Where Does All That Plastic Get into the Ocean?

The world produces 300 million tons of plastic each year. About two percent of it – around eight million metric tons – ends up in the ocean. It’s a staggering amount – yet only one percent of that plastic is actually found on the surface of the ocean. Half of that one percent winds up in trash vortices; the other half is more widely dispersed. That leaves 99 percent (7.92 million metric tons) unaccounted for each year. Where does it go? Science only began to unravel the riddle at the turn of the millennium when we uncovered a previously unknown phenomenon: microplastic. 80 percent of plastic waste ends up in the ocean, often via rivers. 20 percent is tossed overboard from ships. A portion of the plastic waste is carried great distances by ocean currents and gathers in the large trash vortices like the Great Pacific Garbage Patch in the North Pacific Gyre. On this journey, which can take up to 10 years, large pieces of plastic are progressively eroded, broken down by sunlight, and eaten by bacteria, fragmenting into many smaller pieces. The result is microplastic, meaning plastic as plankton in some parts of the ocean. Very small pieces of plastic can penetrate the fish’s intestinal walls and become trapped in the surrounding tissue. The microplastic then enters the food chain and eventually winds up on our plates – and in our own stomachs. The consequences of consuming microplastic have yet to be studied – after all, microplastic itself has only been a research topic since 2007. One finding is already cause for concern: the surface of microplastic acts like a sponge that soaks up toxins, including environmental poisons like PCB and disease-causing germs, helping them spread and threatening entire fish populations.

Once plastic gets into the ocean, there is no way to get it back out. That is because most of it becomes microplastic, which is so small that the process of filtering it out of the water would also filter out the aquatic life as well. That would still leave the larger pieces of plastic that are so dangerous to larger animals. There are many technical solutions aimed at these aspects of ocean cleanup under development. Here as well we must consider the ecological consequences as well as the benefits. For instance, if one plans to scoop the garbage out of large areas of the sea, then fish and other organisms will also be caught unintentionally, as happens in commercial fishing. We must ask: how great is the benefit compared to the damage that will result?

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Plastic garbage from cities and industrial centers flows directly into rivers and seas with untreated wastewater. Microplastic used as additives in cosmetic products is not filtered out by water treatment plants. Fishing nets and lines lost or intentionally abandoned at sea. Lost loads and ship materials. Garbage illegally dumped at sea. Catastrophic waste: wreckage and garbage swept out to sea by hurricanes, floods, and tsunamis.

Where Does the Plastic Waste Come from? The Top 20 Countries with the Worst Plastic Waste Management

The solution to the problem actually lies on land. 31.9 million metric tons of plastic waste are improperly disposed of globally; 4.8 to 12.7 million metric tons of it ends up in the ocean. The top 20 countries shown above are responsible for 83 percent of global plastic waste mismanagement. Taken together, the 23 coastal EU countries would rank 18th on this list. North America, China, and Europe produce around two-thirds of the world’s plastic disposed of in an uncontrolled manner. Political engagement is a powerful lever for setting the right incentives to change. Developing a circular economy is just a matter of political will.