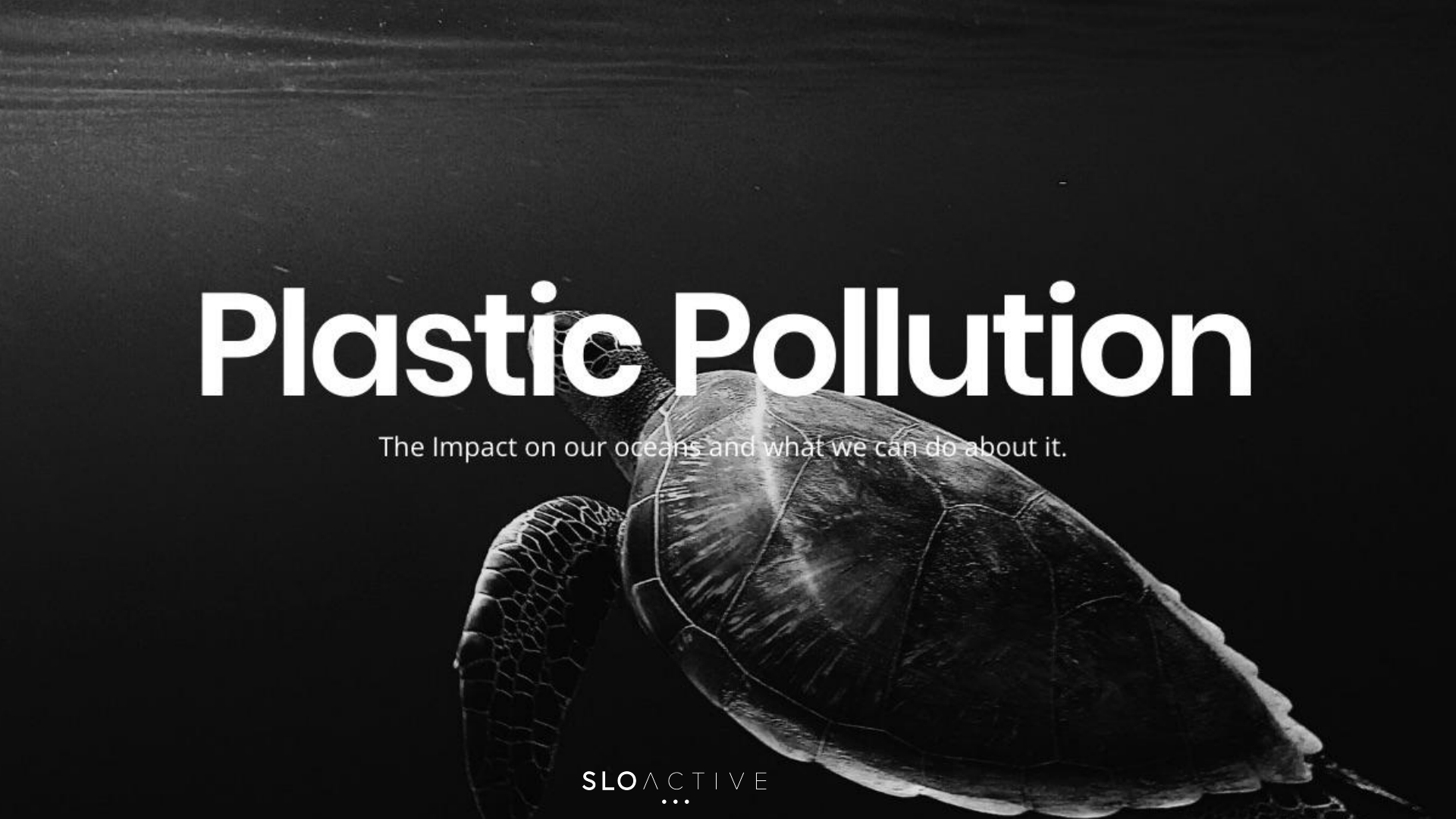

Plastic Pollution
The Impact on our oceans and what we can do about it.
SLOACTIVE

Plastic Pollution: The Problem

Litter in the environment is an ongoing problem, but arguably one of the most pressing environmental challenges that we are faced with today is marine plastic debris. The two common sources marine debris originates from are:

1. land-based, which includes litter from beach-goers, as well as debris that has either blown into the ocean or been washed in with stormwater runoff; and

2. ocean-based, which includes garbage disposed at sea by ships and boats, as well as fishing debris, such as plastic strapping from bait boxes, discarded fishing line or nets, and derelict fishing gear.

While discarded fishing gear takes its toll on the marine environment by entangling marine life and destroying coral reefs, it only comprises an estimated 20% of all marine debris – a staggering 80% of all marine debris stems from land-based sources.

How Much Plastic is in the Ocean?

A study published in 2017 estimated between 1.15 to 2.41 million tonnes of plastic enters the oceans via rivers annually, with peak months being between May and October. The top 20 contributing rivers, which according to the report are mostly found in Asia, contribute around 67% of all plastics flowing into the ocean from rivers around the world.

The demand for plastic has increased dramatically over the last 70 years. According to Plastic Ocean, 300 million tons of plastic is produced globally every year. Half of that plastic is used for disposable items that will only be used once. As a result, more than 8 million tons of discarded plastic ends up in our oceans every single year. Once it is there it doesn't readily go away. The Worldwatch Institute estimates that the average American or European person typically uses 100 kilograms of plastic every year, most of which consists of packaging, and while it is estimated that Asians currently only use an average of 20 kilograms per person, this is expected to rise due to economic growth in the region.

Plastic Pollution Facts & Figures

10–20 million

Tons of plastic ends up in our oceans every year, according to a report released by the Worldwatch Institute in 2015.

5.25 trillion

estimated number of plastic particles currently floating around in world's oceans.

$13 billion

number of estimated losses per year associated with marine plastic debris due to the negative impact on marine ecosystems.

How Does Plastic Breakdown?

One of the characteristics that make plastic so popular for use in a wide range of industries is that it is extremely durable and long-lasting. However, this trait also makes it persist in the environment.

Plastics are photodegradable – meaning that they break down into smaller and smaller pieces when exposed to sunlight. Because the temperature they are exposed to in the ocean is much lower than that on land, the breakdown process takes much longer in the marine environment.

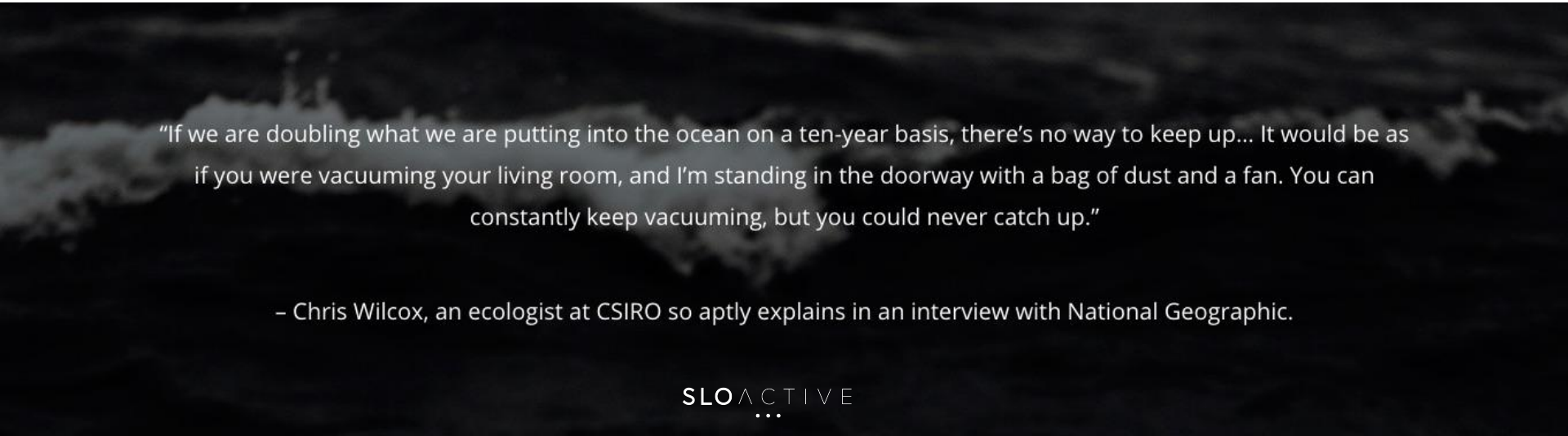
But while plastic debris is slowly breaking down in the ocean, more and more plastic is being tossed or washed into the sea – at a rate far faster than what it is breaking down.

Consequently, there is a LOT of plastic in the ocean – it comes in all shapes, forms, and sizes, and is found floating on the surface, suspended in the water column or littering the ocean floor, and eventually washes up on beaches around the world, wreaking havoc with marine life in all these ecosystems.

According to Greenpeace's report Plastic Debris in the World's Oceans: "At least 267 different species are known to have suffered from entanglement or ingestion of marine debris including seabirds, turtles, seals, sea lions, whales, and fish. The scale of contamination of the marine environment by plastic debris is vast. It is found floating in all the world's oceans, everywhere from polar regions to the equator."

5 Gyres – The Oceans Garbage Patches

Large volumes of this plastic tend to accumulate within five oceanic 'garbage patches', also known as 5 gyres, located in the Atlantic, Indian and Pacific Oceans. The largest of these is the Great Pacific Garbage Patch which stretches across the Pacific Ocean between Japan and North America, with the greatest concentration of garbage lying in the stretch of ocean between California and Hawaii where scientists estimate concentrations of plastic to be around 480,000 pieces per square kilometre.



"If we are doubling what we are putting into the ocean on a ten-year basis, there's no way to keep up... It would be as if you were vacuuming your living room, and I'm standing in the doorway with a bag of dust and a fan. You can constantly keep vacuuming, but you could never catch up."

– Chris Wilcox, an ecologist at CSIRO so aptly explains in an interview with National Geographic.

Single Use Plastic – the Majority of Marine Waste

Plastics and polystyrene foam (Styrofoam) comprise 90% of all marine debris, with food and beverage containers being one of the most common items found in ocean and coastal surveys. According to the Ocean Conservancy's International Coastal Cleanup 2017 Report, if all the plastic bottles collected during the 2016 International Coastal Cleanup were stacked they would have stood 372 times higher than Dubai's towering Burj Khalifa (828 meters high); all the plastic straws collected off beaches around the world would have stood 145 times higher than the One World Trade Center in New York City (541 meters); while all the plastic utensils collected would have stood 82 times higher than the Kuala Lumpur's Petronas Towers (452 meters), and all the cigarette lighters collected would have stood 10 times higher than the Eiffel Tower in Paris (324 meters).

Beach Pollution: Beach Cleanup Findings

52k	4.3m	4k	3.4k
Plastic Grocery Bags	Plastic Lids	Plastic Straws & Stirrers	Glass Beverage Bottles
1.8m	1.5m	800k	700k
Cigarette Butts	Plastic Beverage Bottles	Plastic Bottle Caps	Food Wrappers

The Health Impact on our Wildlife

The below photo shows all of the pieces of plastic that were removed from the stomach of a single north fulmar, a seabird, during a necropsy at the National Wildlife Health Lab. (Photo Credit: Carol Meteyer, USGS). How does this happen?

1. Plastic packaging is lightweight, so it is easily blown or washed into rivers where it is carried to the sea, or it may blow directly into the sea if not safely stowed by beach users
2. Plastic breaks down into smaller and smaller pieces, and because it readily floats it is often mistaken for food by surface feeding animals, including fish and seabirds
3. Marine turtles ingest plastic bags which they mistake for jellyfish, and small items such as gas lighters or plastic pellets in various stages of decomposition are mistaken for food by seabirds and marine animals
4. Seabirds have been known to feed these plastic pellets to their chicks, resulting in the death of the chicks, which ultimately can cause population numbers of affected species to decrease if fewer and fewer chicks are being successfully raised

Furthermore, plastics and polystyrene are made up of toxic chemicals, including petroleum, which may be released as the gastric juices try to digest it, and are absorbed into the body tissue. These toxins also leach into the water column as plastics break down, contaminating filter feeding organisms who ingest the water while feeding. But the problems don't end there. Plastics are known to accumulate persistent organic pollutants (POPs), including Polychlorinated Biphenyls (PCBs) and DDT that are known to disrupt the endocrine system and affect development, at concentrations of a hundred thousand to a million times greater than naturally found in seawater. These contaminants are stored in the body fat and organs of animals and are passed on to predators that feed on them, becoming more concentrated in the tissues of organisms higher up the food chain.

The unaltered stomach contents of a dead albatross chick photographed on Midway Atoll National Wildlife Refuge in the Pacific in September 2009 include plastic marine debris fed the chick by its parents. (Photo Credit: Chris Jordan/US Fish & Wildlife Services)

Canadian fisherman Adam Turnbull fished a pike from the Saskatchewan River, belted with a plastic Powerade wrapper ring. The fish most likely swam through the ring when she was smaller and the ring has cut into her flesh as she has grown. (Photo Credit: Adam Turnbull)

Lots and lots of different plastic types just in this picture of a small part of the beach. Different kinds of plastic are predominant, a lot of it originating from shipping and fisheries, but also from plain household garbage. (Photo Credit: Bo Eide)

Long living top predators continue to accumulate more and more toxins in their systems over time. Studies have revealed that marine top predators, such as killer whales and polar bears, are amongst the most contaminated animals on Earth. These contaminants reduce fertility and breeding success, and compromise the affected animal's immune system, making them more vulnerable to disease and infection.

Potential Solutions

We need to tackle the problem of marine debris head on. It's not just an issue for environmentally conscious, it is an issue that ultimately affects human health. Man is a top predator that feeds on a variety of ocean fish, shellfish and other marine species. We face the same risks as the killer whale and polar bear. While any plastic or polystyrene pellets that may have been clogging the gut of the fish that is nicely presented on our dinner plate have been long removed, the toxic contaminants originating from that debris remain stored in the flesh we are about to eat. Food for thought indeed.

Eliminating Plastic at Source

Clearly, this is a mammoth problem and one that needs to be addressed as a matter of urgency. One obvious solution is to switch from plastic and polystyrene packaging to environmentally friendly alternatives, such as compostable plant fiber packaging made from natural materials that readily break down in the environment without causing any harm, and which contain no harmful chemicals. Many cities and countries around the world have implemented stricter legislation with regard to plastic shopping bags, with some banning them outright. Perhaps we need to do the same for plastic bottles, straws, etc. Consumers should be proactive and opt for reusable and/or refillable containers rather than disposable packaging wherever possible. This will not only save suppliers, and by extension shoppers, money, it will also benefit the environment and everything that is dependent on the environment for survival.

Single Use Plastic Alternatives & How You Can Help

Reusable Water Bottle

Avoid bottled water. Buy a decent water filter and a reusable stainless steel bottle or a glass bottle; There are collapsable options for the city dwellers.

Reusable Shopping Bag

Keep reusable shopping bags with you: in your car, work bag, jacket pocket, and next to your front door. They're cheap and there are foldable/pocket options.

3 Minute Beach Tidy

If you spend time enjoying the beach and the ocean, pay mother nature a thank you. Make it your pre-surf/dive/swim ritual: spend 3 mins picking up trash from the beach.

Slow Down

Stop eating on the go. Slow down and take time to enjoy your food: eat in or take a lunchbox. Reduce your use of disposable cutlery, plates and packaging and recycle where possible.

Say No To Straws

Americans use 500 million drinking straws every day. Now imagine how that translates to the rest of the world. If you really love straws, carry a stainless steel one in your bag.

Reusable Coffee Cups

We all love our coffee and tea, but it really takes its toll on our environment. Carry a reusable coffee cup with you. There are plenty of options available, from bamboo to collapsable silicone cups to glass cups.

Plastic Recycling Initiatives

Because it is so tough and durable, plastic can be reused or it can be recycled. Popular musician and environmental advocate, Pharrell Williams, is the co-owner of G-Star RAW, a sustainable clothing brand that recently launched the 'RAW for the Oceans' collection that recycles single use plastic containers collected from beaches all over the world into stylish apparel. The 'RAW for the Oceans' fashion line has collaborated with Bionic Yarn, another company that Williams is both a partner and Creative Director of, which uses recycled ocean plastics to make sustainable clothing yarn. This creative approach provides a sustainable resource — there is plenty of plastic in the sea — while at the same time tackles the humungous problem of ocean plastics by putting this practically unlimited resource to good use.

Philanthropist, environmental advocate, and entrepreneur, Richard Branson, has proposed that we implement a deposit refund system for plastic bottles. Offering an incentive for users to return plastic bottles for recycling makes absolute sense, especially these are one of the most prolific items found on beaches around the world.

While reducing or eliminating plastic packaging may help to stem the flow of plastics at the source, we still need to take steps to prevent plastic that is already in the environment from flowing into the ocean, and to clean up the vast amount of plastic littering beaches around the world, as well as the plastic currently swirling around ocean gyres.

Beach Cleanups

Every year, the Ocean Conservancy coordinates the International Coastal Cleanup in collaboration with environmental organisations, schools and other community initiatives around the world, encouraging volunteers to take part in local beach cleanups to rid the environment of trash. This can be stepped up at a local level, where individuals, communities and organisations can get more actively involved in cleaning up their local beaches to help keep them free of plastic and other debris.

Right: collecting plastic debris and water samples from Kamilo Beach, South of Big Island Hawaii. Kamilo Beach is approximately 1,500 feet (460 m) long and is located on the remote southeast coast of the Ka'ū District on the island of Hawaii. There are no paved roads to the beach. (Photo Credit: Cesar Harada)

Ocean Cleanup Innovations

Some innovative individuals have proposed other solutions for removing plastic from our oceans, including deploying large floating booms to trap and catch plastic designed by a Dutch entrepreneur when he was still a teenager, and floating sea bins designed by two surfers that can be used to remove plastic from harbours, for example.

While these are all indeed innovative and creative solutions to an ever growing problem, they will in all likelihood not be enough to stem the tide of plastic entering and swirling around our oceans. Nor do they address the problem of microplastics and tiny plastic microbeads that are now having a large impact. A committed multi-pronged approach is urgently needed. We need to take action now.

List of Plastic Pollution Charities

Who else is taking action?

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