

INDUSTRIES THAT CONTRIBUTE TO WATER POLLUTION

BY: TRAVIS WANG



Water is one of Earth's most abundant but precious resources. Keeping our water clean and pollution-free is not only important to us, but also the vast aquatic ecosystems that sustain life. Human pollution not only damages the quality of our air, but also the quality of our water. Several industries contribute heavily to the water pollution problem, dumping harmful wastes without any regard for the consequences.

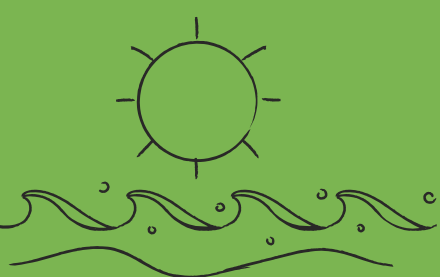
Mining operations produce manufacturing wastes that contaminate water to be impotable. When these chemicals leak into drinking supplies of nearby towns and cities, people get sick. While not a direct consequence of mining, Flint, Michigan's water supply demonstrates the harm in contaminated water. Their water supply was contaminated by lead in corroded pipes, lead being a byproduct of mining as well. According to the EPA, more than 40% of Western watersheds in the US had been polluted by mines. Even with the safety standards in place to reduce the impact of the industry, the tailings (material leftover from ore extraction) need to be monitored for decades, if not centuries.



Agriculture is a huge culprit as well in water pollution. In the United States, it's reported to be the top source of contaminants in rivers and streams. Rain brings fertilizers, pesticides, and wastes into our waterways. The result is that all of the chemicals in the fertilizers and pesticides and all of the pathogens in the wastes are flushed into our drinking water. Fertilizer can cause even more issues by feeding algae and destroying bodies of water by way of algae blooms. Algae blooms absorb all of the nutrients out of the water, suffocating any aquatic life unfortunate enough to live in the lake, ponds, rivers, etc. while turning the water into undrinkable sludge until the algae die off when they sap all of the oxygen and space.



Even the ocean, with a seemingly endless supply of water is not safe from human contamination. Being so large, most contamination around the coast ends up in the neighboring oceans. All of the little accidents from septic tanks, vehicles, farms, livestock ranches, timber harvest areas, oil or chemical spill add up over decades. Dumping trash into the ocean allows the chemicals and contaminants to seep into the water and eventually be absorbed by marine life, making them unsafe for human consumption. Littering additionally introduces plastics, which have done great harm to marine life. Even the plastic bags and such that don't strangle fish end up breaking down into microplastics which may lodge themselves inside an unwilling host. Research is still ongoing surrounding the potential harm from microplastics in not only aquatic life, but also humans.



Kevin Zhuo

THE PATCH OF TRASH

SUNNY XIAO

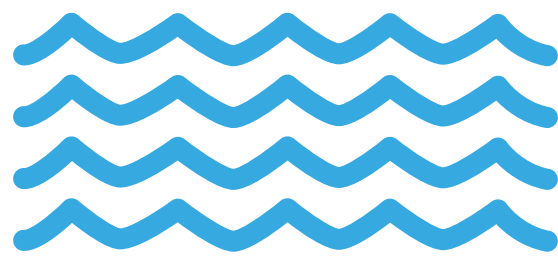
When water pollution is brought up, it's usually in the context of water contamination, such as acid rain. What people fail to note is the concept of physical piles of trash in the water. Or more specifically, an approximately 1.6 million square kilometer sized collection of trash: the Great Pacific garbage patch.

The plastic bottle caps left forgotten and washed away and broken fishing nets are just two products contributing to an enormous collection of plastic, primarily consisting of microplastics. As the industry recognizes the durability and low cost of plastic, the amount of plastic used has solely fluctuated. From the bags you buy your apples in to the containers we use to package deli food, the use of plastic has not slowed down.

Now, you may be wondering, how is it harming us? It isn't, but it's harming animals. Sea turtles have mistaken plastic bags for jellyfish, a key component in a turtle's diet, causing intestinal blockages. Birds have been eating the plastic instead of food, eventually leading to starvation and thus death. A significant amount of Albatross chicks have died from ingesting microplastic.

Unfortunately, due to the patch's location -- the middle of nowhere -- no country has taken the initiative to clean up the trash. Instead, organizations like the Ocean Cleanup are dedicated to restoring the ocean back to what it was centuries ago.

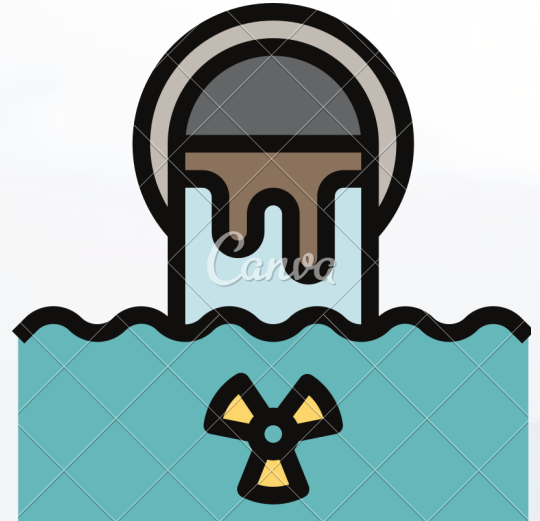
On land, there are numerous ways to help. Primarily, we need to cut down on our plastic use. Buy reusable bags, use paper straws, pick up your trash at the beach, purchase food like oats and rice from bulk bins....the list goes on and on. Ultimately, we are not the ones producing plastic; the companies we buy products from are. However, we can do our best to avoid these products that use excessive packaging and unnecessary bagging to do our part in saving marine life.



What Causes Water Pollution?

Jason Hu

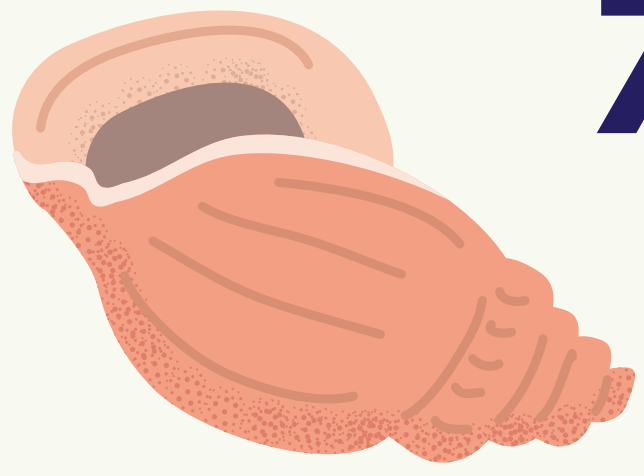
Water pollution occurs when bodies of water are contaminated by foreign substances, usually as a direct result of human activities. This can have a varied affect on the water, ranging from very minimal damage, to destroying the entire ecosystem. Not only does this pollution affect animals and plants, it can also affect the people that rely on the water source for drinking and bathing water. So what exactly causes this water to become polluted? One of the most prominent causes is waste and sewage. Most of the world's sewage isn't processed and goes directly back into the ocean or other bodies of water. As you can imagine, this wastewater is very polluted and contains many toxic substances.



Not only does this introduce chemicals into the environment that the organisms are not used to, it makes the water very dangerous to drink. In areas without water treatment plants, polluted waterways may be the only source of drinking water, posing quite a threat as it is not safe to drink at all. The open waters are also subjects of dumping. Many people and companies throw whatever trash they have into the water, which can alter the river flow. In addition, much of the garbage that we throw out circles its way back into the ocean. For example, plastic bags and bottles are often found washed up on shore, or floating around in the ocean. Animals are unable to distinguish the difference between this trash and their food, and inadvertently eat it. This can cause major digestive issues and even potentially kill them. Another source of pollution comes from agricultural waste.

Farmers often use fertilizers and pesticides as nutrients to help their plants grow. However, when there is rain, it can wash the fertilizer away, and it ends up in lakes or rivers. Since the fertilizer contains a large amount of nutrients, there is a sudden influx in the water. This allows algae to thrive and bloom in large colonies. Once the nutrient level rebounds to its normal level, the algae will die, and be decomposed. However, this decomposition process requires large amounts of oxygen, significantly lowering the oxygen concentration. Due to this, many of the fish and plants are unable to get enough oxygen, and will eventually suffocate. As you can see, water pollution is caused from many different sources, many of which can be restricted. Although reform efforts have begun, if widespread change is not initiated, our waters will continue to become polluted and marine life will suffer as a result.

Alyssa Kuang



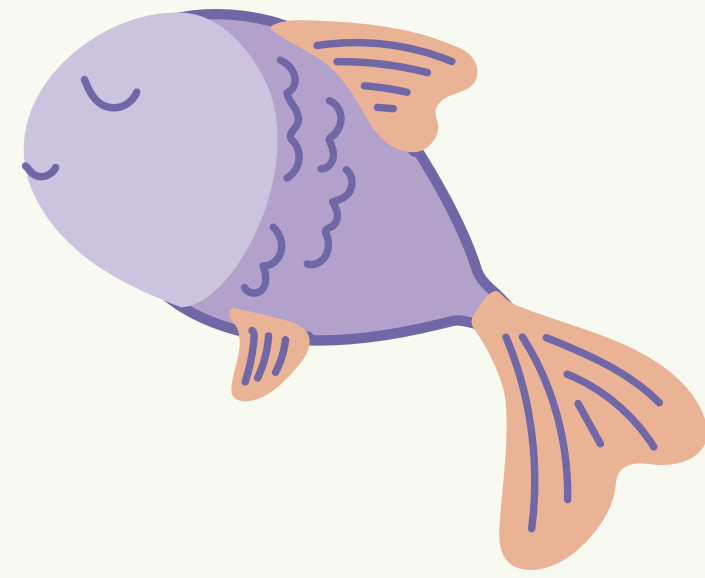
7 ANIMALS AFFECTED BY PLASTIC POLLUTION

Flora Yuan

What animals do we put at risk through plastic pollution in the ocean?

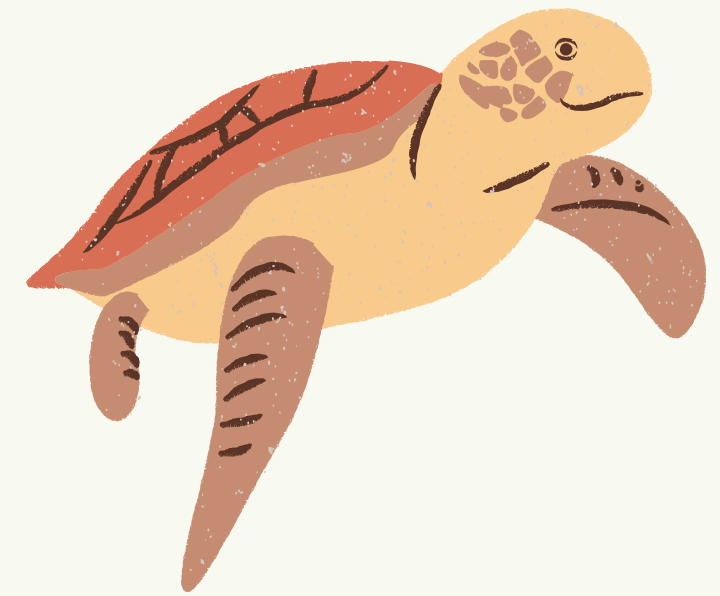
Fish

As ocean pollution increases, fish are at high risk of taking in minute plastic debris through their gills. Studies conducted in the United Kingdom show that it is more difficult for animals to get rid of waste captured in their gills, as opposed to items taken in by mouth. The microplastics can affect the fish on a cellular level, causing cell damage and inflammation. Fish can also become entangled in the plastic debris, causing suffocation, starvation, and drowning.



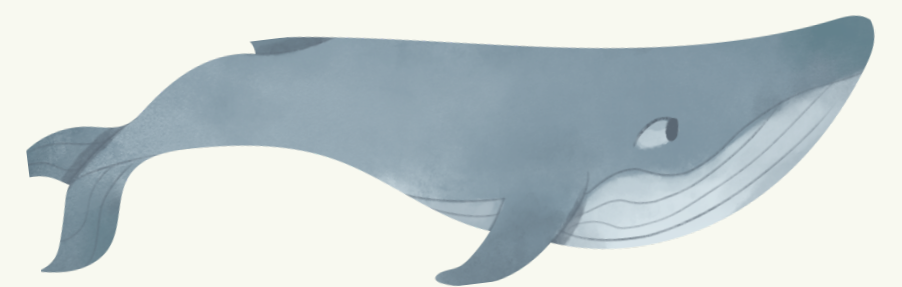
Sea Turtles

Studies have shown countless sea turtles that are injured or die each year due to entanglement in synthetic plastic or commercial fishing nets. Sharp plastics can additionally rupture their internal organs, while plastic bags can cause intestinal blockages, resulting in starvation. Another infamous situation is the ingestion of these plastic bags. Turtles, mistaking plastic bags for jellyfish, consume the plastic bags; in turn, this makes them unnaturally buoyant, which can stunt their growth and lead to slow reproduction rates. Consuming plastic may also obstruct the turtle's digestive system, leading to death.



Dolphins/Whales

Similar to sea turtles, mammalian animals, such as dolphins or whales, mistakenly recognize plastic debris as a source of food. These ingestions have been found to puncture and tear the stomach lining, which leads to starvation and death. Once plastic accumulates in the dolphin/whale's stomach over time, the animal no longer feels hungry, prompting it to no longer hunt and feed itself nutrients. This leads to the starvation of the mammals. Many studies have shown that postpartum dolphins and whales have large amounts of plastic waste in their digestive system. Finally, larger plastic constituents, such as plastic bags, could get stuck on the animals' bodies, leading to an obstruction in their movement.



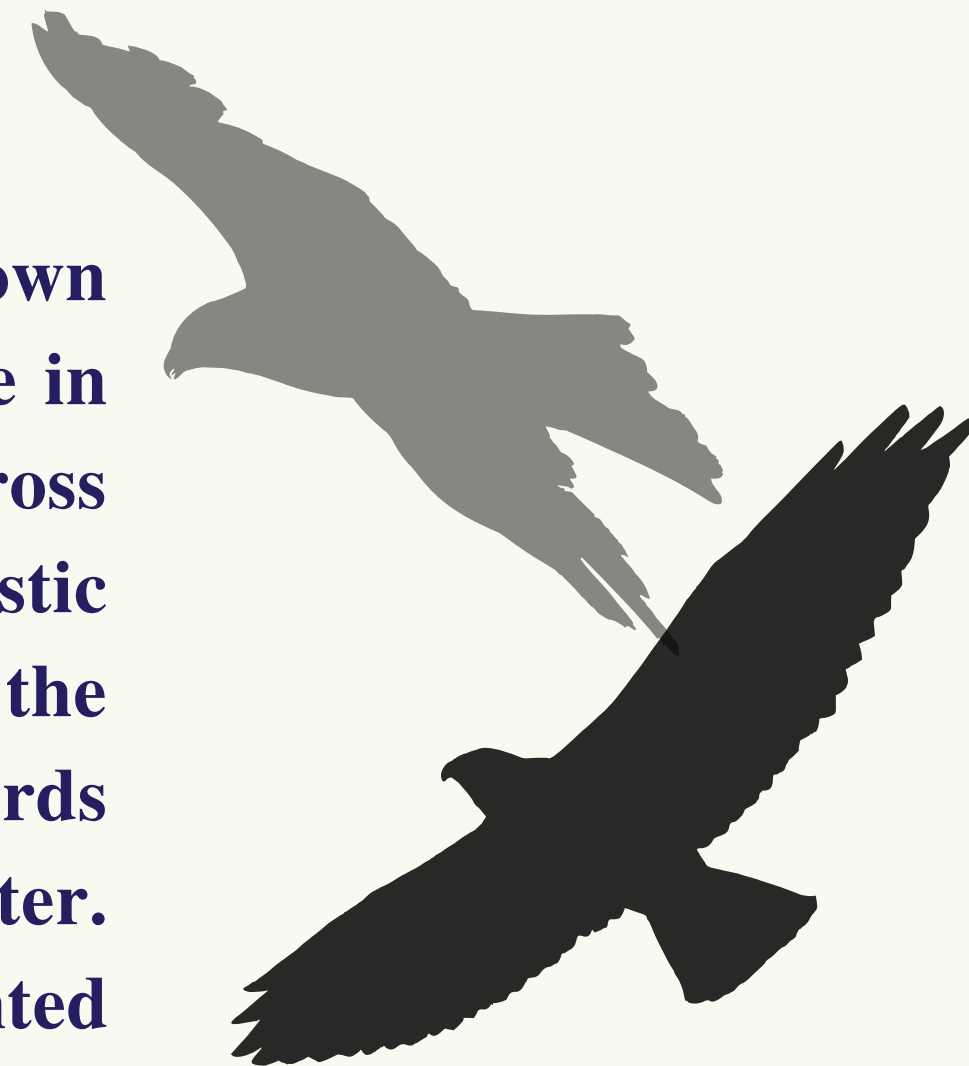
Sea Lions/Seals

Plastic debris, including fishing lines, lures, and nets entangle sea lions and seals. Additionally, sea lions and seals can also get stuck in plastic packing bands or bags, which leads to injury or suffocation. Sea animals often eat microplastics because they are small in size; these plastics contain toxic chemicals that decrease reproduction as well as increase the chance of death. Studies have shown a progressive worsening in the condition of sea lions and seals that have eaten microplastics, illustrating that these animals suffer for months or years before death.



Sea Birds

Sea birds sustain injuries by eating plastic debris. Studies have shown that 90% of marine birds have ingested plastic debris at least once in their lives, most notably the Laysan albatross. The Laysan albatross dive in the water in order to catch fish or squid, but pick up plastic along the way. Digested microplastics cause obstructions in the digestive tract and puncture internal organs. Additionally, sea birds often find themselves entangled in plastic as they dive into the water. Other studies have found that birds that had eaten plastic have stunted growth and a decline in kidney function.



Crabs

Microplastics can enter the crabs' bodies through their gills, as well as by ingestion. Smaller crabs, such as hermit crabs, can be killed after being trapped in plastic debris. Additionally, hermit crabs are animals that don't have shells of their own; this means they have to find empty shells to find shelter in. On beaches, crabs can crawl into plastic containers and be unable to get out, eventually dying inside the container.



Humans

In addition to all the effects on other animals, humans are affected based on a chain reaction, specifically the food chain. Humans ingest the animals that eat the microplastics, such as fish, crabs, etc. Plastics soak up harmful toxins such as lead, cadmium, and mercury, all of which are very dangerous to humans. Today, we still know very little about what levels of contamination might negatively affect us. Diseases such as cancer, diabetes, chronic inflammation, and various immune diseases are just a few examples of the severe issues plastic and its toxic components can cause.

