

Canada's approach to plastic pollution

Microplastics Health Effects Webinar Series

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October 19, 2020



Outline

1. Canadian context
2. Science Assessment of Plastic Pollution
3. Plastics research & monitoring in Canada
4. Potential regulatory agenda
5. Next steps



Canadian context

Prime Minister announces intent to ban harmful single use plastics where warranted and supported by science
(June 2019)

Microbeads regulations
July 2018

Canadian Council of Ministers of the Environment (CCME) strategy on zero plastic waste
Nov 2018

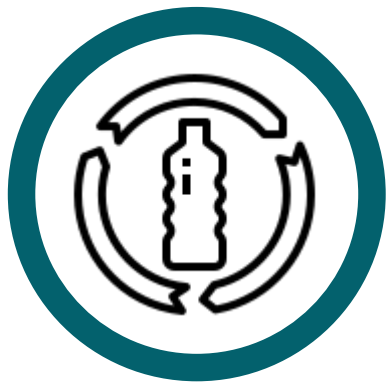
Canada launches Oceans Plastics Charter
June 2018

Canada's Plastics Science Agenda
July 2019

1. Draft Science assessment of plastic pollution
2. Increasing Knowledge on Plastic Pollution (IKPP) call for proposals
(Feb 2020)

1. Final Science assessment of plastic pollution
2. Discussion paper on integrated management approach
3. Proposed order to add plastic manufactured items to Schedule 1 of the Canadian Environmental Protection Act
(Oct 2020)

Science Assessment of Plastic Pollution: Purpose



Summarize the current state of the science regarding potential impacts of plastic pollution on the environment and human health



Guide future research



Inform decision-making on plastic pollution in Canada

Science Assessment of Plastic Pollution: Introduction

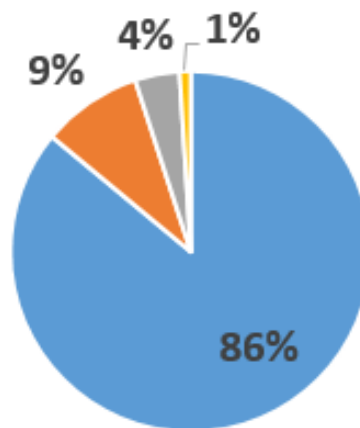
- Global plastic production has increased over the past decades, **at a rate faster than any other material**
- In Canada, total sales of plastic are estimated at **\$35 billion**
- An estimated 1% of Canadian plastic waste (equivalent to **29 kilotons**) was released to the environment in 2016

Macroplastic: plastic particles greater than 5 mm in size

Microplastic: plastic particles less than or equal to 5 mm in size

Microfibre: specific type of microplastic defined as being fibrous in shape and less than or equal to 5 mm in length

Distribution of plastic waste in Canada (2016)



Science Assessment of Plastic Pollution: Occurrence

ENVIRONMENTAL OCCURRENCE



- Globally, **single-use plastic** items are one of the most common types of macroplastics found on **shorelines**
- Microplastics are abundant in **water bodies (e.g., oceans and lakes)**, on **shorelines** and in **sediments**



- **Microfibres** are the most abundant type of microplastics found in water globally



- **Groundwater** is likely less exposed to microplastic pollution than surface waters
- Microplastics are also found in **soils**, and have been detected in **indoor and outdoor air**

Science Assessment of Plastic Pollution: Occurrence

OCCURRENCE IN FOOD AND DRINKING WATER



Current data on the occurrence of microplastics in food is limited. Most of the information that is available is on findings in **seafood**



Microplastics have been detected in some **bottled water** samples outside of Canada



Microplastics are detected in some studies of **tap water** outside of Canada

Science Assessment of Plastic Pollution: Effects on the Environment and Human Health

- Potential effects may be related to the physical impacts of the plastics or from the chemicals present in or on plastic

Effects arising from plastics

Environment

- **Macroplastic** pollution has been shown to cause physical harm to living organisms (e.g., by entanglement or ingestion)
- Some studies indicate that **microplastic** exposure can lead to developmental and reproductive effects or mortality; however, a similar number of studies indicate no effects

Human health

- Human exposure to **macroplastic** is not anticipated to be a concern
- There is limited information on the human health effects of **microplastics**. Some studies report adverse effects in laboratory animals and in humans; however the health effects cannot be linked to the general population

Science Assessment of Plastic Pollution: Effects on the Environment and Human Health

Potential effects of chemicals in or on plastic

- Effects from the transport of chemicals depend on the properties of the plastic, the receiving environment, and the chemical added to or picked up by the plastic
- Current literature suggests that the **impact on living organisms from chemicals transported in or on plastics is limited**, and
- Recent reviews by the World Health Organization (WHO), the European Food Safety Authority (EFSA) and the Food and Agriculture Organization of the United Nations (FAO) indicate a **low concern for human health from chemicals present on microplastics** from food or water

Science Assessment of Plastic Pollution: Findings

- There are many sources that contribute to plastic pollution
- Macroplastics have been shown to cause physical harm to environmental receptors
- Information on the impacts of microplastics to human health and the environment is limited
- Action is recommended to reduce macro and microplastics that end up in the environment

Research is recommended in the following areas:

- Development of **standardized methods** for sampling, quantifying and characterizing and evaluating the effects of macro and microplastics
- Further understanding of **human exposure** to microplastics and the effects of microplastics on **human health**
- Further understanding of the **ecotoxicological effects** of microplastics
- Expanding and developing consistent **monitoring** efforts to include lesser characterized environmental compartments such as soil

Plastics research & monitoring funding programs

- Funding programs such as the Increasing Knowledge on Plastic Pollution (IKPP), the Plastics Science for a Cleaner Future program (PSCF) and the Northern Contaminants Program (NCP) address some of the research gaps identified in the Science Assessment of Plastic Pollution

The Increasing Knowledge on Plastic Pollution (IKPP) focuses on human health effects and ecotoxicological effects

- Up to a maximum of **\$200,000 per project**, over **two years (2020-2022)**.
- Projects to be funded will address the effects of microplastics in aquatic and terrestrial environments, including the effects of environmentally relevant concentrations of microplastics in various species and settings.

Plastics research & monitoring funding programs

Plastics Science for a Cleaner Future program (PSCF) focuses on detection and characterization of plastic pollution, effects on the environment, wildlife and human health

- Up to a maximum of **\$1 M per project**, over **four years (2021-2025)**.
- Projects to be funded will address the detection of plastics in understudied environments, methods development, and generating new effects data.

The Northern Contaminants Program (NCP) is enhancing support for research and monitoring of plastics in Northern environments and wildlife

- The NCP engages Northerners and scientists in researching and monitoring of long-range contaminants in the Canadian Arctic.
- Approximately **\$2.0M over two years (2020-2022)** will be used to detect, quantify, and characterize plastic pollution in northern environments and wildlife, generating more data on this issue.

Health Canada microplastics research in water

Testing Canadian drinking water for microplastics

- Pilot study tested drinking water (intake, post-treatment and within distribution system) from five drinking water plants and bottled water in two of these facilities
- Study assessed microplastics in each step of the treatment and bottling processes to evaluate whether treatment/bottling impact microplastic concentrations
- Collaboration with McGill University
- Pilot study results indicate 91-92% removal efficiency for particles > 20 µm, but also highlights some methodological challenges for measuring and characterizing microplastics

Gaps addressed:

- Concentrations in drinking water

Health Canada microplastics research in air

1. Microplastics in New Homes Research Study

- Microplastics are being measured in settled house dust as a component of the New Homes Air Quality Study (survey of 40 new homes)

2. Microplastics Air Pollution Laboratory Experiment (MAPLE) Study

- This project developed and validated methods for collecting and characterizing MP <math><2.5\ \mu\text{m}</math> in diameter in fine particulate air samples ($\text{PM}_{2.5}$).
- Method will be applied to additional indoor and outdoor fine particulate air samples.

3. Microplastics in non-exhaust vehicle particulate emissions

- Study is a review of tire and brake wear (TBW) emissions as a contributor to traffic-related air pollution (TRAP) in Canada, and includes analysis of microplastics in ambient air



Health Canada microplastics research

Other ongoing and planned studies

- Method development study on the detection and characterisation of microplastics and nanoplastics in bottled water
- Toxicity study to examine detection of microplastics in tissues following 14-day oral exposure in rodents
- Developmental toxicity study on microplastics using chicken embryos
- Research study investigating the transformation of microplastics exposed to drinking water oxidants and its effects on sorption and leaching of emerging chemicals of potential health concern

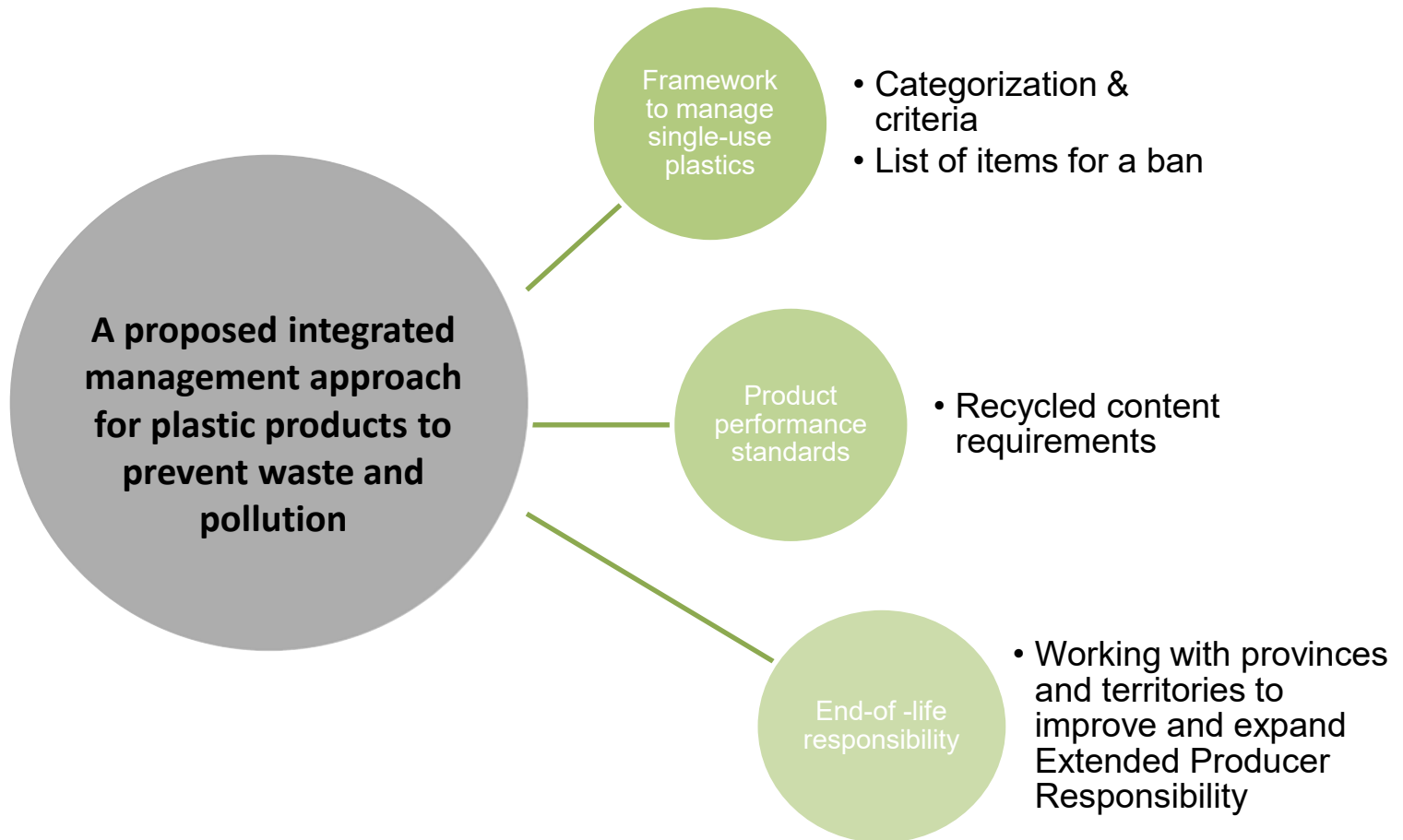
Potential regulatory agenda

- The comprehensive federal agenda to work towards eliminating plastic pollution includes
 - banning single-use plastics, where warranted and supported by science
 - introducing product performance requirements (e.g. recycled content) to support sustainable end-markets for recycled plastics and the zero plastics goal; and
 - working with provinces and territories to strengthen collection and recovery through Extended Producer Responsibility
- The *Canadian Environmental Protection Act, 1999* (CEPA) would allow most measures; it requires a stepped approach:



Risk
management
options
(Discussion
Paper)

Integrated Management Approach: Discussion Paper



Banning harmful single-use plastics

- Environment and Climate Change Canada has identified six single-use plastic items as potential candidates for a total, partial or conditional ban
- Consultations will inform development and implementation of regulations, including phase-in periods, reporting requirements, appropriate exemptions
- Draft regulations will be posted on Canada Gazette I for consultation in 2021; discussions will be ongoing for the development of other measures to support the implementation of this framework

Items identified as potential candidates for a ban

1. Checkout bags
2. Straws
3. Cutlery
4. Stir sticks
5. Six-pack rings
6. Food service ware made from problematic plastics

Next Steps

- Continued domestic and international engagement
- Continue to increase research capacity to address data gaps
- Public consultation on the integrated management approach (Discussion paper) and the proposed order to add plastic manufactured items to Schedule 1 of CEPA (comment period closes December 9th, 2020)
- Draft regulations on the ban to be published in Canada Gazette, Part I in 2021

Thank You !



For more information on plastics initiatives in Canada please visit:

<https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/zero-plastic-waste/canada-action.html>

To comment on the integrated management approach please visit:

<https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/consultations/plastics.html>

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