

Microplastics in the NY-NJ Harbor Estuary

by Sandra Meola

Our world's oceans are expected to contain 1 metric ton of plastic for every 3 metric tons of fish by 2025, and by 2050 more plastics than fish by weight (Ellen MacArthur Foundation, 2016). At an alarmingly quick pace, we are contaminating our waterways and critical global food source with plastics and contaminants. To reverse this startling prediction, environmental advocates have sounded the alarm, encouraging the public to avoid like the plague single-use, throwaway plastics and switch over to sustainable and renewable alternatives.

How did we become so reliant on plastic? After World War II, the plastic industry exploded, producing modern convenient throwaway products. Today, many of us are reliant on single-use products such as plastic bags, bottles, straws, utensils, and to-go boxes. These plastics, once used and discarded, can enter local waterways through littering, stormwater runoff, and improper waste management. Once in a local waterway, plastic never truly biodegrades. Rather, a plastic bag breaks down into tiny pieces, becoming microplastics (defined as plastics smaller than 5mm, about the size of a grain of rice and smaller). We have also used personal care products containing exfoliating plastic microbeads. These microbeads enter the wastewater stream to the water resource recovery plant that, unable to capture these tiny floating plastics, discharges them into the environment, illuminating one of the technical challenges for water resource recovery processes. Plastic also poses health risks to marine life as well as humans. Plastic can attract and adsorb contaminants already present in waterways. Plastic, itself, is a synthetic material derived from oil. Thus, when plankton, fish, or birds mistake microplastic for food, they also ingest contaminants adhered to the plastic. Microplastics and the associated contaminants can move up the food chain and potentially end up on our dinner plates.

The NY-NJ Harbor Estuary Plastics Study

NY/NJ Baykeeper, an environmental non-profit focused on water quality issues within the New York-New Jersey Harbor Estuary



A jarred sample of plastics was collected from Newark Bay prior to lab analysis.

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(NY-NJ Harbor Estuary), set out to quantify the number of plastic pieces in the waters surrounding the most densely populated region in the country. A first-of-its kind study, NY/NJ Baykeeper provided a first look at the quantity, type, and distribution of plastic pollution within NY-NJ Harbor Estuary waters with a goal of educating the public and policymakers and encouraging behavioral changes.

Eighteen samples were collected in 18 locations in the NY-NJ Harbor Estuary using a 333-micron manta trawl net designed to collect floatable debris off the water's surface. For each sampling site, the net was dragged alongside the vessel for 30 minutes. Plastics present in samples were separated into three size classes (0.333-0.999 mm, 1.00-4.749mm, and >4.75mm) (Figure 1) and categorized by type. Type categories included: fragments (unidentified hard plastic); polystyrene foam (popularly known as Styrofoam or cigarette butt filters); line (fishing line or clothing fibers); pellets (nurdles or microbeads); and film (plastic bag or cling wrap). All plastics within each simple were then counted using a dissecting microscope.

The NY-NJ Harbor Estuary is one of the most urban estuaries on Earth, including the Ports of New York and New Jersey, ranging as far north as the Tappan Zee Bridge and as far south as Sandy Hook Bay, and encompassing an area of approximately 250 square miles (647.5 square kilometers). Nevertheless, research results were still alarming. According to NY/NJ Baykeeper's estimates, at least 165 million plastic pieces are floating within NY-NJ Harbor-Estuary waters at any given time. Approximately 85 percent of particles counted were microplastics (smaller than 5mm) and the average plastic quantity per square kilometer sampled in New York waters was approximately twice the average of New Jersey waters (556,484 and 391,634 per square kilometer, respectively). Thirty-

Nurdles: Very small pellets of plastic that serve as raw material in the manufacture of plastic products.

Source: *Oxford Dictionaries.com*



NY/NJ Baykeeper utilized a manta trawl net to gather the samples. The net is designed to float on the water's surface capturing floatable plastics.

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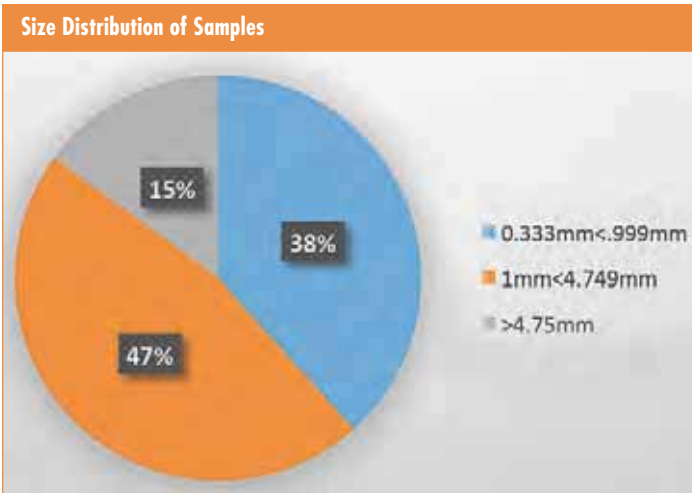


Figure 1

eight percent of plastics within the samples was polystyrene foam, likely from Styrofoam single-use products such as take-out boxes and coffee cups.

The Road Ahead

There is significant progress being made to prevent and reduce plastic trash from entering local waterways and making its way into oceans. In December of 2015, President Obama signed the Microbead-Free Waters Act into law, which will ban the sale and manufacturing of personal care products containing plastic microbeads by 2019. On May 5, 2016, the New York City Council passed a bag fee bill requiring merchants to collect 5 cents per

carry-out bag from consumers beginning October 1, 2016. State lawmakers in New Jersey have introduced a bottle bill, which would require a refundable deposit on beverage containers to ensure a higher rate of recycling and litter reduction.

Together, we can all make a difference to prevent and reduce plastic pollution, restore our waterways and associated habitat, and protect these resources for future generations to enjoy.

About NY/NJ Baykeeper

NY/NJ Baykeeper is the citizen guardian of the NY-NJ Harbor Estuary. Since 1989, we've worked to protect, preserve, and restore the environment of the most urban estuary on Earth – benefiting its natural and human communities. Through our estuary-wide programs we seek to end pollution, improve public access, conserve and restore public lands, restore aquatic habitats, encourage appropriate and discourage inappropriate development, carry out public education, and work with federal and state (New York and New Jersey) regulators and citizen groups as partners in planning for a sustainable future for the NY-NJ Harbor Estuary.

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References

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