



### What are microplastics?

Microplastics are defined as plastic pieces 1-5mm in size. Estimates put the total amount of floating microplastics at over 5 trillion pieces, weighing over 250 000 tons. This does not include those that have sunk to the bottom of the ocean, washed up on beaches or have accumulated inside marine organisms. It is estimated that 1.5 million tons of microplastics are released into the ocean each year. This is the equivalent of every person on the planet throwing an empty plastic grocery bag into the ocean every week (IUCN, 2017).

### Where do they come from?

The greatest problem with plastics is that they are designed to not break down. Although **larger items of plastic litter** do disappear from sight over time, this is largely the result of them being broken up into smaller and smaller fragments –eventually becoming microplastics.

The synthetic materials used to make **clothing** are plastic-based and in a single wash, nearly 1900 fibres can be released per garment. Every second, it is estimated that laundry water is adding around two billion microplastic fibres into Europe's waters alone. These fibres enter the ocean through poor wastewater management.

Spillage of the tiny pellets used as the base material in the manufacture of all plastic products cause these nurdles to end up in the environment. The addition of microplastic beads to personal care products (face and body scrubs, toothpaste...) results in their addition to our waste-water systems.

### Why should we be concerned?

#### The problem of consumption

- Animals ranging from shellfish to whales have been found to eat microplastic particles, with suggestion that some may even be deliberately selecting plastic to consume. Algae can act a bit like a magnet for microplastics, which is both bad for the algae (blocking out the light it needs to make food) and for the animals that eat the algae. Microplastic contamination has been found in the flesh of mussels and oysters intended for human consumption: this probes the question are we eating microplastics?
- **Physical injury:** By accumulating in animal guts and stomachs, they can cause blockages, as well as limiting the amount of real food the animal can consume. They can also entangle smaller organisms.
- **Poisoning:** Many plastics contain toxins and can also attract and bind to many other pollutants found in the water, concentrating them to potentially dangerous levels. These chemicals can then be released after ingestion, threatening the health of the organism.

#### The problem of rafting

- Amongst the species found on microplastics are some that cause illness in humans and marine animals (eg. *Vibrio spp.* bacteria). Microplastics and their inhabitants are often carried long distances across the world in ocean currents. This can introduce them into ecosystems in which they are not currently present, thus potentially causing a negative impact.





### The 'missing' microplastics

Estimates for plastic breakdown range from 100's to 1000's of years, but with large-scale plastic production having only been widespread for around 60 years, these are just approximations. Based on the measured quantities of larger plastic litter, known breakdown rates to microplastics, and measured quantities of microplastics, it is clear **that a large proportion of the expected microplastic particles are 'missing'...** So where are they?

- Could it be that the rate at which plastics break down accelerate over time, or as the particles get smaller? This would be a good thing!
- Colonisation of plastic by biota can make the particles dense enough to sink to the ocean floor, where they can still be harmful.
- Several organisms consume microplastics, either deliberately or accidentally, but we don't know to what extent.

### What actions can society take?

- **Avoid products containing microplastics.** Websites like [beatthemicrobead.org](http://beatthemicrobead.org) provide country-specific lists of microplastic-free (and safe) personal care products. Also, items of clothing should specify their material on the washing label. You can even fit filters to your washing machine to catch plastic microfibers before they enter the water system.
- **Reduce your plastic waste.** Even if you dispose of plastic correctly, wind, poor waste management and other factors can still cause it to end up in the marine system. Avoid single-use plastic products and those with excessive packaging.
- **Push for government and business action** through purchase choice and your voice as a voter. Several countries have already banned microbeads in detergents and cosmetics.
- Perhaps most importantly, **spread the word!** The more people aware of the problem and taking action, the stronger the push for change.

### How is A ROCHA involved?

- A ROCHA's Marine Conservation Programme studies plastic pollution and encourages individuals, churches, and communities to reduce plastic use.
- You can help! A ROCHA's Microplastics Toolbox contains resources to act against microplastics on multiple levels: science, theology, education, media and lifestyle.



A ROCHA's marine team sampling microplastics in the Camargue region, France (Photo credit: Robert Sluka)

