Health Canada and the Public Health Agency of Canada
Santé Canada et l'Agence de la santé publique du Canada
Canada

Evaluation of the Chemicals Management Plan (CMP)

Prepared by
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Health Canada and the Public Health Agency of Canada

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List of Acronyms

AFN	Assembly of First Nations
BPA	Bisphenol A
CCPSA	Canada Consumer Product Safety Act
CEPA	Canadian Environmental Protection Act
CEQGs	Canadian Environmental Quality Guidelines
CESD	Commissioner of the Environment and Sustainable Development
CHMS	Canadian Health Measures Survey
CHPSD	Consumer and Hazardous Products Safety Directorate
CMP	Chemicals Management Plan
CRA	Cumulative risk assessment
DSL	Domestic Substances List
ECCC	Environment and Climate Change Canada
EDC	Endocrine-disrupting chemical
ENVI	House of Commons Standing Committee on Environment and Sustainable Development
EPA	Environmental Performance Agreement
EU	European Union
F&DA	Food and Drugs Act
FA	Fisheries Act
FEQGs	Federal Environmental Quality Guidelines
GCDWQs	Guidelines for Canadian Drinking Water Quality
IRAP	Identification of Risk Assessment Priorities
ITK	Inuit Tapiriit Kanatami
NCP	Northern Contaminants Program
NGO	Non-governmental organization
NRI	Non-regulatory initiative
OECD	Organization for Economic Cooperation and Development
PBDEs	Polybrominated diphenyl ethers
PCB	Polychlorinated biphenyl
PCPA	Pest Control Products Act
P2 Notice	Pollution Prevention Planning Notice
PFOS	Perfluorooctanesulfonic acid
P/T	Provincial/Territorial
SAC	Stakeholder Advisory Council
SBPM	Substance-based performance measurement

SGBA+	Sex- and Gender-based Analysis Plus
TPP	Travelling Public Program
UNEP	United Nations Environment Programme
US EPA	United States Environmental Protection Agency
WHO	World Health Organization

Executive Summary

Evaluation Purpose

The Chemicals Management Plan (CMP) is a jointly managed initiative of Health Canada and Environment and Climate Change Canada (ECCC). It brings together various federal chemicals programs under a single strategy aimed at assessing environmental and human health risks posed by chemical substances and organisms, and managing toxic substances according to the risks they present to human and environmental health. The CMP has been funded in three phases since its inception in 2006, with the final phase sunsetting in March 2021.

This evaluation examined the relevance and performance of the CMP and explored future and continuing needs beyond March 2021. It covered the last two years of CMP2 (2014-15 and 2015-16), as well as the first three years of CMP3 (2016-17 to 2018-19).

It is important to note that other reviews relating to chemicals management were completed during this evaluation period. Most notably, the House of Commons Standing Committee on Environment and Sustainable Development (the “Standing Committee” or ENVI) released its report on the comprehensive review of the provisions and operation of the *Canadian Environmental Protection Act* (CEPA) in June 2017. More recently, in fall 2018, the Commissioner of the Environment and Sustainable Development (CESD) issued its Report on Toxic Substances. Both reports contained recommendations directed to, or with implications for, the Government of Canada’s chemicals management activities, and the Government of Canada has outlined an action plan in response to each report. This evaluation aimed to provide different recommendations from those appearing in the ENVI and CESD reports, in order to avoid duplication.

Program Description

CEPA provided the Government of Canada seven years to categorize the 23,000 existing chemical substances on the Domestic Substances List (DSL), based on specific criteria identified in the *Act*. The categorization process for existing substances was completed in 2006, resulting in approximately 4,300 priority substances that were suspected to be inherently toxic to humans or to non-human organisms, and persistent or bioaccumulative, or that present the greatest potential for exposure to Canadians, and as a result were required by CEPA to be assessed under the *Act*. Each substance was assigned a priority level, with approximately 500, 2,600, and 1,200 substances classified as high, medium, and low priority, respectively. Organisms on the DSL were also required to be assessed, as were new substances.

At the 2002 World Summit for Sustainable Development, the Government of Canada committed to addressing priority existing substances by 2020. The creation of the CMP was announced in 2006, with the goal of addressing the 4,300 priority existing substances by 2020 and implementing risk management actions where necessary, using appropriate combinations of CEPA, the *Pest Control Products Act* (PCPA), the *Food and Drugs Act* (F&DA), the *Fisheries Act* (FA), the *Hazardous Products Act* (HPA), and since 2011, the *Canada Consumer Product Safety Act* (CCPSA). In addition to risk assessment and risk management, other core

CMP functions or activity areas are compliance promotion and enforcement, research, monitoring and surveillance, stakeholder engagement and risk communications, and policy and program management.

Conclusions

The CMP has made significant progress towards its flagship commitment to address priority existing substances. Due to considerable health, environmental, and other societal costs associated with toxic chemicals, the risks posed by chemicals continues to be an important issue that will require a robust federal chemicals management program. Although the current program is due to sunset, key issues related to chemicals still exist, new concerns in chemicals management continue to emerge, and growth in the global chemical industry is projected, meaning that it will be important for the Government of Canada to address the issue of chemicals management now and in the future. A federal chemicals management program is also critical to fulfilling the Government of Canada's domestic statutory obligations and international commitments.

Since its inception in 2006, the CMP has made progress in all of its functional activity areas. As of September 30, 2018, the program had:

- addressed 81% of the priority existing substances, a pace and volume of assessment work that key informants acknowledged as a significant accomplishment, especially in comparison to chemical regulatory agencies elsewhere in the world;
- made progress toward fulfilling commitments relating to new substances, F&DA substances, and pesticides;
- proposed, developed, or implemented 156 risk management instruments for existing substances deemed toxic under CEPA, and implemented risk management for new substances;
- undertaken compliance promotion and enforcement activities relating to risk management measures under CEPA and the CCPSA, and began developing a risk framework for identifying ECCC enforcement priorities, based on highest risk to the environment and human health;
- undertaken several hundred research projects and a variety of monitoring and surveillance activities, and used this information to inform CMP activities;
- used established approaches to stakeholder engagement and risk communication, but also developed a new approach to public outreach and risk communication to provide more relevant and easy-to-find information, and encourage Canadians to take action to protect themselves from the risks of substances of concern, in part in response to findings and recommendations from the previous evaluation; and

- spent 95% of planned resources between 2014-15 and 2017-18 and implemented a number of operational efficiencies, including establishing a streamlined approval process for regulatory packages, implementing numerous measures to improve efficiency in risk assessment, and adopting a software suite to enhance information management and sharing.

Moving forward, there is considerable agreement that a future federal chemicals management program should maintain a strong risk assessment function. While approximately 4,300 substances were identified as a priority for risk assessment, based on a review of available information on 23,000 substances that existed in commerce in Canada between January 1, 1984 and December 31, 1986, the understanding of chemicals has moved beyond the original criteria, and use patterns and exposure continue to evolve. Finalizing risk assessments for the 4,300 substances will not mean that risk assessment work on existing chemicals is complete. Furthermore, the risk assessment agenda is continuously growing as a result of rapid growth in the number of new substances, as well as new and emerging scientific information relating to existing substances. The number of risk management instruments to be developed and implemented will likewise increase. The need will also increase for related CMP functions, such as risk management. Greater effort will be needed in measuring the effectiveness of risk management strategies and instruments, as well as compliance promotion and enforcement, monitoring and surveillance, research, and stakeholder engagement, public outreach, and risk communication. With regard to stakeholder engagement, there are opportunities to diversify the range of organizations involved in the CMP's Stakeholder Advisory Council (SAC) to include health professional associations, who have historically had limited representation in this forum.

There is some evidence that Canadians and stakeholder groups are accessing and using CMP information to avoid or minimize risks posed by harmful substances, as well as some evidence demonstrating industry compliance with certain risk management measures. There is limited evidence at the present time to support conclusions about whether the CMP has reduced the potential for exposure to harmful substances, although biomonitoring and environmental monitoring trend data are beginning to emerge for some substances that have had risk management measures in place for several years. The program does not yet have an approach to measuring reduced health and environmental threats from harmful substances, primarily due to conceptual and methodological limitations in disaggregating the impacts of the CMP from other variables. Furthermore, after almost 15 years, the CMP is not able to produce or agree on basic program information, including information about program activities and outputs, in a timely manner.

Overall, the CMP fulfills an important role in chemicals management in Canada due to its broad mandate and substantial capacity. Areas for future focus include existing and emerging concerns, such as endocrine-disrupting chemicals, vulnerable populations, occupational exposure, cumulative exposure and effects, and regrettable substitution, as well as enhancing stakeholder engagement, and implementing improvements to information collection, information management, and the measurement and reporting of results.

Recommendations

Although the current CMP is due to sunset in March 2021, there is a clear need for an ongoing federal chemicals management program. In addition to the recommendations below, the evaluation findings highlighted several areas that the CMP should take into account for future planning, including addressing the 2017 ENVI report and strengthening core program functions beyond risk assessment.

The 2017 ENVI report identified 87 recommendations based on data collected in 2016, many of which relate to issues that were also identified as part of the current evaluation. These issues include health inequality and vulnerable populations, substitution and alternative assessments, as well as new and emerging issues, such as endocrine disruptors, aggregate exposure, biotechnology, and cumulative and synergistic effects of substances. The evaluation findings reinforce the need for the CMP to continue its ongoing efforts to address recommendations stemming from the ENVI report.

The evaluation findings also highlighted the importance of ongoing risk assessment, while recognizing the need to continue to support other core components of the CMP. Moving forward, it will be important to continue risk assessment work and improve assessment approaches, while also strengthening other core CMP functions, including risk management, research, monitoring and surveillance, compliance promotion and enforcement, and stakeholder engagement and risk communications.

Recommendation 1: Revitalize mechanisms for stakeholder engagement.

While there is widespread agreement that stakeholder engagement is an important strength of the CMP and should be an ongoing part of the program, there are opportunities to revitalize mechanisms for stakeholder engagement moving forward. Most notably, although the membership of the SAC has been refreshed over the lifetime of the CMP, it has historically had limited representation from major health and public health professional associations. Diversifying the range of stakeholder organizations involved in the CMP to include health professional associations and other relevant groups could help to bring new perspectives to the program. This is likely to be particularly important if the CMP is significantly redesigned after 2021.

Recommendation 2: Improve program performance measurement to facilitate program management, decision making, and meaningful reporting to the public.

This evaluation identified several opportunities for the CMP to improve its approach to performance measurement and reporting, some of which address long-standing program issues. After almost 15 years, it remains challenging for program partners to produce and agree on basic information about the CMP in a timely manner. The implementation of a system for accurately collecting and managing basic program information, including information about program activities and outputs that is accessible to all program partners, should be a priority.

The program's current efforts to measure and report on exposure and threat reduction are highly technical, and there are challenges in disaggregating the impacts of the CMP from other variables. It will be important for the CMP to develop an approach to reporting on exposure and threat and risk reduction that is accessible and resonates with Canadians, while still being scientifically valid.

Management Response and Action Plan

Evaluation of the Chemicals Management Plan 2014-15 to 2018-19

As noted in the evaluation, the House of Commons Standing Committee on Environment and Sustainable Development (ENVI) released a comprehensive review of the *Canadian Environmental Protection Act* (CEPA) in June 2017, and the Commissioner of the Environment and Sustainable Development (CESD) issued a Report on Toxic Substances in fall 2018. Both reports also contained recommendations that were either directed at, or had implications for, the Government of Canada's chemicals management activities, and the Government of Canada has also developed action plans in response to each of these reports. In particular, the CESD audit also included recommendations related to improving performance measurement and communication with the public. In response, the Government committed to a number of key deliverables, including developing a long-term approach to systemically assessing the effectiveness of risk management controls put in place for substances determined to be toxic under the *Canadian Environmental Protection Act*, 1999.

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees, agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
Recommendation 1: Revitalize mechanisms for stakeholder engagement	Management agrees with this recommendation. Since the current CMP will be ending, the revitalized mechanisms for engagement will be ready post-2020.	1. With the objective to engage stakeholders more effectively and broaden the range of stakeholder organizations to be consulted, ECCC and HC will task the newly established HC-ECCC Working Group on Engagement to develop a needs analysis, building on lessons learned from the first three phases of the CMP, and in line with any changes to the program.	Needs analysis and recommendations	Q4 2019-20	DG, SRAD/STB, ECCC DG, SED/HECSB, HC A/DG, ICWD, EPB, ECCC	Existing resources will be used.

Recommendations	Response	Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Recommendation as stated in the evaluation report	Identify whether program management agrees, agrees with conditions, or disagrees with the recommendation, and why	Identify what action(s) program management will take to address the recommendation	Identify key deliverables	Identify timeline for implementation of each deliverable	Identify Senior Management and Executive (DG and ADM level) accountable for the implementation of each deliverable	Describe the human and/or financial resources required to complete recommendation, including the source of resources (additional vs. existing budget)
		2. A report will also be commissioned to provide recommendations on effective engagement mechanisms and the range of stakeholders (e.g. youth, Indigenous populations, P/Ts etc.).	A report including analysis and recommendations on effective engagement mechanisms and relevant stakeholders.	Q2 2020-21		
Recommendation 2: Improve program performance measurement to facilitate program management, decision making, and meaningful reporting to the public.	Management agrees with this recommendation	1. The program will set up a working group with the mandate to establish an authoritative source of data, while acknowledging differences in tracking needs where relevant. Specifically, this working group will develop standard definitions and data collection processes and tools to support tracking and reporting of statistical information. 2. In order to improve public communications, a landing page will be created as part of establishing a web presence where new and future risk management performance-related information will be available.	Terms of Reference to establish a working group Standard Operating Procedures (including common definitions) and joint data collection tools Landing page containing new and future risk management performance activities and reports	Q3 2019-20 Q2 2020-21 Q4 2019-20	DG, SRAD/STB, ECCC A/DG, ICWD/EPB, ECCC DG, SED/HECSB, HC DG, SRAD/STB, ECCC A/DG, ICWD/EPB, ECCC DG, SED/HECSB, HC	Existing resources will be used.

1.0 Evaluation Purpose

The Chemicals Management Plan (CMP) is a jointly managed initiative of Health Canada and Environment and Climate Change Canada (ECCC). The CMP brings together various federal chemicals programs under a single strategy aimed at assessing environmental and human health risks posed by chemical substances and organisms, and managing toxic substances according to the risks they present to human and environmental health.

The CMP has been funded in three phases since its establishment in 2006:

- Phase I covered the period from 2006-07 to 2010-11(CMP1)
- Phase II covered the period from 2011-12 to 2015-16 (CMP2)
- Phase III covers the period from 2016-17 to 2020-21 (CMP3).

This evaluation covered the last two years of CMP2 (2014-15 and 2015-16), as well as the first three years of CMP3 (2016-17 to 2018-19). The Office of Audit and Evaluation (OAE) of Health Canada and the Public Health Agency of Canada led the evaluation, in cooperation with ECCC's Audit and Evaluation Branch, and with the support of program representatives from Health Canada and ECCC. The goals of the evaluation were to examine the relevance and performance of the CMP, and to explore future and continuing needs beyond March 2021, when CMP funding will sunset.

2.0 Program Description

2.1 Origins

The *Canadian Environmental Assessment Act, 1999* (CEPA) provided the Government of Canada seven years to categorize the 23,000 existing chemical substances on the Domestic Substances List (DSL), based on specific criteria identified in the *Act*. The categorization process for existing substances was completed in 2006, resulting in approximately 4,300 priority substances that were suspected to be inherently toxic to humans or to non-human organisms, are persistent or bioaccumulative, or present the greatest potential for exposure to Canadians, and, as a result, were required by CEPA to be assessed under the *Act*. Each substance was assigned a priority level, with approximately 500, 2,600, and 1,200 substances classified as high, medium, and low priority, respectively. Organisms on the DSL were also required to be assessed, as were new substances.

At the 2002 World Summit for Sustainable Development, the Government of Canada committed to address priority existing substances by 2020. The creation of the CMP was announced in 2006, with the goal of assessing the 4,300 priority existing substances by 2020, and implementing risk management actions for substances deemed toxic under section 64 of CEPA. Under CEPA, a substance is toxic "if it is entering or may enter the environment in a quantity or concentration or under conditions that (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity; (b) constitute or may constitute a danger to the environment on which life depends; or (c) constitute or may constitute a danger in Canada to human life or health" (GoC, 1999, sec. 64). The CMP

implements risk management actions for toxic substances using appropriate combinations of CEPA, the *Pest Control Products Act* (PCPA), the *Food and Drugs Act* (F&DA), the *Fisheries Act* (FA), the *Hazardous Products Act* (HPA), and, since 2011, the *Canada Consumer Product Safety Act* (CCPSA).

It is important to note that a source document articulating the commitment made by the Government of Canada in 2002 was not available. Therefore, it is unclear whether the commitment made at that time was to "address" or to "assess" the priority existing substances by 2020. Foundational documents for CMP1 from 2006 use both terms, and Health Canada and ECCC have, over time, shifted towards using "address" rather than "assess" when referring to the commitment. While CEPA does not define the term "address", the term is currently used by the program to refer to substances that were assessed under the CMP, and for which an official conclusion on toxicity was reached under s. 64 of CEPA, as well as substances for which an approach was used that did not provide an official CEPA s. 64 conclusion. This report uses the term "address" to refer to the 2020 commitment and uses the term "assess" when greater precision is possible.

2.2 Activities and Partners

The CMP consists of several core functions or activity streams: risk assessment, risk management, compliance promotion and enforcement, research, monitoring and surveillance, stakeholder engagement and risk communications, and policy and program management.

- **Risk assessment** - This activity refers to scientific assessments conducted to determine if there are potential environmental and human health risks associated with chemical substances or organisms. The assessment considers multiple sources of exposure, and is conducted on both existing substances and new substances. It provides the evidence needed to determine whether a substance is toxic according to section 64 of CEPA, and ultimately, whether risk management is required.

- **Risk management** - If a substance is determined to be harmful to human health or the environment through risk assessment, as defined in CEPA, measures will be put in place to prevent or manage the associated risks. The CMP uses an integrated approach to selecting and implementing risk management measures, using appropriate acts, including CEPA, the PCPA, the F&DA, the FA, and the CCPSA. This is known as the "Best Placed Act" approach. Risk management measures may be regulatory or non-regulatory instruments and may include such controls as restrictions on use, how the substance is manufactured, and how much of the substance can be released into the environment.[1]

[1] An example of regulatory control instruments include regulations that prohibit or set limits on the use, manufacture, import or sale of substances which may be released into the environment or limit exposure to humans. Other examples include Environmental Emergency Regulations that require industries to plan and be prepared for environmental emergencies and help prevent emergencies from happening, and requirements that industries must notify the government in the event that there is a significant new use for a substance. Examples of non-regulatory control instruments include pollution prevention notices that necessitate planning and actions by companies to reduce waste or pollution, Environmental Performance Agreements (EPA), codes of practice, national standards and guidelines, developing and updating best management practices, programs to ensure consumers have the option to return products for safe disposal, and promoting the use of safer substitutes over harmful chemicals.

- **Compliance promotion and enforcement** - Compliance promotion and enforcement activities are undertaken, so that businesses and other organizations can take steps to understand their obligations and verify compliance. Compliance promotion activities are delivered through site visits, workshops, information sessions, presentations, information packages, and responses to individual inquiries. Compliance promotion also includes providing general information on risk management tools and supporting industry stakeholders' roles in CMP initiatives. Enforcement activities include inspections, investigations, enforcement measures, and prosecutions under various acts and regulations.

- **Research** - Research is conducted on substances or groups of substances to investigate the toxicological mechanisms of substances, the means by which Canadians and their environment may be exposed to substances, and the means by which substances may be released into the environment. Findings from research projects are used to inform risk assessment and risk management decision making, and to aid in the development and validation of assessment models and tools.

- **Monitoring and surveillance** - This includes a variety of environmental and human monitoring programs for the detection of substances in the air, water, sediments, wastewater, indoor environments, humans, and other organisms, such as fish and birds. In addition, food monitoring and targeted surveillance activities are also conducted to identify harmful levels of chemicals present in foods. Commercial use information is also collected through reporting requirements under CEPA, voluntary industry reports, and international cooperation activities. Information collected through the monitoring and surveillance program is used to support other CMP core functions, as well as performance measurement.

- **Stakeholder engagement and risk communications** - CMP stakeholder engagement and risk communication activities target a variety of audiences, including industry stakeholders, Indigenous organizations and peoples, environmental and health non-governmental organizations (NGOs), academics, researchers, consumer groups, health professionals, early childhood educators, federal/provincial/territorial partners, and the general public, including vulnerable populations. The goals of stakeholder engagement are to provide information that supports involvement in program implementation and development, to ensure that CMP decision making is informed by a broad range of expertise and viewpoints, to foster transparent and predictable decision making and program activities, and to avoid duplicating work on chemicals management. The goals of risk communication activities are to inform the public about the CMP and the risks and safe use of substances of concern, and to encourage the public to take action to protect their health and the environment.

- **Policy and program management** - This activity oversees the delivery of the program through coordination, planning, reporting, policy development (including post-2020 work), international cooperation, governance through the provision of a secretariat function for CMP committees, management of CMP-specific information management and technology tools, and performance measurement of the CMP. This activity is internal to the Government of Canada.

These activities are delivered by several branches within Health Canada and ECCC. Health Canada branches include the Healthy Environments and Consumer Safety Branch, the Regulatory Operations and Enforcement Branch, the Health Products and Food Branch, the Pest Management Regulatory Agency, and the Communications and Public Affairs Branch. ECCC branches include the Environmental Protection Branch, the Science and Technology Branch, and the Enforcement Branch. Details about branch roles and responsibilities can be found in Appendix 1.

2.3 Previous Evaluations

The CMP was previously evaluated in 2010-11 and 2014-15. The most recent evaluation covered an abbreviated portion of CMP2 (2011 to 2014) and identified five recommendations relating to the CMP approval process, commitments related to Petroleum Sector Stream Approach substances, performance reporting, effectiveness of risk management measures, and risk communication to Canadians. Table 1 provides details on these recommendations. A Management Response and Action Plan to address evaluation recommendations was developed by the program. At the time of the current evaluation, all actions were reported to have been completed, with the exception of two actions related to recommendation 2, which are still in progress.

Table 1: Recommendations from Previous (2014-15) CMP Evaluation

Recommendations	
1	CMP partners should clarify roles and responsibilities of various program partners to ensure relevant partner engagement, as well as explore opportunities for a more streamlined decision-making and approval process for substances that are toxic to only human health or the environment.
2	CMP partners should take necessary steps to address CMP commitments related to the Petroleum Sector Stream Approach substances, and initiate risk management as required.
3	CMP partners should strengthen performance reporting by reviewing the logic model, streamlining the expected outcomes, collecting data for all expected outcomes, and, where feasible, identifying CMP-specific substances.
4	Building on previous work, CMP partners should continue to intensify efforts on reviewing the effectiveness of implemented risk management measures, in particular, non-regulatory measures, as part of the risk management review process, and communicate the results to stakeholders and the public.
5	CMP partners should develop a better understanding of the information needs of Canadians, with respect to the risks and safe use of substances of concern, and enhance outreach and communications as necessary.

2.4 Expected Outcomes

CMP activities are expected to lead to specific immediate, intermediate, and long-term outcomes.

Immediate outcomes

- Program-generated knowledge, information, and data are used by internal stakeholders to inform risk assessment, risk management, risk communication and stakeholder engagement, research, and monitoring.
- Canadians and stakeholder groups have access to information that meets their needs on the risks and safe use of substances of concern.
- Industry conforms to and complies with established risk management measures.

Intermediate outcomes

- Canadians use the information to avoid or minimize risks posed by substances of concern.
- Risk management measures reduce the potential for exposure to harmful substances.

Long-term outcome

- Reduced threats to health and the environment from harmful substances.

The connection between the CMP's activities and the expected outcomes is depicted in the logic model (see Appendix 2).

2.5 Resources

Planned CMP expenditures for 2014-15 through 2017-18 are presented in Table 2. The program had a budget of $393 million in B-base funding over this period.

Table 2: CMP Planned Expenditures ($ millions), B-base Funding, 2014-15 to 2017-18[a]

Program activity	Health Canada	ECCC	Total
Risk assessment	$87.52	$14.66	$102.18
Risk management	$69.15	$54.23	$123.88
Compliance promotion and enforcement (ECCC only)[b]	$0.00	$12.06	$12.06
Research	$51.61	$7.17	$58.78
Monitoring and surveillance	$45.13	$19.56	$64.69
Policy and program management (Health Canada only)	$10.69	$0.00	$10.69
Stakeholder engagement and risk communication (Health Canada only)	$11.77	$0.00	$11.77
ECCC internal services	$0.00	$9.55	$9.55
Total	**$275.88**	**$117.23**	**$393.11**

[a] Financial information provided by Health Canada and ECCC.

[b] For Health Canada, planned expenditures relating to compliance promotion and enforcement are included under risk management.

In addition to Health Canada and ECCC, the Public Health Agency of Canada receives CMP funding to deliver the Travelling Public Program (TPP). The TPP will be covered under the broader Travel and Border Health evaluation, scheduled in 2021-22, and is therefore outside of the scope of this evaluation.

2.6 Current Context

In March 2016, the House of Commons Standing Committee on Environment and Sustainable Development (the "Standing Committee" or ENVI) was charged with undertaking a comprehensive review of the provisions and operation of CEPA. The Standing Committee's report, *Healthy Environment, Healthy Canadians, Healthy Economy: Strengthening the Canadian Environmental Protection Act, 1999*, was tabled in Parliament in June 2017 (Parliament of Canada, 2017). Many of the report's 87 recommendations concern areas of the *Act* that are focused on chemicals management in Canada, or areas that have the potential to affect chemicals management activities. Key recommendations included:

- Recognizing a right to a healthy environment and the principles put forward in the United Nations Declaration on the Rights of Indigenous Peoples;

- Expanding and strengthening duties and rights for transparency, public participation, accountability mechanisms, and consultation by, among other things, increasing transparency and public participation in the New Substances and biotechnology regimes;

- Modifying the CMP website to include a system whereby anyone can submit data, evidence, and arguments for consideration, and developing a new online and searchable public environmental enforcement database;

- Defining “vulnerable populations” and requiring consideration of vulnerable populations and marginalized communities in risk assessment and risk management;

- Requiring consideration of aggregate exposure and cumulative effects of chemicals in risk assessment and risk management;

- Revising the definition of “toxic” to ensure that it addresses endocrine disruptors and implementing measures, thresholds, techniques, and reporting specifically addressing endocrine disruptors;

- Requiring a mandatory alternatives assessment and a mandatory substitution test to encourage the use of safer alternatives to toxic substances;

- Requiring a reverse-burden approach for substances of very high concern;

- Requiring mandatory hazard labelling for products containing toxic substances, as well as mandatory monitoring of listed toxic substances;

- Adopting a life cycle approach to assessing and managing substances under CEPA; and

- Increasing funding to ensure effective monitoring and enforcement of CEPA.

In its follow-up report, published in June 2018, the Government of Canada committed to addressing many of the Standing Committee’s recommendations through policy and program improvements to the CMP, as well as future legislative reform (GoC, 2018c).

More recently, in fall 2018, the Commissioner of the Environment and Sustainable Development (CESD) issued its Report on Toxic Substances (CESD, 2018). The audit examined whether ECCC had enforced regulations under CEPA to control the risks of toxic substances, whether ECCC and Health Canada had evaluated their progress in meeting objectives for reducing risks to the environment and human health, and whether the departments had communicated the risks of toxic substances to the public. Overall, the audit concluded that “despite long-standing efforts, ECCC and Health Canada still had significant work to do in selected areas to effectively control the risks from toxic substances and to inform Canadians about those risks”. Key recommendations included:

- Ensuring that risks to human health and the environment are taken into account when prioritizing enforcement activities (ECCC);

- Establishing a long-term and systematic approach to evaluating how effective actions are in controlling toxic substances, including setting measurable objectives, monitoring the achievement of these objectives, and setting timelines for completion (ECCC and Health Canada); and

- Developing clear priorities, timelines, and accountabilities to address identified issues to communicate risks of toxic substances (Health Canada), and working together to develop communication activities for the public that address both environmental and human health issues (ECCC and Health Canada).

In their response to the CESD report, ECCC and Health Canada agreed with these recommendations and committed to taking action to address them. Both departments are currently working to address the recommendations.

This evaluation aimed to provide different recommendations from those appearing in the ENVI and CESD reports, with a view to avoiding duplication.

3.0 Evaluation Description

This evaluation covered the last two years of CMP2 (2014-15 and 2015-16), as well as the first three years of CMP3 (2016-17 to 2018-19). However, where relevant, the evaluation examined achievements over the life of the program. All CMP functions and activities were included, with the exception of the Public Health Agency of Canada's TPP, which will be covered under the broader Travel and Border Health evaluation, scheduled in 2021-22.

The evaluation issues were aligned with the Treasury Board of Canada's *Policy on Results* (2016), and considered the five core issues under relevance and performance. The specific evaluation questions and methodological approach were informed by a preliminary document review and scoping interviews with key program representatives. The evaluation matrix (Appendix 3) details the evaluation issues, questions, indicators, and data sources. The Evaluation Plan details the evaluation strategy for this program.

Several lines of evidence were used, including document, data, and literature reviews; key informant interviews; a survey of industry stakeholders; and an expert panel. Details are provided in Appendix 4. Data was analyzed by triangulating information gathered from these different lines of evidence. The use of multiple lines of evidence and triangulation were intended to increase the reliability and credibility of the evaluation findings and conclusions.

The limitations encountered in this evaluation, as well as the mitigation strategies that were put in place to ensure that the evaluation findings can be used with confidence to guide program planning and decision making, are described in Appendix 4.

4.0 Findings

4.1 Relevance: Continued Need for the Program

By the time program funding sunsets, the CMP will have addressed the vast majority of the priority existing substances. Regardless of whether the Government of Canada's 2020 target is fully achieved, an ongoing federal chemicals management program is needed to fulfill the Government of Canada's domestic statutory obligations and international commitments, and to address key issues and new and emerging concerns and risks. Examples include endocrine-disrupting chemicals, vulnerable populations, occupational exposure, cumulative exposure and effects, and regrettable substitution, among others.

As of September 30, 2018, the CMP had addressed 81% of the 4,363 existing substances prioritized following categorization of the DSL. This includes:

- 66% (2,861) for which a final Screening Assessment Report had been published;
- 7% (322) for which a draft Screening Assessment Report had been published; and
- 8% (371) for which an approach was used that did not provide an official conclusion under s. 64 of CEPA.[2]

In addition, a total of 156 risk management measures had been implemented or were being developed for substances deemed toxic under CEPA as of that date. Thus, the program will have made considerable progress toward accomplishing the commitment made by the Government of Canada at the 2002 World Summit for Sustainable Development.

Regardless of whether or not the target is fully achieved, there is a clear need for an ongoing federal chemicals management program after CMP funding sunsets. In the immediate term, there will be a need to complete and finalize outstanding risk assessments from CMP3 and to develop, implement, and monitor risk management instruments, as appropriate.

More broadly, an ongoing program is needed in order to fulfill the Government of Canada's statutory obligations under CEPA and other federal acts to assess and manage new and existing substances, to ensure that existing risk management is meeting the intended environmental and human health objectives, and to fulfill its commitments under international agreements such as the Stockholm Convention on Persistent Organic Pollutants, the Minamata Convention on Mercury, and the Strategic Approach to International Chemicals Management (SAICM).

[2] Program representatives explained that, in some instances after preliminary work, it was determined that due to existing risk assessment or risk management actions on particular substances, there was no need for further assessment under CEPA at the time, and that assessment work should focus on substances for which assessments had not yet been conducted. A total of 371 substances were determined to fall into this category. The program published approach documents for these substances with the opportunity for public comment. The main documents are Approach for a Subset of Petroleum Substances Prioritized during Categorization, Approach for a Subset of Substances Prioritized during Categorization That Have Already Been Addressed, and Approach for a Subset of Inorganic and Organometallic Substances. Program representatives noted that these substances will be considered for future risk assessment or risk management activities, if new information becomes available.

In addition, a variety of key issues and new and emerging concerns and risks underscore the need for an ongoing federal chemicals management program. Regulatory agencies around the world, including in Canada, are recognizing the need to address issues such as endocrine-disrupting chemicals, vulnerable populations, cumulative exposures and effects, regrettable substitution, alternatives assessment and informed substitution, and traceability of chemicals in the context of a global supply chain, among many others.

- **Endocrine disrupting chemicals (EDCs).** EDCs are substances that can produce adverse developmental, reproductive, neurological, and immune effects in humans and wildlife, even at very low levels of exposure and particularly if exposure occurs at a vulnerable time, such as gestation and lactation, postnatal development, puberty, or reproduction (Endocrine Society, 2018; OECD, 2018c; US EPA, 2015b; WHO/UNEP, 2013). EDCs are used in agricultural, industrial, and manufacturing sectors, as well as in a range of everyday products, including toys, cosmetics, detergents, food and food packaging, paint, furniture, and electronics, among many others.

- **Vulnerable populations.** Vulnerable populations have greater exposure to chemicals or are more susceptible to the effects of exposure (Parliament of Canada, 2017). Vulnerable populations include, but are not limited to, pregnant and breastfeeding women, children, seniors, Indigenous peoples, and workers. With regard to workers, as noted in the last evaluation, Canada has historically not considered occupational exposure in chemical risk assessments, an approach that puts it at odds with its counterparts in the United States (US), Australia, and the European Union (EU) (Health Canada, 2015). However, the program is currently working with provinces and territories to identify opportunities to better protect workers.

- **Cumulative exposures and effects.** Human and ecological risk assessment of chemicals undertaken by regulatory agencies has traditionally focused on exposure to individual chemicals; however, combined effects from multiple chemicals and sources have not been routinely assessed (Evans, Martin, Faust, & Kortenkamp, 2016; Kienzler, Bopp, van der Linden, Berggren, & Worth, 2016). Since, in the real world, humans and the environment are typically exposed to more than one chemical at a time from multiple sources, there has been growing recognition of the need to consider cumulative exposures and effects in risk assessment.

- **Regrettable substitution, alternatives assessment, and informed substitution**. "Regrettable substitution" refers to the use of chemicals that are functionally similar to, but no less harmful than, the chemicals they are intended to replace (Zimmerman & Anastas, 2015). Examples of chemicals that have been inappropriately replaced include bisphenol A (BPA) in certain products, certain pesticides, flame retardants, and per- and polyfluoroalkyl substances. The desire to prevent regrettable substitution, as well as growing consumer and societal interest in moving toward greener, more sustainable products and processes that do not contain or use harmful chemicals, is prompting regulatory agencies to incorporate consideration of

safer alternatives to chemicals of concern through the use of alternatives assessment and by encouraging informed substitution.

These issues, as well as others, were the subject of recommendations contained in the ENVI report on the Parliamentary Review of CEPA, to which the Government of Canada responded in its June 2018 Follow-up Report. A more detailed discussion of these issues, along with an overview of the Government of Canada's response to date, is provided in Appendix 5.

The need for continued national and international action to minimize the adverse impacts of chemicals was recently emphasized in the United Nations Environment Programme's (UNEP) Global Chemicals Outlook II Synthesis Report (UNEP, 2019). Citing a WHO estimate of the burden of disease from selected chemicals as 1.6 million lives in 2016, and noting that the global chemical industry was projected to double in size between 2017 and 2030, the report predicted that exposures, concentrations, and adverse health and environmental impacts will increase if sound management of chemicals and waste is not achieved worldwide.

Other recent studies have also drawn attention to the health and other societal costs associated with toxic chemicals. One study estimated that EDC exposures in the EU contribute substantially to disease and dysfunction across the life course, with costs in the hundreds of billions of Euros per year (Trasande et al., 2015). A similar US study estimated that known EDCs found in plastic bottles, flame retardants, metal food cans, detergents, cosmetics, and pesticides cost the US more than $340 billion a year in health costs and lost earnings (Attina et al., 2016). Both the EU and US studies considered a subset of EDCs with the highest probability of causation, thus potentially underestimating the costs.

Virtually all internal and external key informants agreed that there is a need for an ongoing federal chemicals management program, citing the ubiquitous presence of chemicals in our lives, the rapid growth in the number of new substances, and scientific and technological advances requiring updates to prior risk assessments based on new information, as well as evaluation of existing risk management measures. Furthermore, there is widespread agreement among key informants that risks to the environment and human health would not be adequately addressed if the CMP or a similar federal program did not exist. In the absence of the program, key informants envisioned a less coordinated, efficient, and evidence-based management of chemicals in Canada, as well as the ability of the Government of Canada to keep pace with scientific developments and meet its obligations under CEPA and international agreements being compromised.

There is widespread agreement among key informants on the continued need for the CMP. There is also agreement that the program should maintain a strong risk assessment function, but also increase efforts on other core CMP functions, including risk management, with greater effort on measuring the effectiveness of risk management strategies and instruments, compliance promotion and enforcement, monitoring and surveillance, research, as well as stakeholder engagement, public outreach, and risk communication. The future design of the CMP is discussed in detail in Section 4.4.1 below.

4.2 Relevance: Alignment with Government Priorities

CMP activities are generally well aligned with current federal priorities, but alignment with some priorities, including climate change, sex- and gender-based analysis plus, reconciliation with Indigenous peoples, and open and transparent government, could be enhanced.

Current federal priorities, as expressed in the December 2015 Speech from the Throne, annual Federal Budgets, and recent Ministerial Mandate letters, include environmental protection and climate change, open and transparent government, science and innovation, diversity and equality, including sex- and gender-based analysis plus (SGBA+), and reconciliation with Indigenous peoples (ECCC, 2018c; GoC, 2016, 2017, 2018b; Health Canada, 2018a; Office of the Prime Minister, 2015, 2017; PCO, 2015).

CMP activities and expected outcomes are reasonably well aligned with these priorities, although there are opportunities for further enhancement. The Government of Canada's planned approach to addressing the issues raised in the ENVI report, if implemented, may serve to enhance alignment.

- **Environmental protection.** Given its overarching goal of helping to protect human health and the environment from harmful substances, the CMP is generally well aligned with the current government's commitment to protecting the environment. In the future, greater emphasis on alternatives assessment, informed substitution, and pollution prevention could further align it with this priority.

- **Climate change mitigation and adaptation.** At present, climate change is not a specific objective of the CMP. Greater attention to climate change may be warranted, since it may bring about changes that could increase chemical exposure, especially in Canada's North.

- **Diversity and equality, including SGBA+.** SGBA+ is integrated to some extent into CMP core functions. Health Canada and ECCC acknowledge sex- and gender-based differences in health risks and outcomes, and use scientific information when available to consider the potential impacts of exposure to harmful substances on vulnerable populations, such as expectant mothers, children, and First Nations and Inuit communities. In response to the ENVI report, the CMP is considering ways to enhance consideration of vulnerable populations in chemicals management activities in the future, which could enhance alignment with this priority.

- **Reconciliation with Indigenous peoples.** Recognizing that First Nations and Inuit communities may be more vulnerable to the potential impacts of exposure to certain harmful substances, some risk assessments have specifically considered this exposure, and work has been done to engage Indigenous peoples and develop targeted risk communications. More systematic consideration of Indigenous peoples in CMP activities, including risk assessment, risk management, risk communications, and monitoring and surveillance, could improve alignment.

- **Open and transparent government.** The ENVI report included several recommendations to expand and strengthen duties and rights for transparency, public participation, accountability, and consultation that directly implicate the CMP. Expert panellists identified a need for greater transparency on the specific data, methods, and models used in risk assessments. For example, they were uncertain if peer-reviewed scientific literature was considered in risk assessments.

- **Science and innovation**. The CMP is a science-based program that generates and uses new scientific evidence, methods, and tools to inform and carry out its activities. Expert panellists suggested that the program could benefit from the advanced facilities and equipment available in academic research settings by pursuing more collaborations with university-based researchers.

In addition to considering the extent to which the CMP is aligned with current federal priorities, the evaluation also examined program alignment with the Core Responsibilities and Expected Results of Health Canada and ECCC, and found them to be well aligned (ECCC, 2018c; Health Canada, 2018a). For example, as one component of ECCC's Substances and Waste Management Program, the CMP aligns with and supports that department's Core Responsibility of Preventing and Managing Pollution, and contributes to its expected result that "the Canadian environment is protected from harmful substances". Similarly, as one component of Health Canada's Health Impacts of Chemicals Program, the CMP aligns with and supports that department's Health Protection and Promotion Core Responsibility, and contributes to its expected result that "Canadians are protected from unsafe consumer and commercial products and substances".

4.3 Relevance: Alignment with Federal Roles and Responsibilities

As in the last evaluation, Health Canada and ECCC activities under the CMP are consistent with federal and departmental roles and responsibilities. Although various other federal, provincial, and territorial programs and initiatives address issues related to chemicals management, risks to the environment and human health would not be adequately addressed in the absence of the CMP.

Health Canada and ECCC activities under the CMP are consistent with federal roles and responsibilities, and there has been no change in this regard since the previous evaluation. Under CEPA, Health Canada and ECCC have a legislated obligation to assess and manage the risks posed to the environment and human health by chemical substances and organisms. Furthermore, Health Canada has responsibilities for minimizing risks posed to human health by chemical substances and organisms under several acts under its authority, including the F&DA, the PCPA, the CCPSA, and the *Human Pathogens and Toxins Act*. Similarly, ECCC has relevant responsibilities under the FA. Health Canada's and ECCC's roles and responsibilities under the CMP are also consistent with their powers, duties, and functions, as laid out in the *Department of Health Act* (GoC, 1996) *and* the *Department of the Environment Act* (GoC, 1985), respectively.

In addition to the CMP, the Government of Canada addresses issues related to chemicals management through several complementary programs and activities. These include the Addressing Air Pollution Horizontal Initiative, which aims to improve air quality and health in Canada, and provide Canadians with the tools to make informed decisions to help reduce their exposure to indoor and outdoor air pollutants; the Federal Contaminated Sites Action Plan, which aims to reduce environmental and human health risks from known federal contaminated sites; and several related programs delivered through the Environmental Public Health Division at Indigenous Services Canada (ISC).

Provincial and territorial (P/T) governments also have a role in chemicals management. Their roles include occupational health and safety, ensuring that public drinking water is safe, regulating industries that produce and use chemicals, and regulating the associated release of effluents and emissions. The Government of Canada collaborates with other levels of government, including the provinces and territories, in several areas related to chemicals management, including wastewater management. Federal regulations that manage releases into water include the *Metal and Diamond Mining Effluent Regulations*, the *Pulp and Paper Effluent Regulations*, and the *Wastewater Systems Effluent Regulations*.

In addition, Health Canada works with P/T governments to develop the *Guidelines for Canadian Drinking Water Quality* (GCDWQs), which are used by all jurisdictions to establish their own regulatory requirements for drinking water quality. ECCC works with P/T governments through the Canadian Council of Ministers of the Environment to develop Canadian Environmental Quality Guidelines (CEQGs), which are used on a voluntary basis by all jurisdictions to help manage surface water quality. ECCC also develops Federal Environmental Quality Guidelines (FEQGs) to meet federal obligations for surface water quality monitoring and performance measurement for risk management. Finally, as already noted, CMP partners have recently begun exploring ways to enhance collaboration with P/T occupational health and safety regulators on occupational exposure to chemicals. Key informants representing all categories generally regard other programs as complementary to the CMP, rather than duplicative, noting that they do not share the same broad mandate, focus, substantial capacity, and motivation to engage in chemicals management activities as the CMP. For these reasons, key informants agreed that risks to the environment and human health would not be adequately addressed in the absence of the CMP.

4.4 Performance: Efficiency

4.4.1 Program Implementation, Delivery, and Future Design

Since its inception, the CMP has made progress in all of its functional activity areas. There was considerable agreement among key informants and expert panellists that a future federal chemicals management program should maintain a robust risk assessment function, while also increasing effort on other core CMP functions. These include risk management (such as measuring the effectiveness of risk management strategies and instruments), compliance promotion and enforcement, monitoring and surveillance, research, as well as stakeholder engagement, public outreach, and risk communication. With regard to stakeholder engagement, there are opportunities to diversify the range of organizations involved in the Stakeholder Advisory Council (SAC) to include health professional associations, who have historically had limited representation in this forum.

Risk assessment

As of September 30, 2018, the CMP had addressed 81% of the 4,363 priority existing substances identified following categorization, leaving the remaining 19% for the final 2.5 years of the program. While the CMP may not fully achieve the Government of Canada's 2020 target, the progress it has made toward this goal was widely acknowledged by key informants as a significant accomplishment. Many industry, international, and external key informants compared the CMP's pace and volume of assessment work favourably with that of chemical regulators elsewhere in the world.

Since its inception, as part of its risk assessment function, the CMP has also accomplished the following:

- assessed an additional 195 substances prioritized in separate processes, as well as 5,353 New Substance Notifications;
- prioritized substances on the Revised In-Commerce List and identified 25% for further evaluation;
- completed assessments and re-evaluations of food ingredients including flavours, food additives, contaminants, packaging materials, and incidental additives;
- completed approximately 200 re-evaluations and special reviews of older pesticides; and
- contributed to or completed full risk assessments for substances in consumer products and cosmetics, conducted over 2,500 cosmetic notification searches to provide information for use in exposure estimates, and tested priority substances in specific consumer products and cosmetics, including developing or refining lab test methods.

In addition, program partners collaborated with the EPA under the Regulatory Cooperation Council to develop a framework for collaboration on substance assessments and common regulatory reporting requirements for new chemical uses. This framework was taken into account during the development of a draft regulatory proposal to amend the *Food and Drug Regulations* for environmental risk assessment of substances regulated under the F&DA, which will align Canada's approach with that of the US and the EU.

Internal and external key informants, as well as expert panellists, emphasized the ongoing need for a robust risk assessment function. Approximately 4,300 substances were identified as a priority for risk assessment based on a review of available information on 23,000 substances that existed in commerce in Canada between January 1, 1984 and December 31, 1986. However, the understanding of chemicals has moved beyond these original criteria to include additional considerations, and use patterns and exposures continue to evolve. Finalizing risk assessments for the 4,300 substances will not mean that risk assessment work on existing chemicals is complete.

Furthermore, the risk assessment agenda is continuously growing as a result of rapid growth in the number of new substances, as well as new and emerging scientific information relating to existing substances. To this end, in 2014, the CMP published the Identification of Risk Assessment Priorities (IRAP) process, which sets out a process for the systematic collection, consolidation and analysis of new information, in order to determine appropriate action for substances with new information (Health Canada, 2017b). IRAP was developed in response to a need for a formal process for identifying substances that should be added to the CMP's forward work plans, based on new and emerging information. Program representatives noted that 14 groups of priorities, representing approximately 1100 substances, have been identified for further problem formulation and risk assessment work, as part of the IRAP process to date.

Internal key informants further noted that a number of outstanding areas of risk assessment work have been identified, which likewise necessitates an ongoing risk assessment function. Some examples include risk assessment of nanomaterials, inventory updates to support risk assessments for nanomaterials, detailed risk assessments for approximately 800 substances on the Revised In-Commerce List, and risk assessment of pharmaceuticals and Chemical Substances of Unknown or Variable Composition and Complex Reaction Products and Biological Materials.

While internal and external key informants agreed that a future CMP should continue to do risk assessment work, there was also general agreement on the need to increase efforts on other CMP activities; namely, risk management (including measuring the effectiveness of risk management strategies and instruments), compliance promotion and enforcement, monitoring and surveillance, research, and public outreach and risk communication.

Risk management

As of September 30, 2018, 156 risk management instruments had been proposed, were in development, or had been finalized for existing substances deemed CEPA-toxic, regardless of whether they were assessed as part of the CMP. Program representatives indicated that, while the program was aware of the number of risk management instruments in place at the time, there was not always a direct correlation with substances assessed as part of the CMP, given that risk management instruments manage substances and groups of substances, and that risk management instruments are continually being evaluated and updated as needed. As an example, they indicated that the assessed and managed approach had identified a number of substances where a formal assessment was not required, because the substances were already addressed by existing risk management measures. As such, the program was unable to report on the number of risk management instruments taken

specifically in relation to the 4,363 priority existing substances. ECCC's Instrument Choice Framework, including the Best Placed Act approach, continued to be used to identify appropriate risk management instruments. There has been a slight increase in the use of non-CEPA instruments over time and these now account for 25% of all risk management measures used in the CMP. Overall, there is a slightly higher proportion of regulatory (52%) compared to non-regulatory (48%) measures; this includes instruments introduced under CEPA, as well as other acts.

Since the inception of the CMP, as part of risk management activities, program partners have also done the following:

- put in place 263 risk management measures for new substances, primarily Significant New Activity (SNAc) provisions of CEPA;
- explored non-regulatory initiatives (NRIs) for substances regulated under the F&DA, the results of which are expected to inform the development of a Pharmaceutical Strategy;
- modified or added 27 Cosmetic Ingredient Hotlist entries in response to health concerns assessed through the CMP;[3] and
- published FEQGs for 12 substances or groups, with work ongoing for an additional eight, as well as over 40 guidelines and guidance documents for Canadian drinking water quality.

Internal and external key informants identified several concerns related to risk management. Program representatives cited insufficient information to inform risk management, delays in meeting timelines, and inadequate resources, such as an insufficient number of highly-qualified personnel to perform these activities. In particular, risk management often requires more detailed information that is outside the scope of a given risk assessment, requiring risk management staff to engage in additional data gathering once assessments are completed. For instance, additional information could be requested on specific product formulations, manufacturing processes, or alternatives. This type of information helps to target and refine the final risk management action.

Industry key informants commented favourably on what they characterized as the CMP's "flexible" approach to risk management, but also raised concerns about potential "disconnects" between risk assessment and risk management, suggesting that some risk management measures address the wrong risk or only part of the risk, or prohibit substances that are no longer in use. Similarly, some external key informants and expert panellists also questioned the CMP's approach to risk management. However, their concern was that, to date, a lower level of effort has been applied to risk management compared to risk assessment, that it leaves important sources of exposure unaddressed, and that it is inadequate, "tokenistic", or insufficiently stringent. These evaluation participants encouraged the CMP to take a more robust approach to risk management in the future.

[3] Although itemized separately here, additions and amendments to the Cosmetic Ingredient Hotlist are also included in the count of 156 risk management instruments that have been implemented for existing substances deemed CEPA-toxic. However, according to data that was provided and approved by Health Canada and ECCC, the 156 risk management instruments include 19 additions and amendments to the Cosmetic Ingredient Hotlist, whereas information provided by the Consumer and Hazardous Products Safety Directorate indicates that a total of 27 such additions and amendments have been implemented since 2009.

There was considerable support among internal and external key informants, as well as expert panellists, for greater effort to be made on risk management in the future, including efforts to measure the effectiveness of risk management instruments, particularly as the number of toxic substances requiring risk management continues to increase as a result of completed and ongoing risk assessment work.

Compliance promotion and enforcement

During the period covered by this evaluation (2014-15 to 2018-19), ECCC's compliance promotion activities targeted geographically dispersed, hard-to-reach, small and medium-sized enterprises, Indigenous peoples, and federal departments. ECCC also conducted over 9,400 inspections relating to CEPA regulations used in the CMP, of which over 90% targeted five regulations.[4] These included the following:

- the *Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations* (the PERC Regulations);
- the *PCB Regulations*;
- the *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*;
- the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*; and
- the *Environmental Emergency Regulations*.

ECCC also took 10,781 enforcement actions, primarily in the form of written warnings (77%).[5] In addition, Health Canada's Consumer Product Safety Program carried out 634 CMP-related inspections as part of 16 cyclical enforcement projects for consumer products and cosmetics, collected and analyzed 1,718 CMP-related samples, and implemented 59 enforcement actions in instances of non-compliance.

Some internal and external key informants raised concerns that enforcement activities under the CMP to date have been insufficient for understanding compliance levels or determining the extent to which risk management measures have been effective.

ECCC's approach to enforcing toxic substance regulations under CEPA was scrutinized by the Commissioner of the Environment and Sustainable Development (CESD) in their fall 2018 Report on Toxic Substances (CESD, 2018). The CESD observed that ECCC did not, in most cases, base its enforcement priorities on risks to human health and the environment, but instead "prioritized enforcement activities mainly on the basis of businesses' potential for non-compliance". The CESD recommended that ECCC ensure that risks to human health and the environment are taken into account when prioritizing its enforcement activities. ECCC is developing a risk framework for identifying enforcement priorities based on the highest risk

[4] ECCC enforcement data pertains to regulations within a "CMP/Toxics" group of regulations, one of six groups recently identified by ECCC for the purpose of threat risk assessment. According to ECCC, regulations fell into the CMP/Toxics group if the substance or activity regulated did not belong to another medium or sector. The CMP/Toxics group is different from the group of regulations for which enforcement data was reported in the last evaluation of the CMP.

[5] Enforcement actions 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.

of non-compliance that causes the greatest harm to human health and/or the environment, in response to the CESD's recommendations.

As with risk management, internal and external key informants agreed that there is a need for greater effort on compliance promotion and enforcement in a future chemicals management program, as the number of toxic substances and the number of risk management instruments continue to grow.

Research and monitoring and surveillance

Several hundred research projects have been undertaken, and a variety of monitoring and surveillance initiatives have been underway, since the inception of the CMP. For the period covered by the evaluation, priorities included exposures, toxicity, methods and tools development, and nanomaterials, among others.

As part of monitoring and surveillance, CMP partners gather commercial information through mandatory and voluntary information-gathering initiatives. The information gathered is used to inform priority setting, risk assessment, and risk management.

Major monitoring and surveillance initiatives include the following:

- the Canadian Health Measures Survey (CHMS), in collaboration with Statistics Canada;
- the Maternal-Infant Research on Environmental Chemicals (MIREC) study;
- the Northern Contaminants Program (NCP);
- the Total Diet Study and targeted food surveys;
- the CMP Monitoring and Surveillance Fund at Health Canada;
- ECCC's CMP Environmental Monitoring and Surveillance Program; and
- the National Pollutant Release Inventory.

Findings and data from research, as well as monitoring and surveillance, are used internally to inform CMP activities and disseminated externally. For example, data generated through these activities was used to inform risk assessments and risk management for triclosan, phthalates, manganese, selenium, perfluoralkyl substances, pyrethroids, strontium, chlorhexidine, cobalt, thiocarbamates, and nanomaterials, among others.

Notable gaps in biomonitoring at this time include Canadians living in the territories, with the exception of populations involved in NCP projects, and First Nations living on-reserve, neither of whom are included in the CHMS. The non-participation of First Nations in the CHMS has reportedly been influenced by the perceived conflict between the data custodianship rules and secrecy requirements of the *Statistics Act*, and the principles of Ownership, Control, Access and Possession (OCAP™) of research information collected with participation of and that is about First Nations, to which First Nations people and their advocacy organizations adhere. The need to implement an ongoing human biomonitoring program for First Nations on-reserve, similar to the CHMS, was emphasized by interviewees and expert panellists.

More broadly, key informants and expert panellists agreed that an enhanced monitoring and surveillance function would be critical to understanding exposure and evaluating the effectiveness of risk management, as the number of new substances and the number of risk-managed substances continue to increase. Some specifically highlighted the importance of monitoring and surveillance in the context of climate change, which has the potential to significantly alter exposure patterns.

Stakeholder engagement and risk communication

Since the inception of the CMP, stakeholder engagement has occurred through a variety of formal working groups, committees, and other mechanisms. These include the following:

- industry-only groups, such as the CEPA Industry Coordinating Group and the Biotechnology Industry Government Working Group;
- multi-stakeholder groups, such as the CMP Science Committee and the CMP Stakeholder Advisory Council (SAC);
- capacity contracts with AFN, ITK, and the New Brunswick Lung Association and Canadian Network for Human Health and the Environment;
- multi-stakeholder workshops held twice per year;
- ongoing multi- and bilateral engagements and consultations with industry and NGOs (in-person, by teleconference, and online); and
- public comment periods for draft risk assessments, consultation documents, and risk management documents.

Overall, industry and external key informants, including NGOs, see the CMP's stakeholder engagement function as an important strength of the program, and almost all agreed it should continue in the future.[6] Moreover, most were in agreement that communication and collaboration should be enhanced, both with domestic partners and stakeholders, as well as with international partners and stakeholders, including regulatory agencies and international organizations, such as the OECD, in a future chemicals management program.

While industry key informants were generally satisfied with the existing engagement mechanisms, those representing NGOs perceived several shortcomings. These included a perception that industry has disproportionate influence on the program, that the membership of the SAC has been relatively static since its inception, and that the range of stakeholders involved in the SAC has been limited, and in particular, consists of limited representation from major health and public health professional associations.

Analysis of the membership of the SAC from CMP1 to CMP3 reveals the following:

- A total of 35 organizations have been members of the SAC since CMP1. Of these, 14 (40%) have represented industry. SAC members have also included seven health-related NGOs (20%), four environmental NGOs (11%), four other types of NGOs, such as consumer organizations (11%), four Indigenous organizations (11%), and two labour organizations (6%).

[6] However, a minority view, expressed by a few industry key informants, was that stakeholder engagement activities should diminish in the future, as part of an overall reduction in the scope and activities of a federal chemicals management program.

- Seven of the 35 organizations (20%) have been on the SAC since CMP1, none of which are health-related organizations. These long-standing members of the SAC are AFN, ITK, the Chemical Industry Association of Canada (formerly the Canadian Chemical Producers' Association), the Canadian Consumer Specialty Products Association, the CEPA Industry Coordinating Group, Environmental Defence, and the Canadian Environmental Law Association. Furthermore, 17 of the 35 organizations (49%) have been on the SAC in at least two phases, three of which are health-related: the Canadian Institute of Child Health, Chemical Sensitivities Manitoba, and the Canadian Paediatric Society.

- In CMP3, 11 new members were added to the SAC, including two health-related organizations, the National Network for the Environment and Women's Health and the New Brunswick Lung Association, as well as five new industry groups and four other organizations. As of CMP3, the only health professional organization on the SAC was the Canadian Paediatric Society.

Appendix 5 contains detailed membership information. Overall, although it is clear that the SAC's membership has been refreshed to some extent over the lifespan of the CMP, it is also clear that representation from major health and public health professional organizations has been relatively limited. Moving forward, there are opportunities to diversify and broaden the range of stakeholder organizations involved in the SAC.

With regard to risk communication, Health Canada has communicated information on the health impacts of chemicals of concern in various ways: in print, online on the canada.ca (Chemicals Substances) and canada.ca/health websites, through consumer and industry trade shows, through social media and media outreach, as well as through 147 Chemical Awareness and Learning Module (CALM) sessions across Canada, reaching over 3,000 individuals, including Health Canada and Public Health Agency of Canada employees, early childhood educators and students, health professionals and students, seniors, First Nation communities, immigrants, town and city employees, and parents. Since the last evaluation, Health Canada and ECCC have begun publishing plain language summaries for high-profile CMP substances specifically for a non-technical (general population) audience. Furthermore, the public summary document was rebranded as an information sheet, with improvements to language and content, and risk assessment fact sheets were also developed.

In response to numerous drivers for change, including findings from the previous evaluation that identified risk communication as a weakness of the CMP, the program developed an updated approach to public outreach and risk communications, as articulated in the Environmental Health Public Outreach Strategy 2015-2021. The Strategy has guided recent outreach efforts and provides a framework for risk communications beyond 2020. The Healthy Home campaign, launched in December 2018, includes a range of new activities and messaging to encourage Canadians to take action to protect themselves from the risks of substances of concern. The campaign has an initial focus on parents of young children aged 0-6 years, but also speaks to other vulnerable populations and can be expanded over time. More recently, ECCC and Health Canada committed to developing a collaborative communications approach to better communicate risks from chemicals to the public, in

response to the findings and recommendations of the fall 2018 CESD Report on Toxic Substances.[7]

Most internal and external key informants, as well as expert panellists, agreed on the ongoing importance of risk communications as a component of the CMP. Suggestions for improving risk communications included delivering more targeted communications designed for specific audiences, leveraging existing communications networks and capabilities (for example, those of the NCP to disseminate information to Canadians in the North), and partnering more extensively with civil society organizations to design and deliver risk communications. The public education campaign undertaken by Health Canada's Radon Program, which involved collaborating with NGOs to release consistent messaging to the public, was cited as a successful model.

Other aspects of program design

Internal and external key informants, as well as expert panellists, emphasized that a future federal chemicals management program should continue to stay abreast of scientific developments and new and emerging issues. Many emphasized the need to address issues such as EDCs, vulnerable populations, occupational exposure, cumulative exposure and effects, and regrettable substitution, among others. These issues are well documented in the literature and are currently a focus of attention for regulatory agencies around the world.[8] As already noted, many of these issues were the subject of recommendations stemming from the Parliamentary Review of CEPA, and the program is already considering how they could be addressed in a future chemicals management program (see Appendix 5 for detailed information).

There was some disagreement among key informants on the future overall framework or objectives of the CMP, with some advocating for a hazard-based approach, rather than the CMP's current risk-based approach. Most expert panellists were supportive of the risk-based approach on the grounds that it is more scientifically defensible and more aligned with the approach taken by other jurisdictions, with the exception of the EU, in addition to being the approach that is required by current legislation. Another perceived advantage was that this approach allows regulators to focus limited resources on areas of greatest risk.

On the other hand, expert panellists also acknowledged the shortcomings of the risk-based approach, most notably, the need to continually update risk assessments based on new exposure data, as well as a general lack of hazard and exposure data to inform risk assessments. Similarly, although a few international key informants commented positively on Canada's risk-based approach to chemicals management, observing that it is similar to the one adopted by the WHO, it was also noted that the risk-based approach is associated with greater data requirements to inform effective decision making, which can be challenging when there are significant data gaps.

7 The CESD noted that "information on Health Canada's website was often unclear and difficult to find" and that ECCC's "communication activities to explain environmental risks were limited,"; there were also weaknesses that "made it difficult for Canadians to find information to make informed choices about toxic substances" (CESD, 2018).

8 While most key informants appeared to envision an expanded scope for the CMP in order to address these issues, a few industry key informants asserted that, as the assessment of the priority existing substances nears completion, it may be preferable to narrow or re-focus the program's scope or activities.

Expert panellists were of the view that hazard-based and risk-based approaches could and should co-exist in a complementary fashion within a future federal chemicals management program. Specific suggestions included conducting group assessments of structurally similar substances (as was done, for example, for phthalates) to help prevent regrettable substitutions, and incentivizing or encouraging the use of less hazardous, but functionally similar, substances (i.e., informed substitution). Overall, expert panellists emphasized the importance of developing a risk-based approach that is also preventative, citing the centrality of prevention as a principle within CEPA.

4.4.2 Efficiency and Resource Use

Overall, program partners spent 97% of planned CMP (B-base) resources between 2014-15 and 2017-18. CMP partners took various actions to improve efficiency during the period covered by this evaluation, including establishing a streamlined approval process for regulatory packages, implementing numerous measures to improve efficiency in risk assessment, and adopting a software suite to enhance information management and sharing.

Efficiency

During the period covered by this evaluation, CMP partners took numerous steps to improve efficiency in program processes and delivery. For example, in response to a recommendation from the previous evaluation, CMP partners implemented a LEAN process that resulted in a streamlined approval process for regulatory packages. According to internal key informants, this has been successful in reducing approval times, although some noted that the process is still fairly complex. The magnitude of the improvement was not quantified.

CMP partners also introduced numerous measures to address data needs and gain efficiency in risk assessments, in an effort to achieve the 2020 target. These measures include the following:

- developing a Risk Assessment Toolbox that sets out a tiered approach to risk assessment;
- establishing the CMP Data Needs Committee Steering Group within Health Canada to provide a governance process for targeted testing and research to support immediate risk assessment needs;
- adopting existing hazard characterizations from international partners, where available, and supplementing these with Canadian exposure scenarios;
- examining new approach methodologies for prioritization and risk assessment of data-poor chemicals through the use of in-vitro methods; and
- using approaches such as rapid screening, ecological risk classification of organic and inorganic substances, and application of Science Approach Documents to efficiently integrate health and ecological evaluation.

While internal key informants emphasized the program's successes in gaining efficiency and addressing data needs for risk assessment, particularly for the data-poor substances assessed during CMP3, they also reported that information gaps often remain. These include gaps in data obtained from industry, lack of information on substances in products throughout the supply chain, and insufficient hazard and exposure data, among others.

CMP partners also took the following measures:

- adopted a suite of information management software to improve efficiency in how reviews are conducted and how information is shared and accessed within and across Health Canada and ECCC;
- implemented improvements to communication and coordination; and
- developed a variety of policies, frameworks, standard operating procedures, and service standards; for example, implementing efficiency measures for the primary review of Cosmetic Notifications, which has reportedly produced a 66% decrease in the time required for these reviews.

Some internal key informants highlighted the program's efforts to proactively identify and plan for upcoming developments; for example, by collecting information on substances likely to be assessed in the future.

Resource use and adequacy

Overall, CMP partners spent 97% of planned B-base resources between 2014–15 and 2017–18, as shown in Table 3. Health Canada spent 98% of its planned funds overall, but underspent significantly on stakeholder engagement and risk communication (73% of planned funds were spent), although the absolute dollar value was small ($3.2 million), and underspent slightly on risk assessment and risk management. Conversely, Health Canada overspent on research by 19% ($9.9 million). It did not provide explanations for these variances.

ECCC spent 95% of its planned funds. The most notable area of ECCC underspending was monitoring and surveillance, where it spent 73% of planned funds; however, the absolute dollar value was small ($5.3 million in unspent funds). The most notable area of overspending was research, where the department spent 55% more than planned. Again, the associated dollar value was small (approximately $4 million in overspending). ECCC spending was close to what was planned for risk assessment and for compliance promotion and enforcement. Representatives of the Enforcement Branch reported that the Branch drew on A-base funds to supplement CMP funding for needed enforcement activities, estimating that $737,000 of its general funding budget was used over a period of five years to cover costs related to the implementation of the CMP. ECCC representatives reported that the department drew on A-base funds to support other CMP activities as well. In interviews, some representatives of both ECCC and Health Canada suggested that resources for ECCC's CMP activities may currently be inadequate, particularly for compliance promotion and enforcement. However, this view was not unanimous among program representatives.

Table 3: Planned and Actual CMP Expenditures, 2014-15 to 2017-18 ($M), B-base Funding[a]

Program activity	Health Canada				ECCC				TOTAL			
	Planned	Actual	Variance	Actual/ planned	Planned	Actual	Variance	Actual/ planned	Planned	Actual	Variance	Actual/ planned
Risk assessment	$87.52	$82.87	$4.65	94.69%	$14.66	$15.64	-$0.98	106.68%	$102.18	$98.51	$3.67	96.41%
Risk management	$69.15	$64.55	$4.59	93.36%	$54.23	$49.19	$5.04	90.71%	$123.38	$113.75	$9.63	92.19%
Compliance promotion and enforcement	$0.00	$0.00	$0.00	N/A	$12.06	$11.84	$0.22	98.20%	$12.06	$11.84	$0.22	98.20%
Research	$51.61	$61.53	-$9.92	119.23%	$7.17	$11.13	-$3.96	155.22%	$58.78	$72.66	-$13.88	123.62%
Monitoring and surveillance	$45.13	$43.92	$1.21	97.31%	$19.56	$14.29	$5.27	73.04%	$64.69	$58.21	$6.49	89.97%
Policy and program management	$10.69	$8.81	$1.88	82.43%	$0.00	$0.00	$0.00	N/A	$10.69	$8.81	$1.88	82.43%
Stakeholder engagement and risk communication	$11.77	$8.60	$3.18	73.01%	$0.00	$0.00	$0.00	N/A	$11.77	$8.60	$3.18	73.01%
ECCC internal services	$0.00	$0.00	$0.00	N/A	$9.55	$9.55	$0.00	100.00%	$9.55	$9.55	$0.00	100.00%
Overall	**$275.88**	**$270.29**	**$5.59**	**97.97%**	**$117.23**	**$111.64**	**$5.59**	**95.23%**	**$393.11**	**$381.93**	**$11.18**	**97.16%**

[a] Financial information provided by Health Canada and ECCC.

4.5 Performance – Achievement of Outcomes

4.5.1 Access to and Use of Information on Substances of Concern

There is some evidence, primarily anecdotal, that Canadians and stakeholder groups are accessing and using CMP information to avoid or minimize risks posed by harmful substances. Moving forward, a robust approach to measuring the effectiveness of the program's public outreach and risk communications activities will be essential to evaluating their success.

As was also the case in the last evaluation, there is limited information on the extent to which Canadians and stakeholder groups accessed and used CMP information to avoid or minimize risks posed by harmful substances during the period covered by this evaluation.

In 2015 and 2017, partly to address the recommendation from the previous evaluation to better understand the information needs of Canadians, Health Canada undertook two surveys that examined Canadians' awareness and understanding of environmental health risks and their information needs (TNS Canada, 2016; Ekos Research Associates, 2017). Both surveys asked respondents about the extent to which they used various sources when looking for information on health risks that may be present in their home. In 2015, 11% of respondents identified Health Canada's website as a source of information on health risks that may be present in their home, while in 2017, 60% of respondents identified Health Canada's website. The reason for these divergent findings is not clear, particularly since both surveys used similar methodologies and similarly worded questions.

The 2015 study also explored the extent to which respondents had used CMP information products, finding that one-fifth of respondents had used at least one Hazardcheck tool and that most of these took further action as a result; furthermore, 4% of respondents had heard of the CMP. The 2017 survey did not examine use and impact of Hazardcheck or other CMP risk communication products, nor did it examine awareness of the CMP. However, it found a high degree of trust among participants in Health Canada as a source of information.

Beyond these two studies, information provided by Health Canada indicates that recent public outreach and communications activities are reaching audiences. For example, during the first quarter (January to March 2019) of the Healthy Home Campaign, over 40,000 visitors accessed web content brought together under one campaign page. During this time, program partners posted on Facebook (six posts) and Twitter (26 posts), for a total of 328,747 impressions (where "impressions" refers to the number of times the content was displayed), with messages on topics such as chemical safety, mould, carbon monoxide, and lead. Promotional efforts were increased by posting a paid social media ad regarding "Locking Up Chemicals" on Facebook and Instagram that reached 172,563 unique users, with a total of 1,429,381 impressions. Advertising also included search engine marketing to promote the "Healthy Home" section of the Canada.ca website (Canada.ca/healthy-home - Canada.ca/maison-saine), with 186,000 impressions and 11,300 clicks between March 4 and 17. During this period, web visits were 12 times higher than before March 4. Finally, a variety of outreach materials and engagement strategies were piloted at 11 events, including

children and senior fairs, and home and garden shows, from late January to March 2019. During these pilot events, there were 3,413 interactions and 3,656 pieces of material were distributed.

There is also some anecdotal evidence of behavioural change at the organizational level as a result of Health Canada's recent communications activities. For example, following Health Canada's advisory on boric acid, several organizations issued warnings of the risks of boric acid when making slime and children's crafts, shared the Health Canada advisory, and posted alternative recipes for making slime that do not contain boric acid, with a reference to the advisory (Little Bins for Little Hands, 2018; Ontario Midwives, 2016; Today's Parent, 2016, 2017, 2018; University of Waterloo, 2017). Health Canada representatives reported that they have regularly received questions from the public through correspondence or at trade shows, asking how they can reduce risks, or for information on alternative chemical products, after having seen Health Canada's outreach products.

Finally, there is some evidence that specific interested stakeholders are accessing and using CMP information. For example:

- Feedback from Chemical Awareness and Learning Modules (CALM) participants indicates that a large majority of those who participated in these sessions and completed a feedback survey report in 2016-17 reported improved understanding (96%) and an intent to apply the information (93%).
- Territorial authorities have used information generated through the Northern Contaminants Program (NCP) to develop risk communications and public health messaging on the risks of contaminants in the North.
- Provinces and territories use the *Guidelines for Canadian Drinking Water Quality* (GCDWQs) to establish their own regulatory requirements for drinking water quality, and use the Canadian Environmental Quality Guidelines (CEQGs) to help manage surface water quality.
- Many external key informants reported that they use CMP information to inform their participation in stakeholder engagement.

In general, external key informants agreed that CMP information is useful for stakeholders who are keenly interested in and well equipped to understand and interpret it, such as NGOs and members of the Stakeholder Advisory Council (SAC), but is less accessible and useful to the general public. Information produced by the CMP is seen as overly technical, inadequately tailored to specific audiences, and too focused on CMP accomplishments, rather than providing information on risks and how Canadians can protect themselves.[9] As a result, external key informants believe members of the public would probably not consider the CMP their "first stop" for information on chemical substances, and suggested that many are probably not even aware of these materials. As previously described, the CMP has

[9] A few external key informants went further, questioning the assumptions underlying the CMP's risk communication activities. They noted that the public may have limited capacity to modify their behaviour and environment in a way to protect themselves from chemical substances, despite being aware of the associated risks. Therefore, changes in awareness may not translate into changes in behaviour. These key informants were of the view that placing responsibility for protection from chemical substances on consumers is contrary to the precautionary principle and the principle of pollution prevention within CEPA, which puts the onus on government to protect the environment and human health.

developed an updated approach to public outreach and risk communications that is intended to address some of these perceived weaknesses. Moving forward, a robust approach to measuring the effectiveness of the program's public outreach and risk communications activities, including regular surveys of the general public and targeted groups to gauge awareness and use of CMP information, will be essential to evaluating the success of the new strategy.

4.5.2 Compliance with Risk Management Measures

Some evidence suggests that industry understanding and awareness of risk management measures may have improved since the previous evaluation, and there is some evidence of industry compliance with certain measures. For CEPA instruments enforced by ECCC, a non-compliance detection level of 28% among inspected entities was reported for the period from 2014-15 to 2017-18. There is also evidence that industry has complied with non-regulatory measures under CEPA, and that these have been successful in achieving specific risk management objectives. In addition, Health Canada's cyclical enforcement projects for consumer products and cosmetics have uncovered instances of non-compliance among targeted entities.

Results from the CMP industry survey suggest that industry awareness and understanding of risk management measures have improved since the last evaluation, although results are not representative of all regulated industries and sectors. Among survey respondents who said that risk management measures have been implemented under the CMP that apply to them, 76% agreed they have a strong understanding of these measures, compared with 58% in 2014. Furthermore, 86% understand what actions they need to take to come into compliance, compared with 62% in 2014. In theory, improved industry understanding of risk management measures and necessary actions should eventually contribute to higher compliance.

Some compliance information is available for CEPA instruments enforced by ECCC. ECCC prioritizes its enforcement activity based on a variety of criteria and uses a targeted approach to inspections. In 2017-18, less than 2% of the regulated community was inspected (ECCC, 2018d). Because most regulations inspected are targeted (i.e., based on referrals), the rate at which non-compliance is detected is likely higher than when random inspections are conducted. As a result, the rate at which non-compliance is detected (the "detection level") cannot be generalized to the regulated community as a whole.

ECCC data indicates that, for CEPA regulations falling into a recently created "CMP/Toxics" group, the detection level was 28% between 2014-15 and 2017-18, and ranged from 0% to 67%, depending on the regulation. This is consistent with an internal analysis conducted by ECCC, which observed that "targeted inspections uncovered high rates of non-compliance: 25% for CEPA-regulated entities" (ECCC, 2018d). The detection level was highest for the following regulations: the Prohibition of Certain Toxic Substances Regulations (64%), Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (46%), and Chromium Electroplating, and Chromium Anodizing and Reverse Etching Regulations (38%).

By comparison, the last evaluation reported a compliance rate of over 80% among inspected entities for the period from 2011-12 to 2013-14. The rate ranged from 44% to 100%, depending on the regulation. ECCC representatives indicated that the compliance rate measures for the evaluations were based on calculations using two different databases with different attributes and structures. As a result, the methodologies used to calculate the "compliance rate for inspected entities" and the "detection level" are different, but the definitions are essentially the inverse of each other.

The PERC regulations were the subject of a pilot project initiated in CMP2 to develop a statistically valid methodology for determining compliance and the impact of focused compliance promotion activities. Following focused compliance promotion and enforcement activities on a random sample of facilities, the compliance rate with the PERC regulations for 2015-16 was found to be 62.8%, an 11.8 percentage point increase over 2012-13, when it was 51%. This example indicates that focused compliance promotion activities can be effective in increasing regulatory compliance.

In addition to the above information on compliance with regulations implemented under CEPA, ECCC has recently published reports on the effectiveness of two types of NRIs, namely Pollution Prevention (P2) Planning Notices and Environmental Performance Agreements (EPAs). Both reports show that these instruments have been successful in achieving specific risk management objectives.

- The report on the effectiveness of P2 Notices (ECCC, 2018b) summarizes the results of 10 completed Notices, of which three were implemented under the CMP: BPA in industrial effluents, mercury releases from dental amalgam waste, and mercury releases from mercury switches in end-of-life vehicles processed by steel mills. A fourth P2 Notice implemented under the CMP for siloxane D4 in industrial effluents has also been completed, but was not included in the report. The report noted that, overall, of the 563 facilities that implemented P2 plans to reduce environmental releases of 21 toxic substances, 92% were successful in achieving the risk management objective, and many of those that did not were still able to achieve considerable reductions. The report concluded that P2 Notices can be effective in changing industry behaviour and achieving results to help protect the environment and human health.
- The second report summarizes the results of 13 EPAs completed since the implementation of the Policy Framework for Environmental Performance Agreements in 2001 (ECCC, 2018a). Over 175 companies and facilities participated in these 13 EPAs to manage risks from selected pollutants, including substances deemed toxic. The primary objectives were fully met in 77% of agreements, partially met in 8%, and not met in 15%, although the report noted that the latter still had positive impacts and results.

Finally, some compliance information is available for risk management measures implemented by Health Canada under the CCPSA and the F&DA. For example, a cyclical enforcement project found 89% of slime, dough, and modelling clay samples to be compliant with boric acid requirements in the Toys Regulations, and the non-compliant products were recalled. As another example, a cyclical enforcement project to verify industry compliance

with the Cosmetic Ingredient Hotlist of cosmetic products containing methylisothiazolinone and the combination of methylisothiazolinone and methylchloroisothiazolinone, and to verify industry compliance with requirements for notification and labelling, found that 76% of samples were compliant with F&DA and the Cosmetic Regulations. Non-compliance resulted in one recall, one stop sale, and eight voluntary actions.

Because all of Health Canada's and most of ECCC's CMP-related inspections are targeted (i.e., not random), non-compliance rates identified through compliance and enforcement activities are presumed to be higher than across the regulated community as a whole.

4.5.3 Reduced Potential for Exposure/Reduced Threats from Harmful Substances

Human biomonitoring and environmental monitoring trend data are beginning to emerge to support future conclusions about whether risk management measures have achieved the program's intermediate outcome of reduced potential for exposure to harmful substances. To date, human biomonitoring data for BPA and lead show a general statistical decrease over time, while there is no clear trend for mercury and PBDEs. Environmental monitoring data for these substances show no clear trend.

The program continues to work on developing options for measuring the extent to which its activities have achieved its long-term outcome of reduced threats to the environment and human health from harmful substances. Related to this, the program has also committed to establishing a long-term systematic approach to evaluate how effective its actions are in controlling toxic substances, including setting measurable objectives, monitoring the achievement of these objectives and setting timelines for completion, in response to the fall 2018 CESD Report on Toxic Substances. There is a need to develop an approach to reporting on exposure and risk/threat reduction in way that is accessible to Canadians.

In the intermediate term, the CMP aims to reduce the potential for exposure to harmful substances through implementation of risk management measures. Achievement of this outcome is not expected for recently introduced risk management measures. During the period covered by this evaluation, CMP partners continued work on Substance-based Performance Measurement (SBPM) to measure the effectiveness of risk management actions for selected toxic substances that have had risk management measures in place for several years. Performance analysis and reporting for polybrominated diphenyl ethers (PBDEs), BPA, mercury, and lead is occurring over the period of 2017 to 2019, and a second round of candidates for SBPM has been selected, but not yet approved.

Recent analysis of human biomonitoring data completed by Health Canada indicates a general statistical decrease over time for BPA and lead, with no clear trend for mercury and PBDEs. Health Canada's analysis also indicates a decline over time in phthalates, PFOS, and PCBs in the general population, as well as dioxins and furans in breast milk. Arsenic and cadmium levels have remained stable, while mercury has remained stable in the general population, but has declined in the North. Environmental monitoring data for BPA, lead, mercury, and PBDEs show no clear trend (Millenium EMS Solutions, 2018). It is important to note that the time period covered by these analyses differs across these substances, as does

the timing of implementation of risk management measures. However, according to data provided by the program, all four are subject to risk management measures implemented during the CMP (i.e., in 2006 or later).

Key informants had mixed views about the extent to which this outcome has been achieved and many were simply unable to comment. Some pointed out that, to the extent that risk management measures have been implemented, they should, in theory, have reduced exposure to harmful substances. Others, however, including both internal and external key informants, noted that, because many risk-managed substances are bio-accumulative and persistent and may remain in the environment for many years after they are no longer used, evidence of the impacts of risk management measures will only become apparent in human biomonitoring and environmental monitoring trend data over a longer time span. This, in turn, speaks to the importance of ongoing monitoring and surveillance activities. Finally, some external and industry key informants believe that exposure has not been meaningfully reduced, either because risk management measures have been inadequate or do not address the primary source of exposure, or because there has been insufficient enforcement.

In the long term, the CMP aims to reduce threats to the environment and human health from harmful substances. The program has invested resources in exploring various options for measuring this outcome, but has not yet identified a preferred approach, due in large part to the numerous challenges and considerable conceptual and methodological complexity involved, including difficulties with attribution in terms of disaggregating the impacts of the CMP from other variables.

The fall 2018 CESD Report on Toxic Substances made several observations relevant to this outcome, noting that, despite some progress, ECCC and Health Canada "had not completed work to address our 2009 recommendation to assess whether they were meeting their overall objectives to reduce the risks of toxic substances to human health and the environment." The report recommended that ECCC and Health Canada "establish a long-term, systematic approach to evaluate how effective their actions are in controlling toxic substances, including setting measurable objectives, monitoring the achievement of these objectives, and setting timelines for completion." Both ECCC and Health Canada agreed with this recommendation, and a task team has been formed to address it.

As a first step, the program published the BPA performance evaluation report (human health component) in December 2018, which reported a 96% decrease in exposures of infants who were bottle fed formula in 2014, compared to the highest exposure estimate in the 2008 BPA final screening assessment (Health Canada, 2018d). The report concluded that significant progress had been made toward achieving the risk management objective of achieving the lowest level of release to infant formula from BPA-containing food packaging and from polycarbonate baby bottles that is technically and economically feasible, and toward achieving the human health objective of minimizing the exposure of infants to BPA to the greatest extent practicable.

Finally, it should be noted that the conceptual distinction between the CMP's intermediate outcome (risk management measures reduce the potential for exposure to harmful substances) and its long-term outcome (reduced threats to health and the environment from harmful substances) may not be clear to lay audiences. Related to this, the program's current

efforts to measure and report on exposure and threat reduction are, understandably, highly technical. For example, publically available reports on the first four cycles of the CHMS, which report on human exposure to environmental chemicals based on human biomonitoring, are geared to scientific, regulatory, and public health professionals, and are not readily comprehensible to members of the lay public. It will be important for the CMP to develop an approach to reporting on exposure, and threat and risk reduction that is accessible and resonates with Canadians, while still being scientifically valid.

4.5.4 Unintended Consequences

A key positive unintended consequence of the CMP is the international recognition that Canada has gained for its global leadership in chemicals management. Regrettable substitution, where industry replaces toxic chemicals with others that may be equally harmful, appears to be the main unintended negative consequence.

The main positive unintended consequence stemming from the CMP is the international recognition that Canada has gained for its global leadership in chemicals management. International key informants identified numerous perceived strengths of Canada's approach, including its clarity, transparency, pragmatism, flexibility, and comprehensiveness. They also highlighted Canada's capacity-building work in other countries and its willingness to collaborate internationally. International key informants emphasized the importance of Canada continuing its international engagement and leadership efforts.

While some key informants suggested that the CMP has produced negative unintended consequences on consumer behaviour, certain industrial sectors, and the economy, there is no objective evidence to substantiate this. At the present time, the main negative unintended consequence of the program appears to be the phenomenon of regrettable substitution, a process by which industry replaces toxic chemicals by other similar chemicals that may be equally harmful. Regrettable substitution is documented in the literature and has been acknowledged by chemical regulatory agencies as an unintended outcome of activities to assess and manage risks from some harmful chemicals. Canada is currently considering options for preventing regrettable substitution. Although the program does not appear to have plans to address regrettable substitutions that have already taken place, it has initiated a project to identify possible trends in the use of new substances compared to existing substances that could potentially indicate that regrettable substitution is occurring.

4.5.5 Performance Measurement

Although the CMP is a long-standing program with a well-developed performance measurement infrastructure, generating basic program information in a timely manner remains a significant challenge. Work is ongoing to develop a centralized approach to information collection and management, which should help to resolve this issue. The program is also working on developing an approach to performance measurement post-2020, with an emphasis on measuring the effectiveness of risk management efforts, strengthening performance measurement for public outreach activities, and establishing a methodology for measuring the CMP's long-term outcome of reducing threats to health and the environment from harmful substances.

The CMP is a long-established program with a well-developed performance measurement infrastructure. The logic model and performance measurement framework were last updated in September 2017 and January 2018 respectively, and a CMP Performance Indicators Inventory, containing over 30 performance indicators, has been created.

In addition, the CMP has been incorporated into some relevant Performance Information Profiles (PIPs) at Health Canada and ECCC. At Health Canada, these include the Healthy Environments and Consumer Safety Branch's Health Impact of Chemicals and Water Quality PIPs, the Health Products and Food Branch's Food and Nutrition Program PIP and its Biological and Radiopharmaceutical Drugs Program PIP, as well as the Pest Management Regulatory Agency's Pesticides Program PIP. At ECCC, these include the Substances and Waste Management PIP and the Compliance Promotion and Enforcement – Pollution PIP. Most relevant performance indicators from each of these PIPs have been included in the CMP Performance Indicator Inventory.

While the evaluation was unable to validate whether all of the indicators contained in the inventory are regularly tracked by the program, performance information is regularly collected and reported to both internal and external audiences. Program partners prepare dashboard reports and other reports for internal audiences, and report to the public through the annual CMP progress reports, the CEPA Annual Report, departmental annual reports, and the GCInfobase.

Nevertheless, based on the experience of this evaluation and the previous one, it remains challenging for program partners to produce and agree on basic information in a timely manner, including information about program activities and outputs. Program representatives spent considerable time and effort in producing and verifying basic information to be included in this report, such as the number of substances assessed since the inception of the CMP, the number of substances deemed toxic as a result of those risk assessments, and the number of risk management measures implemented for substances deemed toxic as a result of those risk assessments. In some cases, despite these efforts, discrepancies have remained (e.g., the number of amendments and additions to the Cosmetic Ingredient Hotlist since the inception of the CMP), to the extent that certain data has been deliberately excluded from the report (e.g., the number of substances deemed toxic as a result of CMP risk assessments).

Program representatives indicated that the lack of consistent use of the existing information management and information technology systems are part of the reason for these challenges. At present, information is entered in a variety of ways using a variety of information management tools, and generating overview statistics and reports is difficult because not all required information is stored in the same repository (GoC, 2018a). The program has begun setting out a strategy to develop a centralized and streamlined approach to capturing, managing, and approving information to support performance management, reporting, and evaluation and audits (GoC, 2018a). Ultimately, the aim is to develop a centralized information system to avoid duplication and enhance efficiency.

Currently, program partners are developing an approach to performance measurement post 2020 (GoC, 2018d), with plans to do further work on measuring the effectiveness of risk management efforts, strengthen performance measurement for public outreach activities, and establish a methodology for measuring the long-term outcome of the program (reducing threats to health and the environment from harmful substances), including identifying and agreeing on the nature and number of sample substances.

5.0 Conclusions

The CMP has made significant progress towards its flagship commitment to address priority existing substances. Due to considerable health, environmental, and other societal costs associated with toxic chemicals, the risks posed by chemicals continues to be an important issue that will require a robust federal chemicals management program. Although the current program is due to sunset, key issues related to chemicals still exist, new concerns in chemicals management continue to emerge, and growth in the global chemical industry is projected, meaning that it will be important for the Government of Canada to address the issue of chemicals management, now and in the future. A federal chemicals management program is also critical to fulfill the Government of Canada’s domestic statutory obligations and international commitments

Since its inception in 2006, the CMP has addressed a large majority of priority existing substances, put in place risk management measures for substances deemed toxic under CEPA, and made progress in its other functional activity areas. The program spent 95% of planned resources between 2014-15 and 2017-18 and implemented a number of operational efficiencies, but is not able to report basic program information, including information about program activities and outputs, in a timely manner.

There is some evidence that Canadians and stakeholder groups are accessing and using CMP information to avoid or minimize risks posed by harmful substances, as well as some evidence demonstrating industry compliance with certain risk management measures. There is limited evidence at the present time to support conclusions about whether the CMP has reduced the potential for exposure to harmful substances, although biomonitoring and environmental monitoring trend data are beginning to emerge for some substances that have had risk management measures in place for several years. The program does not yet have an approach to measuring reduced health and environmental threats from harmful substances, primarily due to conceptual and methodological limitations in disaggregating the impacts of the CMP from other variables. The program is also not able to produce and agree

on basic program information, including information on program activities and outputs, in a timely manner.

Areas for future focus include existing and emerging concerns, such as endocrine-disrupting chemicals, vulnerable populations, occupational exposure, cumulative exposure and effects, and regrettable substitutions, as well as enhancing stakeholder engagement, implementing improvements to information collection and management, and measurement and reporting of results.

6.0 Recommendations

Although the current CMP is due to sunset in March 2021, there is a clear need for an ongoing federal chemicals management program. In addition to the recommendations below, the evaluation findings highlighted several areas that the CMP should take into account for future planning, including addressing the 2017 ENVI report and strengthening core program functions beyond risk assessment.

The 2017 ENVI report identified 87 recommendations based on data collected in 2016, many of which relate to issues that were also identified as part of the current evaluation. These issues include health inequality and vulnerable populations, substitution and alternative assessments, as well as new and emerging issues, such as endocrine disruptors, aggregate exposure, biotechnology, and cumulative and synergistic effects of substances. The evaluation findings reinforce the need for the CMP to continue its ongoing efforts to address recommendations stemming from the ENVI report.

The evaluation findings also highlighted the importance of ongoing risk assessment, while recognizing the need to continue to support other core components of the CMP. Moving forward, it will be important to continue risk assessment work and improve assessment approaches, while also strengthening other core CMP functions, including risk management, research, monitoring and surveillance, compliance promotion and enforcement, and stakeholder engagement and risk communications.

Recommendation 1: Revitalize mechanisms for stakeholder engagement.

While there is widespread agreement that stakeholder engagement is an important strength of the CMP and should be an ongoing part of the program, there are opportunities to revitalize mechanisms for stakeholder engagement moving forward. Most notably, although the membership of the SAC has been refreshed over the lifetime of the CMP, it has historically had limited representation from major health and public health professional associations. Diversifying the range of stakeholder organizations involved in the CMP to include health professionals associations and other relevant groups could help bring new perspectives to the program. This is likely to be particularly important if the CMP is significantly redesigned after 2021.

Recommendation 2: Improve program performance measurement to facilitate program management, decision making, and meaningful reporting to the public.

This evaluation identified several opportunities for the CMP to improve its approach to performance measurement and reporting, some of which address long-standing issues for the program. After almost 15 years, it remains challenging for program partners to produce and agree on basic information about the CMP in a timely manner. The implementation of a system for accurately collecting and managing basic program information, including information about program activities and outputs, that is accessible to all program partners, should be a priority.

The program's current efforts to measure and report on exposure and threat reduction are highly technical, and there are challenges in disaggregating the impacts of the CMP from other variables. It will be important for the CMP to develop an approach to reporting on exposure and threat and risk reduction that is accessible and resonates with Canadians, while still being scientifically valid.

Appendix 1 – Roles and Responsibilities

Health Canada

Healthy Environments and Consumer Safety Branch (HECSB)

Within Health Canada, HECSB is the lead branch for the CMP initiative, and within HECSB, the Safe Environments Directorate (SED) is the lead CMP directorate. SED is responsible for collecting information on use patterns, conducting risk assessments, developing risk management strategies, and implementing them when this is not the responsibility of other directorates, conducting scientific research, conducting monitoring and surveillance related to chemicals, implementing risk communications activities, and program management. A variety of bureaus within SED, including the Chemicals and Environmental Health Management Bureau (CEHMB), the Existing Substances Risk Assessment Bureau (ESRAB), the Risk Management Bureau (RMB), and the New Substances Assessment and Control Bureau (NSACB), carry out these responsibilities. In addition, the RMB works with the Regulatory Operations and Enforcement Branch (ROEB) to deliver regionally-specific public outreach activities that augment nationally-focused activities, and the Water and Air Quality Bureau (WAQB) works in collaboration with provinces and territories to develop the *Guidelines for Canadian Drinking Water Quality.*

Also within HECSB, the Environmental Radiation and Health Sciences Directorate (ERHSD) is responsible for conducting scientific research to identify possible hazards or substances or groups of substances, the toxicological mechanisms of substances, and the means by which Canadians may be exposed to substances, as well as delivering the biomonitoring component of the CMP and providing overall coordination of the CMP monitoring and surveillance program. The Environmental Health Sciences and Research Bureau (EHSRB) is responsible for these research, monitoring, and surveillance activities.

Finally, within the Consumer and Hazardous Products Safety Directorate (CHPSD), the Consumer Product Safety Program's role is to manage the potential health and safety risks posed by consumer products and cosmetics in the Canadian marketplace. The program is delivered through a risk-based, post-market approach under the authority of the *Canada Consumer Product Safety Act* (CCPSA) and the cosmetic provisions of the *Food and Drugs Act* (FDA). In the context of the CMP, the CHPSD has two key functions: risk assessment and risk management, including laboratory activities. CHPSD works with their program partners in the Regulatory Operations and Enforcement Branch (ROEB), who deliver compliance, enforcement, and outreach activities.

Health Products and Food Branch (HPFB)

HPFB is the scientific and regulatory authority for health products and food. Within HPFB, CMP funding was received to conduct risk assessments, implement risk management strategies, conduct scientific research, conduct monitoring and surveillance, conduct stakeholder outreach, and for program management purposes.

CEPA requires premarket notification and an assessment of risks to health and to the environment for substances new to Canada that exceed prescribed quantities. Currently, new substances in F&DA-regulated products undergo assessment by the SED as required by the New Substances Notification Regulations (NSNR) under CEPA for environmental and health risks due to environmental exposure. Within HPFB, the Policy, Planning, and International Affairs Directorate (PPIAD) is responsible for leading the development of a modernized, effective, and more internationally aligned regulatory framework that is more appropriate for these substances, and is supported by SED and ECCC's Science and Technology Branch (STB) in this activity. PPIAD was also mandated under the CMP with researching and conducting stakeholder consultations on existing and potential non-regulatory initiatives (NRIs), and determining if the role that NRIs play in the management of F&DA products, in particular their release to the environment, could be improved or developed.

The Food Directorate (FD) received CMP funding to gather information and conduct dietary exposure estimates of food additives, food flavouring agents, food ingredients, substances naturally occurring in foods, food contaminants, and substances used in food packaging materials and incidental additives to inform the CMP assessment and risk management of CMP substances as needed. The FD leads any food-related risk management activities that are implemented under the F&DA. The FD also performs monitoring and surveillance activities of CMP substances in foods to ensure that chemicals are not present in foods at levels that are harmful to human health, and to fill exposure data gaps, as well as conducting research projects on toxicological mechanisms of CMP substances in foods and nanomaterials with food implications. Finally, the FD conducts food industry-specific engagement activities, such as presentations and responses to public inquiries and media requests, to inform food industry stakeholders of the implications of CMP risk assessment and management outcomes as they relate CMP implications to the food industry.

Other HPFB directorates, including the Biologics and Genetic Therapies Directorate (BGTD), the Natural and Non-Prescription Health Products Directorate (NNHPD), the Therapeutic Products Directorate (TPD) and the Veterinary Drugs Directorate (VDD) support the CMP by providing important data, knowledge and expertise, and will contribute to the implementation of risk management actions, where required, for existing substances where the source of concern is in a product regulated under the F&DA.

Regulatory Operations and Enforcement Branch (ROEB)

ROEB leads compliance and enforcement and complementary science programs to inform and protect Canadians from health risks associated with products, substances, and their environment. Compliance and enforcement programs are delivered in partnership with HECSB, HFPB and PMRA.

ROEB's CMP work involves compliance and enforcement for consumer products and cosmetics. This includes responding to stakeholder inquiries about regulatory requirements under the CCPSA and F&DA, ensuring compliance with the Acts and Regulations, promoting CMP awareness and compliance, and conducting regional surveillance.

ROEB also informs Canadians on health risks and safe use of chemicals. ROEB works closely with HECSB's SED and CHPSD to develop and implement engagement tools and activities, such as CMP publications and environmental health guides, a social marketing campaign, and the direct delivery of chemical awareness workshops. ROEB develops regional partnerships with a wide variety of public and private organizations across the country to increase information dissemination capabilities and reach more targeted audiences, including youth, new immigrants, and Indigenous peoples.

Communications and Public Affairs Branch (CPAB)

CPAB's work helps to make sure that Canadians have access to the information they need to take action on their health and safety. CPAB is a full-service communications branch that directly supports Health Canada and the Public Health Agency of Canada in their missions, in accordance with the Government of Canada Communications Policy.

CPAB provides a broad spectrum of services, including strategic communications, issues management, crisis and risk communications, media services, digital communications, creative services, marketing, internal communications, and an external ombudsman office for the F&DA. CPAB is also the primary liaison with the Privy Council Office's (PCO) Communications section and Communications in the Minister's Office.

Specific to the CMP, CPAB advises on communications activities and messaging to maximize their impact and effectiveness. CPAB also helps to ensure CMP messaging resonates with Canadians, reaches the appropriate target audiences, and motivates them to take action.

Pest Management Regulatory Agency (PMRA)

PMRA's mandate is to prevent unacceptable risks to human health and the environment through the regulation of pest control products. Under the *Pest Control Products Act* (PCPA), the Agency regulates pest control products for use in Canada, develops policies and guidelines, promotes sustainable pest management, looks to improve the regulatory process to increase efficiency, and carries out compliance and enforcement; however, as of July 15, 2019, ROEB carries out compliance and enforcement activities on behalf of PMRA. The Agency contributes to risk assessments under the CMP when pest control products are implicated in CMP priorities, and where appropriate, takes action relating to those pesticide active ingredients or formulants, consistent with the requirements of the PCPA. The PMRA does not receive any funding with respect to existing substances, but may participate, due to its expertise, in discussions regarding chemicals with pesticide uses.

As part of the CMP, PMRA is continuing to work on the re-evaluation of previously approved pesticides, according to legislated timelines and requirements under the PCPA, as well as on continuing to monitor health and environmental incidents related to pesticides, analyzing trends and sales data, and taking regulatory action as needed.

Environment and Climate Change Canada (ECCC)

Environmental Protection Branch (EPB)

EPB is ECCC's focal point for expertise on the department's legislation, regulations, and other tools to influence the behaviour of Canadians to improve Canada's natural environment. Four of EPB's five directorates are involved in the implementation of the CMP. The Energy and Transportation Directorate (ETD) and the Industrial Sectors Chemicals and Waste (ICW) Directorate share the responsibility of managing the risks from various industrial sectors in Canada through the development, implementation, compliance promotion, and performance measurement of risk management instruments.[10] In addition, the ICW Directorate has the primary risk management coordination role for the CMP. ICW is also responsible for substance-based performance measurement. EPB also undertakes stakeholder engagement and engages internationally on multilateral agreements related to the sound management of chemicals and waste.

The Legislative and Regulatory Affairs Directorate (LRAD) supports regulatory development and implementation through the provision of training and advice. In particular, the LRAD provides advice on amendments to ECCC's statutes, as well as on relevant amendments to other departments' Acts and on private members' bills. It also supports effective environmental risk management by supporting the consistent application of statutory authorities and providing regulatory training to risk managers. The Environmental Protection Operations Directorate (EPOD) conducts selected compliance promotion of CMP risk management instruments and manages the Environmental Emergency Regulations that include some CMP substances.

Science and Technology Branch (STB)

Within STB, the Science and Risk Assessment Directorate (SRAD) consists of a number of divisions that play many different roles across the CMP's functional areas. The Program Development and Engagement Division undertakes information gathering, stakeholder engagement, coordination of all publications and assessment scheduling, coordination of regulatory packages, New Substance Notifications, Significant New Activity (SNAcs) Notices and Orders for new and existing substances, managing substance lists in the Canada Gazette, coordination of the New Substances Regulatory Working Group, program policy and planning, and program coordination for CMP delivery. The Emerging Priorities Division coordinates research and monitoring activities in collaboration with other directorates within STB (Water, Air, Wildlife) and ICW, conducts nanotechnology and biotechnology risk assessments, and develops environmental quality guidelines. The Ecological Assessment Division is responsible for conducting all the ecological assessments for new and existing chemicals under the CMP, examining new approach methodologies for prioritization and risk assessment of chemicals, creating science approach documents, identifying substances that

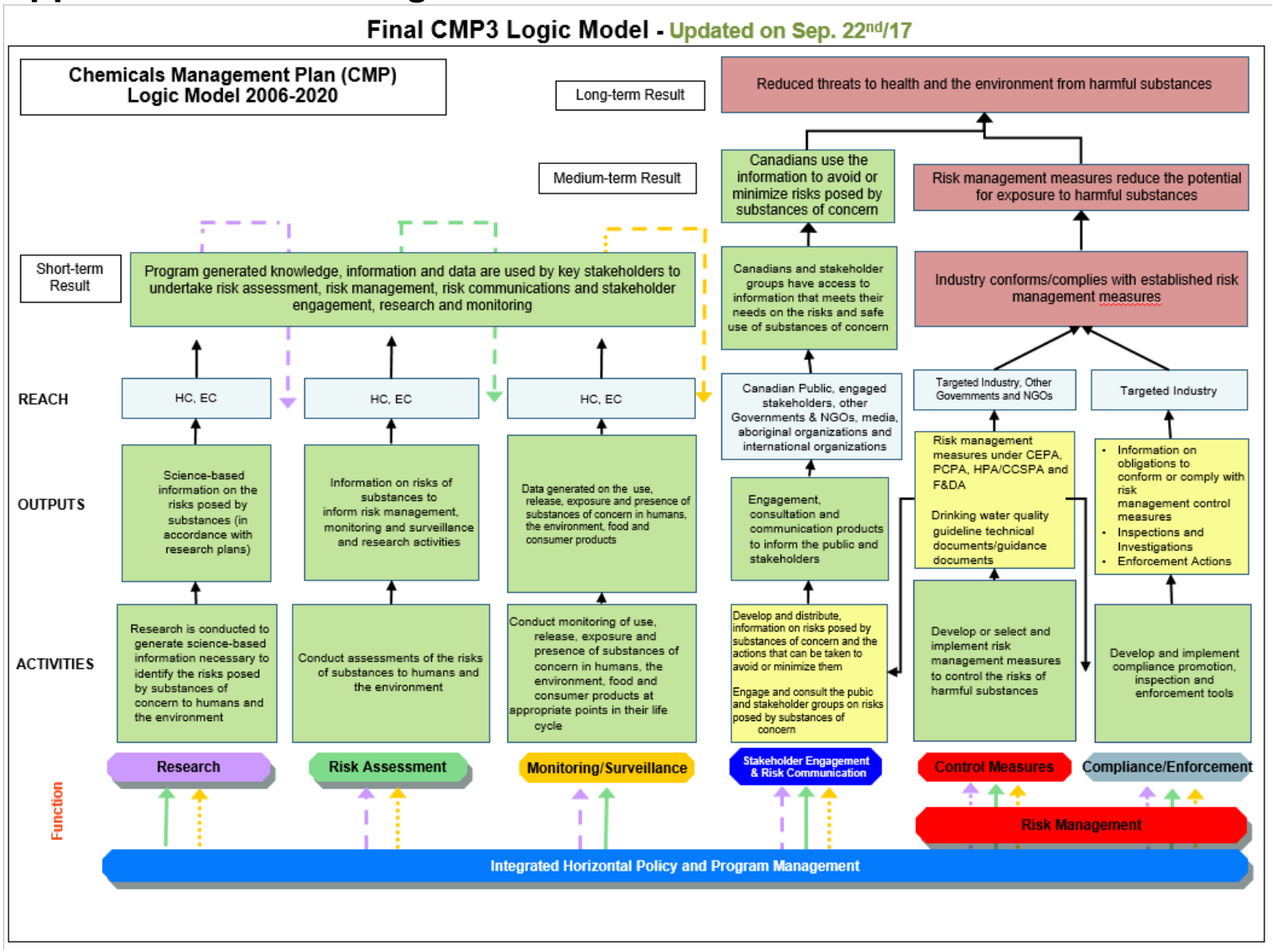
[10] CSD's scope of responsibility includes the industrial, consumer, and commercial chemical sectors, as well as related sectors such as electrical and electronic equipment; ETD's scope of responsibility includes the oil and gas, transportation, and electricity sectors; and ISD's scope of responsibility includes the mining and mineral operations, forestry and forest products, and wastewater sectors.

should be added to the CMP's forward work plans via IRAP and based on new and emerging information on new and existing substances, as well as developing guidance.

Enforcement Branch (EB)

The EB verifies that individuals, companies, and government agencies comply with pollution prevention and conservation goals of environmental Acts and regulations administered by ECCC, such as CEPA. Enforcement officers are responsible for conducting on- and off-site inspections to verify compliance and, if necessary, conduct investigations into suspected violations. The overarching goal is to return facilities to compliance in a timely manner. The Environmental Enforcement Directorate (EED) also takes part in the regulatory development phase of the CMP, working with other ECCC programs to ensure proposed regulations are clear and enforceable. The Enforcement Services Directorate develops and delivers training to enforcement officers.

Appendix 2 – CMP3 Logic Model



Appendix 3 – Evaluation Matrix

EVALUATION OF THE CHEMICALS MANAGEMENT PLAN (CMP) – EVALUATION MATRIX		
Evaluation issues and questions	**Indicators**	**Potential data sources**
RELEVANCE		
Issue #1: Continued need for the program		
1. Will there be a continued need for a federal chemicals management program after 2020?	▸ Assessment of the extent to which CMP objectives and targets have been met or are likely to be met by 2020 ▸ Evidence that ongoing work and new/emerging issues related to chemicals management would benefit from or require a federal response, post-2020 ▸ Presence or absence of other programs (federal, provincial, territorial, or other) addressing similar objectives or issues in chemicals management ▸ Expert and stakeholder assessment of continued need for a federal chemicals management program, post-2020	Document and data review Literature review Key informant interviews (internal and external) Expert panel
2. To what extent do health and environmental impacts of chemicals differ systematically across population groups? Are there certain population groups that should be targeted by the CMP?	▸ Evidence of the extent to which health and environmental impacts of chemicals differ systematically across population groups ▸ Expert and stakeholder perspectives on need for CMP to target specific population groups	Document and data review Literature review Key informant interviews (internal and external) Expert panel
Issue #2: Alignment with government priorities		
3. Since the previous evaluation, have there been significant changes to Government of Canada, Health Canada or ECCC priorities and roles regarding chemicals management?	▸ Alignment of CMP objectives and activities with current federal government priorities (e.g., environmental protection, climate change, innovation, reconciliation, SGBA+)	Document review: - recent Speeches from the Throne and Budgets - program planning and performance measurement documents
Issue #3: Alignment with federal roles and responsibilities		
4. Do Health Canada and ECCC activities in delivering the CMP align with federal government roles and responsibilities?	▸ Correspondence of CMP activities with Health Canada and ECCC roles and responsibilities	Document review: - program documents - relevant federal Acts and Regulations
PERFORMANCE		
Issue #4: Achievement of expected outcomes		
5. **Use of information by Health Canada and ECCC recipients.** To what extent do Health Canada and ECCC recipients use knowledge,	▸ Documented evidence that knowledge, information, and data is used by Health Canada and ECCC recipients to inform activities	Document and data review, including PMF and PIP Key informant interviews (internal)

EVALUATION OF THE CHEMICALS MANAGEMENT PLAN (CMP) – EVALUATION MATRIX		
Evaluation issues and questions	**Indicators**	**Potential data sources**
information, and data on substances of concern to undertake risk assessment, risk management, risk communications and stakeholder engagement, research, and monitoring?	▸ Level of satisfaction of Health Canada and ECCC recipients with knowledge, information, and data (including relevance, quality, utility, and timeliness)	
6. **Access to and use of information by Canadians and stakeholder groups**. To what extent do Canadians and stakeholder groups have access to information that meets their needs on the risks and safe use of substances of concern, and use this information to avoid or minimize risks posed by these substances?	▸ Documented evidence of program efforts to make information available to Canadians and stakeholder groups (outreach activities, educational materials distributed, risk communications, etc.) ▸ Proxy indicators of access including page views on CMP website, listserv subscription rates, and reach of News Canada publication ▸ Stakeholder perspectives on extent to which Canadians and stakeholder groups have access to and use information generated by Health Canada and ECCC to avoid or minimize risks posed by substances of concern	Document and data review, including PMF and PIP Key informant interviews (internal and external)
7. Industry compliance. To what extent does targeted industry conform to/comply with established risk management measures?	▸ Number and percentage of targeted industry that are in conformity to or in compliance with established risk management measures ▸ Targeted industry self-reports	Document and data review, including PMF and PIP Survey of industry
8. **Reduced potential exposure to harmful substances.** To what extent have risk management measures reduced the potential for exposure to harmful substances?	▸ Exposure or release levels for a select group of substances where risk management measures are in place (SBPM) ▸ Key informant perspectives on degree to which risk management measures have reduced the potential for exposure to harmful substances	Document and data review, including PMF and PIP Key informant interviews (internal and external)
9. **Reduced threats to health and the environment from harmful substances.** To what extent have threats from harmful substances to health and the environment been reduced?	▸ Long-term risk of a selected group of representative or significant harmful substances where risk management actions have been put in place	Document and data review, including PMF and PIP
10. Are there differences in the achievement of expected outcomes across different population groups? If so, to what extent and in what ways?	▸ Evidence of differential impact across different population groups	Document and data review Key informant interviews (internal and external)
11. Have there been any positive or negative unintended consequences of the CMP?	▸ Evidence of unintended consequences ▸ Evidence of issues arising from regrettable substitutions	Document review Literature review Key informant interviews (internal and external)

EVALUATION OF THE CHEMICALS MANAGEMENT PLAN (CMP) – EVALUATION MATRIX		
Evaluation issues and questions	**Indicators**	**Potential data sources**
Issue #5: Efficiency		
12. Is the CMP on track to produce planned outputs? What factors have facilitated or hindered the program's ability to meet its targets?	▸ Number and nature of outputs for each key CMP activity: - risk assessments completed and percent achievement of 2020 goal of assessing all existing substances of concern - risk assessments completed for other substances, including older pesticides, food additives, contaminants and food packing material, in-commerce list substances and new substances - risk management measures developed/implemented - research studies conducted - monitoring and surveillance projects completed - compliance and enforcement strategies developed and implemented - risk communications and stakeholder engagement activities undertaken ▸ Number and percent of targets and service standards being met ▸ Stakeholder perspectives and accounts of factors that have facilitated or hindered achievement of planned outputs and targets (e.g., information management and information technology)	Document and data review (PMF and PIP) Key informant interviews (internal)
13. Has the CMP taken measures to improve the efficiency of key processes and activities? Have these measures been successful at improving efficiency?	▸ Evidence that the program has taken measures to improve efficiencies ▸ Stakeholder perspectives on the success of these measures at improving efficiency	Document review Key informant interviews (internal and external) Survey of industry
14. Does the design of the CMP adequately recognize and address the possibility of differential health and environmental impacts of chemicals across different population groups? What, if any, changes are needed, post-2020?	▸ Evidence that key CMP activities recognize and address the possibility of differential health and environmental impacts across different population groups ▸ Stakeholder perspectives on adequacy of current approach and suggestions for changes	Document review Key informant interviews (internal and external)

EVALUATION OF THE CHEMICALS MANAGEMENT PLAN (CMP) – EVALUATION MATRIX		
Evaluation issues and questions	**Indicators**	**Potential data sources**
15. How effectively does the CMP engage or collaborate with stakeholders in carrying out CMP activities? What, if any, changes are needed, post-2020?	▸ Evidence that program partners engage/collaborate with stakeholders (industry, P/T, international, and others) ▸ Stakeholder perspectives on effectiveness of engagement and collaboration ▸ Stakeholder suggestions for ways to improve engagement and collaboration	Document review Key informant interviews (internal and external) Survey of industry
16. Are resources adequate and appropriately allocated across key activities to achieve the expected outcomes?	▸ Comparison of planned vs. actual expenditures overall and by program activity and partner ▸ Stakeholder perspectives on adequacy and allocation of resources	Document and data review (financial information) Key informant interviews (internal)
17. What changes to program design or delivery could improve CMP effectiveness and efficiency, post-2020?	▸ Stakeholder perspectives on potential changes to program design or delivery to improve effectiveness and efficiency, including potential changes to: - Overall program framework or objectives - Program activities - Program processes - Roles/responsibilities of Health Canada and ECCC - Program governance - Other elements of design or delivery as identified by stakeholders (e.g., addressing multiple exposures) ▸ Approaches taken by other jurisdictions to chemicals management, and assessment of applicability to Canadian context	Document review Literature review (international comparisons) Key informant interviews (internal and external) Survey of industry Expert panel
18. Is an effective performance measurement system in place? Is performance measurement information used in CMP decision making? What, if any, changes are needed?	▸ Existence of a performance measurement system ▸ Appropriateness of indicators for measuring expected outcomes and possible alternatives ▸ Evidence that the performance measurement system considers SGBA+ ▸ Evidence that relevant performance data is being collected, tracked, and used in decision making ▸ Evidence that performance information adequately measures relevant outcomes ▸ Perceived utility of performance data for decision making	Document review (PMF and PIP) Key informant interviews (internal)

Appendix 4 – Evaluation Methods

Literature review

The literature review gathered information from both peer-reviewed (scientific and other academic) journals and grey literature, such as industry journals, newspapers, magazines, and websites. The scope of the literature review was a small number of evaluation questions related to relevance and program efficiency, as shown in the evaluation matrix. With respect to relevance, the literature review provided evidence of the extent to which there is an ongoing need for the CMP by examining new and emerging issues in chemicals management, as well as (as part of that review) the extent to which there is evidence that differential health impacts of chemicals may warrant targeting of CMP activities. In addition, the literature review included a jurisdictional comparison component that aimed to identify potential best practices or changes to program design or delivery that could be contemplated in the Canadian context.

Document and data review

The document and data review provided historical and contextual information for the CMP and responded directly to virtually all of the evaluation questions, as shown in the evaluation matrix. Documents and data examined as part of this task included following:

- legal and fiscal authorities, terms and conditions, and other official government documents;
- planning documents, such as policy and strategic plans, committee reports, Departmental Plan, and Departmental Results Reports;
- operational documents, such as work plans and business operational plans;
- documents describing program management and governance, such as Memoranda of Understanding (MOU), committee terms of reference, and meeting minutes;
- accountability documents and data, such as Performance Measurement Frameworks (PMF) and Performance Information Profiles (PIP), as well as associated performance measurement data and reporting (annual reports, progress reports, etc.);
- information available on the CMP website;
- relevant legislation, regulations, and guidelines;
- financial information to support assessment of program efficiency; and
- other relevant internal and publicly available documents and data.

Zotero software was used to organize and manage the material collected through these methods.

Industry survey

A bilingual, web-based survey of industry stakeholders was conducted. Guidance and direction from Public Works and Government Services Canada on public opinion research and surveys limited the evaluation to surveying individuals who were known to have had contact with Health Canada or ECCC for reasons related to the CMP. Thus, the survey sample was

provided by program partners in the form of several Excel spreadsheets. After cleaning to remove duplicates, the final sample consisted of 6,831 unique email addresses.

The Public Health Agency of Canada's and Health Canada's Office of Audit and Evaluation (OAE) sent an email to stakeholders in the sample advising them that the evaluation was taking place and that they would shortly receive an email invitation containing the survey link. The survey was launched on December 14, 2018.

Undeliverable or bounce back messages were received for a significant proportion (18.9%, n=1,290) of the email addresses in the sample. As such, the final valid sample was considered to be 5,541. Five rounds of email reminders were issued to respondents who had not yet completed the survey on the date of each reminder in order to increase the response rate. Field operations closed on January 13, 2019. The survey achieved 346 completions, representing a response rate of 6.2%. By comparison, the industry survey conducted in 2014 as part of the previous evaluation of the CMP achieved 260 completions, representing a completion rate of 4.7%.

Key informant interviews

Key informant interviews were used to gather informed opinions and observations on the evaluation questions from stakeholders involved in, or familiar with, the CMP. The key informant interviews contributed qualitative evidence to address almost all evaluation questions. Tailored interview guides were designed for following categories of key informant:

- Program representatives, including representatives of both Health Canada and ECCC;
- Industry stakeholders, including both industry associations and individual firms;
- External stakeholders, including non-governmental organizations (NGOs), researchers and academics, provincial and territorial government representatives, and Indigenous organizations; and
- International stakeholders.

A total of 62 interviews were conducted with 100 key informants. Both individual and group interviews were conducted. Interviews were conducted between December 3, 2018 and February 21, 2019. The table below provides the distribution of completed interviews by respondent category. Interview responses were analysed thematically using Nvivo software.

Table 4: Distribution of Interviews by Key Informant Category

Key informant category	Number of interviews	Number of key informants
CMP program representatives	**29**	**62**
Health Canada	12	25
ECCC	17	37
Industry stakeholders	**11**	**13**
Industry associations	9	10
Individual firms	2	3
External stakeholders	**17**	**19**
NGOs	9	10
Researchers and academics	3	3
Provincial and territorial or other federal government representatives	2	3
Indigenous organizations	2	2
Other external stakeholders	1	1
International stakeholders	**5**	**6**
Total	**62**	**100**

Expert Panel

An expert panel was held after preliminary findings from the other lines of evidence had emerged. The panel gathered experts' views on selected key themes and issues arising from the evaluation, namely alignment with federal priorities, the future framework and design of the CMP, including program scope and activities, and approaches to demonstrating program effectiveness or impact.

The expert panel took place via teleconference on April 25, 2019 with nine participants who were recruited from a list of potential participants identified by Health Canada, ECCC, and the evaluation team. The panel was comprised of individuals with particular knowledge and expertise relating to chemicals management issues in Canada, and included researchers and academics (n=3), representatives of NGOs (some of whom also held other roles, such as academics or health professionals) (n=2); representatives of international regulatory agencies and organizations (n=2); and former program employees (n=2). Participants received an information package in advance of the discussion and were offered an honorarium of $300 for their participation.

Limitations and Mitigation Strategies

Most evaluations face constraints that may have implications for the validity and reliability of evaluation findings and conclusions. The following table outlines the limitations encountered in this evaluation and describes mitigation strategies that were put in place to ensure that the evaluation findings can be used with confidence to guide program planning and decision making.

Table 5: Limitations and Mitigation Strategies

Limitation	Impact	Mitigation Strategy
As was the case for the previous evaluation of the CMP, this evaluation found it challenging to obtain a clear picture of the current status of program activities and establish basic facts about the program. Examples include the total number of substances that have been assessed as of a given date, the number of risk management measures proposed and implemented, and the number of toxic substances covered by the risk management measures proposed and implemented, to name a few examples.	Data presented in this report may not be consistent with data reported by the program elsewhere.	None. The CMP has implemented improvements to information technology which are expected to facilitate information management and reporting in the future.
Due to the wide range of regulated industries and sectors potentially affected by the CMP, a comprehensive and representative list of regulated industry was not available for purposes of the industry survey sample. Related to this, some of email addresses included in the sample did not belong to industry stakeholders, but rather to non-governmental organizations or other non-industry stakeholders. The full extent to which non-industry stakeholders may have been included in the survey sample is unknown, as there was no systematic way of identifying such email addresses and removing them from the sample. Finally, due to undeliverable email addresses, almost one-fifth of the intended target audience did not receive the survey invitation.	The lack of a comprehensive or representative list of industry stakeholders means that the survey is not representative of the regulated industries or stakeholders. The presence of non-industry stakeholders in the sample may have had the effect of reducing the overall response rate, and the large proportion of undeliverable email addresses reduced the pool of stakeholders who were afforded an opportunity to complete the survey.	Survey findings are used in conjunction with other lines of evidence. No conclusions are drawn solely on the basis of the survey results.
External key informants were identified based on purposive sampling. Budget considerations placed constraints on the number of external key informant interviews that could be completed.	External key informant interview findings cannot be interpreted as representing the views of all stakeholders or categories of stakeholders.	Interview findings are used in conjunction with other lines of evidence. No conclusions are drawn solely on the basis of interview data.
Limited quantitative information to support analysis of efficiency and economy.	Quantitative analysis of efficiency and economy was limited primarily to comparing planned and actual spending.	Analysis is supplemented by qualitative information from interviews and international comparisons.

Appendix 5 – Supplementary Information

Table 6: Key Issues and New or Emerging Concerns and Risks in Chemicals Management

Issue/risk	Discussion	CMP response to date
Endocrine-disrupting chemicals (EDCs)	EDCs are substances that can alter the normal functions of hormones and produce adverse developmental, reproductive, neurological, and immune effects in humans and wildlife; such effects can occur even at very low levels of exposure, particularly if exposure occurs at a vulnerable time, such as gestation and lactation, postnatal development, puberty, or reproduction (Endocrine Society, 2018; OECD, 2018c; US EPA, 2015b; WHO/UNEP, 2013). EDCs are widely used in agricultural, industrial, and manufacturing sectors, and in a range of everyday products including toys, cosmetics, detergents, food and food packaging, paint, furniture, and electronics, among many others. As a result, human exposure to EDCs is "multi-source, multi-pathway, and multi-route" and not readily modified through personal choices (Meeker, 2012). In recent years, regulatory agencies have focused attention on assessing and managing the risks posed by EDCs. In the European Union (EU), for example, pesticides and biocides must be formally assessed for endocrine-disrupting properties, and in principle, active substances that meet the criteria for endocrine disruptors will not be approved except in specific circumstances.	In Canada, some CMP risk assessments have considered endocrine-related effects when data is available, and Health Canada and ECCC maintain active research programs on EDCs as required under CEPA (Health Canada, 2017a). Canada also contributed to Organization for Economic Cooperation and Development (OECD) guidance on standardized test guidelines for evaluating chemicals for endocrine disruption (OECD, 2018b), and in 2018, the CMP Science Committee considered ways to advance consideration of EDCs under CEPA (ECCC & HC, 2018), pursuant to Canada's commitment to address ENVI recommendations concerning EDCs.
Vulnerable populations	Vulnerable populations either have greater exposure to chemicals or are more susceptible to the effects of exposure (Parliament of Canada, 2017). Vulnerable populations include, but are not limited to, pregnant and breastfeeding women, children, seniors, Indigenous peoples, and workers. At the present time, vulnerable populations are considered in CMP risk assessments based on available information, with the exception of workers. However, the program's primary focus to date has been infants and children, pregnant women, and Indigenous peoples, as well as those living near commercial or industrial facilities (Health Canada, 2018c).	CMP partners have begun to explore how protection of vulnerable persons can be enhanced in a future chemicals management program. In November 2018, Health Canada, following up on one of the recommendations contained in the ENVI report, published a consultation document seeking input on a proposed definition of "vulnerable populations" and identifying specific population groups that are included within this definition due to greater biological susceptibility or greater exposure (Health Canada, 2018c).
Occupational exposure	The increased health risks, including cancers, reproductive dysfunction, and respiratory diseases, among others, that are associated with exposure to chemicals, including pesticides, solvents, diesel engine exhaust, crystalline silica, and many others in a wide range of occupational settings are well-documented in the literature. Under the CMP, occupational data (e.g., occupational exposure studies) may sometimes be considered in CMP risk	In a recent draft issue paper, Health Canada acknowledged that, although occupational exposure has historically been considered outside the scope of CMP risk assessment on the grounds that workplace health and safety is an area of provincial/territorial (P/T) jurisdiction, nothing in CEPA formally excludes

Issue/risk	Discussion	CMP response to date
	assessments, including extrapolation of exposure levels to the general population (e.g., workers using similar products that may be available to consumers), but conclusions about toxicity are not made on the basis of occupational exposure. As the last evaluation noted, the Canadian approach is at odds with the practice of regulatory agencies in the United States (US), Australia, and the EU (Health Canada, 2015).	its consideration (Health Canada, 2018b). The paper also noted that occupational exposure is often a driver for risk management action in jurisdictions where it is considered, including for chemicals that have been assessed in Canada. Program representatives reported that Health Canada has been working with provinces and territories to identify potential opportunities to better protect workers, learning from international chemicals management agencies on their approaches, and consulting with labour, industry, and P/T occupational health and safety regulators. In addition, Health Canada partners in the CMP are developing a joint proposal for an integrated approach to protecting workers from occupational exposure.
Cumulative exposure and effects	Human and ecological risk assessment of chemicals undertaken by regulatory agencies has traditionally focused on exposure to individual chemicals; combined effects from multiple chemicals and sources has not been routinely assessed (Evans et al., 2016; Kienzler et al., 2016). Since, in the real world, humans and the environment are typically exposed to more than one chemical at a time from multiple sources, there has been growing recognition of the need to consider cumulative exposures and effects in risk assessment. Various approaches to cumulative risk assessment (CRA) have been proposed and employed. While some approaches consider only the cumulative effects of chemical stressors, some authors emphasize the need to also consider non-chemical stressors, such as low income, poor housing quality, age, genetic characteristics, and pre-existing health conditions, on the grounds that doing so is important to understanding disparities in vulnerability and risk across populations, and developing appropriate risk management options (Sexton, 2012; Solomon, Morello-Frosch, Zeise, & Faust, 2016).	Canada has been active in international efforts through the World Health Organization's (WHO) International Programme on Chemical Safety and the OECD to advance work in this area (Meek et al., 2011; OECD, 2018a). CMP partners published a proposed approach to CRA of certain phthalates in August 2015 (ECCC & HC, 2015) and a CRA framework for pesticides in April 2018 (PMRA, 2018). In its 2018 follow-up to the ENVI report, the Government of Canada acknowledged the need for greater consideration of cumulative effects and exposure in chemical risk assessments (GoC, 2018c).
Regrettable substitution, alternatives assessment, and informed substitution	The term "regrettable substitution" refers to the use of chemicals that are functionally similar to, but no less harmful than, the chemicals they are intended to replace (Zimmerman & Anastas, 2015). Regrettable substitution has occurred with bisphenol A (BPA), pesticides, flame retardants, and chemicals widely used in a range of consumer products, notably per- and polyfluoroalkyl substances. The desire to prevent regrettable substitution, as well as growing consumer and societal interest in moving toward greener, more sustainable products and processes that do not contain or use harmful chemicals, is prompting	In the Canadian context, CMP partners have commissioned two research studies, collaborated with the CMP Science Committee on a combined discussion paper and report on informed substitution (Health Canada, ECCC, & CMP Science Committee, 2018), and consulted with stakeholders on informed substitution.

Issue/risk	Discussion	CMP response to date
	regulatory agencies to incorporate consideration of safer alternatives to chemicals of concern through the use of alternatives assessment, which has been defined as "a process for identifying, comparing, and selecting safer alternatives to chemicals of concern…on the basis of their hazards, performance, and economic viability" (MA TURI, 2013), and informed substitution. A variety of frameworks and approaches have been developed, and work continues, including at the international level, on refining these approaches and articulating guidance and tools to support regulatory agencies, industry, and other stakeholders in these efforts. Some regulatory jurisdictions, including the EU as well as some US states (California, Washington, and Maine, under state authority), already require priority substances (or substances of very high concern) to be assessed for the potential for safe and feasible substitution (Jacobs, Malloy, Tickner, & Edwards, 2016). Others, such as the US (federal authority), emphasize voluntary approaches. The EPA's Safer Choice Program includes a product labelling certification program and the Safer Chemicals Ingredient List, intended to help manufacturers find safer alternatives to harmful chemicals.	

Table 7: Alignment with Federal Priorities

Priority	Discussion
Environmental protection	Given its overarching goal to protect human health and the environment from harmful substances, the CMP is generally well aligned with the current government's commitment to protecting the environment. In the future, greater emphasis on alternatives assessment and informed substitution, currently being explored by the program, could further align it with this priority. Some external key informants, as well as expert panellists, suggested that the CMP should do more to reflect the principle of pollution prevention within CEPA, not only by encouraging informed substitution and a move toward green chemistry, but also by implementing more robust risk management.
Climate change adaptation and mitigation	At present, the CMP is less directly aligned with the Government of Canada's climate change priority. Greater attention to climate change may be warranted, since it may bring about changes, such as greater release of chemicals into the environment as the Arctic permafrost thaws. Expert panellists highlighted the need to more directly address issues related to climate change, suggesting that this could be done through monitoring and surveillance to track changes in exposure, especially in the North, informed substitution (e.g., to preference chemicals with a smaller carbon footprint), and developing a response to managing chemical incidents or emergencies stemming from natural disasters or extreme weather events (i.e., identification and remediation of fugitive chemicals).
Diversity and equality, including SGBA+	SGBA+ has been integrated to some extent into CMP core functions. Health Canada and ECCC acknowledge sex- and gender-based differences in health risks and outcomes and use scientific information where available to consider the potential impacts of exposure to harmful substances on vulnerable populations such as expectant mothers, children, and First Nations and Inuit communities. In response to the ENVI report, the program is examining ways to enhance consideration of vulnerable populations in chemicals management activities in the future. Expert panellists agreed that the CMP should give more consideration to vulnerable populations, including considering long-term effects, multiple exposures, and socio-economic stressors that are important to vulnerability.
Reconciliation with Indigenous peoples	Indigenous peoples may be more vulnerable to the health impacts of environmental contaminants as a result of numerous factors. For example, Arctic and Northern populations who rely on traditional lifestyles and foods may be exposed to chemicals used in other parts of the world, which are then transported and deposited to Arctic regions through climatic processes; they may also lack access to clean drinking water and safe housing (Health Canada, 2011). Other risk factors include living in close proximity to contaminated sites, such as mines and associated waste and tailings, and engaging in cultural practices that are pathways of exposure (US EPA, 2015a). While reconciliation is not at present an explicit objective of the CMP, the program has recognized that First Nations and Inuit communities are more vulnerable to the potential impacts of exposure to harmful substances, and some risk assessments, such as the assessment for selenium, have specifically considered exposure on the part of First Nations and Inuit. Program representatives reported that the CMP works with the Environmental Public Health Division at Indigenous Services Canada (ISC) in various ways (for example, by sharing science and collaborating on environmental impact assessments and risk communications), and has maintained capacity contracts with the Assembly of First Nations (AFN) and Inuit Tapiriit Kanatami (ITK) to support their participation in engagement efforts and to conduct risk communication activities targeted to their respective communities. Expert panellists and some key informants encouraged more systematic consideration of Indigenous peoples in CMP activities, including risk assessment, risk management, and risk communications. The importance of monitoring and surveillance was also emphasized, including environmental monitoring of country foods in the context of climate change and the need for an ongoing human biomonitoring program for First Nations on-reserve, a population that is not currently included in the Canadian Health Measures Survey (CHMS).

Open and transparent government	Through its stakeholder engagement and risk communication activities, the CMP supports the current government's emphasis on openness and transparency. In addition, the program makes a variety of information about program activities, including both technical and plain language information, available on its website. As already noted, the ENVI report included several recommendations to expand and strengthen duties and rights for transparency, particularly with respect to products of biotechnology, as well as public participation, accountability, and consultation that directly implicate the CMP. Expert panellists also weighed in on the issue of openness and transparency, but were primarily concerned about whether and the extent to which peer-reviewed scientific literature is considered in CMP risk assessments. They highlighted a need for greater transparency with regard to the specific data, methods, and models used in assessments. In the context of transparency, the program published an approach in October 2018 to disclose confidential information and promote transparency in chemicals management in order to "achieve an appropriate balance between transparency and industry's right to protect confidential information" and "help with publishing robust rationales for risk assessment decisions" (Government of Canada, 2018).
Science and innovation	The CMP is a science-based program whose key activities, including risk assessment and risk management, are informed by scientific evidence. In addition, the program generates scientific evidence to inform risk assessment and risk management through its research and monitoring and surveillance activities. Furthermore, the program aligns with the government's innovation priority by developing and integrating new methods and tools into core CMP functions, including risk assessment. Expert panellists identified opportunities for more collaborative work with university-based researchers, so that the CMP can benefit from the advanced facilities and equipment available in academic research settings.

Table 8: Membership of the SAC, CMP1 to CMP3

Name		CMP1	CMP2	CMP3
Assembly of First Nations	Indigenous	X	X	X
Inuit Tapiriit Kanatami	Indigenous	X	X	X
Canadian Chemical Producers' Association/Chemical Industry Association of Canada*	Industry	X	X	X
Canadian Consumer Specialty Products Association	Industry	X	X	X
CEPA Industry Coordinating Group	Industry	X	X	X
Environmental Defence	Environmental NGO	X	X	X
Canadian Environmental Law Association	Environmental NGO	X	X	X
Canadian Petroleum Products Institute/Canadian Petroleum Products Association	Industry	X	X	
Consumers' Association of Canada	Other NGO	X	X	
Canadian Institute of Child Health	Health NGO	X	X	
Food and Consumer Products of Canada	Industry	X	X	
Crooked Creek Conservancy Society of Athabasca	Environmental NGO	X	X	
Electronics Product Stewardship Canada	Other NGO		X	X
Canadian Paint and Coatings Association	Industry		X	X
Chemical Sensitivities Manitoba	Health NGO		X	X
Retail Council of Canada	Industry		X	X
Canadian Paediatric Society	Health professional association		X	X
Canadian Cancer Society	Health NGO	X		
Canadian Public Health Association	Health professional association	X		
United Steelworkers	Labour	X		
Communications, Energy and Paperworkers Union of Canada	Labour	X		
Home Hardware	Industry	X		
Metis National Council	Indigenous		X	
Canadian Association of Importers and Exporters	Industry		X	
Canadian Steel Producers Association	Industry			X
Canadian Tire Corporation	Industry			X
National Network on Environment and Women's Health	Health NGO			X
New Brunswick Lung Association	Health NGO			X
Canadian Cosmetic Toiletry and Fragrance Association	Industry			X
Responsible Distribution Canada	Other NGO			X
Ecojustice	Environmental NGO			X

Name		CMP1	CMP2	CMP3
Consumers Council of Canada	Other NGO			X
Maritime Aboriginal Peoples Council	Indigenous			X
Mining Association of Canada	Industry			X
Canadian Vehicle Manufacturers Association	Industry			X
Source: SAC Membership lists provided by the program. *Organization's name changed.				

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