



Plastic pollution solutions

RICHARD CAREY/FOTOLIA

It is estimated that there are at least 46000 pieces of plastic in every square mile of ocean. **Liz Sheffield** examines what we can do about this huge threat to marine life

September's news stories about a seal finally freed from a plastic Frisbee-type flying ring brought plastic pollution back into the spotlight (see <https://tinyurl.com/y95p8opf>). The upsetting account with a (so far) happy ending was perfect timing to motivate the volunteers on this year's annual Great British Beach Clean. During beach cleans, which are held all over the world, volunteers collect waste items, thus preventing them from getting into the marine environment. If you watch *Sky News*, you probably know about sea turtles mistaking plastic bags for their favourite snack of jellyfish, and about microbeads from cosmetics entering the food chain. But do you know what you can do and what scientists are doing to address the plastic pollution problem?

Biodegradable microbeads

Microbeads used in the cosmetics industry are usually made from oil products converted into polyethylene or polypropylene, which are both cheap and easy to make. These plastics take hundreds of years to break down in the environment (see Figure 1). A single shower using gel containing microbeads can result in 100 000 plastic particles entering the ocean. The beads are less than 0.5 mm in diameter so are too small to be removed by

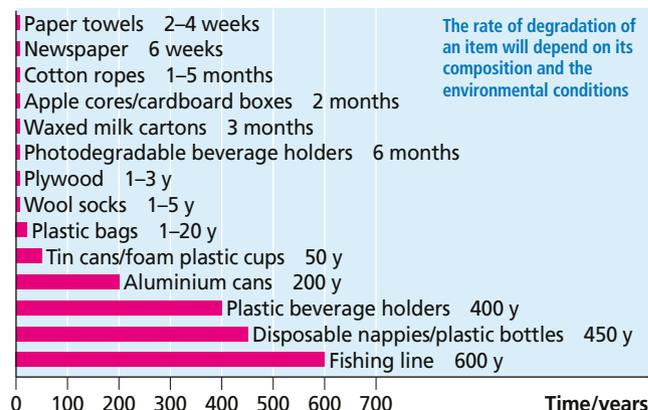


Figure 1 Average time taken for familiar items of rubbish to degrade in the ocean

sewage filtration systems. They end up in rivers and oceans, where they are ingested by birds, fish and other marine life. Thanks to pressure from environmental groups, the UK government has recently pledged to ban plastic microbeads. But the public enjoy the sensation of microbeads in products, so researchers have now found a way to make microbeads from biodegradable cellulose. Microbes in our own digestive systems break down the cellulose in our food, and those in marine ecosystems will be able to degrade the new microbeads. Even better news is that the source of the cellulose could be waste from other processes, such as paper making.

Win over the public

A recent paper in the journal *Nature Human Behaviour* highlighted examples where public pressure has led to policy change, including levies on single-use plastic bags and the ban on the use of plastic microbeads. The authors suggested that such pressure reflects human affection for coasts and oceans and a growing recognition in some members of the public that what we do on land can have extremely detrimental effects at sea. They suggest that more could be done to influence human behaviour.

Ocean plastic pollution poses challenges similar to those of other environmental threats, such as climate change, because the symptoms are often considered remote from the largely land-based causes. This is linked to a perceived lack of urgency to tackle the problems, but the researchers suggest that the public could potentially become motivated if powerful images were carried on everyday products, similar to those already being used on cigarette packaging. Fear and disgust are powerful emotions, however, so the researchers urge caution and suggest any successful campaign would need to make people appreciate the problem and understand how they can play an important part in the solution.

Johnson & Johnson recently phased out the plastic sticks in their cotton buds because they were informed they were not removed by sewage treatment and were building up on beaches. On hearing the news, Dr Sue

Kinsey, Senior Pollution Policy Officer of the Marine Conservation Society was delighted but added that we can all do more:

...only the 3Ps — pee, poo and paper — should go down the toilet, everything else should go in the bin

Sounds like a good slogan for a public lavatory campaign to me.

Further reading

People's love of the seas could be the key for plastic pollution solution. *ScienceDaily News*, 18 September 2017: <https://tinyurl.com/ybol4tvn>

Biodegradable microbeads made from cellulose. *ScienceDaily News*, 17 June 2017:

<https://tinyurl.com/y9k3wv5r>

Johnson & Johnson ditch plastic cotton buds to save oceans: <https://tinyurl.com/yakqnsem>

What can you do?

Buy paper instead of plastic products (e.g. see www.cottonbudproject.org.uk); recycle.

Tell your friends and family about the issues, post this article or send the following link on social media: <https://tinyurl.com/ycm6m8kl>

Start a recycling initiative in your school, college, sports club (e.g. see <https://tinyurl.com/yab8o4z4>)

Sign up to a local beach clean programme (e.g. www.mcsuk.org/beachwatch/user/register and www.nationaltrust.org.uk/features/beach-cleans) or start your own.

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