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## Microplastics: Microplastics in the Great Lakes

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## Microplastics: Microplastics in the Great Lakes

### Cover Page Footnote

Student contributors include: Science: Tammy Bleier Designer: Courtney Cahoon

# Microplastics: Microplastics in the Great Lakes



**Science: Tammy Bleier**

**Designer: Courtney Cahoon**

The College at Brockport, State University of New York

*Keywords: Plastics, Recycling, Pollution, Great Lakes, Microplastics*

## **Abstract**

The effects of microplastics in the Great Lakes.

# Microplastics

## Microplastics in the Great Lakes

Science: Tommy Bleier

Design: Courtney Cahoon

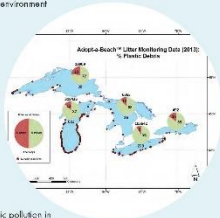
*“While plastic begins to break down almost immediately, it does not decompose for hundreds of years. This means that plastic pollution of all sizes can remain in the environment far beyond our lifetimes.”*



Microplastic pellets and fragments, compared to a penny.



Small plastic pieces, harmful to our lakes and environment.



Plastic pollution in the Great Lakes.

MICROPLASTICS ARE DEFINED as plastic particles measuring less than five millimeters in length or diameter. Most microplastics surveys categorize particles based on morphology and separate them into one of five categories: beads/pellets, fibers/lines, fragments, foams and films. They are formed in one of two ways:

- 1) Primary: particles are created to be small intentionally (Ex. Microbeads, pellets)
- 2) Secondary: particles are created by break down of larger plastic pieces (Ex. Fibers/lines, fragments, foams, films)

Microbeads, which are found in many cosmetic products, have received a lot of media attention. Many cosmetic companies are switching from microbeads to natural, sustainable alternatives such as salt, sugar, fruit seeds, and coffee grounds. However, primary microplastics, including microbeads, account for less than 20% of microplastic pollution worldwide. Over 80% of microplastic pollution is due to the breakdown of larger plastics.

STUDIES HAVE SHOWN that plastic begins to break down into smaller pieces almost immediately after entering a body of water. Wave action, temperature changes, and sunlight can cause plastic to become brittle and initiate the shedding of microplastic. The longer an item remains in the environment, the more microplastics it can create. One plastic bag can contribute millions of microplastics to the world's oceans and lakes. While plastic begins to break down almost immediately, it does not decompose for hundreds of years. This means that plastic pollution of all sizes can remain in the environment far beyond our lifetimes.

Current research estimates that millions of microplastics exist in surface waters of each of the Great Lakes. Concentrations are lowest in Lake Superior and increase steadily until reaching Lake Ontario, the last Great Lake before the Atlantic Ocean. The highest microplastic concentration has been found just outside Toronto, where 3.4 million pieces were recorded in one square mile. These particles eventually enter the St. Lawrence River and are carried to the North Atlantic.

MICROPLASTICS POSE SEVERAL threats to oceans, lakes and rivers. Because of their small size, they are easily ingested by aquatic organisms. Ingestion of microplastics has been linked to many issues in aquatic organisms (see poster 8, Biology of Plastics). In addition to the physical impacts of microplastic ingestion are the chemical impacts. Plastics contain a variety of chemicals that can leach into the gut contents once they are ingested. They can also absorb other chemicals present in their environment, which can be released once ingested (see poster 9, Chemistry of Plastics).

Last year, we learned that microplastics are present in drinking water pulled from the Great Lakes. Shortly after this study was released, a pilot study showed that microplastics are in humans (see poster 9, Health & Human Impacts). While we are learning more about the status and consequences of microplastics in the Great Lakes, there are many questions that remain unanswered.

*“Over 80% of microplastic pollution is due to the breakdown of larger plastics.”*

