Occurrence, Transport, Fate, and Regulation of Microplastics Across Canadian Environments

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Background

Microplastics generated through the degradation of discarded plastics are pervasive environmental contaminants that have the potential to cause harm. Over the past two decades, growing scientific evidence has informed regulatory responses worldwide, with international efforts coordinated by the United Nations Environment Programme towards a legally binding global plastics waste treaty. In line with this evolving landscape, Canada has implemented a suite of progressive measures to reduce (micro)plastic pollution and advance a circular plastics economy. However, the rapid expansion of microplastics research in Canada has not been effectively integrated into regulatory decision-making, resulting in policies that are informed by incomplete and fragmented evidence. Here, we synthesize Canada's expanding microplastics evidence base alongside its evolving regulatory framework to identify critical knowledge gaps and their implications for environmental management.

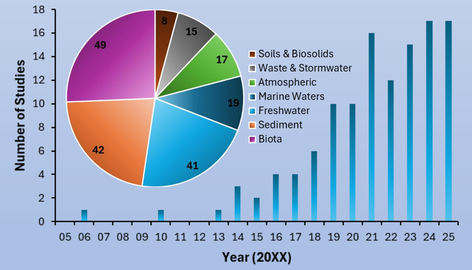


Figure 1. *Annual number of publications documenting microplastics in Canadian environments (n = 119). Insert shows the total number of studies measuring microplastics in different environmental compartments.*

References & Acknowledgements

Yang et al. (2026) Environ. Chem. Lett. DOI: 10.1007/s10311-026-01912

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Microplastic Monitoring Data

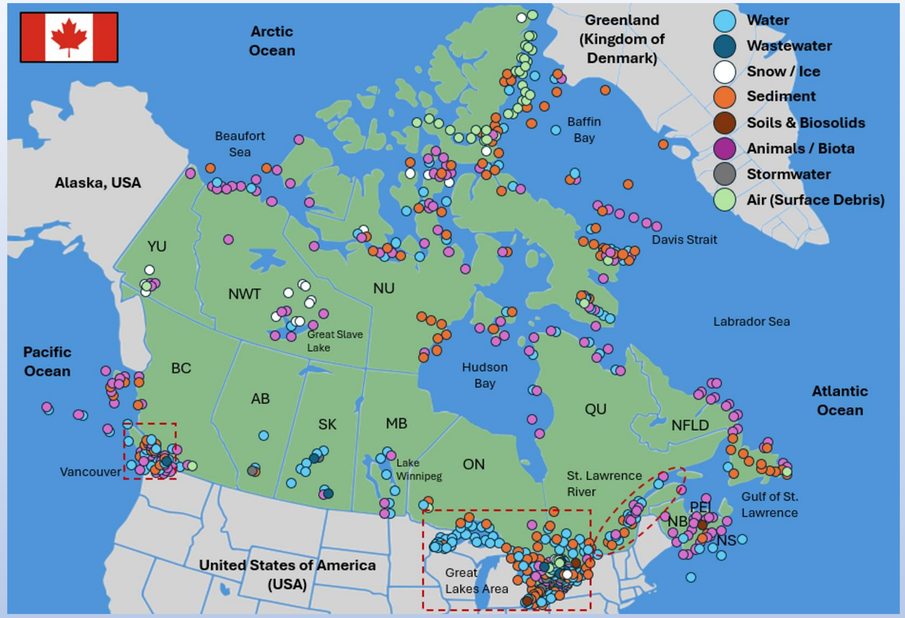


Figure 2. *Detection of microplastics and anthropogenic particles across Canada.*

Table. 1. *Summary of microplastics (MPs) and anthropogenic particles (APs) concentrations across Canada.*

Environmental Compartment or Region	Concentrations or Deposition Rates	Notable Hotspots
Atmosphere	1–100 APs/m^2/day	Greater Toronto Area: 3,270 APs/m^2/day Baffin Island (Qaqulluit): 2,433 ± 1,235 APs/m^2/day
Canadian Great Lakes	0–8.0 × 10^5 MPs/km^2 0.03–0.8 MPs/L	Lake Ontario Harbors: 5.1 × 10^6–2.0 × 10^7 MPs/km^2 Hamilton Harbor: 48–204 MPs/L
St. Lawrence River & Estuary	0–2.4 MPs/L	N/A
Arctic Lakes	0–5 MPs/L	N/A
Arctic Coastlines	<0.1 MPs/L	Byron Bay: 12.06 ± 14.36 MPs/L
Pacific Coastline (Vancouver)	0–10 MPs/L	N/A
Atlantic Coastlines	<0.001 MPs/L	N/A
Prairies Lakes and Rivers	<0.1 MPs/L	N/A

Regulatory Overview

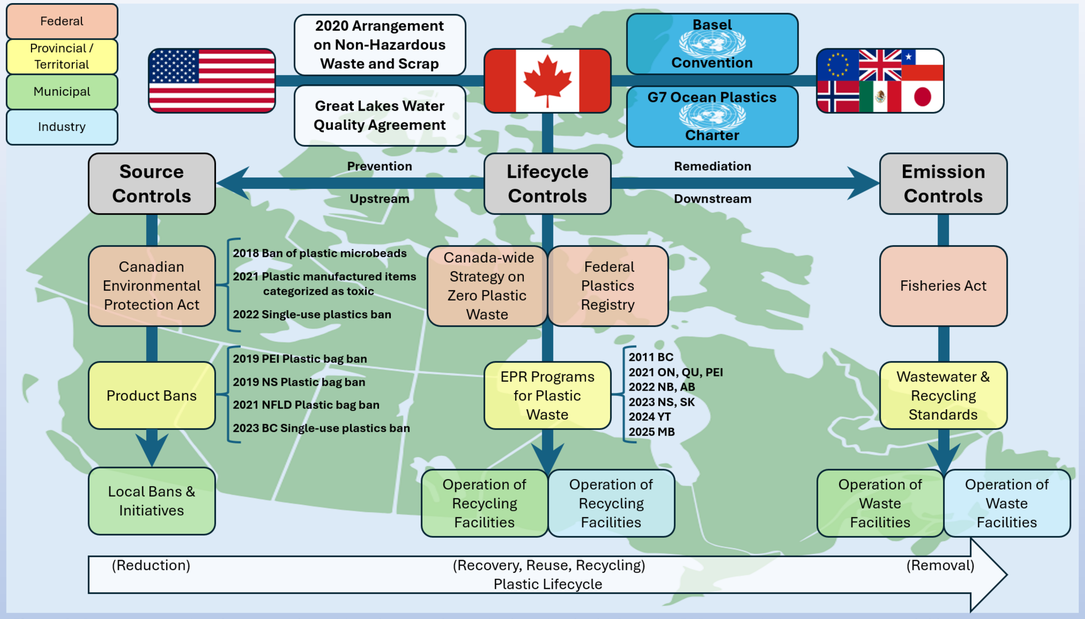


Figure 3. *Regulatory and policy strategies addressing plastics and microplastics in Canada. EPR, extended producer responsibility.*

Table. 2. *Summary of microplastics (MPs) concentrations in solid and liquid wastes across Canada.*

Waste Samples	Microplastic Concentrations	Notable Hotspots	Emission Controls
Stormwater	0–40,000 MPs/L	Too Few Datapoints	None
Wastewater Effluent	0–35 MPs/L	Too Few Datapoints	None
Wastewater Biosolids	1.0 × 10^3–9.0 × 10^6 MPs/kg	Unknown: Data is Anonymized	None

Summary and Future Directions

Microplastics have now been detected across Canada's diverse environmental compartments, with high concentrations near urban centers and coastal regions. In parallel, aquatic biota frequently ingest microplastics, raising concerns for ecosystem integrity and food security. However, inconsistent methodologies, ecotoxicological results, and long-term and geographical monitoring, particularly in northern, forested, mountainous, and rural regions, have hindered both environmental risk assessments and evaluations of policy effectiveness. Microplastics in terrestrial biota, including livestock, wildlife, and crops, are also unexplored. Addressing these knowledge gaps will strengthen Canada's leadership in global microplastic research and support the development of evidence-based strategies to mitigate microplastic pollution.