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# CHEMICAL SUBSTANCES IN CANADIAN MUNICIPAL WASTEWATER: GET YOUR DATA HERE!

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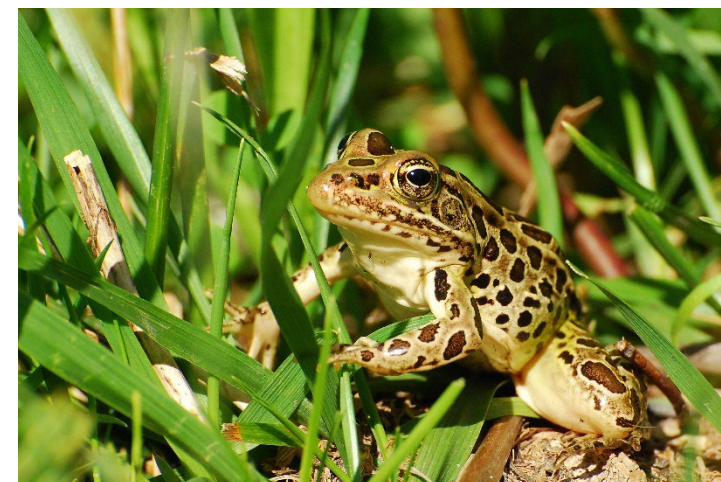


# OUTLINE

- The Chemicals Management Plan (CMP)
- Monitoring & Surveillance in support of CMP
- Wastewater Monitoring Program
- Open Government and Open Government Portal
- Wastewater data available on the Open Government Portal
- Uses of substance data
- Benefits of data sharing

# THE CHEMICALS MANAGEMENT PLAN (CMP)

- Launched by the Government of Canada in 2006 as a commitment to protect human health and the environment from the risks of harmful chemicals
- Co-led by Health Canada and Environment and Climate Change Canada (ECCC)
- Designed to:
  - Take action on the highest priority substances
  - Provide transparency and predictability through
    - Clear priorities and timelines
    - Ongoing engagement with stakeholders and the public
  - Invest in research and monitoring
  - Align work on chemicals across regulatory programs



# ECCC MONITORING PROGRAMS

- Water
- Air and precipitation
- Sediment
- Aquatic biota (fish)
- Terrestrial biota (birds)
- **Wastewater influents, effluents and biosolids**



# CMP WASTEWATER MONITORING PROGRAM

- Wastewater effluents and residuals (solids) are important routes of entry of many chemical substances to the environment, through consumer products
- Wastewater sector has no control over what enters its treatment systems
- Very little field information available to verify or calibrate model predictions for removal and fate





# CMP WASTEWATER MONITORING PROGRAM

- Program Objectives
  - Temporal trends in influents, effluents, and removals (warm, cold)
  - Fate of compounds during wastewater treatment: disappearance, partitioning to solids
  - Concentrations entering environment
  - Baseline data to evaluate future **upstream** control measures



# WASTEWATER TREATMENT IN CANADA

- Facultative lagoons
- Aerated lagoons
- Chemically-assisted primary treatment
- Secondary aerobic biological treatment
- Advanced nutrient removal treatment
- Solids treatment



# SAMPLING TECHNIQUES

- Raw Influent, Final Effluent
  - 24-hour composite
  - Refrigerated
  - Equal volume
  - Stainless steel
  - 3 weekdays
- Treated Biosolids
  - Grab
  - Stainless steel
  - 3 weekdays





# OPEN GOVERNMENT

- A governing culture that holds that the public has the right to access the documents and proceedings of government to allow for greater openness, accountability, and engagement
- YEARS of data, historically not easy to access



# OPEN GOVERNMENT PORTAL AND OPEN DATA

- Platform in which information is made easily accessible and available to Canadians under the Open Government initiative
- Open Data: “*structured data that is machine-readable, freely shared, used and built on without restrictions*”



# DATA AVAILABLE ON THE OPEN PORTAL TO DATE - 1

Substance/Groups	Uses	Concerns
<b>Hexabromocyclododecane (HBCD)</b>	Polystyrene foam products, paints, plastics, adhesives, electronics	<ul style="list-style-type: none"> <li>• Harmful to environment</li> </ul>
<b>Bisphenol A (BPA)</b>	Industrial chemical for polycarbonate products and resins	<ul style="list-style-type: none"> <li>• Acutely toxic to aquatic organisms, harmful to environment and biological diversity</li> </ul>
<b>Tetrabromobisphenol A (TBBPA)</b>	Flame retardant used in manufacturing of plastics and resins	<ul style="list-style-type: none"> <li>• Potential concern to environment, but not currently released in amounts that are expected to cause harm to organisms</li> </ul>
<b>Triclosan (TCS)</b>	Antimicrobial agent	<ul style="list-style-type: none"> <li>• Highly toxic to aquatic organisms</li> <li>• May be entering environment at levels that are harmful to the environment</li> </ul>
<b>Nonylphenol and its Ethoxylates (NPE)</b>	Detergents, pulp and paper processing, degreasing agents	<ul style="list-style-type: none"> <li>• May have immediate or long-term adverse effects to environment and biodiversity at current concentrations entering environment</li> </ul>
<b>Halogenated and Organophosphate flame retardants (HFRs, OPFRs)</b>	Polyurethane products	<ul style="list-style-type: none"> <li>• Several HFRs and OPFRs proposed to pose environmental health risks</li> <li>• Assessments currently underway</li> </ul>

# DATA AVAILABLE ON THE OPEN PORTAL TO DATE - 2

Substance/Groups	Uses	Concerns
<b>Per- and Polyfluoroalkyl Substances (PFAS)</b>	Surfactants, lubricants, repellants (water, dirt, grease), firefighting foams, textiles, cosmetics, food packaging	<ul style="list-style-type: none"> <li>Adverse environmental and/or human effects (liver damage, impacts on neurological and fetal/child development, impaired immune system, infertility, cancer risks)</li> <li>“Forever chemicals”</li> </ul>
<b>Polybrominated diphenyl ethers and other brominated flame retardants (PBDEs, BFRs)</b>	Carpet underlay, furniture foam, appliances, electrical and electronic equipment, building and automobile materials, textiles, adhesives, sealants, rubber products, coatings	<ul style="list-style-type: none"> <li>Wildlife may be at risk of secondary poisoning (i.e. an organism coming into contact or ingesting another organism)</li> <li>PBDEs entering environment at concentrations that are harmful to the environment</li> </ul>
<b>Pharmaceutical and Personal Care Products and Hormones (PPCPs)</b>	Pharmaceuticals, personal care products (e.g. cosmetics), prescription drugs	<ul style="list-style-type: none"> <li>Up- and down-regulation of genes for growth, reproduction, and metabolism</li> <li>Endocrine disruptors</li> <li>Antibiotic resistant strains of natural bacterial populations</li> </ul>
<b>Total Recoverable and Dissolved Metals</b>	Wide variety of uses (technology, naturally present in local geology)	<ul style="list-style-type: none"> <li>Toxicity (e.g. lead, mercury, copper, silver)</li> </ul>



# LET'S LOOK AT SOME DATA

## Chemicals Management Plan Wastewater Monitoring Program

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### Have your say



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### Additional Information

**Contact Email:** [open-ouvert@tbs-sct.gc.ca](mailto:open-ouvert@tbs-sct.gc.ca)

#### Keywords:

Wastewater | Sludge

Biosolids | Treatment

Raw influent

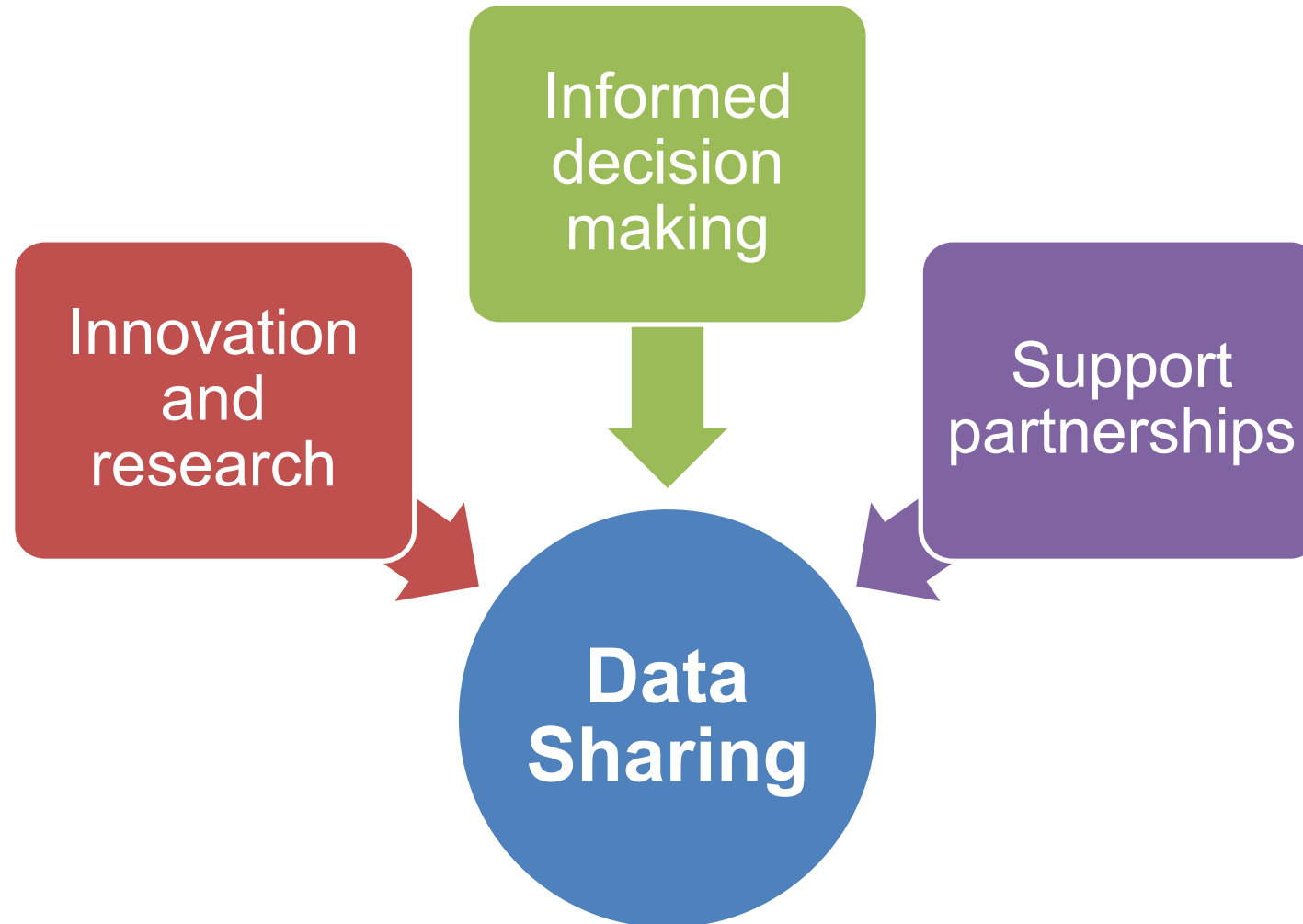
In 2006, the Government of Canada initiated the Chemicals Management Plan (CMP), which takes action regarding chemicals that are harmful to human health or the environment. One element of the CMP is Monitoring and Surveillance, which generates data on the presence and levels of chemical substances in environmental matrices. These data are used to make decisions regarding the best approach to protect Canadians and their environment from risks these substances might pose.

In support of the CMP, a wastewater monitoring program was initiated in 2009 to generate data on priority substances that may be released to the environment. The wastewater sector has been identified as an important release point to the environment for certain CMP substances. The purpose of the wastewater monitoring program is to gather information from representative municipal wastewater treatment plants (WWTPs) across Canada to determine the levels of selected chemical substances entering WWTPs, the fate of these substances through typical wastewater and sludge treatment processes (primary treatment, activated sludge treatment, lagoon treatment, etc.) at warm and cold

# HOW THESE DATA ARE USED

- Internally for informing risk assessors and risk managers
- Externally for publications by ECCCC's Wastewater Science Unit and government and academic collaborators

# BENEFITS OF DATA SHARING



# UPCOMING DATA PUBLICATIONS TO THE OPEN GOVERNMENT PORTAL

- Total recoverable metals (2009-2014)
- Updating existing substance datasets with data from 2021-2022





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# ***WASTEWATER SYSTEMS EFFLUENT REGULATIONS - OPEN DATA AND MAPS***

September 8, 2022



# OPEN DATA

Environment and Climate Changes Canada (ECCC) publishes data reported by wastewater systems that are subject to the *Wastewater Systems Effluent Regulations* (WSER). The data is available in Excel or .csv format and is updated annually. The dataset currently covers the years 2013 to 2020 and includes the following:

- treatment types and discharge point locations,
- average concentrations of carbonaceous Biochemical Oxygen Demand (cBOD) and Total Suspended Solids (TSS),
- acute lethality test results,
- volumes of effluent discharged from the final discharge point and from combined sewer overflow points.

**[Wastewater Systems Effluent Regulations Reported Data](#)**

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# OPEN MAPS

ECCC publishes online maps that present WSER data and results.

- [Treatment types of the wastewater systems in Canada subject to the WSER](#)  
Displays type of treatment utilized (mechanical, lagoon or no treatment).
  - [WSER – Monitoring results](#)  
Summarizes carbonaceous biochemical oxygen demand (cBOD) and total suspended solids (TSS) results for each wastewater system.
  - [Acute lethality test results](#)  
Percentage of acute lethality test failures for each wastewater system
  - [Combined Sewer Overflow volumes from wastewater systems subject to the WSER](#)  
Volume of effluent (in m<sup>3</sup>) discharged in a year from all CSO points situated within the collection area of a wastewater system.
  - [Combined Sewer Overflow - Number of points](#)  
The number of combined sewer overflow points with at least one overflow event in a year within each wastewater system.
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# ACKNOWLEDGEMENTS

- Funding for the wastewater monitoring program provided by Chemicals Management Plan (CMP)
- Wastewater treatment plants, municipalities, research partners
- Wastewater Science Unit and Wastewater Regulatory Unit at ECCC

