Small Plastic, Quite Drastic: Microfiber Pollution in the Great Lakes
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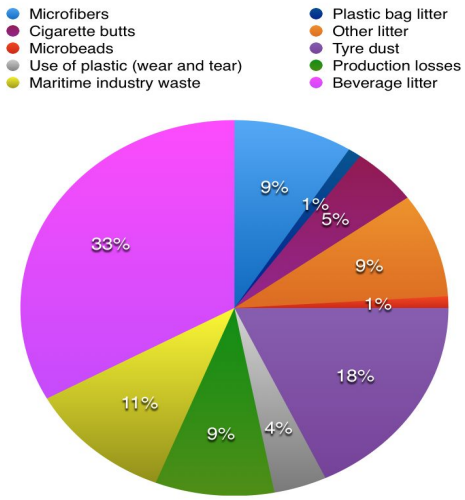
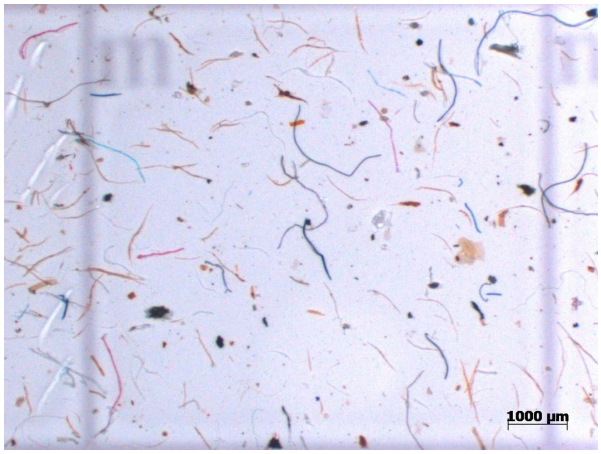
Perhaps the most pressing problem of plastic pollution is also the most unknown. Puny plastic particles called microfibers are greatly contributing to pollution in the Great Lakes and other bodies of water. Microplastics are pieces of plastic debris less than 5 mm in size, in the environment resulting from the disposal and breakdown of consumer products and industrial waste. The most widely known type of microplastics are microbeads, but surprisingly they only make up 1% of those found in the Great Lakes. Recently, it has been discovered that microfibers contribute significantly more to the problem of plastic pollution, accounting for an astounding 71% of microplastics the Great Lakes.



Pie chart measuring the amount of different types of plastic pollutants in the ocean.

Microfibers come from synthetic materials such as nylon, polyester, rayon, acrylic, and spandex, which are often used in clothing. Clothing made out of synthetic materials shed these tiny fibers of plastic when they get knocked off in the wash. A single fleece can shed up to 81 000 fibers of plastic per wash. Unlike a dryer, a washing machine does not have a lint filter to catch these pesky pieces of plastic, so they are able to wash down the drain. These plastic particles travel through the sewage system and into water treatment plants. These fibers are too small to be completely filtered out by the water cleaning facilities, thus making their way into the water source. Locally, the water source in Thunder Bay is Lake Superior. Our water is taken from the lake and returns there after being treated. Therefore, any microfibers not filtered out in the water treatment plant will be drained into Lake Superior. Since all the Great Lakes are connected by a drainage system, microfibers and other plastics polluting Lake Superior can travel through the drainage basin. Water from Lake Superior flows to Lake Michigan, then to Huron. This flows to Lake Erie, which drains into the final lake, Ontario. Since Lake Ontario is

the final stage, it is the most polluted. However, since all water eventually drains into the ocean, the microfibers and other plastics eventually make it there too.



A microfiber sample showing the miniscule size of the plastic shreds.

The increasing threat levels moving through the Great Lakes. This includes effects from plastic pollutants such as microfibers.

Microfibers have a large impact on the environment. Primarily, plastic is manufactured to be both lightweight and durable. However, the same qualities that make it so favourable, make it a huge threat to the environment. The characteristic of longevity means that any plastic in the environment will be present for decades, even centuries. In fact, those trillions of microfibers circulating in the Great Lakes will still be present over 1000 years from now. Additionally, microfibers can begin the process of biomagnification. This is the increase in the concentration of a substance as it moves up the trophic levels. Microfibers, like most plastics, have a sponge-like facet. They have the ability to absorb toxins such as flame retardants and PCBs (polychlorinated biphenyl) as well as invasive bacteria present in water. It is easy for these toxins to move up the food chain because animals often mistake plastic for food. For instance, a small crustacean ingests ten microfibers that contain traces of PCBs, before being eaten by a fish. That fish consumes ten crustaceans before being eaten by a larger fish. Each step up the food chain, the consumer is ingesting a growing amount of plastic, and thus the concentration of the pollutant in each level increases exponentially. But this does not just affect animals. That large fish eats ten small fish before being caught for human consumption. The amount of pollutant in the fish being consumed and entering the human body is now one thousand times greater than it was before biomagnification. This is a problem because the toxins and bacteria absorbed by plastics can be harmful to humans on the cellular level.

Although microfibers are a serious problem, they have a very simple solution; prevent them getting into the water. The obvious solution is to eliminate the use of synthetic fabrics in clothing and opt for natural materials such as cotton, wool, silk, cashmere, and linen. These fabrics are the superior choice because they are sustainable and they last longer without containing any harmful toxins. However, if your wardrobe must include synthetic materials, there are various ways to capture these microfibers once they are knocked free in the washing machine. You can install a washing machine lint filter which captures lint from synthetics before it washes down the drain. Additionally, the Rozalia Project has developed a ball shaped-filter that is able to catch these fibers as well. Finally, you can purchase special wash bags that you put your clothes into prior to washing, that prevents the fibers from entering water. The use of any of these devices significantly decreases the amount of plastic entering the water. However, the issue of microfibers is relatively unknown and unstudied. In fact, the superintendent of the Thunder Bay Water Pollution Control Plant stated, "Microfibers are not something that we treat for… [they are] an emerging substance of concern in the wastewater industry and environment." Also, there are minimal studies being conducted in the Great Lakes concerning the threat microfibers pose. That being said, the first step to solving the issue of microfibers is to raise awareness.

A photo of the Rozalia Project's microfiber catcher. It is a ball-shaped filter which is placed into the washing machine during a laundry cycle that collects and traps microfibers, lint, and hairs preventing them from flowing down the drain.

Microfibers are a serious, overlooked issue that bring harm to the environment, animals, and subsequently humans. The problem of microfiber pollution has various solutions that can greatly decrease the amount of microplastic entering the environment. Until everyone does their part to cut back the problem of plastic pollution, our fish will be served with a side of plastic.

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