,4-Dioxane
PFOA	QMRA	Total coliforms
	Copper	Natural organic matter
		Barium

2.5. Waste

Waste generally refers to any material, non-hazardous or hazardous, that has no further use, and which is managed at recycling, processing or disposal sites or facilities.

⁵¹ www.canada.ca/en/health-canada/services/environmental-workplace-health/water-quality/drinking-water/federal-provincial-territorial-committee-drinking-water-health-canada.html

In Canada, the responsibility for managing and reducing waste is shared between the federal, provincial, territorial and municipal governments. Municipal governments are responsible for collecting and managing waste from homes for recycling, composting and disposal, while provincial and territorial authorities are responsible for the approval, licensing and monitoring of waste management operations.

For its part, ECCC exercises responsibilities with respect to disposal at sea of specified materials, as well as the international and interprovincial movements of hazardous waste and hazardous recyclable material.

2.5.1. Monitoring

DISPOSAL AT SEA SITE MONITORING PROGRAM

As required by CEPA, representative disposal at sea sites are monitored to verify that permit conditions are met, and that scientific assumptions made during the permit review and site selection process are correct and sufficient to protect the marine environment. By monitoring disposal sites, ECCC is able to verify that the permitting of disposal is sustainable and that permit holders can have continued access to suitable sites. Where monitoring indicates a problem or where the site has reached its capacity over time, management action in the form of closing, moving or altering the site use can occur.

In 2017–2018, monitoring projects were completed at 14 ocean disposal sites nationally (or 13% of the 104 actively used sites this fiscal year).

In April 2017, in the Pacific and Yukon Region, monitoring was conducted at five disposal at sea (DAS) sites with results pending.

- At the Cape Mudge, Comox (Cape Lazo), Malaspina and Point Grey DAS sites, monitoring consisted of sediment sampling and analysis for physicochemical parameters and toxicity testing and sediment profile imaging surveys.
- Monitoring at the Five Finger Island DAS site consisted of sediment sampling and analysis for PCBs.

In 2017-2018, the analysis of results from monitoring studies that were conducted in September 2016 at five DAS sites (Five Finger Island, Porlier Pass, Sand Heads, Thornbrough Channel and Watts Point) were completed.

- Contaminants (cadmium, mercury, total PAHs and total PCBs) were found to be below national screening levels
- For sediment toxicity testing, passing results were seen at all sites, except for one issue identified at the Five Finger Island DAS site where two of three composite samples failed the sublethal echinoid larval development test since. Therefore, three core samples were taken during a subsequent April 2017 study at this site, results of which are still pending.
- Sediment Profile Imaging study data revealed that:
 - disposal material was not deposited outside of the DAS site boundary nor was it transported outside of the DAS site boundary following deposition,
 - fine and very fine silt-clay sediments were predominantly characterized outside the Sand Heads DAS site,
 - the benthic habitat quality outside of the DAS site boundary did not appear to be affected by disposal activity, and
 - the presence of wood waste was observed at Five Finger Island, Porlier Pass and Thornbrough Channel DAS sites.

In the Quebec Region (QR), monitoring surveys were conducted at a total of six DAS sites in 2017-2018, three sites in the Magdalen Islands and three sites on the Gaspé Peninsula.

- The Magdalen Islands sites: bathymetric surveys were conducted in October 2017 at the Millerand, Pointe-Basse and L'Île-d'Entrée sites. These surveys were conducted to determine if the disposal activities had been carried out in accordance with the conditions of the DAS permits.
- The Millerand and L'Île-d'Entrée sites: monitoring was also conducted to confirm that the depth above the mounds at the disposal sites remained safe for navigation.
- The Gaspé Peninsula: bathymetric studies were conducted in October 2017 at the Sainte-Thérèse-de-Gaspé, Saint-Godefroi and Gascons sites. These surveys were conducted to determine if disposal activities had been carried out in accordance with the conditions of the DAS permits. The results of the monitoring studies conducted in 2017-2018 are currently pending.

In 2017-2018, the results for monitoring studies that were conducted in 2016-2017 became available. Seven DAS sites were monitored, including the Depot E, Pointe-Basse (PBCM-1), L'Île-d'Entrée (IE-6) and Depot D sites which are located in the Magdalen Islands and the l'Anse-à-Brillant (ABR-1), l'Anse-à-Beaufils (AB-5) and Port-Daniel (PD-6) sites which are located in Gaspésie.

At the Depot E, PBCM-1, IE-6 and ABR-1 sites, the results of the bathymetric monitoring studies have concluded that:

- the disposals complied with the respective permit conditions,
- the depths remained safe for navigation above the mound at the IE-6 disposal site,
- no management measures were necessary, and
- the disposal sites could continue to be used.

However, for the AB-5 and PD-6 sites, 3,890 m³ and 3780 m³ of dredged material disposed of in 2016, respectively, could not be detected in the October 2017 bathymetric surveys at these sites. These disposal sites can continue to receive material from maintenance dredging.

In the Atlantic Region (AR), in 2017-2018, monitoring studies were conducted at three DAS sites; the Outer False Harbour site in Nova Scotia, the Woods Island site in Prince Edward Island and the Pigeon Hill Bar site in New Brunswick to assess compliance with permit conditions with results pending.

- At the Outer False Harbour site, two separate studies were conducted. In April 2017, a post-disposal geophysical assessment of the site and surrounding areas was conducted, including multi-beam bathymetric and backscatter surveys. In August 2017, an optical imaging study was also conducted at this site.
- In November 2017, a post-disposal bathymetric survey was conducted at the Woods Island site study to assess the compliance with the DAS permit conditions, to define the post-disposal footprint of the disposal site and to satisfy Condition 3.2 of the *Fisheries Act* Serious Harm Authorization issued by the DFO Fisheries Protection Program (DFO).
- At Pigeon Hill Bar site, which is a new site, a post-disposal bathymetric survey was conducted in September 2017.

With respect to the two DAS sites that were monitored in 2016-2017, the Outer False Harbour and Black Point site, the results of the geophysical surveys which consisted of bathymetric, backscatter and ground-truthing sampling monitoring studies have concluded that the disposals complied with the respective permit conditions and that the disposal sites could continue to be used. For the Black Point site, following the bathymetric studies conducted in 2016-2017, a decision was made to move the release zone for future disposals commencing in 2017-2018.

2.5.2. Risk management activities

DISPOSAL AT SEA

Part 7, Division 3 of CEPA imposes a general prohibition on the disposal of substances into waters or onto ice from activities taking place at sea. Disposal at sea activities conducted under a permit from ECCC are exempt from this prohibition and permits are only available for a short list of wastes. A permit cannot be granted unless disposal at sea is the environmentally preferable and practical option.

The disposal at sea provisions of CEPA help Canada to meet its obligations as a party to the 1972 London Convention and the more modern London Protocol (1996). Canada reports the number of permits, quantities and types of wastes, and results of disposal site monitoring to the London Protocol Secretariat each year.

At the London Protocol meetings in 2017, Canada led or participated in the development of a series of “low cost, low tech” technical guidance documents, and supported workshops and technical assistance that is offered to bring implementation within reach of more countries. Canada continued to Chair the London Protocol Compliance Group, which encourages and supports compliance and ratification of the treaty. Canada also continued to Chair the Scientific Groups of the Protocol and Convention, which address new and emerging technical issues that arise.

DISPOSAL AT SEA PERMITS

In 2017–2018, 69 permits were issued in Canada for the disposal of 6.2 million tonnes of waste and other matter (Tables 13 and 14), compared to 81 permits for the disposal of 7.1 million tonnes in 2016–2017. Most of the material permitted for disposal was dredged material that was removed from harbours and waterways to keep them safe for navigation. Also permitted was excavated native till (geological matter) that was disposed of at sea in the lower mainland of British Columbia, where on-land disposal options for clean fill are extremely limited. Fish-processing waste was also permitted in remote communities where there is no access to reuse-and-recycling opportunities.

Table 13: Disposal at sea quantities permitted (in tonnes) and permits issued in Canada from April 2017 to March 2018

Material	Quantity Permitted	Permits Issued
Dredge Material*	4 973 150	35
Fisheries Waste	39 644	29
Geological Matter*	1 137 500	5
Vessels	—	—
Organic Matter	—	—
Total	6 150 294	69

* Dredged material and geological matter were converted to tonnes using an assumed density of 1.3 tonnes per cubic metre..

Table 14: Disposal at sea quantities permitted (in tonnes) and permits issued by region from April 2017 to March 2018

Material	Atlantic		Quebec		Pacific and Yukon		Prairie and Northern	
	Quantity Permitted	Permits Issued	Quantity Permitted	Permits Issued	Quantity Permitted	Permits Issued	Quantity Permitted	Permits Issued
Dredge Material	1 511 900	12	98 800	9	3 362 450	14	0	0
Fisheries Waste	38 494	26	1 150	3			0	0
Geological Matter					1 137 500	5	0	0
Vessels	—	—	—	—	—	—	—	—
Organic Matter	—	—	—	—	—	—	—	—
Total	1 550 394	38	99 950	12	4 499 950	19	0	0

* Dredged material and geological matter were converted to tonnes using an assumed density of 1.3 tonnes per cubic metre.

The number of permits issued decreased slightly in 2017–2018 (Figure 11). The quantities permitted continue to fluctuate from year to year, showing decreasing quantities for dredged material but a slight increase in excavated material, this past year (Figure 12).

Figure 11: Number of disposal at sea permits issued in each fiscal year by type of material

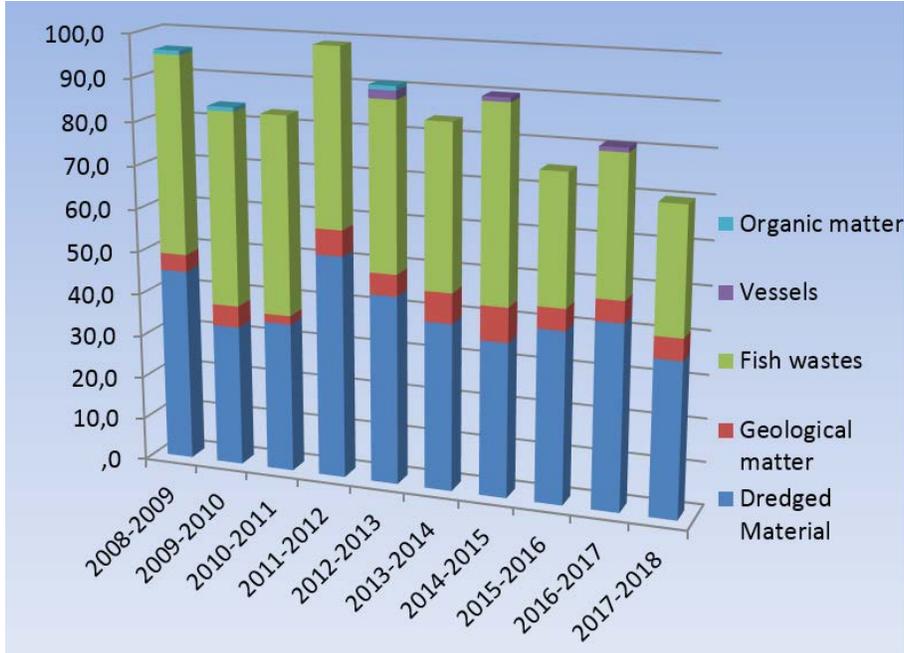
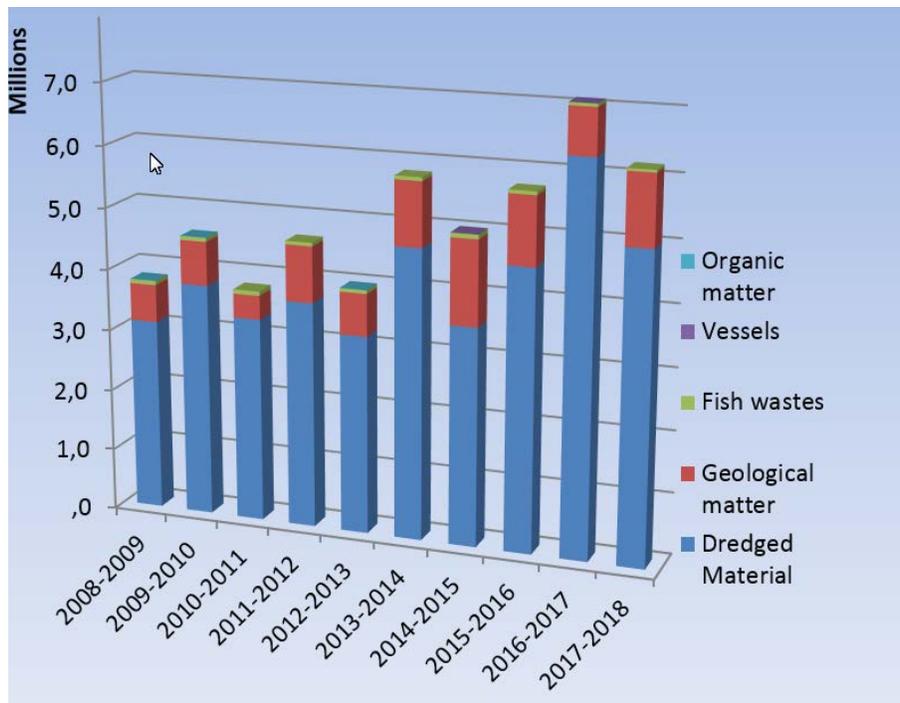


Figure 12: Annual disposal at sea quantities permitted (in millions of tonnes)



Further information on disposal at sea is available online.⁵²

CONTROLLING THE MOVEMENT OF HAZARDOUS WASTE AND HAZARDOUS RECYCLABLE MATERIAL

With respect to managing the movement of hazardous wastes and recyclable material, CEPA provides authority to:

- make regulations governing the export, import and transit of waste (including both hazardous and prescribed non-hazardous waste) and hazardous recyclable materials;
- establish criteria for refusing an export, import or transit permit, should the hazardous waste or hazardous recyclable material not be managed in a manner that will protect the environment and human health; and
- make regulations governing movements of hazardous waste and hazardous recyclable materials between provinces and territories.

Canada implements its international obligations as a party to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention), the Organization for Economic Co-operation and Development Decision on the Control of Transboundary Movement of Wastes Destined for Recovery Operations (OECD Decision), and the Canada–United States Agreement on the Transboundary Movement of Hazardous Waste through the Export and Import of Hazardous Waste and *Hazardous Recyclable Material Regulations*, the *Interprovincial Movement of Hazardous Waste Regulations* and the *PCB Waste Export Regulations*, 1996.

⁵² www.canada.ca/en/environment-climate-change/services/disposal-at-sea.html#2.6

In 2017,⁵³ ECCC processed 1826 notices for proposed imports, exports and transits of hazardous wastes and hazardous recyclable materials under the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*. The notices received covered 16 865 waste streams, which exhibited a range of hazardous properties such as being flammable, acutely toxic, oxidizing, corrosive, dangerously reactive and environmentally hazardous. From these permits, 31 759 individual transboundary shipments of hazardous waste and hazardous recyclable material were reported in movement documents received by ECCC. By comparison, in 2016, 35 372 individual transboundary shipments were done; a decrease of more than 10%, in 2017.

Almost all imports (99.9%) and exports (96.7%) of hazardous wastes and hazardous recyclable materials occurred between Canada and the United States. The remaining import exchanges occurred with United Arab Emirates, Russia Federation, Uruguay, and Venezuela; while the remaining exports occurred with Mexico, Belgium, Germany and Republic of Korea.

The quantity of hazardous wastes and hazardous recyclable materials imported into Canada was 369 972 tonnes (t) in 2017. This represents a decrease of 7142 t or 1.9% relative to 2016. Shipments imported destined for recycling totaled 240 661 t and represented about 65 % of all imports in 2017. Imports of all hazardous wastes and hazardous recyclable materials in 2017 were shipped to authorized facilities in four provinces: Quebec, Ontario, British Columbia and Alberta.

Hazardous recyclable material imported into Canada in the greatest quantities were:

- spent lead-acid batteries;
- spent sulfuric acid, corrosive liquids, waste liquors from pickling of metals;
- hydraulic fluids (used oil);
- flammable liquids, organic solvents; and
- metal-bearing waste.

The remaining 129 311 t imported were hazardous wastes (35 %) and were mostly composed of:

- metal-bearing waste;
- treated wood;
- organic solvents/flammable liquids;
- aluminum remelting by-products;
- wastes from the production, formulation and use of biocides and phytopharmaceuticals, pesticides, herbicides; and
- spent sulfuric acid, corrosive liquids.

The quantity of hazardous waste and hazardous recyclable materials exported was 387 313 t in 2017. This represents a decrease of 25 612 t or 6.2 % from 2016. Shipments exported for recycling totaled 316 384 t and represented about 81.7 % of all exports in 2017. Exports of hazardous recyclable materials in 2017 originated from eight provinces: Ontario, Quebec, New Brunswick, British Columbia, Alberta, Saskatchewan, Manitoba and Nova Scotia.

The majority of hazardous recyclable material exported abroad for recycling includes:

- spent sulfuric acid, corrosive liquids, waste liquors from pickling of metals;
- aluminum remelting by-products;
- spent lead-acid batteries;
- treated wood; and
- hydraulic fluids (used oil).

⁵³ Export and import quantities set out in this section of the report represent actual movement values that took place from January 1, 2017, to December 31, 2017.

The remaining 70 929 t exported were hazardous wastes (18.3 %) and were mostly composed of:

- aluminum remelting by-products;
- spent sulfuric acid, corrosive liquids, waste liquors from pickling of metals;
- hydraulic fluids (used oil and equipment contaminated with oil); and
- clinical and related waste.

Tables 15 and 16 list the quantities of hazardous wastes and hazardous recyclable materials exported and imported from 2008 to 2017.

Table 15: Hazardous waste and hazardous recyclable material, imports, 2008–2017 (tonnes)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Waste	270 390	268 391	146 499	151 295	101 796	190 841	159 008	118 403	118 130	129 311
Recyclables	262 337	221 778	217 663	243 491	243 434	245 110	221 354	249 323	258 984	240 661
Total imports	532 727	490 169	364 162	394 786	345 230	435 951	380 362	367 726	377 114	369 972

Table 16: Hazardous waste and hazardous recyclable material, exports, 2008–2017 (tonnes)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Waste	117 212	105 234	70 740	86 500	91 847	93 786	94 601	86 623	63 513	70 929
Recyclables	365 468	315 631	357 627	374 207	413 614	422 388	436 608	429 391	349 412	316 384
Total exports	482 680	420 865	428 367	460 707	505 461	516 174	531 209	516 014	412 925	387 313

Please note that data are revised periodically as new information becomes available. Therefore, information presented here may differ from information published in other reports.

In August 2017, ECCC published a consultation document outlining the proposed amendments to the regulations relating to the international and interprovincial movements of hazardous waste and hazardous recyclable materials⁵⁴, to solicit feedback prior to the publication of proposed Regulations.

2.6. Environmental emergencies

Part 8 of CEPA (Environmental Matters Related to Emergencies) addresses the prevention of, preparedness for, response to and recovery from uncontrolled, unplanned or accidental releases into the environment of substances that pose potential or immediate harm to the environment or danger to human life or health.

Part 8 of CEPA provides the authority, among other things, for making regulations, guidelines and codes of practice. It also establishes a regime that makes the person who owns or has the charge, management or control of such a substance liable for restoring the damaged environment and for the costs and expenses incurred in responding to an environmental emergency.

⁵⁴ www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/consultations/proposed-regulations-cross-border-movement.html

The *Environmental Emergency Regulations* (referred to as the E2 Regulations) require any person who owns, manages, or has the control of a regulated substance at a place in Canada, at or above the established threshold, to notify ECCC when this quantity threshold is met or when the maximum container capacity meets or exceeds this threshold. If the total quantity and container capacity thresholds are both met, there is an additional requirement to prepare and exercise an environmental emergency (E2) plan. The E2 plan ensures that any person that owns, manages, or controls specific hazardous substances equal to or above certain quantity and container capacity thresholds has a plan for prevention, preparedness, response and recovery in the event of an environmental emergency.

The Environmental Emergencies website⁵⁵ includes implementation guidelines for E2 plans, a common issues section and online notice filing. The website also provides public access to a database containing basic information about persons or places (e.g., company names and addresses) that are subject to the Regulations.

As of March 31, 2018, there were approximately 4800 regulatees from various sectors under the E2 Regulations. Of these regulatees, approximately 3000 were required to prepare E2 plans. The seven most commonly identified substances requiring E2 plans are propane, anhydrous ammonia, butane, pentane, gasoline, hydrochloric acid, and chlorine.

In 2017-2018, ECCC's regional activities associated with the implementation of the E2 Regulations included conducting site visits, delivering presentations to the regulated community, and promoting and enforcing compliance with regulated persons. As a result of targeted efforts to increase the implementation of E2 plans by regulated parties, approximately 97% of those regulated parties which require E2 plans reported to the departments that they have fully implemented and tested their plans.

55 www.canada.ca/en/environment-climate-change/services/environmental-emergencies-program.html

3. Administration, public participation and reporting

3.1. Federal, provincial, territorial cooperation

NATIONAL ADVISORY COMMITTEE

Part 1 of CEPA (Administration) requires the Ministers to establish the National Advisory Committee, composed of one representative for the federal Minister of the Environment and one for the federal Minister of Health, representatives from each province and territory, and not more than six representatives of Aboriginal governments from across Canada.

The National Advisory Committee (NAC) provides a forum for provincial, territorial and Aboriginal governments to advise the Ministers on certain actions being proposed under the Act, enables national cooperative action, and seeks to avoid duplication in regulatory activity among governments. The Committee was provided opportunities to advise and comment on initiatives under the Act.

To carry out its duties in 2017–2018, the CEPA NAC held a teleconference meeting in June, and the NAC Secretariat corresponded regularly with committee members regarding various initiatives implemented under CEPA. These initiatives included opportunities to comment on and be informed of numerous actions taken under the Act.

This includes various risk assessment activities under the CMP, including:

- the publication of 28 draft screening assessments which included 316 substances, 3 groups of substances, and 1 living organism;
- the publication of 17 final screening assessments which included 26 substances, 5 groups of substances, and 9 living organisms;
- 6 proposed orders to add 6 substances or groups of substances to Schedule 1, the List of Toxic Substances; and
- 2 final orders which added fuel oil no. 2, and natural gas condensates (NGCS) to Schedule 1.

Members were also informed of numerous risk management activities, including:

- publication of the *Environmental Violations Administrative Monetary Penalties Regulations*;
- publication of *Regulations Amending the Prohibition of Certain Toxic Substances Regulations, 2012*;
- publication of *Microbeads in Toiletries Regulations*;
- a code of practice for the management of PM_{2.5} emissions in the potash sector; and
- a pollution prevention plan notice for air emissions from the iron, steel and ilmenite sector.

In addition, members were also provided with an opportunity to comment on:

- proposed *regulations limiting carbon dioxide emissions from natural gas-fired generation of electricity*;
- proposed amendments to the reduction of carbon dioxide emissions from coal-fired generation of electricity regulations;
- a proposed notice requiring the preparation of a pollution prevention plan for toluene diisocyanates;
- a consultation document on the development of a proposed pollution prevention plan notice for triclosan;
- information on the Government of Canada's multi-stakeholder workshop on regulations respecting formaldehyde in composite wood products;

- ratification of the protocol to abate acidification, eutrophication and ground-level ozone under the convention on long-range transboundary air pollution;
- the development of a national strategy for the safe and environmentally sound disposal of lamps containing mercury;
- a notice of intent to vary the requirements under the significant new activity provisions for 2-(2-methoxyethoxy)ethanol (DEGME) under the Chemicals Management Plan; and
- a consultation document on the proposed amendments of the *Products Containing Mercury Regulations*.

Members were provided with an offer to consult on:

- a proposed code of practice for the environmentally sound management of end-of-life lamps containing mercury;
- Canadian Ambient Air Quality Standards (CAAQS) for nitrogen dioxide;
- a proposed administrative amendments to the *Regulations Prescribing Circumstances for Granting Waivers Pursuant to Section 147 of the Act*.

Members were provided an opportunity to advise on proposed regulatory initiatives related to:

- a consultation document describing the proposed regulatory approach to prohibit asbestos and products containing asbestos;
- proposed Prohibition of Asbestos and Asbestos Products Regulations;
- the proposed related amendments to the *Export of Substances on the Export Control List Regulations*;
- proposed regulations respecting reduction in the release of methane and certain volatile organic compounds (upstream oil and gas sector);
- proposed regulations respecting reduction in the release of volatile organic compounds (petroleum sector); and
- proposed amendments to the *Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations*.

Members were also informed of:

- performance agreements with three metal processing sectors;
- guidelines for the reduction of nitrogen oxide emissions from natural gas–fuelled stationary combustion turbines for the risk management of nitrogen oxide;
- information gathering under section 71;
- the final Canadian Ambient Air Quality Standards (CAAQS) for sulphur dioxide;
- a notice for the National Pollutant Release Inventory for 2018 and 2019; and
- a publication of reviewed 2016 National Pollutant Release Inventory data.

FEDERAL-PROVINCIAL/TERRITORIAL AGREEMENTS

Part 1 also allows the Minister of the Environment to negotiate an agreement with a provincial or territorial government, or an Aboriginal people, with respect to the administration of the Act. It also allows for equivalency agreements, which allow the Governor in Council to suspend the application of federal regulations in a province or territory that has equivalent regulatory provisions. The intent of an equivalency agreement is to eliminate the duplication of environmental regulations.

Canada–Ontario Agreement on Great Lakes Water Quality and Ecosystem Health

Since 1971, Canada and Ontario have worked together through a Canada–Ontario Agreement to support the restoration and protection of the Lakes basin ecosystem. The 2014 Agreement guides the efforts of Canada and Ontario to restore, protect and conserve Great Lakes water quality and ecosystem health in order to assist in achieving the vision of a health, prosperous and sustainable region for present and future generations. It is also an important mechanism for implementing Canada’s obligations under the Canada–United States Great Lakes Water Quality Agreement.⁵⁶

In 2017-18, in partnership with Indigenous Peoples and Great Lakes stakeholders, the Governments of Canada and Ontario finalized the Canada-Ontario Lake Erie Action Plan with the goal of reducing annual phosphorus loading into Lake Erie by 40% from a 2008 baseline. Canada also provided funding support in 2017-18 through the Great Lakes Protection Initiative for three projects targeting chemicals of concern.

Memorandum of Understanding between Canada and Quebec

The Province of Quebec and the Government of Canada have been collaborating since 1994. The parties currently co-operate through a memorandum of understanding for data collection, effective until March 2018, whereby Quebec provides a single data-entry portal for regulatees for the following federal regulations:

- *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* made pursuant to CEPA;
- *Pulp and Paper Mill Defoamer and Wood Chip Regulations* made pursuant to CEPA; and
- *Pulp and Paper Effluent Regulations* made pursuant to the *Fisheries Act*.

Canada–Nova Scotia Equivalency Agreement

An equivalency agreement between the Government of Canada represented by the Minister of the Environment and the Government of Nova Scotia represented by their Minister of Environment regarding the federal *Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations* took effect in July 2015. Further to this agreement, the Governor in Council adopted an order suspending the application of the federal regulation in Nova Scotia. In accordance with the five-year term limit in CEPA, the agreement is set to terminate at the end of 2019.

Nova Scotia Environment reported no enforcement actions between April 2017 and March 2018.

Canada–Alberta Equivalency Agreement

As a result of the 1994 Agreement on the Equivalency of Federal and Alberta Regulations for the Control of Toxic Substances, the following CEPA regulations, or parts thereof, do not apply in Alberta:

- *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* (all sections);
- *Pulp and Paper Mill Defoamer and Wood Chip Regulations* [4(1), 6(2), 6(3)(b), 7 and 9]; and
- *Secondary Lead Smelter Release Regulations* (all sections).

Alberta Environment indicated that, in 2017-2018, there were no reported violations by the four pulp and paper mills regulated under the provincial pulp and paper regulations.

Environmental Occurrences Notification Agreements

Federal, provincial and territorial laws require, in most cases, notification of the same environmental emergency or environmental occurrence, such as an oil or chemical spill. To reduce duplication of effort, ECCC and Fisheries and Oceans Canada entered into environmental occurrences notification agreements⁵⁷ with the governments of British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, the Northwest Territories and Yukon, which are in effect until March 2021.

56 www.canada.ca/en/environment-climate-change/services/great-lakes-protection/canada-united-states-water-quality-agreement.html

57 www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/agreements/occurrences-notification.html

These notification agreements are supported by the *Release and Environmental Emergency Notification Regulations* under CEPA and the *Deposit out of the Normal Course of Events Notification Regulations* under the *Fisheries Act*.

The purpose of the notification agreements is to establish a streamlined notification system for persons required to notify federal and provincial/territorial governments of an environmental emergency or environmental occurrence. Under these notification agreements, 24-hour authorities operating for the provinces and territories receive notifications of environmental emergencies or environmental occurrences, on behalf of ECCC, and transfer this information to the Department.

In 2017-18, ECCC continued to work with its provincial and territorial counterparts to implement the Notification Agreements. This work included the establishment of management committees and the development of standard operating procedures for the collection and processing of notifications of environmental occurrences.

3.2. Public participation

CEPA REGISTRY

Part 2 of CEPA (Public Participation) provides for the establishment of an environmental registry, whistleblower protection, and the right of an individual to request an investigation and pursue court action.

The CEPA Registry⁵⁸ was launched on ECCC's website when the *Act* came into force on March 31, 2000. Continuous efforts are made to increase the Registry's reliability and ease of use. The Registry encompasses thousands of CEPA-related documents and references. It has become a primary source of environmental information for the public and private sectors, both nationally and internationally, and has been used as a source of information in university and college curricula.

From April 2017 to March 2018, the CEPA Registry website had 178,751 visits, making it the third-largest area visited on the ECCC website, after Weather and Ice. There were approximately 1000 public enquiries made concerning CEPA in the last fiscal year. Areas of enquiry included: substances, regulations (e.g. engine emissions, fuels, dry cleaning, import and export of hazardous waste, storage tank systems), permits and enforcement.

PUBLIC PARTICIPATION

CEPA includes many requirements to provide the public with access to information, to provide comments on proposed initiatives and to provide access to justice. These provisions include a mandatory consultation and public comment periods for orders, regulations and other statutory instruments; requirements to publish information and maintain a CEPA registry. Other provisions allow for a member of the public to bring civil actions against alleged offenders, to request reviews of existing laws and policies, as well as providing protection for whistle-blowers.

In addition, engaging stakeholders and the public is central to several programs under CEPA. For example, at each stage in the CMP management cycle stakeholders are engaged and the public has the opportunity to be involved and comment on proposed assessments of substances or groups of substances.

During 2017–2018, there were 69 opportunities posted on the Registry for stakeholders and the members of the public to provide comments on proposed initiatives to be taken under CEPA. These included:

- 27 draft assessments of substances or groups of substances,
- 6 substances or groups of substances proposed for addition to the List of Toxic Substances,
- 7 proposed regulations, and
- 4 consultation documents on proposed risk management initiatives.

Please see CEPA Registry public consultations, available online.⁵⁹

58 www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry.html

59 www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry.html#summary-details5

CMP-related committees and activities

The CMP Science Committee supports a strong science foundation to CMP by providing external national and international scientific expertise to Health Canada and ECCC on scientific issues. The CMP Science Committee started its second term in the fall of 2017. The first meeting of the new term was held in January 2018 on the topic of “Informed Substitution.” Members engaged in constructive discussions as they continued developing the Committee’s scientific input for the Government of Canada. Meeting records and reports are available online.⁶⁰

The CMP Stakeholder Advisory Council (CMP SAC) met twice in 2017–2018. The purpose of the Council is to obtain stakeholder advice on the implementation of the CMP, and to foster dialogue on issues pertaining to the CMP between stakeholders and government, and also among different stakeholder groups. Information for the CMP SAC can be found online.⁶¹

In May and November 2017, the government hosted a multi-stakeholder workshop to engage and receive input from stakeholders on issues important to chemicals management in Canada beyond 2020.

CMP Progress Reports⁶² were published in July and December 2017. The CMP Progress Report provided jointly by ECCC and HC ensures stakeholders and other interested parties are kept up to date on the activities and programs related to the CMP.

Targeted stakeholder awareness activities undertaken in 2017–2018 included the continuation of the webinar series with non-industry health and environment stakeholders with a session on human biomonitoring programs under the Chemicals Management Plan. Given the role the public plays in reducing the risk of chemicals to their health, partnerships are developed, including those with youth organisations to expand the reach of our messaging. Also information is provided through a variety of multi-media platforms and by distilling scientific information into plain language for the public. Additionally, the regional offices actively reached Canadians by educating and enabling key influencers through workshops, trade shows and other activities.

National Pollutant Release Inventory consultation

The National Pollutant Release Inventory (NPRI) Multi-Stakeholder Work Group is the primary consultation mechanism for the NPRI program, with representatives from industry associations, environmental groups and Indigenous organizations providing input on changes to the requirements and other aspects of the program such as tools to access the data. Consultations during 2017–2018 included a number of teleconferences and paper-based consultations, and one in-person meeting in February 2018. Consultations focused on proposed changes to the program requirements for 2018 reporting, including for the oil and gas extraction and electricity generating sectors and certain substances such as volatile organic compounds and chlorinated alkanes.

In addition to the above-mentioned consultations, the NPRI program⁶³ shares information and gathers ideas from stakeholders and the public. Activities include engaging users of NPRI data to get input on how to meet their needs such as through an in-person data users’ workshop in February 2018; working collaboratively with other government programs and international organizations; and updating stakeholders regularly on the NPRI.

Greenhouse Gas Emissions Reporting Program consultation

ECCC expanded its facility Greenhouse Gas Emissions Reporting Program (GHGRP), by implementing significant changes to the reporting requirements in 2017, lowering the reporting threshold from 50 000 tonnes to 10 000 tonnes CO₂ equivalent and requiring all facilities engaged in carbon capture, transport and geological storage to report. Phase I of the expansion, implemented in the collection of data for the year 2017 further expanded the reporting and methodological requirements for all facilities engaged in the production of cement, aluminum, iron & steel, lime and in carbon capture and storage. Phase II will similarly apply more stringent requirements for the reporting

60 www.canada.ca/en/health-canada/services/chemical-substances/chemicals-management-plan/science-committee/meeting-records-reports.html

61 www.canada.ca/en/health-canada/services/chemical-substances/chemicals-management-plan/stakeholder-advisory-council/meetings.html

62 www.canada.ca/en/health-canada/services/chemical-substances/chemicals-management-plan/progress-report.html

63 www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/public-consultations.html

of 2018 data by facilities engaged in electricity generation, petroleum refining, pulp and paper manufacturing, mining, base metal smelting/refining. Consultations with stakeholders (provincial and territorial governments, industry) occur in each phase of the expansion.

Information about the GHGRP consultations will be posted online.⁶⁴

3.3. Reporting

THE POLLUTION PREVENTION RESOURCE FINDER

Part 4 of CEPA provides the authority for the establishment of a national pollution prevention information clearinghouse to facilitate the collection, exchange and distribution of information regarding pollution prevention.

In fall 2017, the Canadian Pollution Prevention Information Clearinghouse (CPPIC) was redesigned and rebranded the Pollution Prevention resource finder (P2 finder). The P2 finder is Canada's largest publicly accessible database of links to practical resources that can help individuals and organizations be more environmentally friendly. It is searchable and filterable to allow users to easily search for specific types of resources. The P2 finder contains links to resources for:

- Employees or volunteers
- Homeowners or renters
- Travelers
- Youths or educators
- Businesses (including non-profit organizations)
- Community groups
- Governments
- Health care facilities

STATE OF THE ENVIRONMENT REPORTING

The Canadian Environmental Sustainability Indicators (CESI) program reports on key environmental sustainability issues including, climate change and air quality, water quality and availability, wildlife, biodiversity, habitat, pollution, waste and toxic substances. It is designed to convey the state of Canada's environment, including historical trends, in a straightforward and transparent manner. CESI is used to inform citizens, Parliamentarians, policy makers and researchers with comprehensive, unbiased and authoritative environmental information. The CESI program responds to Environment and Climate Change Canada's commitments under CEPA and the *Department of the Environment Act* to report to Canadians on the state of the environment and is the prime instrument to measure progress of the Federal Sustainable Development Strategy.

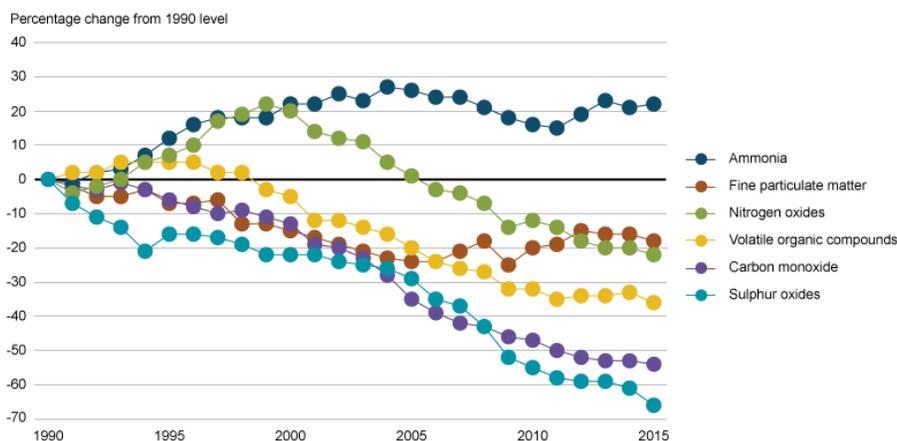
The indicators are prepared by ECCC through close collaboration with science and data experts across the federal government, including Health Canada, Statistics Canada, Natural Resources Canada, Agriculture and Agri-Food Canada, and Fisheries and Oceans, as well as relevant provincial and territorial counterparts. The data used to calculate indicators originate from a variety of sources, including surveys, measurement networks and other research initiatives that are expected to be maintained and updated for the foreseeable future.

64 www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions.html

In August 2017, the indicator on **Air Pollutant Emissions**⁶⁵ was updated. The indicators report emissions released through human activities for six key air pollutants: sulphur oxides, nitrogen oxides, volatile organic compounds, carbon monoxide and fine particulate matter. For each pollutant, indicators are provided at the national and regional level, and by source. Facility-level emissions are also provided through an interactive map (Figure 13). The indicator shows that:

- in 2015, emissions of five key air pollutants: SO_x, NO_x, VOCs, CO and PM_{2.5} were 18% to 66% lower than in 1990, while emission levels of NH₃ were 22% higher than in 1990, and
- Quebec, Ontario and Alberta accounted for more than 55% of Canada’s total emissions of the six key air pollutants in 2015.

Figure 13: Air Pollutant Emissions, Canada, 1990 to 2016



In October 2017, the **Emissions of Harmful Substances to Air**⁶⁶ and the **Releases of Harmful substances to Water**⁶⁷ indicators were published. These indicators track human-related emissions and releases of mercury, lead and cadmium. Air emissions are provided at the national and regional (provincial and territorial) level and by source for each substance. Facility and global emissions to air are also provided for mercury. The air indicators show that:

- lead, mercury and cadmium emissions were about 90% lower in 2015 than in 1990.
- decreases in emissions came mostly from large reductions in non-ferrous smelting and the mining industry.

Releases to water are provided at the national and regional (provincial and territorial) level, by source and at facility level for each substances. The water indicators show that:

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

65 www.canada.ca/en/environment-climate-change/services/environmental-indicators/air-pollutant-emissions.html

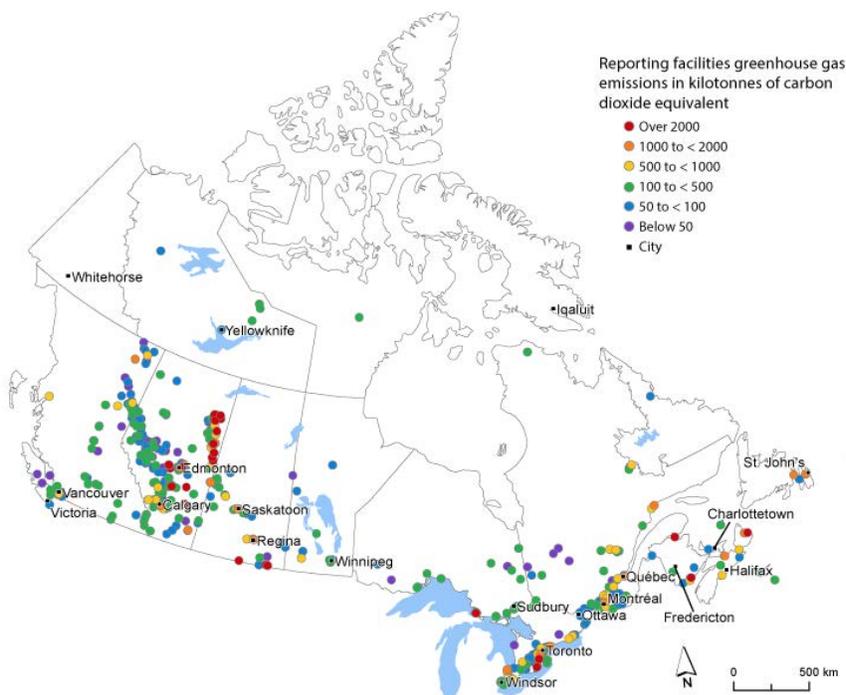
66 www.canada.ca/en/environment-climate-change/services/environmental-indicators/emissions-harmful-substances-air.html

67 www.canada.ca/en/environment-climate-change/services/environmental-indicators/releases-harmful-substances-water.html

In January 2018, the indicator for **Greenhouse Gas Emissions from Large Facilities**⁶⁸ was published. This indicator provides consistent information on emissions from the largest emitting facilities in Canada in 2016 (Figure 14). The indicator shows that:

- 263 megatonnes (Mt) of GHGs in carbon dioxide equivalent (CO₂ eq) were emitted by 596 facilities reporting to the GHG Reporting Program, and
- emissions from the reporting facilities account for over one third (37%) of Canada’s total GHG emissions in 2016.

Figure 14: Greenhouse Gas Emissions from Large Facilities



The indicators are published on the CESI website⁶⁹ showing national and regional results along with the methodology explaining each indicator and links to related socio-economic issues and information. CESI also has an interactive map⁷⁰ that enables the user to quickly explore Canada’s local and regional environmental indicators.

NATIONAL POLLUTANT RELEASE INVENTORY

The National Pollutant Release Inventory (NPRI)⁷¹ is Canada’s legislated, publicly accessible national inventory of pollutant releases (to air, water and land), disposals and transfers for recycling. The NPRI includes information reported by industrial and other facilities that meet specified criteria and provides the main input to Canada’s comprehensive Air Pollutant Emissions Inventory (APEI).

68 www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions/large-facilities.html

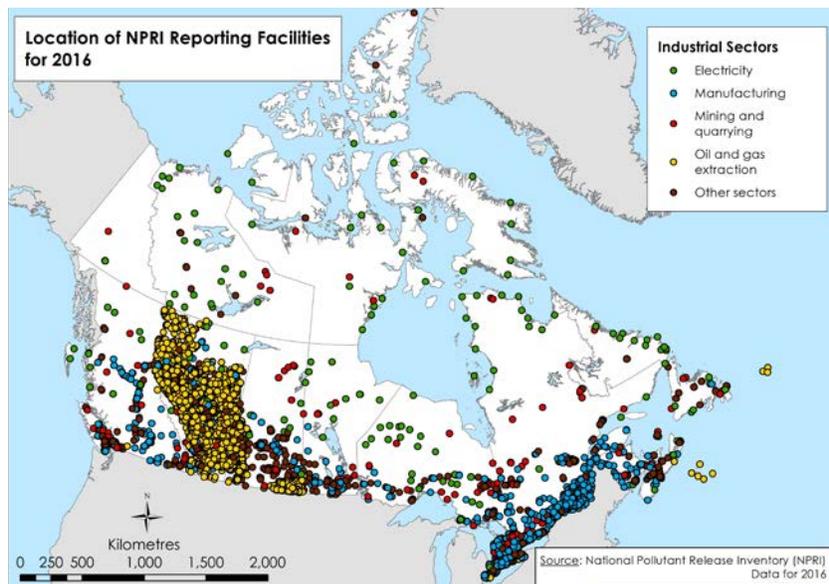
69 www.canada.ca/en/environment-climate-change/services/environmental-indicators.html

70 www.canada.ca/en/environment-climate-change/services/environmental-indicators/interactive-maps.html

71 www.canada.ca/en/services/environment/pollution-waste-management/national-pollutant-release-inventory.html

The NPRI supports the identification and management of risks to the environment and human health, including the development of policies and regulations on toxic substances and air quality. Public access to the NPRI data through an annual summary report, an online data search tool⁷², location-based data for use in mapping and downloadable datasets encourages industry to prevent and reduce pollutant releases, and improves public understanding about pollution and environmental performance in Canada.

Figure 15: Location of facilities that reported to the NPRI for the 2016 reporting year



Note: This map shows NPRI reporting facilities for 2016 (7087 facilities), excluding those that did not meet the reporting criteria (944 facilities).

NPRI data for the 2016 reporting year was published in preliminary form in July 2017 and in reviewed form in December 2017.⁷³ Over 7000 facilities, located in every province and territory, reported to the NPRI for the 2016 reporting year (Figure 15).

During 2017–2018, ECCC undertook a number of initiatives to respond to the needs of various users of NPRI data. For example, the Department held consultations on proposed changes to NPRI reporting requirements that are proposed to take effect for the 2018 reporting year (see section 3.2). NPRI requirements for the 2018 and 2019 reporting years were published in the *Canada Gazette* in January 2018⁷⁴, and included a number of changes to improve the information available to data users. ECCC also continued to improve the accessibility of datasets to facilitate analysis by data users with the publication of 2016 data.

Pollution prevention data submitted to the NPRI is analyzed and outlined in the NPRI annual highlights. Pollution prevention activity data submitted by facilities is also summarized in ECCC’s Pollution prevention in practice fact sheets. These fact sheets provide an overview of the implementation of the seven common pollution prevention activities among Canadian facilities.⁷⁵

72 www.canada.ca/en/environment-climate-change/services/national-pollutant-release-inventory/tools-resources-data/access.html

73 <http://gazette.gc.ca/rp-pr/p1/2017/2017-12-30/html/notice-avis-eng.html#na2>

74 <http://gazette.gc.ca/rp-pr/p1/2018/2018-01-20/html/notice-avis-eng.html#na1>

75 www.canada.ca/en/environment-climate-change/services/pollution-prevention/how-canadian-companies-are-preventing.html

AIR POLLUTANT EMISSION INVENTORY

Canada's Air Pollutant Emission Inventory (APEI)⁷⁶ is a comprehensive inventory of air pollutant emissions at the national, provincial and territorial level. The APEI compiles emissions of 17 air pollutants contributing to smog, acid rain and poor air quality since 1990.

This inventory serves many purposes including fulfilling Canada's international reporting obligations under the 1979 Convention on Long-range Transboundary Air Pollution (CLRTAP) and the associated protocols ratified by Canada for the reduction of emissions of sulphur oxides (SO_x), nitrogen oxides (NO_x), cadmium (Cd), lead (Pb), mercury (Hg), dioxins and furans, and other persistent organic pollutants (POPs). The APEI also supports monitoring and reporting obligations under the Canada–U.S. Air Quality Agreement, the development of air quality management strategies, policies and regulations, provides data for air quality forecasting models, and informs Canadians about pollutants that affect their health and the environment.

BLACK CARBON EMISSION INVENTORY

As a member of the Arctic Council, Canada has committed to producing an annual inventory of black carbon emissions.⁷⁷ The associated report serves to inform Canadians about black carbon emissions and provide valuable information for the development of air quality management strategies.

The data used to quantify black carbon emissions are taken from the Air Pollutant Emission Inventory, specifically fine particulate matter (PM_{2.5}) emissions from combustion-related sources, such as transportation and mobile equipment and residential wood burning.

GREENHOUSE GAS INVENTORY

As a signatory to the United Nations Framework Convention on Climate Change (UNFCCC), Canada is obligated to prepare and submit an annual national greenhouse gas (GHG) inventory covering anthropogenic emissions by sources and removals by sinks. Environment and Climate Change Canada is responsible for preparing Canada's official national inventory with input from numerous experts and scientists across Canada. The National Inventory Report (NIR) contains Canada's annual GHG emission estimates dating back to 1990. In addition to providing GHG emission data by mandatory reporting categories, the NIR also presents emission data by Canadian economic sectors, which better support policy analysis and development.

The NIR, along with the Common Reporting Format (CRF) tables, comprise Canada's inventory submission to the UNFCCC and are prepared in accordance with the UNFCCC Reporting Guidelines on annual inventories, Decision 24/CP.19.

Further information on the GHG Inventory is available online.⁷⁸

GREENHOUSE GAS EMISSIONS REPORTING PROGRAM

ECCC requires annual reporting of GHG emissions from facilities (mostly large industrial operations) through its Greenhouse Gas Emissions Reporting Program (GHGRP). The GHGRP is part of ECCC's ongoing effort to develop, in collaboration with the provinces and territories, a nationally consistent, mandatory GHG reporting system, in order to meet the GHG reporting needs of all jurisdictions and to minimize the reporting burden for industry and government.

Key objectives of the GHGRP are to provide Canadians with consistent information on facility-level GHG emissions, to support regulatory initiatives, and to support the National GHG Inventory. The data collected are also shared with provinces and territories.

76 www.canada.ca/en/environment-climate-change/services/pollutants/air-emissions-inventory-overview.html

77 www.canada.ca/en/environment-climate-change/services/pollutants/black-carbon-emissions-inventory.html

78 www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/inventory.html

In December 2017, a Notice was published in *Canada Gazette*, Part I requiring the reporting of GHG emissions for the 2017 calendar year. As part of the program expansion, the Notice included the following changes from previous years:

- Lowering the reporting threshold from 50 kilotonnes (kt) to 10 kt of CO₂ equivalent units (CO₂ eq). All facilities meeting or exceeding the threshold are now required to submit a report.
- Under phase 1 of the expansion, implementing enhanced reporting and methodological requirements for all facilities engaged in the manufacturing of cement, lime, iron & steel and aluminum, as well as carbon capture, transport and geological storage.

In January 2018, the 2016 facility-reported data and related overview report were made publicly available as part of a broader departmental release of GHG information products. The published data included total emissions, by gas, for each facility that reported to the program. ECCC received GHG emissions information for 2017 from 1469 facilities.

Further information on the GHGRP is available online.⁷⁹

Please note that inventories mentioned above are available on the departmental data catalogue⁸⁰ and the Open Data Portal⁸¹.

ECCC'S SINGLE WINDOW REPORTING SYSTEM

ECCC's Single Window Reporting System was initially implemented to reduce burden on industry and support the shared interest across jurisdictions of tracking and reporting progress on the reduction of GHG emissions and certain pollutant releases. This reporting system continues to expand to support electronic reporting to additional Regulations under CEPA. In 2017–2018, streamlined electronic reporting was made available for Parts 1 and 2 of the *Multi-Sector Air Pollutants Regulations*.

Further information on the Single Window Reporting System is available online.⁸²

ENVIRONMENTAL OFFENDERS REGISTRY AND ENFORCEMENT NOTIFICATIONS

The Environmental Offenders Registry contains information on convictions of corporations obtained under certain federal environmental laws including CEPA. The Registry contains convictions obtained for offences committed since June 18, 2009. This tool allows the media and the public to search for corporate convictions using the name for the corporation, its home province, the province where the offence occurred, or the legislation under which the conviction was obtained. Keywords can also be used to search the registry.

The Enforcement Notifications contain information about successful prosecutions across Canada under the acts and regulations administered by ECCC or involving ECCC enforcement officers (including CEPA).

The Environmental Offenders Registry⁸³ and Enforcement Notifications⁸⁴ can be found online.

79 www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting.html

80 <http://donnees.ec.gc.ca/data/>

81 <https://open.canada.ca/en/open-data>

82 www.canada.ca/en/environment-climate-change/services/reporting-through-single-window.html

83 <https://environmental-protection.canada.ca/offenders-registry>

84 www.canada.ca/en/environment-climate-change/services/environmental-enforcement/notifications.html

4. Compliance promotion and enforcement

The goal of compliance promotion is to increase awareness and contribute to the understanding of risk management instruments to help ensure these instruments are effective in achieving desired environmental results. Compliance promotion officers across Canada provide information to regulated communities on what is required to comply with CEPA, the benefits of compliance, and the consequences of non-compliance.

Compliance promotion activities focused on reducing pollution, including the release of toxic substances to air, water or land, and the import and export of hazardous waste that presents a risk to the environment and/or human health. These activities aimed to increase voluntary compliance with regulatory and non-regulatory instruments, thereby mitigating consequential enforcement actions.

CEPA provides enforcement officers with a wide range of powers to enforce the Act, including the powers of a peace officer. Enforcement officers can carry out inspections to verify compliance with the Act; enter premises, open containers, examine contents and take samples; conduct tests and measurements; obtain access to information (including data stored on computers); stop and detain conveyances; search, seize and detain items related to the enforcement of the Act; secure inspection warrants to enter and inspect premises that are locked and/or abandoned or where entry has been refused; seek search warrants; and arrest offenders.

Various enforcement measures are available to respond to alleged violations. Many are designed to achieve compliance without resorting to a formalized judicial process such as prosecutions or seeking an injunction. These measures include directions, tickets, prohibition orders, recall orders, detention orders for ships, and environmental protection compliance orders. In addition, administrative monetary penalties (AMPs) under the *Environmental Violations Administrative Monetary Penalties Act* are available for enforcement officers to respond to designated violations of Parts 7 and 9 of CEPA. AMPs are designed to create a financial disincentive to non-compliance with designated legislative requirements and to provide an alternative to other enforcement measures, which may not be effective or available in all situations. The *Environmental Violations Administrative Monetary Penalties Regulations* which came into force on June 2, 2017, complete the AMPs regime by establishing key details of this regime.

Measures to compel a return to compliance through court action include injunctions to stop or prevent a violation and prosecutions. In addition, once charges have been laid, environmental protection alternative measures agreements may be negotiated with the alleged offender in lieu of prosecuting the charge.

Enforcement activities are conducted in accordance with the Compliance and Enforcement Policy for CEPA and it is available online.⁸⁵

4.1. Compliance promotion priorities

Each year, ECCC develops an annual list of priorities for delivery of compliance promotion activities on issues such as chemical management, air pollutants, and greenhouse gas emissions. Factors that influence the identification of priority activities include the recent publication of new or amended regulatory and non-regulatory instruments, new requirements coming into force, level of compliance, and need to maintain awareness, understanding, or compliance for specific requirements. Resources are aligned with these identified compliance promotion priorities.

⁸⁵ www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/publications/compliance-enforcement-policy.html

In 2017–2018, compliance promotion activities were carried out on 14 priority regulatory and non-regulatory CEPA instruments, namely:

- *Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations*
- *Code of Practice for the End-of-Life Management of Mercury Containing Lamps*
- *Code of Practice for the Environmental Management of Road Salts*
- *Code of Practice for the Reduction of Volatile Organic Compound (VOC) Emissions from the use of Cutback and Emulsified Asphalt*
- *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*
- *Federal Halocarbon Regulations, 2003*
- *Microbeads in Toiletries Regulations*
- *Multi-Sector Air Pollutants Regulations*
- *Products Containing Mercury Regulations*
- *Prohibition of Certain Toxic Substances Regulations*
- *Renewable Fuels Regulations*
- *Storage Tank Systems Regulations for Petroleum Products and Allied Petroleum*
- *Sulphur in Gasoline Fuel Regulations*
- *Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations*

ECCC also worked on planning the implementation for 41 new or amended regulatory and non-regulatory instruments published in the *Canada Gazette*, Parts I and II.

4.2. Compliance promotion activities

Multiple approaches were used to reach the regulated communities, including workshops, information sessions, presentations, information package emails/mail-outs, articles, phone calls, and social media platforms. Many of these activities were carried out in collaboration with provincial and territorial governments, as well as non-governmental organizations and associations.

ECCC was particularly successful with:

- A digital advertisement viewed 1.3 million times over a two-month period for the *Microbeads in Toiletries Regulations*, which led to over 5000 people searching the ECCC website.
- A 68% increase in laboratory reporting for the *Prohibition of Certain Toxic Substances Regulations*.
- A 99% submission of expected compliance reports for the *Code of Practice for the Environmental Management of Road Salt*.
- Twice as many companies responding to ECCC as a result of Behavioural Insights techniques used on the business reply form for the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*.

In 2017-2018, 23,766 known or potential regulatees received compliance promotion awareness materials; and 4,772 stakeholders contacted compliance promotion officers for clarification of regulatory requirements and/or additional information. Most inquiries and feedback were received by email, while the remainder came by fax, letter and telephone.

Recognizing that communication efficiency and accuracy is important when reaching the regulated community, extra efforts were made this fiscal year to improve the quality of the Department's compliance promotion activity data. In 2017–2018 alone, the Department identified over 2,200 new facilities and their contacts, as well as updated information related to an additional 53,860 facilities.

PROMOTING COMPLIANCE TO INDIGENOUS PEOPLE AND WITHIN THE FEDERAL GOVERNMENT

In 2017–2018, ECCC continued to work closely with Indigenous peoples and the federal government by delivering individual communications and individual-instrument and multi-instrument awareness activities for compliance promotion priority regulatory and non-regulatory instruments. Workshops were delivered to Indigenous peoples throughout Canada and with other federal government departments to increase awareness of their obligations to comply with instruments under CEPA. These activities focused on compliance promotion priority instruments including the *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations* and *Federal Halocarbon Regulations, 2003*.

4.3. Enforcement priorities

Each year, ECCC develops a National Enforcement Plan (NEP) that sets out the enforcement activities to be carried out in that fiscal year, including activities to address non-compliance with CEPA. Factors that influence the identification of priority activities include the risk to the environment and human health represented by the regulated substance or activity, governmental and departmental priorities, suspected non-compliance, recent publication of new and amended regulations and domestic and international commitments and obligations.

In 2017–2018, the NEP gave priority to the following CEPA instruments:

- *Off-Road Compression-Ignition Engine Emission Regulations*
- *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*
- *Sulphur in Gasoline Regulations, Benzene in Gasoline Regulations, Sulphur in Diesel Fuel Regulations*
- *Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations*

In addition to the planned inspections carried out under the NEP, enforcement activities under CEPA also include a large number of inspections resulting from responses to complaints, notifications from partners, intelligence or departmental referrals, reported spills and incidents, or other information. In addition, a number of regulations are identified for focus by specific regions. The focus placed on regulations in each region is influenced by a number of factors, including geography, the prevalence of the regulated sectors, regional issues or concerns, and provincial and territorial environmental sensitivities.

4.4. Enforcement activities

Enforcement activities undertaken between April 1, 2017, and March 31, 2018 are summarized in the following four tables.

- Table 17 provides the number of on-site and off-site inspections for each regulation
- Table 18 provides the breakdown of investigations for each regulation for which at least one investigation occurred and/or closed
- Table 19 provides the total number of enforcement measures resulting from inspections and investigations that were imposed for each regulation
- Table 20 provides the number of prosecutions for each regulation

4.4.1. Inspections

Inspections are defined as the active process of gathering information to verify compliance with legislation. This may include site visits, examining substances, products or containers, taking samples, and analyzing records. An on-site inspection involves visiting a site, such as a border crossing, an airport or a port of entry, to conduct any activity/operation/analysis required to verify the regulatee's compliance with a regulation. An off-site inspection is normally undertaken at the officer's place of work or in another location that is not at the regulated site and is usually limited to documentation verification.

Table 17 details the 1832 inspections under CEPA for fiscal year 2017–2018. The number of inspections relates to the number of times the regulation was inspected for compliance using the start date of the inspection for the reference period.

Table 17: Number of inspections under CEPA from April 1, 2017, to March 31 2018

INSTRUMENT	INSPECTIONS*		
	On-Site	Off-site	Total
Canadian Environment Protection Act, 1999 - Total	1466	366	1832
<i>2-Butoxyethanol Regulations</i>	4	-	4
<i>Benzene in Gasoline Regulations</i>	21	-	21
<i>CEPA - Section(s)</i>	40	33	73
<i>CEPA Section 46 Notices - Greenhouse Gases</i>	2	1	3
<i>Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations</i>	19	2	21
<i>Concentration of Phosphorus in Certain Cleaning Products Regulations</i>	1	-	1
<i>Disposal at Sea Regulations</i>	24	2	26
<i>Environmental Emergency Regulations</i>	157	33	190
<i>Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations</i>	201	-	201
<i>Export of Substances on the Export Control List Regulations</i>	1	-	1
<i>Federal Halocarbon Regulations, 2003</i>	72	123	195
<i>Fuels Information Regulations, No. 1</i>	12	1	13
<i>Gasoline and Gasoline Blend Dispensing Flow Rate Regulations</i>	55	-	55
<i>Interprovincial Movement of Hazardous Waste Regulations</i>	15	-	15
<i>Marine Spark-Ignition Engine, Vessel and Off-Road Recreational Vehicle Emission Regulations</i>	5	-	5
<i>National Pollutant Release Inventory</i>	2	1	3
<i>New Substances Notification Regulations (Organisms)</i>	6	-	6
<i>Off-Road Compression-Ignition Engine Emission Regulations</i>	24	1	25

INSTRUMENT	INSPECTIONS*		
	On-Site	Off-site	Total
<i>Off-Road Small Spark-Ignition Engine Emission Regulations</i>	11	-	11
<i>On-Road Vehicle and Engine Emission Regulations</i>	2	-	2
<i>Ozone-depleting Substances and Halocarbon Alternatives Regulations</i>	30	-	30
<i>Ozone-depleting Substances Regulations, 1998</i>	1	-	1
<i>PCB Regulations</i>	162	19	181
<i>PCB Waste Export Regulations, 1996</i>	9	-	9
<i>Products Containing Mercury Regulations</i>	3	-	3
<i>Prohibition of Certain Toxic Substances Regulations, 2012</i>	9	1	10
<i>Pulp and Paper Mill Defoamer and Wood Chip Regulations</i>	3	7	10
<i>Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations</i>	3	5	8
<i>Regulations Respecting Applications for Permits for Disposal at Sea</i>	-	1	1
<i>Release and Environmental Emergency Notification Regulations</i>	-	1	1
<i>Renewable Fuels Regulations</i>	7	-	7
<i>Solvent Degreasing Regulations</i>	6	-	6
<i>Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations</i>	226	7	233
<i>Sulphur in Diesel Fuel Regulations</i>	25	1	26
<i>Sulphur in Gasoline Regulations</i>	18		18
<i>Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations</i>	215	127	342
<i>Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations</i>	74	-	74
<i>Volatile Organic Compound (VOC) Concentration Limits for Automotive Refinishing Products Regulations</i>	1	-	1

*Only those regulations under which an inspection occurred during the time period are listed in this table.

4.4.2. Investigations

An investigation involves gathering, from a variety of sources, evidence and information relevant to a suspected violation. An enforcement officer will conduct an investigation when he or she has reasonable grounds to believe that an offence has been committed under the *Act* and it has been determined that a prosecution is the appropriate enforcement action.

Table 18 describes the number of investigations under CEPA for fiscal year 2017–2018.

Table 18: Breakdown of investigations from April 1, 2017 to March 31, 2018

INSTRUMENT**	INVESTIGATIONS*		
	Started before 2017-2018 and still ongoing at the end of 2017–2018	Started in FY 2017–2018	Ended in FY 2017–2018
Canadian Environment Protection Act, 1999 - Total	109	28	65
CEPA - Section(s)	41	9	19
<i>Concentration of Phosphorus in Certain Cleaning Products Regulations</i>	-	-	1
<i>Disposal at Sea Regulations</i>	8	-	2
<i>Environmental Emergency Regulations</i>	4	-	1
<i>Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations</i>	3	1	1
<i>Federal Halocarbon Regulations, 2003</i>	1	2	1
<i>Gasoline and Gasoline Blend Dispensing Flow Rate Regulations</i>	-	-	3
<i>Marine Spark-Ignition Engine, Vessel and Off-Road Recreational Vehicle Emission Regulations</i>	1	1	-
<i>Off-Road Compression-Ignition Engine Emission Regulations</i>	1	1	3
<i>Off-Road Small Spark-Ignition Engine Emission Regulations</i>	3	-	3
<i>Oil Pollution Prevention Regulations</i>	2	-	-
<i>On-Road Vehicle and Engine Emission Regulations</i>	2	1	-
<i>Ozone-depleting Substances Regulations, 1998</i>	-	-	4
<i>PCB Regulations</i>	14	6	7
<i>PCB Waste Export Regulations, 1996</i>	1	-	-
<i>Renewable Fuels Regulations</i>	2	-	-
<i>Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations</i>	11	2	7
<i>Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations</i>	14	4	12
<i>Volatile Organic Compound (VOC) Concentration Limits for Automotive Refinishing Products Regulations</i>	1	1	1

*Investigations are tabulated by the number of investigation files, based on the start or end date of the investigation. One investigation may be counted under one or more regulations, therefore the data at the regulation level may not add up to the total at the legislative level.

**Only those regulations under which an investigation occurred during the time period are listed in this table.

4.4.3. Enforcement measures

The following are some responses available to address alleged violations of CEPA and its regulations:

- **warnings** to bring an alleged violation to the attention of an alleged offender, and if applicable, return to compliance;
- **directions** generally to prevent or eliminate releases of regulated substances;
- **tickets** for certain designated offences, such as failure to submit written reports;
- various types of orders, including
 - **environmental protection compliance orders (EPCOs)** – generally to require action to be taken to stop an ongoing violation from continuing, or to prevent a violation from occurring;
 - **prohibition orders** – to prohibit activity involving a substance new to Canadian commerce;
 - **recall orders** – to recall regulated substances or products from the marketplace;
 - **detention orders** for ships;
- **injunctions**;
- **prosecution** at the discretion of a Crown prosecutor; and
- **environmental protection alternative measures.**

The measures used in 2017 and 2018 are listed in Tables 19 and 20.

Table 19 sets out the number of written warnings and EPCOs taken under CEPA for fiscal year 2017–2018.

Table 19: Number of Enforcement Measures taken from April 1, 2017 to March 31, 2018

INSTRUMENT	ENFORCEMENT MEASURES FROM INSPECTIONS AND INVESTIGATIONS		
	Written Warnings*	Number of Subjects involved in EPCOs**	EPCOs*
Canadian Environment Protection Act, 1999 - Total	1895	44	202
<i>2-Butoxyethanol Regulations</i>	4		
<i>Benzene in Gasoline Regulations</i>	2		
CEPA - Section(s)	46	4	4
CEPA Section 46 Notices - Greenhouse Gases	3		
<i>Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations</i>	140		
<i>Disposal at Sea Regulations</i>	4		
<i>Environmental Emergency Regulations</i>	413	1	5
<i>Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations</i>	31	-	-
<i>Federal Halocarbon Regulations, 2003</i>	32	-	-
<i>Fuels Information Regulations, No. 1</i>	2	-	-

**ENFORCEMENT MEASURES FROM
INSPECTIONS AND INVESTIGATIONS**

INSTRUMENT	Written Warnings*	Number of Subjects involved in EPCOs**	EPCOs*
<i>Gasoline and Gasoline Blend Dispensing Flow Rate Regulations</i>	18	1	1
<i>Marine Spark-Ignition Engine, Vessel and Off-Road Recreational Vehicle Emission Regulations</i>	11	-	-
<i>New Substances Notification Regulations (Organisms)</i>	-	1	1
<i>Off-Road Compression-Ignition Engine Emission Regulations</i>	26	-	-
<i>Off-Road Small Spark-Ignition Engine Emission Regulations</i>	1	-	-
<i>Ozone-depleting Substances and Halocarbon Alternatives Regulations</i>	10	2	4
<i>PCB Regulations</i>	48	7	19
<i>Prohibition of Certain Toxic Substances Regulations, 2012</i>	1	-	-
<i>Regulations Respecting Applications for Permits for Disposal at Sea</i>	1	-	-
<i>Release and Environmental Emergency Notification Regulations</i>	1	-	-
<i>Renewable Fuels Regulations</i>	18	-	-
<i>Solvent Degreasing Regulations</i>	6	-	-
<i>Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations</i>	931	21	153
<i>Sulphur in Diesel Fuel Regulations</i>	5	-	-
<i>Sulphur in Gasoline Regulations</i>	4	-	-
<i>Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations</i>	127	5	12
<i>Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations</i>	10	-	-
<i>Volatile Organic Compound (VOC) Concentration Limits for Automotive Refinishing Products Regulations</i>	-	2	3

*Written warnings, and EPCOs are tabulated by infractions, which are found at the section, subsection or paragraph level of a regulation. For example, if the outcome of an inspection is the issuance of a written warning that relates to three sections of a given regulation, the number of written warnings is three, even if a single letter was sent to the regulatee.

**The number of subjects involved in EPCOs is represented by the number of regulatees issued EPCOs, regardless of the number of sections. For example, if one regulatee was issued an EPCO for three sections of the PCB Regulations, the number of subjects involved is one.

4.5. Prosecutions, tickets and EPAMs

PROSECUTIONS

For reporting purposes, prosecutions are all instances in which charges were laid against a person (individual, corporation, or government department). The decision to prosecute ultimately rests with the Director of Public Prosecution (DPP) of Canada or her delegated agent. While reviewing the data, it should be noted that prosecutions often continue through multiple fiscal years, so there may be more counts tabulated during a particular year than actual charges laid.

TICKETS

Tickets for offences under CEPA can be issued under the *Contraventions Act*, usually where there is minimal or no threat to the environment or human health. Where an offence has taken place and this offence is designated as ticketable, enforcement officers will issue a ticket, unless they have determined that, in accordance with the criteria of the Compliance and Enforcement Policy for CEPA, another enforcement measure is the appropriate response.

EPAMS

An Environmental Protection Alternative Measure (EPAM) is an agreement that is negotiated with the accused in order to return an alleged violator to compliance with CEPA. It can be used only after a charge has been laid and before the matter goes to trial as an alternative measure to prosecution for an alleged violation of the Act.

Table 20 outlines the number of prosecutions, tickets, and EPAMs under CEPA for fiscal year 2017–2018.

Table 20: Number of Prosecutions and new EPAMs from April 1, 2017 to March 31, 2018

INSTRUMENT	PROSECUTIONS					
	Charges laid in FY 2017–2018			Concluded in FY 2017–2018		
	Tickets	Prosecuted Subjects*	Counts**	Convicted Subjects***	Guilty Counts**	EPAMs****
Canadian Environment Protection Act, 1999 - Total	33	25	135	25	33	0
CEPA - Section(s)	-	10	15	9	10	-
<i>Chromium Electroplating, Chromium Anodizing and Reverse Etching Regulations</i>	2	-	-	-	-	-
<i>Concentration of Phosphorus in Certain Cleaning Products Regulations</i>	-	-	-	1	1	-
<i>Marine Spark-Ignition Engine, Vessel and Off-Road Recreational Vehicle Emission Regulations</i>	-	1	9	-	-	-
<i>Off-Road Compression-Ignition Engine Emission Regulations</i>	-	1	3	1	1	-
<i>Ozone-depleting Substances Regulations, 1998</i>	-	-	-	1	2	-
<i>PCB Regulations</i>	-	4	16	3	4	-
<i>Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations</i>	-	3	8	3	5	-

INSTRUMENT	PROSECUTIONS					
	Charges laid in FY 2017–2018			Concluded in FY 2017–2018		
	Tickets	Prosecuted Subjects*	Counts**	Convicted Subjects***	Guilty Counts**	EPAMs****
<i>Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations</i>	31	11	78	8	9	-
<i>Volatile Organic Compound (VOC) Concentration Limits for Automotive Refinishing Products Regulations</i>	-	2	6	1	1	-

*Prosecuted subjects are the number of subjects charged, where the charge date falls within the reporting period. This means that the number of prosecutions launched is counted, not the number of prosecutions concluded in the reporting year. For example, if a prosecution resulted in a conviction in February 2017 but charges were laid in January 2016, it would not be counted in the columns relating to charges laid. As well, prosecuted subjects are counted by the number of parties charged. This means that if one case resulted in the prosecution of two different subjects, the number reported would be two. The number of prosecuted subjects does not necessarily correspond to the total at the legislative level, because one prosecution might be related to more than one instrument.

**Counts are the number of sections of legislation or regulations, for which there was a charge or conviction during the reporting period. For example, if one person is charged with two counts under CEPA, this is considered one charge laid against the subject and two counts.

***Convicted subjects are the number of subjects convicted during the reporting period and are based on date sentenced.

****EPAMs are counted by the number of charges laid before entering the alternative measures agreement.

4.6. Enforcement highlights

In 2017–2018, 21 subjects were convicted and sentenced for offences of contravening CEPA and its regulations, and \$1,932,500 in fines was directed to the Environmental Damages Fund (EDF).

The Environmental Damages Fund is a specified purpose account, administered by ECCC, to provide a mechanism for directing funds received as a result of fines, court orders, and voluntary payments to priority projects that will benefit our natural environment.

Below are highlights of prosecutions that occurred under CEPA and its regulations in 2017-2018.

OZONE-DEPLETING SUBSTANCES

On September 7, 2017, Fastenal Canada Ltd., of Kitchener, Ontario, was fined \$265,000 after pleading guilty in the Ontario Court of Justice to two counts of contravening the *Ozone-Depleting Substances Regulations, 1998*. ECCC enforcement officers investigated Fastenal Canada Ltd., revealing that, from November 2012 to January 2015, the company imported and sold aerosol products containing hydrochlorofluorocarbons—a regulated ozone-depleting substance.

STORAGE TANKS

On June 15, 2017, CN Railway Company pleaded guilty to violations of the *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations* and the *Fisheries Act* as a result of a release of diesel fuel to the North Saskatchewan River. CN was sentenced to pay a total penalty of \$2.5 million.

This stemmed from an April 9, 2015 report of an oil sheen on the North Saskatchewan River. With assistance from the City of Edmonton’s Drainage Services’ staff, ECCC officers traced the substance over eight kilometres through Edmonton’s storm drain system to an engine fueling station at CN’s Bissell Yard. A joint investigation with Alberta

Environment and Parks determined that the oil-water separator and fuel storage system at Bissell Yard was not compliant with a number of requirements under the *Storage Tank Systems for Petroleum and Allied Petroleum Products Regulations*, which caused an estimated 90 litres of diesel to be released to the storm sewer.

On March 12, 2018, Crop Production Services (Canada) Inc. was sentenced in the Provincial Court of Saskatchewan for violations under the *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*.

The Court ordered the company to pay a total penalty of \$150,000. An investigation conducted by ECCC enforcement officers, in 2016, revealed that Crop Production Services (Canada) Inc. had transferred petroleum products into unidentified storage-tank systems—a violation under the regulations.

PHOSPHORUS

On November 6, 2017, Acuity Holdings, Inc. (Edmonton, Alberta) was fined \$600,000 after pleading to one count of contravening the *Concentration of Phosphorus in Certain Cleaning Products Regulations*.

An investigation conducted by ECCC enforcement officers revealed that Acuity Holdings, Inc. manufactured and sold two commercial laundry detergents (ZepLift and Classic TKO), which contained concentrations of phosphorus in excess of the allowable limit.

TETRACHLOROETHYLENE

On August 16, 2017, Dalex Canada Inc., located in Concord, Ontario, pleaded guilty in the Ontario Court of Justice to one count of contravening the Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements). Dalex Canada Inc. was fined \$100,000.

ECCC enforcement officers conducted inspections in 2014 and identified instances where tetrachloroethylene was being sold to owners and operators of dry-cleaning facilities who did not meet regulatory standards. As a result of ECCC subsequent investigation, Dalex Canada Inc. pleaded guilty to selling tetrachloroethylene to an owner or operator of a dry-cleaning facility who was not in compliance with the regulations. The regulations prohibit anyone from selling tetrachloroethylene to dry cleaners unless the dry-cleaning facility is compliant with certain sections of the regulations. In addition to the fine, the court ordered Dalex Canada Inc. to publish an article in an industry publication, subject to ECCC approval. Dalex Canada Inc. is also required to notify Environment and Climate Change Canada before resuming sales of the regulated product to dry cleaners.

4.7. International enforcement cooperation

Enforcement-related activities are carried out under various international and domestic agreements and organizations. ECCC actively participates in INTERPOL's Pollution Crime Working Group, which brings together member countries to work collectively on pollution crime issues. In 2017-2018, ECCC participated in INTERPOL's 30 Days of Action which was the largest global enforcement action against waste crime and trafficking. In addition, ongoing bilateral cooperation between the U.S. Environmental Protection Agency and ECCC Enforcement supports both countries' domestic mandates, particularly in the area of cross border environmental crime.

5. Contact Information

Further information on CEPA and related activities can be found online at:

CEPA Environmental Registry website

www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry.html

Environment and Climate Change Canada's website

www.canada.ca/en/environment-climate-change.html

Health Canada's website

www.hc-sc.gc.ca

Chemical Substances website

<http://chemicalsubstanceschimiques.gc.ca/index-eng.php>

Environment and Climate Change Canada publications are available from the departmental library or the nearest regional library. Many departmental publications are also available online at www.publications.gc.ca/site/eng/browse/index.html or through Environment and Climate Change Canada's Inquiry Centre:

Environment and Climate Change Canada

Public Inquiries Centre

12th Floor, Fontaine Building

200 Sacré-Coeur Boulevard

Gatineau QC K1A 0H3

Telephone: 819-938-3860

Toll Free: 1-800-668-6767 (in Canada only)

Email: ec.enviroinfo.ec@canada.ca

The following media relations contacts are also available to provide information:

Environment and Climate Change Canada

Media Relations

Toll-free within Canada: 1-888-908-8008

Outside Canada: 1-819-934-8008

Email: ec.media.ec@canada.ca

Health Canada

Media Relations

Telephone: 613-957-2983

