

Microplastic Pollution in Lake Champlain

By Alta Jo Longware, BRASS Board Member

As the use of plastics in consumer products increases, the negative impacts both locally and globally also increase. World plastic production has increased from 1.7 metric tons (1 metric ton = 2205 lbs.) in 1950 to 288 mtonnes in 2012. Plastics of several different types are used to make fleece jackets, toys, beverage bottles, and packaging as well as thousands of other consumer products. Where does it all go? Tons of plastic are recycled into new plastic products. However, more are buried in landfills and even more are trapped in the ocean as garbage patches.

According to the Smithsonian Institute, a 2014 study estimated that 8 million metric tons of plastic trash enter the sea from land every year. In 1992, a tanker with 28,000 rubber toys capsized enroute to the USA. Most are likely part of one of the many enormous garbage patches floating in our oceans.

What kind of problem exists locally? Research is being done by Danielle Garneau PH.D, Associate Professor in Earth & Environmental Science at SUNY Plattsburgh. Dr. Garneau gave an informative presentation on microplastic pollution at the BRASS annual meeting, which was held at the Hand House on May 2, 2016. Dr. Garneau presented findings that identify the types of plastic pollution, possible sources, and the impact that it has on the ecosystems in and surrounding Lake Champlain. Dr. Garneau heads a team of researchers who have collected water and wildlife samples from Lake Champlain and area wastewater treatment facilities.

Highlights of Dr. Garneau's presentation included the following topics:

1. What are microplastics?

They are plastic pieces that are less than 5mm in size. Some are manufactured to be small, such as microbeads, which are found in many consumer products. Others break down (biodegrade) from larger plastic products and packaging. Microplastics are defined by type (fragments, pellet/bead, fiber, film, foam; polymer type (polyethylene, polypropylene, polystyrene); color and density.

2. How do microplastics get into the water?

They sneak into our wastewater from the health and beauty products we use and through washing machines. Many toothpastes and facial scrubs contain microbeads, which are being replaced by natural exfoliants such as cocoa shells. Also, washing one fleece jacket can release as many as 1900 plastic fibers into the wastewater stream. Plastics are not currently filtered prior to disbursement into the river or lake from local wastewater treatment facilities. New York State recently passed legislation to ban the use of microbeads in consumer products including toothpaste and skin products, but that addresses less than 14% of the overall plastic problem. Fragments, pellets, fibers, film, and foam ranging in size from .355 to .999 mm combined top the chart at 67% abundance, consisting of 75% fragments and 20% pellets, and 5% fiber, film and foam combined. For pieces >4.75 mm in size, fragments again took the top billing at 75% and pellets/beads at 14%.

3. Why are microplastics a concern?

Plastic debris contains a “cocktail” of chemical contaminants including methyl mercury, BPA, and PCBs. The toxic chemicals and bacteria from the environment are absorbed and exchanged through the plastic and then ingested by organisms, including fish, muscles, oysters, and other aquatic species. The accumulation in the tissues of those organisms have biological effects, which then are passed up the food chain and to humans. Plastic fibers and fragments are also found in 15 brands of commercial sea salt.

4. What can we do to reduce the microplastic problem?

Dr. Garneau provided some simple strategies to consider.

1. Change what you buy (clothing, hygiene products.)
2. Bring your own reusable bags to grocery shop.
3. Ban the plastic bottle (San Francisco) and foam cup (NYC and DC.)
4. Retrofit washing machines with Filtrol 160.
5. Utilize durable, reusable products.
6. SAY NO TO STRAWS (over 500 million trashed daily in the US alone.)
7. Don't Take it To-Go (or at least not in plastic/foam.)
8. Help Change the Laws: Support Bag/Bottle Fees as well as Extended Corporate Responsibility.

Dr. Garneau's team will continue sampling, quantifying, and mapping microplastic pollution in the Lake Champlain watershed with funding from a Lake Champlain Sea Grant. For more information on the project please visit <https://sites.google.com/site/daniellegarneau/>