



International Joint Commission's Recommendations on

Microplastics in the Great Lakes

February 2017

*A Report to the Governments of Canada and the United States
by the International Joint Commission*

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A handwritten signature in black ink that reads "Lana Pollack".

Lana Pollack
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United States Section

A handwritten signature in black ink that reads "Gordon Walker".

Gordon Walker
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Richard Morgan
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A handwritten signature in black ink that reads "Benoît Bouchard".

Benoît Bouchard
Commissioner
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International Joint Commission's Recommendations on Microplastics in the Great Lakes

Studies have documented the occurrence of plastic debris, including plastic bags, bottles, boxes, fibers, microbeads, and cigarette butts, in marine and fresh waters including the Great Lakes. Larger plastic debris can degrade into smaller microplastics, and it is these smaller particles that are of particular concern. Microplastics generally refer to particles 5 mm or less in size and encompass a range of categories including; microbeads from personal care products; fibers from synthetic clothing; pre-production pellets and powders; and fragments degraded from larger plastic products. Little is known about the fate of these smaller plastic particles, and the IJC is concerned about their potential impacts on environmental and human health.

To address these issues, on April 26-27, 2016, the IJC hosted a workshop on microplastics to address concerns posed by the presence of microplastics in the Great Lakes and their potential to cause impacts to the Great Lakes ecosystem and human health. The workshop was attended by 33 experts from Canada and the United States representing a broad range of sectors including Federal, State, Provincial and municipal governments, industry, non-profit organizations, and academia. A [workshop report](#) was developed that reflects the workshop proceedings and findings and is posted on the IJC web site.

The workshop report includes ten recommendations that were developed through a series of brainstorming sessions followed by a voting process by participants. These workshop recommendations reflect the overall views of the group. The IJC has considered the ten workshop recommendations and the entire workshop report to develop four preliminary recommendations. The IJC requested public input, via its website, on these four recommendations from October 11 to November 10, 2016. This input has been considered in developing the final recommendations to be issued to the governments.

Binational Plan

It is critical to properly manage plastic materials so they do not enter the environment. There is no simple solution to address microplastics and the preventing and reducing the release of plastic debris in the Great Lakes will require a combination of approaches and tools. **The IJC recommends that the Parties develop a binational plan to prevent microplastics entering the Great Lakes using a combination of approaches and tools including, science and research, policy, market-based instruments and education and outreach. This plan should include targets with measureable goals to gauge progress with periodic review for effectiveness and adjustments made as necessary.** To support the successful development and implementation of the plan the Parties should engage a diverse set of stakeholders from both countries, which will lead to more informed and innovative solutions. Furthermore, the IJC proposes three additional recommendations, which support the broad recommendation and reflect each of the three themes of the workshop (i.e., Science, Pollution Prevention, and Public Education and Outreach).

Science

IJC Recommendation: The Parties should jointly undertake monitoring, science and research initiatives for a binational assessment of microplastics in the Great Lakes to inform decision-making by (1) developing and/or adopting standardized sampling and analytical methods (2) developing a transport model to determine the sources and fate of microplastics (3) assessing potential ecological and human health impacts and (4) investing in research for source reduction, improved recycling, and reduced release of plastic pollution.

The study of microplastics in fresh water systems, and the Great Lakes in particular, is relatively new compared to the marine environment, and several knowledge gaps exist. Primarily there is a need for agreement on the definition of microplastics. The IJC recommends defining microplastics as plastic particles measuring less than 5 mm in size, as defined by the National Oceanic and Atmospheric Administration (NOAA). Additional knowledge gaps include the need for a better understanding of the sources, abundance and distribution (spatial and temporal) of microplastics in the environment; the transport patterns to and within the Great Lakes; the rates and mechanisms by which different plastic debris degrades; the bioaccumulation of plastics and associated contaminants in food webs and their potential toxicological consequences; and the potential impact on human health from exposure to microplastics.

All microplastics science and research is underpinned by the need to develop and/or adopt standardized sampling and analytical methods for the collection and identification of microplastics. The use of standard methods would improve the understanding of the levels of microplastics in the Great Lakes and allow policy makers to take meaningful action and identify what constitutes measurable success. For example, the NOAA has developed sampling and analytical protocols for microplastic particles in the size range of 0.333 mm – 5 mm that could be promoted for use in microplastics sampling and research. However, there is a need to develop/utilize sampling and analytical methods able to measure plastic particles at sizes smaller than 0.333 mm.

Fate and transport models help to better understand the exposure to microplastics: their sources (e.g., fibers, pre-production pellets); their entry and concentration in the environment (e.g., wastewater effluent, overland runoff, beaches, boats/vessels); and their fate in the environment (i.e., distribution and uptake among environmental compartments and biota). Once exposure to microplastics is determined, risk assessment methodologies need to be employed to characterize the risk of impacts to ecological and human health.

Research on innovative product development and techniques to reduce the release of microplastics through the manufacturing, use and disposal/recycling process should be encouraged and supported by the government (e.g. modification of textile design/manufacturing process to reduce shedding of plastic microfibers from materials; design of washing machine technologies to capture microfibers; or innovative wastewater treatment technologies). Research on alternative materials to plastics, including but not limited to biodegradable plastics, should include a life-cycle assessment of the plastics and their alternatives in terms of impacts on environmental and human health.

To help in filling the many knowledge and data gaps, engaging with students and academic institutions interested in microplastic pollution can be a beneficial solution. Additionally, citizen science is a useful resource for helping with sampling and data collection over a wide geographic range that can be shared with government agencies, environmental organizations, researchers, and the general public.

Governments should invest in the necessary scientific investigations in order to determine the risk posed by the ubiquitous presence of microplastics in the Great Lakes and take the necessary measured actions relative to other stressors in the Lakes. Notwithstanding this, governments should abide by the precautionary principle, which urges the governments to take measures to prevent environmental degradation even if there is a lack of full scientific certainty.

Pollution Prevention

IJC Recommendation: The Parties should adopt policies that promote life-cycle responsibility of producers and support state, provincial and municipal policies, including market-based incentives and disincentives, to effectively reduce plastic pollution. The Parties should provide funding to compare and analyze existing programs and policies for the reduction and prevention of plastics and microplastics in the Great Lakes; and promote those that are good models for plastics and waste management.

The Governments of Canada and the United States have made great strides in addressing the issue of microbeads through federal legislation enacted in the U.S. and pending legislation in Canada. However, microbeads are a subset of the much broader issue of microplastics, which is a more complex problem requiring more complex solutions. The prevention and reduction of plastic and microplastics requires a holistic approach, both in the tools and methods used, as well as the players involved. There are several federal, state/provincial, municipal, non-government and industry programs that currently exist that could serve as models for plastics (and ultimately microplastics) management and reduction in the Great Lakes. These programs and initiatives can contain best practices and lessons learned that can be shared and

promoted. The plastics industry in particular, through the American Chemistry Council and the Canadian Plastics Industry Association, is involved in a number of national and international programs and initiatives to prevent and reduce marine plastics debris. Including industry in the sharing and communication efforts, would encourage continuous improvement for plastics and microplastics management through reduce, reuse and recycle programs. By comparing and analyzing the effectiveness of existing programs and policies, in North America and internationally, good models for plastics management can be highlighted and promoted in the Great Lakes region.

Improvement in waste management is a key component to reducing plastic debris in the aquatic environment. This requires identification of geographic areas where plastics concentrate, as well as the points within the waste stream where best management practices should be implemented to reduce or eliminate the release of plastics. Such practices can be as simple as providing lids for recycling bins and strategic placement of trash and recycling containers in public areas (especially near water bodies, shorelines or stormwater drains). Various waste management tactics employed at municipal and regional levels (e.g., covered recycle bins, single-stream recycling) should be explored and those that are most effective promoted. Other instruments, such as market-based bans and fees for single-use plastic items (e.g., bags, water bottles), enforcement of litter laws, and bottle redemption programs may be another useful tool to reduce marine plastic debris.

The governments should also explore the effectiveness of requiring industry to use an Extended Producer Responsibility (EPR) program to enhance industry action to prevent and reduce the release of plastics and microplastics. EPR is an environmental policy approach in which the producer's responsibility - financial or physical - for a product extends beyond the manufacturing stage to the post-consumer stage of the product's life-cycle. In principle EPR can incentivize manufacturers to engage in research and design throughout the product's life-cycle, encompassing waste reduction, recovery, recycling and reuse. By examining the entire life-cycle of a product, manufacturers can determine the stages at which research and design should be focused to have the greatest impact on reducing and preventing the release of plastics to the environment. This can include stronger package labelling to ensure proper consumer disposal/recycling, product redesign to reduce plastic use, or use of alternative more environmentally-friendly materials. This life-cycle approach within EPR underscores the concept that manufacturers, suppliers, retailers and consumers all play a role in the end-of-life management of plastics.

All these pollution prevention efforts may also help reduce other forms of pollution. Investments in the implementation of best practices and coordination with the local/regional level could be accomplished through co-sponsoring with industry or other stakeholders or relevant organizations.

Education and Outreach

IJC Recommendation: The Parties should provide funding support for local programs and organizations that provide education and outreach to promote the reduction and prevention of plastics/microplastics in the Great Lakes.

Education and outreach programs should be supported and promoted to improve environmental literacy of plastic/microplastic issues, such as proper disposal and recycling of plastic materials; understanding pathways for entry of microplastics to the environment (e.g. wastewater from homes, stormwater); and impacts of consumer choices. These education and outreach programs and best management practices for preventing and reducing microplastic pollution should be shared with the Great Lakes community, including local businesses, beachgoers, vessel owners, and recreational boaters. Incorporating education on plastics/microplastics into the environmental curriculum of school children (K-12) is of particular importance as this can be an effective means of promoting positive change to the environment now and into the future.

Attention also needs to be given to the socioeconomic aspect of microplastics (e.g. reduction in aesthetic value, cost to tourism, cost to fishery operations). Developing estimates of socioeconomic costs of microplastics impacts can support behaviour changes, policy development and justify monitoring and research.

There are several organizations and programs that can help to promote information sharing and coordinate action among various stakeholders to address microplastics. Volunteer beach/shoreline clean-up efforts in particular, can educate community members by involving them in citizen science research, which assists in the identification and prioritization of waste prevention and reduction strategies for local issues that can be shared with other Great Lakes communities.

All research and scientific findings should be shared in a manner that is easily understandable to the public. Ultimately, the goal of public education and outreach is to enhance environmental literacy to make informed decisions, leading to positive actions and changes in behavior to reduce the amount of plastics (and therefore microplastics) entering the waters of the Great Lakes.