URL: http://www.ontario.ca/page/microplastics-and-microbeads

Microplastics and microbeads

Microplastics are small but harmful plastic particles that can damage lakes, rivers, fish and wildlife. Learn more about Ontario's research on microplastics and their impact on the environment.

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Ontario's microplastics research

Microplastics come from the breakdown of plastic materials and can include:

- fragments (from litter, plastic molding)
- line and fibre (from rope, netting or cigarette butts)
- foam (from food containers and packaging) and film (from plastic bags and wrappers)
- production pellets (small pellets used as stock material in manufacturing plastic products)

The Province of Ontario is currently the leading Canadian jurisdiction undertaking monitoring for microplastics. Scientists in the Ministry of the Environment and Climate Change (MOECC (Ministry of the Environment and Climate Change)) are doing their own studies, as well as working with academic researchers in Canada and the U.S. to get a better understanding of microplastics in the Great Lakes. The studies that MOECC (Ministry of the Environment and Climate Change) is involved in are designed to:

- examine the sources and make-up of microplastics in and entering the Great Lakes from Ontario
- determine what happens to microplastics when they enter the Great Lakes, whether they wash up on shore, settle to the bottom, or remain in the water

Research findings in nearshore waters of the Great Lakes

Using fine mesh nets, MOECC (Ministry of the Environment and Climate Change) staff collected surface water samples in 2014 from nearshore areas in Lake Erie downstream of Detroit-Windsor, near the mouth of the Grand River, and near Fort Erie. Samples from Lake Ontario were collected in Hamilton Harbour, Humber Bay off Toronto, and in Toronto Harbour. Results to date include:

- up to 6.7 million particles of plastic per square kilometer were found (about 7 per square metre), with the highest count occurring in Humber Bay of Toronto. This amount is approximately 10 times greater than what has reported to date at open lake sites in Lake Erie
- microbeads were present in each of the samples, comprising approximately 14% on average of the microplastics. Other types of plastics were found in greater amounts, including fragments from broken down litter, shavings from cuttings/trimmings of plastic, foam from Styrofoam packaging, and fibers
- greater amounts of microplastics were present after rainstorms, indicating that runoff of debris from the landscape through stormwater is an important source to the lakes
- using similar nets, urban streams in the Toronto area and a municipal wastewater treatment plant effluent that enters Lake Ontario were collected to examine the make-up of microplastics enter the lakes from urban areas
- Microbeads were present in wastewater effluent samples, comprising up to 30% of the microplastics found in the effluent samples. Up to 100 microplastic particles were present per 1000 liters of effluent water, consistent with studies elsewhere
- Microbeads were present in several stream samples, generally in low numbers at less than 2% of the microplastic particles found. Fibers accounted for the greatest amount of microplastic particles in urban streams, followed by fragments

Research findings on beaches and lake bottom sediments of the Great Lakes

Beach materials and lake bottom sediments collected by Dr. Patricia Corcoran and researchers from Western University in London, Ontario, and by Environment Canada and MOECC (Ministry of the Environment and Climate Change), are being examined for microplastics in a project funded by the ministry. Initial findings were recently published in the science journal, Environmental Pollution. Findings include:

- Microplastic particles were present in sediment cores from the center of Lake Ontario and from near the Niagara River, but microbeads were not present in these samples
- Greater numbers of microplastic particles were present in the most recent top layer of sediment than in older layers further down the cores, indicating that the amount of microplastics in the system increases with our increasing use of plastic over the past few decades
- Polyethylene was the most abundant polymer type, even though it typically floats on water, indicating that plastic particles will sink to lake bottom as they become weighed down my natural material that attaches to the particles

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Microbeads

Microbeads, a type of microplastic, are small plastic particles that are less than 5 millimetres in diameter. They are used in a number of ways, including as cleansing or exfoliating agents in cosmetics, soaps or toothpaste. Microbeads do not dissolve, and after they are rinsed down the drain they can end up in in our rivers and lakes for decades, harming fish and other wildlife.

Sampling by the Ministry of the Environment and Climate Change (MOECC (Ministry of the Environment and Climate Change)) has found that microbeads are entering Ontario's waterways. Ministry scientists have determined that they are present in Ontario's Great Lakes waters and rivers. For example, on average, microbeads accounted for 14% of the microplastics found in nearshore sites in Lake Erie and Lake Ontario.

Microbeads are just one type of microplastic that can be found in lakes and streams.

Action on microbeads

While many corporations are phasing out microbeads in their products, Ontario is also working with stakeholders to ban microbeads in all personal care products sold in the province.

Ontario's approach to microbeads in the environment follows 5 principles:

1. **Partnership:** Developing partnerships with stakeholders including industry, agriculture, communities, and environmental non-governmental groups to develop a phase-out of microbeads.
2. **Alignment:** Adopting common phase-out timelines, beginning with banning the manufacture of personal care products with microbeads, by December 2017. This date is supported by industry and is in line with the timelines of many US jurisdictions that are also taking action on microbeads.
3. **Precaution:** Taking early precautionary action to reduce microbeads in the environment.
4. **Evidence based:** Ontario will continue to invest in science and use the scientific findings to support actions.
5. **Innovation:** Allowing for innovation by industries in developing alternative products when it can be demonstrated that they promote environmental protection.

In August 2015, the federal government announced its intent to add microbeads to its list of toxic substances. It is also considering options to manage the manufacturing, import and sale of personal care products with plastic microbeads. Ontario will closely monitor and provide input to the national process to ensure immediate and effective action to ban microbeads to protect our lakes, rivers, fish and wildlife.

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The Ministry of the Environment and Climate Change protects and improves the quality of the environment. We also coordinate Ontario's actions on climate change in the name of healthier communities, ecological protection and economic prosperity.