MARINE CONSERVATION SOCIETY

Marine Conservation Society position statement on:

Primary Microplastics

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Geographical extent: UK

'Microplastics' are solid plastic particles which are less than 5mm in size*, and can be the product of the breakdown of larger material, 'secondary microplastics', or enter the environment at this size, 'primary microplastics'. This paper will focus on mitigation measures for primary microplastics, but some interventions will also help to reduce secondary microplastics. To reduce secondary microplastics, the source of macroplastics needs to be addressed. Details of such measures are covered in other MCS policies and briefing papers.

Primary microplastics are a significant source of plastic in the ocean, and in Europe they are equal to, or outweigh, the releases from mismanaged plastic wastes.[1] It's estimated that approximately 11 million tonnes of plastic enter the ocean globally every year, with 1.3 million tonnes (11%) entering as microplastics.[2]

Once microplastics are in the environment it is practically impossible to remove them and due to their persistence they continue to increase in quantity.[3] They can be ingested by marine life at every stage of the food chain and have been found in the stomachs of seabirds, turtles, cetaceans, plankton and fish, including seafood for human consumption. 63% of shrimp in the North Sea have been found to contain synthetic fibres.[4]

Reducing the amount of microplastics entering the environment is essential to achieving good environmental status in our seas, as defined in the UK Marine Strategy,[5] and would allow for a cleaner circular economy. Thereby supporting the aims of UN SDGs, in particular SDG 6 (Clean Water and Sanitation), SDG 12 (sustainable consumption and production) SDG 14 (Life below Water) and SDG 15 (Life on Land).

*Typically defined

We ask for the following key actions to be taken by government, regulators and businesses:

1

<u>Prevention must be prioritised to stop primary microplastics entering the environment,</u> as it is more effective, sustainable and much cheaper than remedial downstream solutions and supports the polluter pays principle.[6]

- UK governments should take forward **proposed restrictions under REACH of intentionally added microplastics**, estimated to reduce emissions by approx. 400 thousand tonnes over a 20-year period.[3]
- UK governments should **introduce legislation that requires washing machine manufacturers to fit microfibre filters** in all new domestic and commercial machines by 2023, with all commercial machines retrofitted with microfibre filters by 2024.
- UK governments and textile and fashion industries to produce **a roadmap for the reduction of microfibre shedding from garments and production**. This should include a publicly available standardised test to determine microfibre loss from clothes, so that they can be rated and designed to reduce shedding.
- UK governments to initiate and **fund research into minimising microfibre loss from fishing gear and from aquaculture**.
- The BSI PAS (Publicly Available Specification) **supply chain certification for pre-production pellets** should be mandatory for all companies operating in the UK.[7]
- UK governments and automotive industry to produce a **roadmap for the reduction of microplastics from roads, including tyre particles and paints**. This should include a standardised test to determine material loss, so that tyres can be given a rating for their shed loss, facilitating innovation to reduce shedding, as well as capture technology on vehicles and treatment of water from road runoff.

2

<u>Wastewater management:</u> Preventing microplastics from entering the wastewater network should be prioritised. However, it is also necessary to understand the quantity of microplastics entering, and exiting, the network, whether via treated effluents, combined sewer discharges (CSOs) or sewage sludge.

- UK water companies should establish **regular monitoring programmes for microplastics in influent, effluent, CSOs and treated sewage sludge (biosolids)**. Best Available Techniques should be applied to different treatment processes and practises to lower microplastic generation and discharges.[6]
- UK Government to establish **a microplastic threshold for treated sewage sludge (biosolids)** used on agricultural land.

3

<u>Monitoring and research programmes from source to sea for microplastics:</u> Currently there is no routine monitoring for microplastics. Therefore, there is an immediate need to establish routine monitoring for microplastics, to provide an accurate picture of environmental status in the whole environment and to assess effectiveness of source control measures.

- Establishment of a **threshold value** similar to that recently described under the Marine Strategy Framework Directive for macroplastics.[8]
- UK Governments to utilise **a standard definition of 'microplastic'** and accurate and repeatable methods for quantification and associated monitoring procedures.
- **Monitoring should cover all pathways and sinks**, including terrestrial, inland water bodies, transitional, coastal and marine waters, sediments (both at the beach and offshore) and biota (including seafood). For example, proposed monitoring under the Marine Strategy only includes marine sediments.[9]
- Fund **research to understand biodegradability**, and associated environment impact, of proposed alternatives to plastics, such as regenerated cellulose.

Background

Environmental and social impacts

Ingestion of plastics by marine organisms can negatively impact feeding behaviour, growth, development, reproduction and lifespan.[10] Microplastics can contain harmful substances such as stabilisers, pigments, plasticisers and flame-retardants, and may adsorb secondary environmental pollutants such as Persistent Organic Pollutants (POPs) or metals, which may be released if ingested.[3] POPs impair reproduction and disrupt marine wildlife's energy balance, endocrine and immune systems, making them more vulnerable to infectious diseases [11] and may affect successive generations of marine mammals by accumulating and passing to young through breastfeeding.[12]

The MICRO project [13] made a first attempt at defining economic impacts of microplastics on the UK aquaculture (oyster) industry in the Channel region and indicated a cost of between £1.5M - £500M.[14] Evidence on the impact of microplastics on human health is still in its infancy, but the annual consumption of microplastics is estimated to be 55,000 per year via seafood,[16] and in 2016, the UK Chief Medical officer was asked to review the effects of microplastics on human health. The World Health Organisation has called "for a reduction in plastic pollution to benefit the environment and reduce human exposure". [17]

Currently there are no thresholds for microplastics in terms of emissions, or environmental indicators for water quality due to the uncertainty associated with exposure concentrations.[6] In addition, due to their extreme persistence, any releases of microplastics result in an increase in the amount in the environment and would eventually exceed any thresholds considered to be safe.[3] Due to this, the European Chemicals Agency (ECHA) considers that microplastics are similar to persistent, bioaccumulative and toxic substances, and, that, "In this respect, the relevant risk characterisation could be considered in terms of when will safe thresholds be exceeded, rather than if safe thresholds will be exceeded…with any release to the environment assumed to result in a risk".[3]

Sources of primary microplastics and pathways to the marine environment

The overwhelming majority of primary microplastic losses (98%) are generated from activities on land, with two thirds coming from synthetic textiles (35%) and tyres (28%).[1] Other sources of primary microplastics include intentionally added microplastics in products such as cosmetics (microplastics in rinse-off cosmetics have been banned in the UK since 2018), laundry detergents, cleaning products, and fertilisers.[3] Intentionally added microplastics can be released directly to the environment, with between 5,400 – 39,700 tonnes of microplastics released annually to European soils through controlled release fertilisers, fertiliser additives, treated seeds and capsule suspension pesticides.[3]

Pre-production pellets (used to manufacture plastic) are lost throughout the supply chain. In the UK up to 53 billion pellets are lost to the environment every year [18] and almost three-quarters of beaches have been found to have pellets present. [19]

Roads provide a major pathway to the ocean providing a conduit for 66% of the microplastics entering the ocean.[1] This is due to microplastics from sources such as tyre wear, road markings, paved surfaces and litter, which may enter the ocean via rainwater run-off directly into watercourses or via the wastewater network.[1]

Wastewater treatment accounts for a further 25% of microplastics input to the ocean [1] with microplastics commonly present in wastewater systems, particularly microfibers.[20] Washing clothing and textiles (industrial and household) creates microfibres through abrasion and shedding of fibres, which then enter wastewater systems and eventually the ocean.[1] At least 9.4 trillion fibres are released each week from washing in the UK alone.[21]

In the UK, 30% of sewers are separated meaning that sewage and stormwater runoff are kept separate.[6] These are generally preferential as they minimise the volume of water requiring treatment.[6] However, if stormwater is not treated it can contain a wide range of microplastic.[6]

The majority (70%) of UK sewers are combined, taking sewage and surface water runoff together for treatment.[22] However, it has been estimated that between 1% and 15% of wastewater can overflow during extreme events, resulting in untreated sewage being discharged directly into the environment.[6] Since these discharges are made up of inputs from homes, industry, and stormwater runoff they contain microplastics from a wide range of sources.

Wastewater treatment works can be effective in preventing the release of microplastics in final treated effluent, removing between 80 – 99%, depending on the level of treatment.[23] However, this can still equate to a significant amount of microplastics being discharged, with one study observing an estimated 65 million microplastics being discharged each day from a single treatment plant.[24]

However, since plastics do not typically biodegrade, much of the microplastic load captured during the treatment process is retained in sewage sludge.[25] A study of eight treatment works in the UK found concentrations of microplastics in sludge can reach 301-10,380 microplastics/g dry weight.[26] In the UK, 87% of sludge, once treated, is subsequently applied to agricultural land as fertiliser.[27] Repeated applications of treated sewage sludge on soils leads to the accumulation of microplastics over time, resulting in high concentrations,[28] which can then be transported to aquatic environments.[29] It has been estimated that approximately 50% of microplastics that are disposed of down the drain are subsequently released to the environment and 86 % of these releases are to agricultural soil via treated sewage sludge.[3]

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