

The Accumulation of Plastic in the Ocean



Plastic is dangerous to ocean wildlife.

Early in the movie *Finding Dory*, the lovable blue tang gets caught in a plastic six pack ring, a problem that she barely notices. Dory just keeps swimming. But that little piece of trash represents an estimated 5.25 trillion pieces of plastic that have found their way to the ocean (Parker 2015a). With serious implications for the health of marine life and humans and associated impacts on the fishing industry, we should all be worrying like Marlin when it comes to the accumulation of plastic in the ocean.

What is plastic?

You probably see and use plastic every day, but you may not know what it actually is. Plastics are synthetic, meaning that they are man-made; they are not found in nature. Most plastics are made from oil or natural gas which provide the organic, or carbon-based, compounds that make up each piece of plastic. The individual molecules of the organic compound are called **monomers**. Plastics are made of chains of monomers called **polymers**. The process of making plastics is called **polymerization** (Nobelprize.org 2007).

Where does ocean plastic come from?

When plastic escapes collection systems, it is referred to as 'leaking'. An estimated 32% (8 million metric tons) of plastic leaks every year and ends up in the ocean. This is the equivalent of dumping one garbage truck into the ocean every minute (Project MainStream 2016). Plastic debris includes household items like bags, cups, and bottles; industrial products like plastic sheeting and hard hats; and fishing gear like nets, buoys, traps, and lines. Pieces smaller than 5 mm are called **microplastics**. Microplastics include large pieces that have broken down and items like the microbeads found in some cosmetics (NOAA 2016).



An enormous amount of our plastic waste ends up in oceans.

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Plastic has also been found in the deep ocean and frozen in Arctic ice, and fish eat a large amount of the debris that invades their watery homes (Parker 2015b). But the real answer to 'Where does ocean plastic go?' is 'Nowhere.' Plastic is not **biodegradable**, which means that it does not decay through the actions of living organisms (Dictionary.com 2016). It doesn't rot. It will remain in the same form for hundreds of years before breaking down into smaller pieces of plastic. But it never goes away. **The Law of Conservation of Mass** tells us that mass cannot be created or destroyed (Sterner et al. 2011). Unless the plastic is physically removed from the ocean, it's there forever.

Negative impacts

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Possible solutions

Some steps have been taken to cut down on the amount of plastic that ends up in the oceans each year. In 2002, Bangladesh outlawed single-use plastic bags and many other countries have followed suit, including China and Rwanda in 2008 and France in January 2016. In all, more than 25 countries have either banned or started taxing single-use plastic bags (Project MainStream 2016). Beginning in 2017, microbeads will be eliminated from rinse-off



Some cities and even countries have outlawed single-use plastic bags.

cosmetics in the United States, although other products will still contain them (Hanson 2016).

However, much more will have to be done to stem the tide of plastic flowing into the world's oceans. Human plastic consumption is expected to double in the next twenty years and if left unchecked, experts predict that by 2050, there will be more plastic than fish in the ocean (Project MainStream 2016).

Reading Comprehension Questions

1. What are polymers?
2. What is the process of making plastics called?
3. How
4. What
5. What does biodegradable mean? Are plastics biodegradable?
6. How
7. Name three problems fish develop after eating plastic.
8. How
9. Which country was the first to ban single-use plastic bags?

Extension Questions

10. One possible
11. What is

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