EUROPEAN FAST FASHION: TACKLING CLOTHING MICROFIBRE SHEDDING TO PREVENT MARINE BIODIVERSITY LOSS

Policy Recommendations for the European Commission

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The European Commission has the power to regulate EU members on microfibre production and pollution. Therefore this policy brief and the recommendations that follow are targeted towards it's members.

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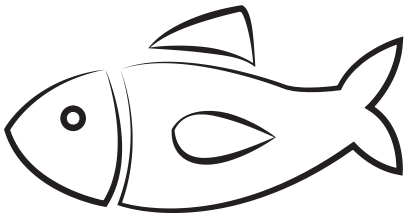
SUMMARY

By 2050, it is predicted there will be more plastic than fish in the world's oceans, a clear threat to marine biodiversity. The impacts are far and wide for over 700 species, most observable the entanglement of marine life in macroplastic, fishing nets. Ingested primary and secondary microplastic affect species through gut-fill, starvation, bioaccumulation, endocrine disruption, and biomagnification up the food chain. However, full implications of this novel entity are currently unknown, due to the varying types such as microfibres and microbeads, which have the ability to bioaccumulate persistent organic pollutants (POPs) in the environment. It is vital that precautionary principle is taken to prevent marine life interacting with microplastic, however, currently no legally binding global action is tackling this tragedy of the commons. National action has been taken to tackle single-use plastic bags and microbeads, and most recently the EU has implemented its first Plastic Strategy. While it strongly focuses on plastic packaging, it does not address the shedding of 0.5 million tonnes of microfibres in synthetic clothing annually, produced by the fashion industry. Therefore the European Union should invest in R&D to innovate non-microfibre shedding materials for the future; ban the use of hazardous chemicals in the production of fabric and manufacturing process of clothing; enforce mandatory preliminary washing by manufacturers of all synthetic clothing before put onto the global market; require all EU members to become Ginetex licensees and promote the Clever Care educational marketing campaign; and create strong clothing recycling infrastructure, with a reward card to incentivize consumers to put their unwanted items back into the circular economy.



THE PROBLEM: PLASTIC POLLUTION

The global production of plastic has increased twentyfold since the 1960s, and is expected to double again over the next two decades (European Commission 2018: 1). As a result there is currently at least 5 trillion plastic pieces (see figure 1) floating around in the ocean (Villarrubia-Gomez 2017: 3). These accumulate around convergence zones in 5 subtropical ocean gyres, known as Great Garbage Patches, due to the effects of thermohaline circulation, ocean surface currents and winds (Villarrubia-Gomaz 201: 3). 94% of plastic pollution in the Great Pacific Garbage Patch (GPGP) is microplastic (Villarrubia-Gomez 2017: 3), plastic particles 5mm in diameter (Bruce et al 2010). Macroplastics eventually breakdown into microplastic, through weathering and degradation on land and in the ocean (Villarrubia-Gomez 2017: 3). However, due to plastics durable properties, it does not fully break down for thousands of years (Barnes et al 2009), so has unknown long-term effects on the biosphere.

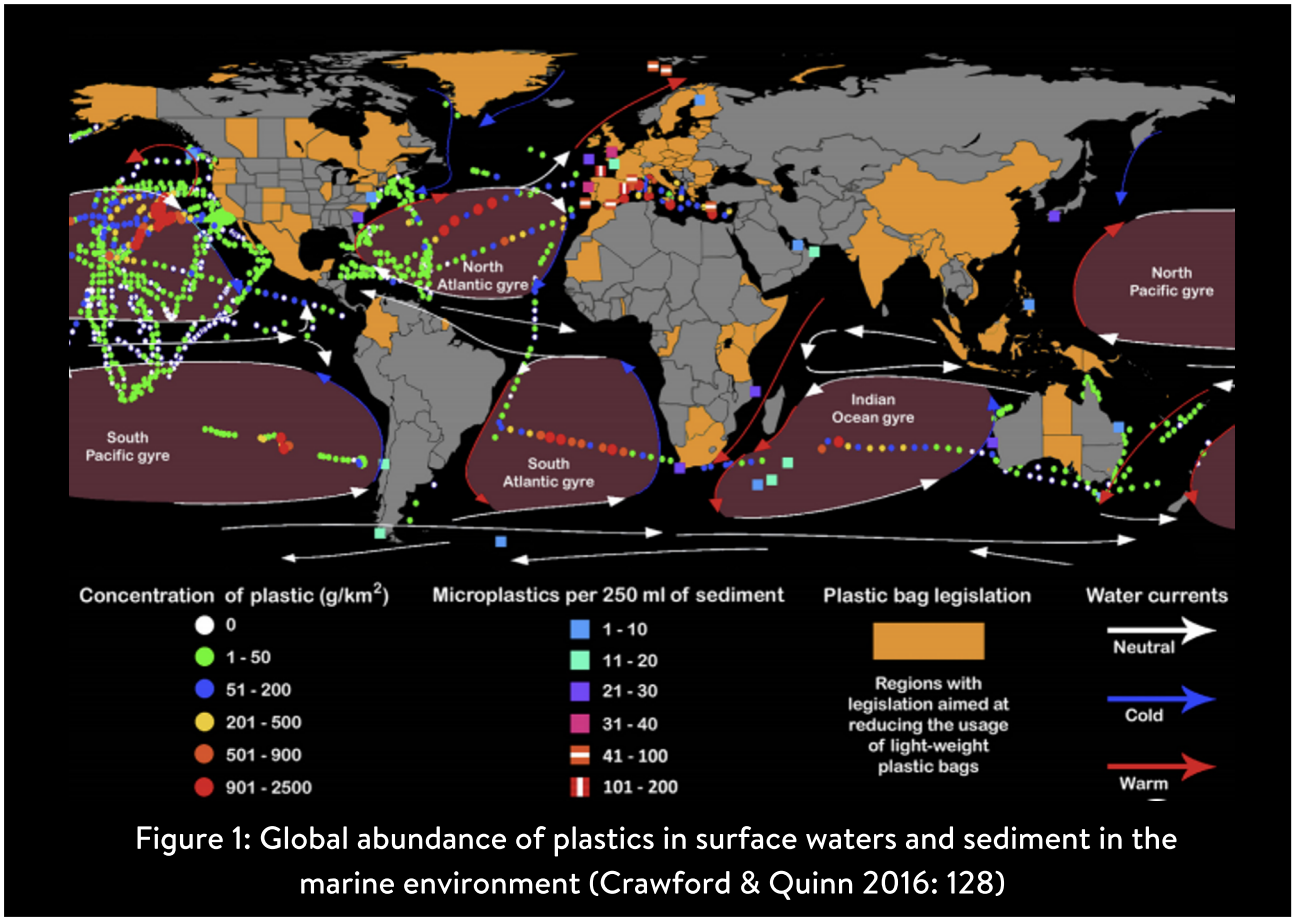
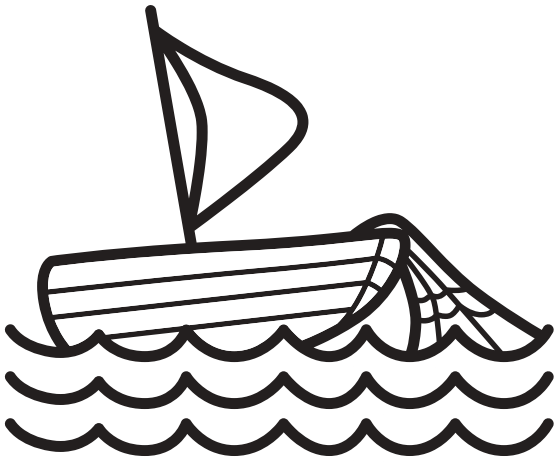


Figure 1: Global abundance of plastics in surface waters and sediment in the marine environment (Crawford & Quinn 2016: 128)

HOW DOES MICROPLASTIC EFFECT BIODIVERSITY?

By 2050, it is predicted there will be more plastic than fish in the world's oceans (Ellen MacArthur Foundation 2017: 17). Nearly 700 species are known to interact with marine debris, with 17% of these prominent on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Gall & Thompson 2015: 1). The impact of macroplastic is much easier to observe than microplastics, most notably the entanglement of animals in fishing nets (Derraik 2002: 844), which make up 46% of plastic pollution mass globally (Lebreton et al 2018: 1). In comparison the impacts of microplastic pollution on biodiversity is not clear-cut, however there is growing evidence of physical and chemical impacts on ecosystems. Organisms are increasingly ingesting microplastic fibres (Laist 1997; Gall and Thompson 2015), mistaking them for food, which consequently leads to a lower intake of needed nutrition, expending energy on plastic instead of algae, leading to gut-fill (Henry et al 2018: 9). This causes starvation and impacts reproduction rates, evidenced from multiple studies on oysters (Sussarellu et al 2015) and copepods (Cole et al 2015). Upon ingestion, microplastic can translocate from the gut to the circulatory system (Browne et al 2008), then into cells and tissue (von Moos et al 2012) as reported in blue mussel Mytilus edulis (Peng et al 2017: 478). Furthermore, there is evidence of microplastics being transferred from lower-tropic-level organisms to their predators (Farrell and Nelson 2013; Setala et al 2014; Peng 2017: 478).



Organisms directly bioaccumulate harmful compounds leached from plastic such as NP, NPEs and BPA (Koelmans et al 2013: 49). Indirectly the absorption of persistent organic pollutants (POPs) and bioaccumlative toxic substances (PBTs) into the hydrophobic surface of microplastics, is ingested by organisms and biomagnify up the food chain (Environmental Agency 2015: 1). PBTs have the potential to cause endocrine disruption, decreased fish populations and reduced species evenness and richness (Rochman et al 2013: 1).

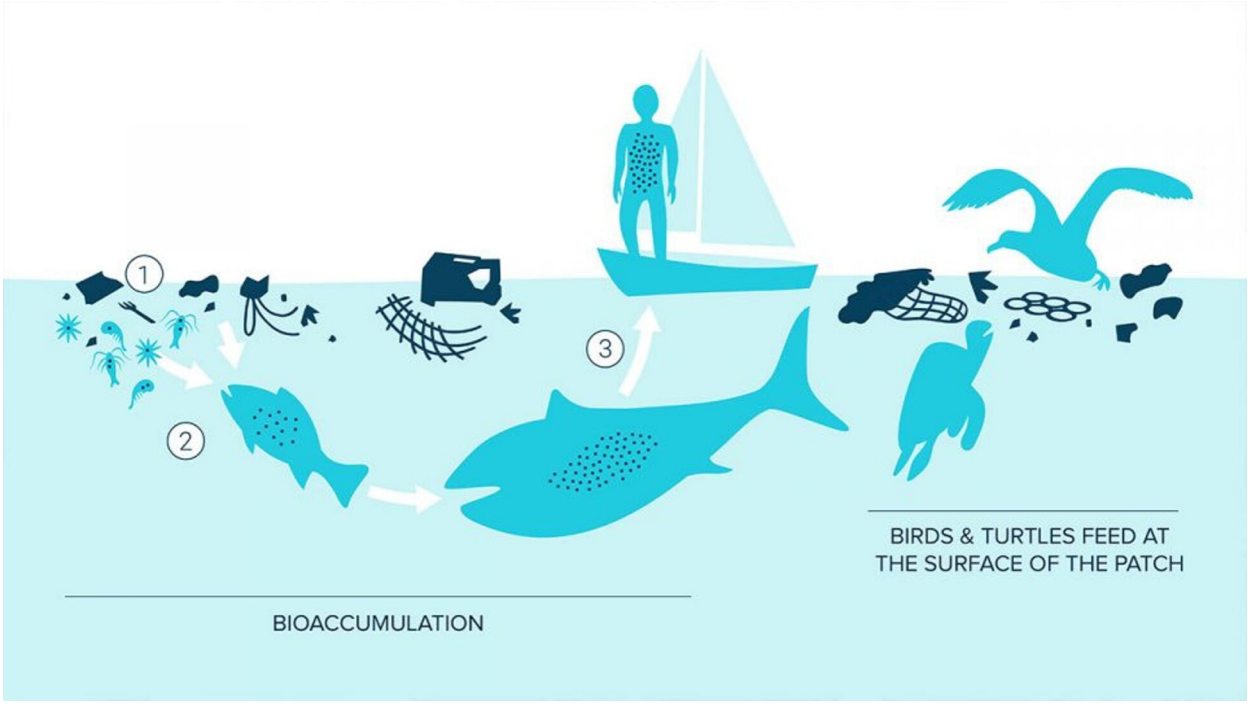


Figure 2: The Process of Bioaccumulation - Ocean Clean Up (2018)

The novel entity of microplastic is complex, due to varying types such as microfibres and microbeads, with differing chemical additives and sorbs from the environment, so the long-term implications of bioaccumulation and biomagnification are currently unknown (Rochmen et al 2013: 5). Therefore it is vital that precautionary principle is taken, preventing microplastic entering oceans before they interact with marine life.

WHAT IS BEING DONE TO TACKLE PLASTIC POLLUTION?

Nationally:

The focus for primary microplastics has been policies phasing out microbeads in rinse-off cosmetics products, evident in the US, UK and Canada (Xanthos & Walker 2017: 23). However this does not cover all microbead products (Xanthos & Walker 2017: 21), with a lack of action on other types of microplastic, particularly microfibres in the textile industry (Ellen MacArthur Foundation 2017: 55).

An increasing amount of countries have implemented the banning of secondary microplastic, single-use plastic bags, such as Bangladesh, India and China as well as market-based strategies, most notably charges in England and Ireland Xanthos & Walker: 20). However, there has been a lack of focus on a much bigger problem, the manufacturing of single-use plastic packaging in the food industry, and the 'fast fashion' phenomenon (Ellen MacArthur Foundation 2017: 18).

China's decision to ban imports of plastic waste (European Commission 2018: 16), has provided a key opportunity to move towards a more circular economy (Figure 3), one which does not involve waste, instead restorative and regenerative by design (Ellen MacArthur Foundation 2017: 22).

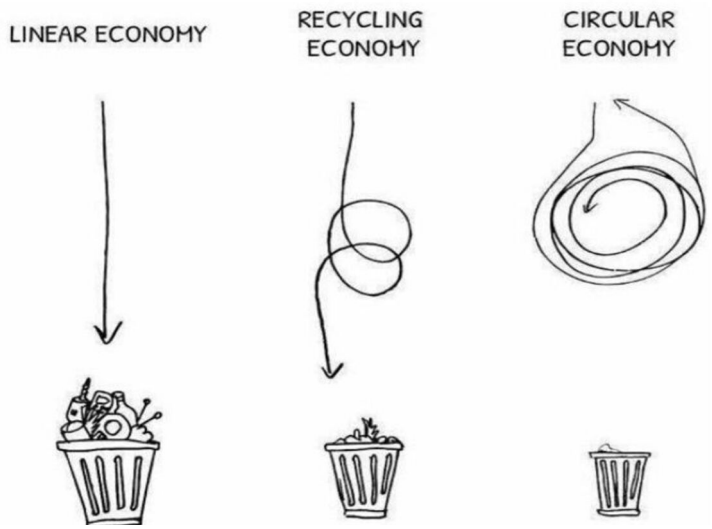


Figure 3: Different economic systems

WHAT IS BEING DONE TO TACKLE PLASTIC POLLUTION?

Globally:

Tackling marine debris is a clear example of a "tragedy of the commons" (Hardin 1968). Plastic migrates through the commons, and more than 50% of ocean area including the GPGP, is not covered by national jurisdiction (Borrelle et al 2017: 9994-9995). Plastic pollution has become an externality not dealt with in the market, therefore international government action is vital (Columbia University 2005: 4).

Various agreements have been put into place to tackle plastic pollution, including MARPOL, the Honolulu Strategy and the United Nations Environmental Program's (UNEP) Clean Seas Campaign, however none of these have been legally binding (Borelle et al 1995).

The EU set out its first ever Plastic Strategy in January 2018 (European Commission 2018), focusing on investment in plastic recycling facilities, increasing the market for recycled plastics and Extended Producer Responsibility (EPR). While this is a really strong Strategy, its main focus is plastic packaging, only briefly mentioning the problem of synthetic fibres and chemical use in the textile industry once (European Commission 2018: 13). As Europe is home to some of the biggest fast fashion retailers in the world, Inditex, H&M and Adidas (Fashion United 2018) it is vital that the EU leads the way in reducing the impact of microfibres on biodiversity.

THE TAKE-MAKE-USE-DISPOSE SYSTEM OF FAST FASHION:

TAKE - The fast fashion industry relies upon 98 million tonnes of non-renewables, including oil to produce synthetic fibres, fertilisers to grow cotton, chemicals to produce, dye, and finish fibres and textiles (Ellen MacArthur Foundation 2017: 20).

MAKE – Within the last 15 years, clothing production has doubled, and represents more than 60% of total textiles (Ellen MacArthur Foundation 2017: 18).

USE –Half a million tonnes of plastic microfibres which shed from polyester, nylon and acrylic, during washing, end up in the ocean annually (Ellen MacArthur Foundation 2017: 21).

DISPOSE - More than half of fast fashion production is disposed of in under a year, with one garbage truck full of textiles landfilled or burnt every second. Only 1% of material used is recycled into new clothing (Ellen MacArthur Foundation 2017: 20).

There is no simple solution to stop microfibre pollution from synthetics, which currently holds 63% of the clothing market share (Plastic Soup Foundation 2017: 4). Switching completely from synthetic fibres to natural, such as cotton[5], would cause a bigger strain on freshwater use, where currently one cotton shirt uses roughly 2,700 litres (Water Footprint Network 2005: 21). While retailers such as H&M are at the forefront of building a more sustainable, circular business model (H&M 2016: 7-21), wide-scale change in the fashion industry will not happen without EU regulation.

RECOMMENDATIONS: TAKE-MAKE-USE-REUSE/RECYCLE

TAKE:

INVESTING IN R&D TO INNOVATE NON-MICROFIBRE SHEDDING MATERIALS.

It is unrealistic that plastic-based fibres can be eliminated from the material stream in the near future, as their properties cannot currently be replicated. However, in the long term there is a need to design new materials from scratch which are biodegradable, or do not shed microfibres (Ellen MacArthur Foundation 2017: 69). Therefore the EU should use Horizon 2020 funding to invest in R&D, not only for plastic packaging (European Commission 2018: 14), but also clothing fibres.

MAKE:

WORK WITH THE ELLEN MACARTHUR FOUNDATION TO PHASE OUT THE USE OF ALL HAZARDOUS CHEMICALS IN THE PRODUCTION OF FABRIC AND MANUFACTURING PROCESS

While some of the biggest fashion retailers, H&M and M&S, have committed to phasing out the use of hazardous chemicals in clothing production (Greenpeace 2012: 5; H&M 2016: 48; M&S 2017: 32), this needs to be regulated across the board. The European Union should therefore work with the Ellen MacArthur Foundation to produce a list of hazardous chemicals, to be phased out of the production process within a realistic timescale, replaced with non-harmful chemicals (Greenpeace 2012: 6). All retailers should be transparent, publicly report all chemicals they use, to ensure producer responsibility and public awareness of the problem.

MANDATORY PRELIMINARY WASHING OF SYNTHETIC CLOTHING BY ALL MANUFACTURERS BEFORE ENTERING THE GLOBAL MARKET:

During the first wash of clothing, significantly more microfibres are released than any other time (MERMAIDS Life+ 2018: 9). Mandatory pre-sale washing with an efficient water treatment system would extend producer responsibility (EPR), preventing a large amount of the problem, microfibres and hazardous chemicals, left with the consumer.

USE:

REQUIRE ALL EU MEMBERS TO BE GINETEX LICENSEES, SO RETAILERS CAN PROMOTE THE CLEVER CARE CAMPAIGN

While there is currently no mandatory care labelling regime at EU level, the ISO EN 3758 standard is based upon the Ginetex symbol (European Parliament 2010: 6 & 12). Requiring all EU members to be Ginetex licensees, will allow them to also use Ginetex's Clever Care logo on labels (Ginetex 2017b). Standardizing one clear educational campaign, to reduce the amount of microfibre shedding, is key to creating behavioural change.

Fashion retailers should follow suit H&M and ASOS through promoting the Clever Care campaign (Ginetex 2017a) on their websites and in-store leaflets. The campaign should also encourage consumers to invest in innovative products, Coraballs or Guppybags, simple and in-expensive ways to capture microfibres in the washing machine, and retailers should stock these products.

REUSE & RECYCLE

WORK WITH I:CO TO CREATE STRONG EU CLOTHING RECYCLING INFRASTRUCTURE, WHICH INCENTIVISES CONSUMERS.

Following the success of H&M and M&S's garment collecting schemes by the I:CO (H&M 2016: 53; I:CO n.d), an EU-wide scheme should be run to collect clothing in all major retail centres. Standardising and scaling up the process of recycling clothing across the EU, is key to building efficient infrastructure which deals with the increasing amount of fabric that currently ends up in landfill.

A reward card should be incorporated, so that consumers earn money each time they recycle, rather than receiving time-limited vouchers (H&M 2016: 31), helping to move away from the 'fast fashion' mindset. The use of the card should only be applicable to retailers who have invested into recycled fabrics, and should eventually only be applicable to items of clothing made from 100% recyclable materials, and within charity shops. This will incentivize consumers to recycle their clothing and spend their money on more sustainable brands, in turn encouraging brands to use recycled fabrics.

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