

A Micro-Plastic Ocean

Keeping plastic out of the ocean is critical to our survival. Not only do we want to keep these harmful plastics away from beloved sea friends, but we rely on the ocean in more ways than you can imagine. We know that plastic continues to threaten the lives of species such as the Green Turtle, and the white dolphin, but microplastics are the real enemy here. When these micro-toxins enter the ocean, it means that the animals and corals which guide the earth's survival will become extinct- and without them, there is no us! Learn about being an ocean ally

1. *Our urban jungle- why does it matter?*
2. *How much plastic ends up in the ocean?*
3. *What is a micro-plastic?*
4. *Why are microplastics bad for the ocean?*
5. *How does ocean plastic interfere with life?*
6. *What is ocean acidification?*
7. *What is sequestering?*

1. Our urban jungle- why does it matter?

When we think of Hong Kong, what most likely comes to mind are the giant skyscrapers, the dining & nightlife, and especially the shopping. In reality, Hong Kong is one of the world's best hiking destinations, and has one of the most diverse ecosystems in the world, with over

6000 species recorded. We are in a tropical hotspot for biodiversity, and if we do not change our consumption habits, then we will lose this precious environment. We want to protect this environment, therefore we are providing facilities for consumer literacy regarding sustainability.



(Hong Kong Pink Dolphin, Photography: Flickr/Judy Gallagher)

2. How much plastic ends up in the ocean?

The reality is that we cannot determine exactly how much plastic ends up in the ocean. No one is keeping track, and because of this the issue persists.

3. What is a micro-plastic?

Plastic Free Seas defines microplastics as any plastic that is smaller than 5mm. There are various types of microplastics; there are primary microplastics, which are those microplastics manufactured to be this size, and then secondary microplastics. Secondary microplastics are the result of the residual breakdown of smaller plastics from larger plastic items, such as water bottles. Both are harmful to the natural environment. As a report by plastic productions specialist Gary Griggs states, plastic production increases by 4% each

year. This means that microplastic concentration will continue to build.



Microplastic pollution is not only an issue of the ocean- these tiny pieces of plastic contaminate the air we breathe, and the soil that our food grows in.

4. Why are microplastics bad for the ocean?

The issue of microplastic is complex, particularly when it comes to our oceans. You can read more about the effects of microplastic on our health in our “health hazards” section, as this crisis is extensive and severe. A report published in 2020 by HKU found that between the years 2017-2020, microplastic concentration in Hong Kong waters increased by 11x. This gives us an idea of the rate of increase we are dealing with, but the scariest part about this, is that there is a profound lack of information on the ways in which microplastics affect Hong Kong waters.

For the past century, we have used plastic because it is durable and plentiful. The Griggs report notes that this is also what makes plastic an issue- because it is a persistent organic pollutant, essentially plastics will exist in some form for lifetimes to come. Microplastics pollute the marine environment, home to species vital to our existence. These tiny pieces of plastic

contain toxic chemicals that are released when they are broken down. These toxins promote coral bleaching, ocean acidification, and are ingested by the fish and other sea creatures that inhabit the ocean. We can infer that toxins are, for lack of a better term, toxic. Therefore not only is it terrible for the fish, but we end up eating these toxins when consuming seafood! This is a process called biomagnification, essentially the concentration of plastic consumption builds as the food chain progresses. Plastic Oceans, an NGO, estimates that each person consumes 40 pounds of plastic in their lifetime.

5. How does ocean plastic interfere with life?

Plastic is a major threat to all marine life, the ways in which they are affected are numerous. From microplastic ingestion to entanglement, to being cut by plastics which then result in infection, the risks associated with ocean plastic are severe. There is still much research to be done about the ways in which micro-toxins affect marine life, but we know that these effects are not good.

Plastic entanglement is something that we see a lot of imagery around, and Gary Griggs estimates that 100,000 marine animals are killed by plastic entanglement per annum. Griggs also notes that around 80% of dead sea turtles have been found to have ingested plastic. Plastic bags are particularly threatening as a choking hazard, which Gary Griggs estimates as having a global use of 500 billion bags per year.



(Hong Kong Jellyfish)

6. What is ocean acidification?

Sophie Hadley, a reporter at Earth, defines ocean acidification as the result of the ocean's PH balance being affected by chemical interference. This chemical interference is a direct result of human activity, to which microplastics from improper waste management is a major contributor. There are many negative impacts of ocean acidification, amongst which includes creating an environment that is too toxic for marine life to live in. Harmful bacteria and microorganisms are released from ocean plastics, which promote coral bleaching. A major issue associated with ocean acidification is the depletion of essential minerals such as calcium carbonate. This is the mineral compound which serves as the building block for marine skeletons and shells, namely Crustacean. With such an acidic ocean environment, marine habitats are slowly being destroyed. Hadley reports that ocean acidity has increased by 26% since 1850.

7. What is sequestering?

Another major issue posed to our planet by ocean plastics, is overburdening of sea sequestration. CO2 is just one of the harmful chemicals that is released from ocean plastics. Our planet is amazing

because it has mechanisms to keep our carbon emissions at bay for us - this process is called sequestration. According to the World Wildlife Fund, the ocean sequesters just over a third of the earth's carbon emissions, the largest source of carbon sequestration. Think of it as a carbon sink. At the depths of the sea, the amount of carbon dioxide is denser than seawater, to give an idea of the ocean's effectiveness as a sequestration tool. Tiny organisms called phytoplankton to ingest carbon dioxide, their bodies are composed of these chemicals. Despite these natural tools at our disposal, we have hit its limit. We are now actively overburdening the ocean's ability to absorb carbon dioxide, to which plastic is a major contributor.