



Photos courtesy of National Aquarium.

The Aquarium Conservation Partnership (ACP)

Plastic Pollution in the Great Lakes

Fact Sheet

While nearly 70 percent of our planet is covered by water, only 2.5 percent of it is freshwater; the rest is saline and ocean-based. Of this 2.5 percent, just 1 percent is easily accessible,¹ as the rest is trapped in glaciers and snowfields. The Great Lakes are the largest surface freshwater system² on the Earth. Only the polar ice caps contain more fresh water. The Great Lakes make up about 21 percent of the world's supply of surface freshwater. **24 million people³ in the U.S. and 9.8 million people in Canada rely on the Great Lakes for drinking water, jobs, and their way of life. Additionally, more than 3,500 species of plants and animals live in the Great Lakes basin.**

About 22 million pounds of plastic flows into the Great Lakes each year.⁴ Plastic pollution in Lake Michigan alone is equivalent to approximately 100 Olympic-sized pools full of plastic bottles dumped into the lake every year.⁵ Plastic accounts for approximately 80 percent of the litter that washes up on the Great Lakes' shorelines.⁶ According to a study conducted at the Rochester Institute of Technology, Lake Michigan receives 5,000 metric tons (11,023,100 pounds) of plastic per year.⁷ This amount is half of all plastic pollution delivered to all five Great Lakes annually. Lake Erie receives 2,500 metric tons (5,511,560 pounds), Lake Ontario receives 1,400 (3,086,470 pounds), Lake Huron receives 600 (1,322,770 pounds), and Lake Superior receives 32 (70,547.9 pounds). While less is known about the amount of plastic in freshwater systems, in certain areas of the Great Lakes, surface water densities of plastics are reported⁸ to be as high as those reported within oceanic gyres.

Tiny pieces of harmful plastic (called microplastics) are prevalent in many rivers that flow into the Great Lakes, according to a study from the U.S. Geological Survey.⁹ The study looked at 107 water

For more information

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¹ *Freshwater Crisis*, National Geographic, n.d. <http://www.nationalgeographic.com/freshwater/freshwater-crisis.html>

² *Great Lakes Facts and Figures*, United States Environmental Protection Agency, 2016. <https://www.epa.gov/greatlakes/great-lakes-facts-and-figures>

³ *Great Lakes and Wisconsin Water Facts*, Great Lakes and Fresh Water, University of Wisconsin Sea Grant Institute, n.d. <http://www.seagrant.wisc.edu/Home/AboutUsSection/PressRoom/Details.aspx?PostID=796>

⁴ Driedger, Alexander G.J. Dürr, Hans H. Mitchell, Kristen. Van Cappellen, Philippe. "Plastic debris in the Laurentian Great Lakes: A review." *Journal of Great Lakes Research* 41.1 (2015) 9-19. <http://www.indiaenvironmentportal.org.in/files/file/Plastic%20debris%20lake%20pollution.pdf>

⁵ *Researchers estimate 10,000 metric tons of plastic enter Great Lakes every year: Study inventories movement of plastic and microplastic debris throughout lake system*, Rochester Institute of Technology, 2016. <https://www.sciencedaily.com/releases/2016/12/161219151752.htm>

⁶ M.J. Hoffman, and E. Hittinger, *Inventory and transport of plastic debris in the Laurentian Great Lakes*, *Mar. Pollut. Bull.*, 2017, <https://doi.org/10.1016/j.marpolbul.2016.11.061>

⁷ Hoffman and Hittinger

⁸ Driedger et al. 2015

⁹ Baldwin, Austin K. Corsi, Steven R. Mason, Sherri A. "Plastic Debris in 29 Great Lakes Tributaries: Relations to Watershed Attributes and



Photo courtesy of National Aquarium.

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samples collected from 29 Great Lakes tributaries in Minnesota, Wisconsin, Indiana, Michigan, Ohio and New York, and found microplastics in every single sample.

The same study¹⁰ also analyzed the types of microplastics found in the river water samples. Researchers found that fibers, which come from items like synthetic clothes, made up 70.9 percent of all microplastics found in the rivers. Microbeads are a major problem for the Great Lakes region. However, by 2018, products with plastic microbeads will not be sold in the U.S. thanks to a 2015 bill¹¹ that bans the manufacture of personal care products with microbeads after July 2017, and bans the sale of those products by 2018.

Plastic waste in freshwater lakes accumulates differently than plastic waste in oceans. Though plastics that enter a lake may disappear from view, much of the waste in the Great Lakes region re-accumulates on the shores⁵, in a different place from where the plastic originated due to the pattern of lake currents. Therefore, it is likely that some cities pollute more plastic than what ends up on their shores. This [video](#) from the Rochester Institute of Technology simulates the path of plastics in Lake Erie.

The potential impact of aquatic plastic pollution on humans is still being studied.¹² Although some plastic materials may be too big for aquatic animals to ingest, the chemicals that plastic materials contain (monomers, plasticizers, flame retardants, antimicrobials, and others) can leak out and be absorbed by both the aquatic environment and the organisms that live there.

To combat disposable plastics, cities around the country¹³ have implemented restrictions on the consumption of single-use plastic bags. Cities with plastic bag bans include Austin, Los Angeles, San Francisco, Seattle and Cambridge, Massachusetts. Similarly, select cities or counties have opted for fees on plastic bag use, including: Boulder, Colorado; Brownsville, Texas; Montgomery County, Maryland; New York, New York; Portland, Maine; Chicago; and Washington D.C.

⁵ *Hydrology*, "Environmental Science and Technology 50.19 (2016) 10377-10385.

¹⁰ Baldwin et al 2016

¹¹ *Microbead Menace*, Alliance for the Great Lakes, n.d. <https://greatlakes.org/campaigns/microbead-menace/>

¹² Teuten, Emma L. Saquing, Jovita M. Knappe, Detlef R.U. Barlaz, Morton A. Jonsson, Susanne. Björn, Annika. Rowland, Steven J. et al. "Transport and release of chemicals from plastics to the environment and to wildlife." *Philosophical Transactions of the Royal Society B* 364.1526 (2009) 2027-2045. <http://rstb.royalsocietypublishing.org/content/royptb/364/1526/2027.full.pdf>

¹³ *State Plastic and Paper Bag Legislation: Fees, Taxes and Bans | Recycling and Reuse*, National Conference of State Legislature, 11 November 2016. <http://www.ncsl.org/research/environment-and-natural-resources/plastic-bag-legislation.aspx>

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About the ACP

The Aquarium Conservation Partnership (ACP) is a first-of-its-kind collaboration of 19 U.S. aquariums that have joined together to take collective action on science-based ocean and freshwater conservation priorities.