

Plastic: Nuisance on Land, Menace at Sea

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Photograph courtesy of Kate Ter Haar.

Water flows downhill. As does everything in that water. Therefore, in Mississippi and Alabama, any pollutant, trash, or debris dropped into a creek or a stream – unless it gets stuck – will go to the Gulf of Mexico. The straw from a drink, the plastic pull-tab from the pack of cigarettes, and all those plastic water bottles – unless recycled or placed in a landfill – will end up in the Gulf. There the plastic will trap, impede, or otherwise harm the fish, turtles, dolphins, seabirds, and whales who depend on the ecosystem.

At least 80 percent of the plastic pollution found in oceans and seas is first dropped on land.¹ It becomes marine pollution by being blown in, or caught up in a river, or when stormwater flushes debris downstream. The greatest mass of marine plastic pollution is known as the Great Pacific Garbage Patch, which is formed as ocean debris is shunted about by different currents until it stalls in the center of that vortex in the Pacific Ocean. According to National Geographic, the size of the Great Pacific Garbage Patch is too large to measure. That is how big it is.



Photograph courtesy of Paul Williams.

Both federal and state laws make littering illegal. While most pollution enforcement focuses on punishing the act of dumping plastics directly into water, most plastics come into the water after a purposeful (or careless) disposal on land. Legislation exists to punish common littering and illegal dumping, but it is not linked to the goal of preventing plastic contamination of marine waters. With almost half the world's population within 50 miles of a coast, passive legislation is not a solution.

Federal Water Law Prohibits Putting Trash in Water

The Clean Water Act (CWA) makes it illegal to dump things into the “waters of the United States,” a term that has been interpreted to mean waterbodies that are or meet up with navigable waters. The act is enforced by the U.S. Environmental Protection Agency (EPA), and enforcement is focused on discharges into the water from direct sources (such as pipelines) and indirect sources (such as stormwater runoff).

The CWA identifies anything that changes the quality of the water it is put into as a “pollutant.” The statute’s definition of pollutant includes “garbage” and “solid waste.” The focus of the CWA, however, is not on trash dumped into creeks so much as preventing businesses and municipalities from pumping contaminants into people’s

drinking water or fish habitat. One way the law does that is by requiring states to establish a total maximum daily load (TMDL) for what municipalities discharge into water. A TMDL is set for each pollutant, and the EPA, or the state, if designated, will issue a discharge permit for those amounts. A TMDL can be set for trash.

While the EPA has set health-based limits for other pollutants, none have been established for trash. This gives some flexibility to states and municipalities in establishing TMDLs. When health-based water quality standards are not met, the law requires states to identify those waters as “impaired.” In the most recent reports to EPA on impaired waters of the states, neither Alabama nor Mississippi identified any waters as impaired due to trash.

According to EPA records, in 2016 Mississippi had designated over 3,764 miles of rivers and streams, nearly a mile of shoreline, and 45,593 acres of ponds and lakes as “impaired,” meaning those waterbodies have pollutants in them, primarily excess nutrients, oxygen depletion, pesticides, and mercury.³ In 2017, Mississippi brought 17 of those waterbodies into full attainment with water quality standards, including two waterbodies that had been listed as impaired since 2008. Alabama had one impaired body of water in 2017 but it reached full attainment during the year.



Photograph courtesy of Ingrid Taylor.

Without a goal to meet for trash TMDLs, it is impossible to fall short. In fact, only two states have trash TMDLs: California and Hawai'i. In Los Angeles, to meet the state's zero trash goal, the city installed \$75 million in trash capture devices. Hawai'i's goal is to have zero trash in its waters by 2034.

State Litter Laws Are Ineffective

While neither Alabama or Mississippi has set a trash TMDL, both states have laws that prohibit dumping. In Mississippi, state law makes it illegal to dispose of "any type of plastics ... into marine waters."⁴ A first violation is punishable by up to a \$500 fine and community service. Subsequent violations may bring a fine up to \$10,000 and/or revocation of boating licenses. Additionally, the state's Air and Water Pollution Control Law makes it illegal to "cause pollution of any waters of the state or to place or cause to be placed any wastes in a location where they are likely to cause pollution of any waters of the state."⁵

Alabama also prohibits littering. It makes criminal the act of littering, or knowingly putting litter on land or water without permission.⁶ Dumping more harmful waste, such as oil, sewage, or litter from a boat into state waters or dropping hazardous material on a highway does not have to be intentional to be a crime.

While a strict reading of these laws shows that littering is a crime, nobody is going to be prosecuted for dropping a candy wrapper near a stream. But it is just those mindless actions that contribute to a massive problem. According to the World Economic Forum, 8.8 million tons of plastic enter the oceans each year.⁷ Efforts to enforce littering laws could help slow the pollution.

Litter on Land Harms Oceans

Decades ago, the focus of plastic trash was on the harm a six-pack ring could do to marine life, but microplastic harm is more insidious. For one thing, despite the fact that there is so much plastic in the ocean, microplastic is not floating on top. According to National Geographic, 70% of marine debris sinks to the bottom, making cleanup even harder. This is because plastic, when exposed to sunlight, dries out, cracks, and begins decomposing. It breaks down into little bits, characterized as microplastics if smaller than 5 mm. Unlike larger pieces of plastic that float on top, microplastics are found throughout the water, even at great depths. Microplastic is hard to see, harder to pick up, and unfortunately, it is more likely to look like food. Those little bits can resemble zooplankton in size and smell, and fish, turtles, and birds can eat it by mistake. A study in the Gulf of Mexico found that 42% of the fish caught along the coast of Texas had ingested plastic.⁸

Another study found that even 1.25 miles below the surface of the ocean, half of the deep sea starfish and sea snails living there had ingested plastic.⁹

According to the EPA, “trash in waters can prevent beneficial uses, degrade habitats and harm wildlife, and may endangered people’s health.” As we are learning, many fish eat microplastic because it emits a food-like odor. This is problematic as waterborn plastic absorbs toxins, which in turn exposes the fish who mistakenly eat the plastic to concentrated levels of those toxins, not to mention plastic. That is bad for the fish and possibly bad for those who eat the fish.

Research on the presence of plastics in the Gulf of Mexico revealed microplastic concentrations that could fairly be described as alarming: the Gulf has one of the highest concentrations of plastics in the world. The concentrations of microplastics “were greater than the abundances of all but four of the five most abundant [species]...” in one form of capture, and were “not statistically different” from species caught in a different manner.¹⁰ Thus, depending on what method used, the odds of pulling a piece of plastic out of the northern Gulf versus a living species is one out of five.

What to Do

The obvious solution to this problem is to prevent plastic trash from getting to the sea. EPA recommends trash capture devices that can be installed at three different spots: at storm drain inlets to stop the trash from entering the water system; in the water pipelines to capture the trash in the system; or in the water to capture trash already there. One European company, Ocean Cleanup, is developing a large device to remove floating plastic in the ocean before it biodegrades into microplastic. Its pilot project is testing a floating boom to capture trash that is pushed naturally into it by the currents of the ocean. The plan is to have specially designed ships pick up the captured plastic and bring the waste to shore. An early prototype of the floating boom was damaged during its two-month trial period in the North Sea in late summer of 2017 and was brought back to the Netherlands for redesign. Ocean Cleanup hopes to install a collector in the Pacific Ocean and thinks it is possible to clean up 50 percent of the Great Pacific Garbage Patch in five years.¹¹

If trash is not stopped at the source, for example by making recycling more available and reducing the amounts of plastic consumers use each day, it can be

picked up along the coast before it biodegrades into more harmful microplastic. Both Alabama and Mississippi host coastal cleanups. In 2017, the Alabama Coastal Cleanup was held on the same day as the International Coastal Cleanup, and some Mississippi groups also participated. In 2016, the International Coastal Cleanup hoisted 9,200 tons of trash from shorelines worldwide. Mississippi postponed its 2017 Coastal Cleanup after Hurricane Nate.

As is clear from the data, a cleanup does not have to be on the coast to help the oceans. Efforts upstream would help. A group that sponsored an annual trash cleanup along the Upper Mississippi picked up nearly 300 tons of trash in five years. Along those lines, even establishing moderate trash TMDLs would reduce contamination. Devices over storm drains to catch smaller trash would make a difference. Cheaper, less regulatory measures such as placing more trash cans near food service locations, recycling more, and littering less also would help. This is a massive problem caused by lots of tiny things; helping a little could have a big impact. 🌊

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Endnotes

1. Matthew Cole *et al.*, *Microplastics as Contaminants in the Marine Environment: A Review*, Marine Pollution Bulletin, 2588, 2590 (Dec. 2011).
2. 33 U.S.C. §§ 1251 *et seq.*
3. EPA, *Mississippi Causes of Impairment for Reporting Year 2016*.
4. Miss. Code Ann. § 51-2-3(1).
5. Miss. Code Ann. § 49-17-29(2). *See e.g.*, Gray v. Mississippi Comm’n on Environmental Quality, 174 So. 3d 956, 960 (Miss. Ct. of App. 2015) (assessing \$62,500 for repeatedly disturbing dirt and adding fill in wetlands without a permit).
6. Ala. Code Ann. § 13A-7-29.
7. World Economic Forum, *How Much Plastic Is There in the Ocean?* (Jan. 12, 2016).
8. Colleen A. Peters, *et al.*, *Foraging Preferences Influence Microplastic Ingestion by Six Marine Fish Species from the Texas Gulf Coast*, Marine Pollution Bulletin (July 2017).
9. Winnie Courlene-Jones, *et al.*, *Microplastic Pollution Identified in Deep-sea Water and Ingested by Benthic Invertebrates in the Rockall Trough, North Atlantic Ocean*, Environmental Pollution, Vol. 231, Part 1, pp. 271-280 (Dec. 2017).
10. Rosana Di Mauro, *et al.*, *Abundant plankton-sized microplastic particles in shelf waters of the northern Gulf of Mexico*, Environmental Pollution, Vol. 230, pp. 798-809 (Nov. 2017).
11. The Ocean Cleanup, www.theoceancleanup.com.