

From Hand to Land to Sea:

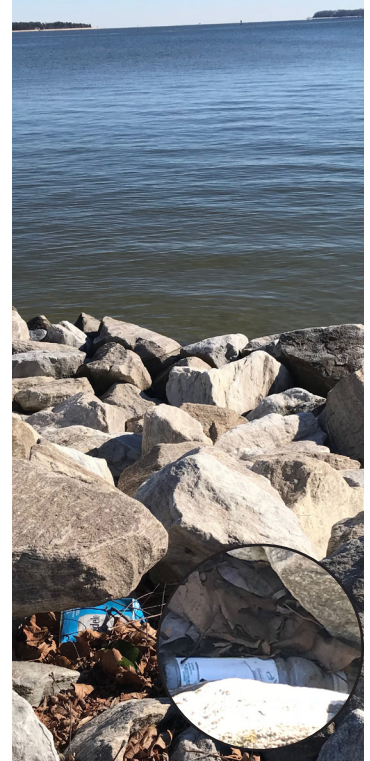
Sources and Destinations of Plastic Pollution

What are the Sources of Pollution?

1. The majority of pollution comes from human activities. Pollution is defined as any substance or energy that is foreign to a particular environment or is present in high enough quantities to cause harm to humans, animals, and plants.
2. Pollution can enter the environment in direct ways. For example, some factories discharge polluted wastewater through pipes directly into nearby lakes or rivers. Pollution can also get into the environment through indirect ways. Runoff can happen when rain or melting snow moves across the surface of the land without being absorbed. As runoff water travels it picks up pollutants like trash and chemicals and carries them into streams or rivers, or into storm drains which lead directly into the nearest water body, ultimately flowing into the ocean. This means that trash, such as drink bottles, can travel from our neighborhoods to the Chesapeake Bay and eventually the ocean! This also means that the source of the pollution can be very far from the environment where it ends up.

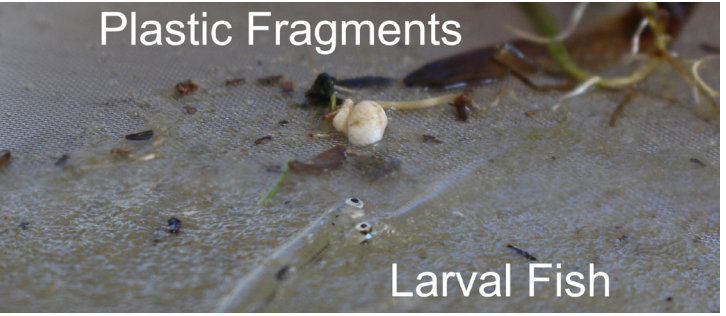
What about plastic pollution?

3. Most of the plastic pollution in the ocean comes from the land and is carried there by runoff. Our per-capita use of plastics - in other words, the amount of plastic that each person in the growing population uses - keeps increasing, which means the chance of it becoming pollution are also increasing. Plastic items can become pollution when they are either intentionally put into the natural environment or when they accidentally get there, such as if the wind blows a trashcan over.
4. There are multiple properties of plastic that make it easy for plastic waste items to be carried by wind and runoff into natural environments. Plastic is lightweight and buoyant (meaning it can float), and because of this, plastic items can be easily carried by wind and water, traveling from your hand, to the land, to streams and rivers, and finally into bays and the ocean.
5. Some plastics easily **break up** into smaller pieces over time, but those pieces do not easily **break down** in the ways that natural materials do. The majority of plastic pollution in the ocean is made up of microplastics. Microplastics are small bits of plastics that are less than 5 millimeters long (about the length of a red ant). Microplastics are plastics that were once larger items (such as plastic forks, children's toys, or microfibers from clothes) that broke apart into smaller pieces or that were originally very small, such as plastic microbeads and glitter. Microplastics are easily carried by the wind and rain because they are lightweight and buoyant, but their tiny size makes their transport through landscapes and waterways even faster. Microplastics are so small in fact that they can be difficult to see and can be very challenging to filter from water, sediments and soil.





Scientists sample the Patuxent River for microplastics



Microplastics were found in all Patuxent River samples

What does pollution do to aquatic systems?

6. Pollution can cause a wide range of problems to living things by negatively affecting the function and stability of the ecosystem. For example, an ecosystem that is affected by pollution may not be able to provide the services it normally does, like clean water, fresh air, or access to food. This can then harm the living things in the ecosystem that depend on those services by causing illness, injury, or even death.
7. Plastic pollution that gets into the environment breaks up into smaller pieces or microplastics over time. When plastic is in the environment, it can also release harmful chemicals that contaminate the air, water, and soil. If living things mistake microplastics for food and ingest them, these harmful chemicals can also be released into their bodies and cause illness or death.
8. Once plastic enters the food chain, it can accumulate in the bodies of organisms either when a living thing directly ingests plastic or when one organism eats another organism that has plastic in its body. Fish, oysters, dolphins, birds, whales and sea turtles have all been found with stomachs full of plastic! These large amounts of plastic prevent these animals from being able to digest real food and will often cause them to eventually die of starvation. Plastic can also accumulate in the environment, reducing the amount of suitable habitat for plants and other organisms by blocking space and sunlight.
9. Large pieces of plastic pollution, like plastic fishing line or soda can rings, can also entangle or wrap around the bodies, fins or limbs of organisms, preventing them from being able to hunt for food or even move. This eventually can lead to suffocation, starvation, or even death for entangled individuals.

What can we do to help?

10. There are many different actions that cities, organizations, and individuals (you!) can take to prevent pollution, especially plastic pollution. The best way to prevent pollution is by reducing the amount we use and waste we produce. For example, you can select foods with little or no plastic packaging or choose to use reusable items instead of single-use ones. You can spread this action to your community by acting as an example and telling them what you have learned about pollution and where it comes from.
11. As citizens and voters, we can also propose and support efforts to make laws that require businesses, factories, and communities to reduce the pollution they produce.
12. Having local cleanups to pick up trash can stop pollution from getting into important habitats and help raise awareness about the problem. People also tend to be less likely to litter in a cleaner environment.
13. Finally, proper disposal of waste items is very important to prevent them from getting picked up by wind and rain and carried to the ocean. Make sure that waste items are contained in trash bags or cans with lids and that they are not overfilled. For plastic waste, check the bottom of the plastic item for the recycling code number and find out if your city will let you recycle it (make sure it's clean first!).
14. **What actions do you plan on taking to prevent pollution in your community?**