



The Macro-Level Problem of Microplastic Pollution

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Alexis Newman is a recent graduate of McGill University, who, last summer, interned at QLF in our Montreal office as a GLN intern and went into the field as an intern for the QLF Conservation and Stewardship Program in New Brunswick. Alexis wrote this article upon reflection of her experience in the Maritimes and about an environment issue that requires more attention.

Although the label had weathered from the jug long ago, the faded bright-orange colouring revealed the product's unmistakable identity as Tide laundry detergent. Having pried the jug from its wedged position amongst some rocks, my colleague Tabea Vischer and I stuffed it into a garbage bag filled with many other pieces of plastic debris. Working as Conservation Interns for the Québec-Labrador Foundation (QLF), we removed a diverse assortment of trash during several beach clean-ups along the coast of Miramichi Bay in New Brunswick. Our oceans are currently full of plastic pollution. However, the most dangerous form of marine debris cannot be easily picked up by the human hand, constituting over 95% of ocean litters: microplastic.

The first International Research Workshop on the Occurrence, Effects, and Fate of Microplastic Marine Debris was held by the National Oceanographic and Atmospheric Agency (NOAA) in 2008, resulting in the scientific consensus of the definition of microplastic. The term 'microplastic' refers to all plastic debris less than five millimetres in diameter. Microplastics can be classified as primary or secondary, according to their source before entering marine environments. Primary microplastics refer to resin pellets from hygiene and personal care products, which are released into the ocean through

wastewater and sewage effluent. Secondary microplastics result from the breakage of larger pieces of plastic into smaller bits through processes of erosion; hence, the state of the Tide jug mentioned previously. It is estimated that 245 million tonnes of microplastic are dumped into the ocean annually by cities and ships. In comparison, that amount of microplastic is equivalent to approximately 15,312,500 school buses!

Biology researchers Chibuisi Gideon Alimba and Caterina Faggio recently published a comprehensive review of the consequential trends of marine plastic pollution, in which they state, "Marine plastic debris [causes] interference with subsistence fishing practices, creation of unattractive coastal land and seascapes for ecotourism, and inhibition of wildlife conservation efforts." Plastic waste directly affects marine life, as they get entangled in pieces and die from suffocation, strangulation, or starvation. In addition, marine life absorbs microplastic by breathing it in or ingesting it, which causes changes in their genetic, immune, hormonal, reproductive, antioxidant, and neurological systems. As a result, microplastic is also a toxicological threat to human life through a process called bioaccumulation, which refers to the transference and increase in contaminants throughout food chains.

According to Alimba and Faggio, "[Research has] showed that 78% of chemicals listed under priority pollutants by the United States Environmental Protection Agency due to their ability to [persist], bioaccumulate, and exhibit toxic effects on biota have been associated with marine plastic litter pollution." The chemicals within plastic are especially concerning due to the material's non-biodegradability. In the early 20th century, thermosetting polymers were added to plastic to increase the durability of the substance, which prevented melting or corrosion. The resistant quality has made the proper disposal and destruction of tiny and impermeable microplastics quite a difficult task.

There are many beautiful coastal regions throughout Canada and the world that are tainted with an extraordinary amount of litter. Proper waste management is a serious issue that requires much more political attention and corporate action.

Here is a photograph that I took of a beach that we visited in Tabusintac, New Brunswick, with a piece of plastic waste that I encircled in red having washed upon the shore. Think about the amount of microplastic resting on this shore that is invisible to the human eye.



Work Cited

Alimba, C. G., and C. Faggio. (2019). Microplastics in the marine environment: Current trends in environmental pollution and mechanisms of toxicological profile. *Environmental Toxicology and Pharmacology*, 68, pp. 61-74. DOI: 10.1016/j.etap.2019.03.001. URL: <https://www.sciencedirect.com/science/article/pii/S1382668918305714>