REMOVING OR RESTRICTING MICROPLASTIC INGREDIENTS OR "MICROBEADS" FROM CONSUMER AND INDUSTRIAL PRODUCTS

FFI GUIDANCE ON IMPROVING CORPORATE INGREDIENT POLICIES AND/OR REGULATORY MEASURES TO EFFECTIVELY PREVENT SOURCES OF MICROPLASTIC POLLUTION

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ABOUT FAUNA & FLORA INTERNATIONAL

Fauna & Flora International (FFI), the world's oldest international biodiversity conservation organisation, is a proven conservation innovator that continues to make a lasting impact on global biodiversity – the variety of life on Earth.

FFI's work spans across the globe, with over 140 projects in over 40 countries, mostly in the developing world. We proudly stand up for biodiversity and aim to show just how relevant it is to all of those who share the planet.

- LEADERSHIP: We've been working for more than a century in innovative, sustainable conservation, developing models that inspire others.
- DIVERSITY: Our focus is biodiversity: to secure a healthy future for our planet where people, wildlife and wild places coexist.
- VALUE: Our lean, entrepreneurial structure and style allow us to engage quickly and effectively on critical environmental issues.
- COLLABORATION: Lasting local partnerships have been at the heart of our conservation activities for more than one hundred years.

OUR VISION

A sustainable future for the planet, where biodiversity is effectively conserved by the people who live closest to it, supported by the global community.

OUR MISSION

To act to conserve threatened species and ecosystems worldwide, choosing solutions that are sustainable, based on sound science and take into account human needs.

LIST OF ACRONYMS

ASTM	American Society for Testing and Materials Standards (International)
BPF	British Plastic Federation
BtMB	Beat the Micro Bead Campaign
°C	Degrees Celcius
DEFRA	Department for the Environment, Fisheries & Rural Affairs
EAC	Environmental Audit Committee
ECHA	European Chemicals Agency
EIA	Environmental Investigation Agency
EU	European Union
FFI	Fauna & Flora International
FTIR	Fourier Transform Infrared Spectroscopy
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
HDPE	High-Density Polyethylene
INCI	International Nomenclature of Cosmetic Ingredients
ISO	International Organization for Standardization
KEBS	Kenyan Bureau of Standards
<	Less than
≤	Less than or equal to
MCS	Marine Conservation Society, UK
MLAN	Marine Litter Action Network
mg/L	Milligrams per litre
µm	Micrometer
mm	Millimeter
MP	Microplastic
MPIs	Microplastic Ingredients
MSFD	Marine Strategy Framework Directive
NB	Nota Bene (take special notice)
nm	Nanometer
NGOs	Non-Governmental Organisations
NSF	Stichting de Nordzee (North Sea Foundation)
PBTs	Persistent, Bioaccumulating Toxins
PCCPs	Personal Care and Cosmetic Products

PE	Polyethylene
PET	Polyethylene Terephthalate
PMMA	Polymethyl Methacrylate
PS	Polystyrene
PSF	Plastic Soup Foundation
PTFE	Polytetrafluoroethylene
PVC	Polyvinyl Chloride
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
T	Temperature
UK	United Kingdom
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Program
UPVC	Unplasticised Polyvinylchloride
US	United States
USA	United States of America

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1. EXECUTIVE SUMMARY

Microplastic ingredients (MPIs), commonly referred to as plastic microbeads[1], are pieces of plastic up to 5mm in diameter (a microplastic (MP)) which are commonly used as ingredients in a variety of consumer and industrial products including, but not limited to, personal care and cosmetic products (PCCPs) and cleaning products. They are a proven direct source of marine microplastic pollution and are a problem because:

- All types of MPs, including MPIs, are known to pass through wastewater sewage treatment[2,3,4,5] and enter waterways and oceans at rates of up to 550 million per day in the UK[6,7].

- In marine and freshwater environments, MPs can persist for hundreds of years[8] and, due to their small size, they are often mistaken for food by a wide range of animals, including over 50 marine species[9]; MPIs specifically have also been found in the digestive tracts of fish in coastal environments[10].

- Impacts of MPs on biodiversity have been demonstrated by peer-reviewed research and include mortality, internal injuries, starvation, reduced growth and sub-optimal feeding/breeding behaviour in marine and freshwater species. MPs are known to persist in organisms' digestive systems; release and adsorb persistent, bioaccumulating and toxic (PBTs) contaminants in the environment; act as a vector, transferring contaminants to those organisms that ingest them, as well as causing bioaccumulation in higher trophic levels (see Appendix 1).[11]

In order to solve this problem, the sectors responsible for PCCPs have made various voluntary commitments, in various global markets, to audit their use of MPIs and remove them where identified as an environmental risk. This process has not been standardised and significant differences of definition and scope exist among voluntary commitments globally.

Policymakers have also made strides to respond to the problem of corporate use of MPIs; the US government introduced the first national ban on products containing specific types of MPIs through the Microbead-Free Waters Act of 2015[12]. In September 2016, the UK Government also announced plans to introduce a national "ban on the sale and manufacture of cosmetics and personal care products containing tiny pieces of plastic, commonly known as 'microbeads'"[13], which could cover a much wider range of products than the US ban and has the potential to be the most progressive piece of legislation tackling a direct source of MP pollution in the world.

The following briefing note has been prepared by Fauna & Flora International (FFI), a UK-based non-governmental conservation organisation that acts to conserve threatened species and ecosystems worldwide, choosing solutions that are sustainable, based on sound science and take into account human needs. We have been working on tackling preventable and unnecessary sources of marine microplastic pollution since 2011 in response to the growing scientific evidence of the potential biodiversity impacts around small pieces of plastic that can be directly taken up by organisms. The purpose of this guidance is to outline the principles and recommendations developed by FFI regarding effective measures to end MPI use that contributes to marine plastic pollution; these principles apply to companies designing voluntary commitments related to MPI use as well as policymakers seeking to ban the sale and manufacture of products containing MPIs.

We ask that the following principles are considered by any company, brand, product formulator or ingredient manufacturer that wants to reduce the accumulation of marine plastic litter by phasing out microplastic ingredients from their products.

These principles state that a corporate commitment to remove microplastic ingredient should include:

1. Restriction of all microplastic ingredients
2. Application to all 'down the drain' products
3. No exemption for non-marine-tested synthetic solid ingredients
4. No exemption for plastic ingredients below a certain size
5. Implementation within an ambitious timeframe
6. Application to all brands in a company's portfolio
7. Application to all future formulations of products

We also ask that these same principles are considered by any regional, national or international policymaker that wants to reduce the accumulation of marine plastic litter by banning the sale, manufacture or import of microplastic ingredients (and/or products containing them).

2. INTRODUCTION

Plastic pollution in the world's oceans is ubiquitous. Globally, 300 million tonnes of plastic are produced annually, in a trillion dollar industry that employs over 180,000 people in the UK alone[14]. Virtually every aspect of life is now reliant upon plastic and consequentially, it is estimated that up to 12 million tonnes of plastic waste enters our oceans and waterways annually[15].

Marine litter is defined as 'items that have been deliberately discarded, unintentionally lost, or transported by wind and rivers, into the sea and on beaches[16]. Over 80% of marine litter is thought to originate from the land and up to 80% of this litter is composed of (macro) plastic waste (large, visible pieces of debris polluting waterways[17]). The socio-economic, ecological and environmental impact of visible macroplastic pollution has been manifest for many years and a large number of interventions have been launched accordingly, including but not limited to national & regional recycling schemes, clean-up operations, plastic bag levies and education campaigns. It is over the course of the last decade that the emergent topic of microplastic pollution has gained global notoriety.

'Microplastics' were reputedly first described by Thompson et al. in 2004[18]; this led to a definition by scientists in the USA, who used the term to refer to 'plastic particles measuring less than 5mm in diameter'[19]. It is important to note that this definition does not include a l lower size limit for microplastic particles and particles as small as 1µm have been recorded in water samples. Today, the body of supporting scientific evidence highlighting the seriousness of the impact of microplastic pollution on biodiversity (see Appendix 1), habitat degradation, and associated socio-economics has grown exponentially – a small sub-set of which is referenced throughout this document. In short, compelling evidence confirms both physical and toxicological effects that microplastic pollution has on marine biota. Many of the known toxins associated with microplastic pollution are passed along the food chain. Reports have even emerged confirming that water samples collected from across the globe are found to be contaminated with microplastic particles[20,21,22,23]. With regard to commercial fisheries, the proven impacts of microplastic pollution could have potentially grave economic repercussions and raise a number of questions highlighting implications for human health which are now being investigated more closely.[24]

Microplastic pollution is no longer a subject of scientific debate – the seriousness of the issue is very much at the forefront of the minds of the public[25], the scientific community[26], businesses (see Appendix 5), non-governmental organisations[27], national policymakers[24] and intergovernmental organisations[28] alike.

An internal FFI horizon scanning exercise in 2011 revealed that despite the seriousness of microplastic pollution - particularly in terms of biodiversity impact - there was limited activity underway in the UK tackling direct sources of microplastic pollution. FFI recognised the need for timely intervention in the UK and in 2012, launched its targeted marine plastics program. Drawing on core strengths held across the organisation, including a strong operational reputation with corporates and effective working relationships with other international NGOs working on similar issues, FFI set out to work collaboratively and constructively to improve corporate policies and practice to prevent avoidable, direct sources of microplastic pollution from entering the marine environment.

3. THE GOOD SCRUB GUIDE INITIATIVE

With the growing body of scientific literature covering the sources and impacts of microplastic pollution, an important distinction was made about *types* of microplastics[26]:

- *Primary microplastics* – purposefully designed and manufactured to function at sizes ≤ 5mm
- *Secondary microplastics* – fragments ≤ 5mm formed by the breakdown of larger pieces of plastic

This distinction was important to FFI because it saw that in the case of primary microplastics, there was likely to be a solution to the problem: where microplastic use was purposeful, originating from a clear source and lost to the environment (accidentally or consequentially), a change in practice would likely eliminate this source of microplastic pollution.

Microplastic particles (often used as abrasives) – or microbeads as they are now known – in cosmetic[29] and personal care products such as facial exfoliators, body scrubs, and toothpastes were widely cited as an example of primary microplastic use[17]. For example, early patents promoting the use of 'pulverised Polyethylene' in facial powders or 'plastic synthetic resin materials' and 'plastic scrubber particles' made of polyethylene, polypropylene or polystyrene in exfoliating products date back to the 1960s[30] and 1970s[31] respectively. These microbeads, as they have come to be known, are (essentially) purpose-designed to wash down the drain and invariably enter the marine environment because the particles are too small (often ≤1mm) to be retained during wastewater treatment processes[32].

An early market research exercise conducted by FFI highlighted the widespread commercial use of non-plastic, natural abrasive alternatives which reaffirmed the notion that this was an avoidable source of marine microplastic pollution. As such, FFI launched its Good Scrub Guide as a tool with which to influence change in corporate behaviour relating to the use (and associated reputational risks) of microplastics in personal care products.

To support this work, FFI created a product database which has evolved over time to assess the ingredients of some 1,500 Personal Care and Cosmetic Products (PCCPs). In 2012, FFI partnered with Dutch organisations Plastic Soup Foundation (PSF) and Stichting de Nordzee (North Sea Foundation, NSF) to launch the internationally focused Beat the Micro Bead (BtMB) website and smartphone App at the United Nations Environment Program (UNEP) second Global Land-Ocean Connections meeting in Jamaica in 2013. Together, the organisations behind the BtMB campaign started to approach some of the world's most prominent multinational corporations about their use of microplastic ingredients (MPIs), encouraging a timely phase out in each instance. This work encouraged multinational corporations to make public commitments very early on that confirmed their intent to remove particular MPIs from at least part of their product range.

These announcements being made on an international stage created an opportunity for brands and retailers operating or headquartered in the UK to follow a shifting market trend. Working closely with the Marine Conservation Society UK (MCS), FFI approached a range of companies to:

- Confirm the absence of MPIs in products marketed by identified 'green' brands
- Encourage the timely phase out of identified MPIs across all product ranges where relevant
- Seek further information and clarification about the use of suspected MPIs in certain products

In each case, FFI worked constructively with UK businesses to craft and publish public statements confirming action and corporate positions relating to MPI use (see Appendix 5). In addition to our work with corporate businesses, FFI & MCS launched a public outreach pledge page – *Scrub it Out!* –within the context of MCS' Marine Litter Action Network (MLAN) in order to gauge the British public's response to the MPI issue.

Following the 2015 announcement of the United States (US) Federal government Microbead-free Waters Act[12], Greenpeace UK launched a petition[25] in the UK encouraging then Prime Minister David Cameron to follow the lead of then President Barack Obama. This campaign was phenomenally successful, securing over 350,000 signatures from the British public in the first month alone and culminated in the formation of a UK microbead coalition – a collaborative partnership between FFI, Environmental Investigation Agency (EIA), Greenpeace UK and MCS – calling for the UK government to impose an effective legislative ban in the UK on the use of all MPIs in all PCCPs and cleaning products that go down the drain.

4. KEY LEARNINGS & OUTCOMES FROM THE GOOD SCRUB GUIDE INITIATIVE

4.1 Voluntary corporate commitments relating to MPI use

Our work in this area has been informed and reinforced by careful and thorough review of published ingredient lists of a wide range of PCCPs and cleaning products[33] (see Appendix 3 for summarised product data) and tracking/leveraging corporate phase-out commitments nationally and internationally[34] *(*see Appendix 5 for list of leveraged corporate commitments*)*. FFI has kept informed of all emerging scientific literature on the subject, tracked and reviewed proposed and enacted microbead legislation from around the world (see discussion in section 5 below) and maintained active participation in relevant multi-stakeholder working groups at home and abroad on this subject.

By reviewing published PCCP ingredient lists, the complexities of this subject became very clear. Plastics are generally defined as synthetic organic polymers[17] but it is important to note that in the context of microplastic pollution and marine litter, not all synthetic ingredients can be considered MPIs. In a published review of MPI use in PCCPs, it was reported that the plastic ingredients of interest share the following properties with microplastic litter[35]:

- Solid phase materials (i.e. solid particulates, not liquids)
- Insoluble in water
- Synthetic
- Non degradable (e.g. according to standardized tests)
- Made from plastic
- Small size (up to 5 mm, although they can be even smaller than 1 µm, i.e. nano-sized)

The key published definitions of MPIs that are relevant to microplastic litter arising from MPI use in PCCPs and cleaning products are summarised in Appendix 2.

Furthermore, it is evident that the molecular make-up of any given plastic polymer has a significant bearing on the final physical state and properties of the ingredient. For example, a given polymer, with differing molecular weights can manifest in several different phases (i.e. liquid, wax, semi-solid and solid matter) but can retain the same technical/chemical name and/or International Nomenclature of Cosmetic Ingredients (INCI) number[35,36,37]. FFI has carefully applied this technical knowledge during its review of UK PCCPs and, where uncertainties have arisen, FFI has sought clarification and further information from some of the producers and formulators of PCCPs in question. FFI maintains an evolving document of unverified polymeric ingredients of concern (see Appendix 4 for full details), which could be MPIs in some product formulations, and continues to discuss these ingredients with product formulators and during conversations with corporates to ensure that in the preparation of voluntary commitments, the status (i.e. physical state) of these unverified polymeric ingredients of concern is reviewed and confirmed and to ensure that all voluntary commitments are as inclusive as possible, including *all* solid, particulate water-insoluble MPIs.

It should be noted that although the use of MPIs in PCCPs was the initial focus of the Good

Scrub Guide initiative, it is known that MPIs are used in a wider range of consumer and industrial products including but not limited to domestic and commercial cleaning products[37]. Legislation governing the publication of ingredients on PCCPs is far more stringent than that of domestic & commercial cleaning products and as such, a review of MPIs in these products has been more challenging. That said, FFI has worked with its partner organisations in the UK microbead coalition to test a selection of such products in a laboratory using Fourier transform infrared spectroscopy (FTIR) to check for the presence of MPIs. Results of this testing have not been conclusive as of January 2017.

During the period 2015-2016, FFI's work with MCS resulted in significant traction with UK businesses – helping generate progressive public commitments from bespoke companies, leading high street brands, major retailers and also multinational corporations (see Appendix 5)[34]. During the same time period, this process was amplified in an international context during FFI's and MCS' involvement in the global BtMB campaign, which also used to celebrate a large number of positive commitments made by national and international companies to voluntarily remove MPIs.

Summary of FFI's key findings between 2012 and 2016 resulted in:

- Identification of six known MPIs commonly used in solid, water-insoluble form – polyethylene (PE)[38,39,40,41], polypropylene (PP)[42,43], polyethylene terephthalate (PET)[44,45], polytetrafluoroethylene (PTFE)[46], polymethyl methacrylate (PMMA)[47] and nylon[48,49]
- Identification of over 110 unverified polymeric ingredients of concern that could be solid, water-insoluble MPIs in some product formulations[35,36,37] (see full list in Appendix 4)
- A systematic review of over 1,500 PCCPs in the UK, across more than 20 product categories, for the presence of known MPIs commonly used in solid, water insoluble form and of unverified polymeric ingredients of concern (see Appendices 3 and 4)
- Recording known, commonly used MPIs in a wide range of sampled PCCPs across over 10 product categories (see Appendix 3)
- Highlighting unverified polymeric ingredients of concern (see Appendix 4) in a wide range of sampled PCCPs across over 10 product types (see Appendices 3 and 4)
- Conducting an evaluation of 58 products in the last four months of 2016 to see whether or not there was any change in the ingredient lists of these products which were previously recorded during the period 2012-2015 as containing known MPIs (see Appendix 3 for more details). We found that:
    - 28 products (or 48.3%) across three product types (body scrubs, deodorants and face scrubs) still contained known MPIs in September-December 2016
    - 16 products (or 27.6%) across four product types (body scrubs, deodorants, face scrubs and soaps) no longer contained known MPIs but contained unverified polymeric ingredients of concern in September-December 2016
    - 14 products (or 24.1%) across four product types (body scrubs, deodorants and face scrubs) no longer contained any known MPIs or unverified polymeric ingredients of concern in September-December 2016
- Conducting a preliminary review, with the help of Greenpeace UK, of more than 50 cleaning products, across 10 product types, on the UK market for presence of common MPIs or unverified polymeric ingredients of concern
- Identification of known MPIs in 8 cleaning products and in 2 cleaning product types as of January 2017
- Recording unverified polymeric ingredients of concern in 33 cleaning products and in 6 product types as of January 2017
- Directly leveraging commitments from over 30 cosmetics brands, UK retailers and multinational cosmetics companies
- Tracking commitments from more than 50 brands, companies and retailers in total

4.2 Limitations with voluntary corporate commitments

In the process of evaluating corporate MPI policy and monitoring PCCP ingredient data, the following patterns have emerged:

1. A number of companies have made unclear or inadequate public commitments that use ambiguous and narrow definitions of MPIs;
2. Commitments, in some cases, appear only to apply to a very limited range of products or to a specific function, e.g. exfoliation;
3. In some instances, MPIs have been replaced with 'biodegradable' plastics. This creates a risk of replacing 'like-with-like' because currently there are no standardised tests that ensure full marine biodegradability of such alternatives;
4. Some companies have shown disregard for the need for timely phase out of MPIs given the associated environmental impact of these ingredients[50,51];
5. There remains an ongoing confusion as to which products can be considered 'rinse-off' or 'leave-on'. This is exacerbated by the fact that many 'leave-on' products can be (and are) disposed of via normal drainage channels[52].

From the ingredient and commitment monitoring described in section 4.1 above, FFI found that products from 11 of the top 20 global beauty companies[53] contained MPIs. Given that only 4 of these 11 companies have made robust, public statements regarding MPI use[11], our sample of microplastic-containing products demonstrates that the major UK market share of PCCPs is likely to contain marine environmental pollutants.

Initially, FFI found that many of the companies that it approached to discuss MPI policies were unwilling to engage on the subject. Increasing media coverage over the past four years and a growing body of supporting scientific literature, coupled the international legislative developments, has made MPI use a very public subject and as such, FFI has experienced a noticeable tide change in the willingness and openness of businesses to engage on this issue.

In October 2015, disparate corporate commitments were aligned across the European cosmetics industry when Cosmetics Europe – the pan-European association for Cosmetics and Personal Care companies – issued a public statement recommending the industry work to prepare voluntary "microbead" phase-out commitments in light of "the public concerns expressed over plastic debris in the marine environment".[54] This recommendation, whilst making some progress, replicated some of the observed limitations of pre-existing corporate commitments discussed herein (see more details in Table 2 below).

5. OVERVIEW OF NATIONAL LEGISLATION RELATING TO MPI USE

5.1 Overview

In the wake of early corporate commitments which denounced the use of MPIs, intense media coverage, scientific studies, political lobbying and international campaigning, draft legislation started to emerge which attempted to formalise key messages and prohibit ongoing use of MPIs. For many, the use of MPIs was considered the 'low-hanging fruit' in an otherwise seemingly insurmountable problem of marine plastic pollution and announcements of legislative bans were initially widely celebrated (Table 1).

Table 1: Summary of global legislative developments that aimed to prohibit use of MPIs in PCCPs

Country	Recent developments
Australia	The New South Wales government called for a national ban on products containing plastic microbeads in August 2014 and in February 2016 the Environment Minister announced that the Federal Government will consider a national ban in 2017[55]
Austria, Belgium, Luxembourg, the Netherlands and Sweden	Joint call to ban the use of microplastics in cosmetics and detergents in the European Union (EU) issued in December 2014[56]
Canada	In November 2016 the Canadian Government announced that it will ban the sale of some products containing plastic microbeads in July 2018[57]
Denmark	The Danish Minister for the Environment announced in May 2016 that will be putting pressure on the European Commission and Parliament to ban plastic microbeads
France	In October 2016 France had notified the European Commission that it will ban some cosmetic products containing microplastics by January 2018[58]
Ireland	The Irish Government committed to banning plastic microbead use in November 2016 as part of a wider marine protection bill[59]
Italy	A national ban on the use of plastic microparticles in cosmetics in Italy was proposed in May 2016[60]
Kenya	In January 2016, Kenya's Bureau of Standards (KEBS) announced it would "discuss use of plastic microbeads in manufacture of cosmetics, soaps and toothpaste products"[61]
New Zealand	In January 2016 New Zealand's Environment Minister commissioned research into the environmental impacts of plastic microbeads and the New Zealand Government began considering a national ban on products containing microbeads[62,63]
Singapore	In October 2016 Singapore's National Parks Board claimed it was "looking into assessing the status and impact of marine debris and microplastics"[64]
South Korea	In September 2016 the South Korean Ministry of Food and Drug Safety announced plans to ban the use of microplastics in cosmetics[65]
Sweden	The Swedish Chemical Agency proposed a ban on cosmetic products containing plastic microbeads in Sweden through an EU-wide regulation[66]
Taiwan	In June 2016 the Environment Protection Administration of Taiwan announced plans to ban personal care products and toothpastes containing microbeads[67]
UK	The UK Government announced plans to ban the sale and manufacture of cosmetic and personal care products containing plastic microbeads in September 2016[13]
USA	US Microbead-Free Waters Act signed into law in December 2015[12]

5.2 Enacted USA national legislation

In December 2015, the US Senate passed the US Microbead-Free Waters Act, which bans "rinse-off cosmetics that contain intentionally-added plastic microbeads beginning on January 1, 2018" and which bans the "manufacturing of these cosmetics beginning on July 1, 2017". The passing of the Act followed the designation of several similar acts in various US States.

The Act, which is the first piece of national legislation relating to MPI use, repeats some of the observed limitations of the Cosmetics Europe voluntary recommendation regarding definitions and scope of MPI use (see Table 2 below).

5.3 Proposed UK national legislation

In September 2016, the UK Government announced plans to ban the sale and manufacture of cosmetic and personal care products containing tiny pieces of plastic, commonly known as 'microbeads', and also pledged to gather evidence on environmental impacts of microbeads used in other products such as household and industrial cleaning products[13]. This announcement followed the publication of an Environmental Audit Committee (EAC, a cross-party group of Members of Parliament) report in August 2016 which urged the Government to introduce the ban and recommended that the "legislation should follow principles set out by Fauna & Flora International around universality and consistency"[68].

The EAC report summarised the findings and conclusions of the EAC inquiry[69] conducted in May 2016 regarding the environmental impact of microplastics. As part of these proceedings, the Committee directly consulted a wide range of relevant stakeholders. These included prominent scientists in the field of marine plastic pollution; FFI and NGO partners MCS and EIA; Cosmetics Europe, the British Plastic Federation (BPF); major multinational PCCP manufacturers as well as Department for Environment, Food & Rural Affairs (Defra) representatives.

At the NGO hearing organised by the Committee, FFI argued that the voluntary measures taken by the industry to date have not succeeded in ending the use of polluting MPIs effectively due to inconsistencies in the standard of voluntary commitments made by different companies[7].

The opportunity for UK national legislation to overcome the inconsistencies of the industry voluntary commitments and the US Microbeads-Free Water Act of 2015 is made clear in Table 2, where "ideal" legislation is compared to both the Cosmetics Europe voluntary recommendation and the US Microbead-Free Waters Act.

In December 2016, Defra launched a public consultation on its proposals to ban the manufacture and sale of cosmetics and personal care products containing microbeads which may cause harm to the marine environment[70]. The proposals published in this consultation have one major limitation in comparison to the "ideal" legislation as demonstrated by the assessment in Table 2. This proposed UK microbeads ban uses the ambiguous term 'rinse-off', which reflects how long a product might stay on the skin rather than the likelihood of the product to go down the drain and reach the marine environment[71]. This is a significant limitation because it means that the ban would not necessarily apply to products such as make-up which:

- are often considered 'leave-on'[45] but
- can often go down the drain in practice[52] and
- are known to contain known MPIs commonly used in solid, water-insoluble form[44,45] (see Appendix 3 for examples).

Table 2: Comparison of ideal microplastic ingredient legislation, the US Microbead-Free Waters Act 2015, the Cosmetics Europe voluntary phase-out recommendation and the Defra proposals to ban the use of plastic microbeads in the UK (as of January 2017)

Legislation/recommendation	All solid plastic ingredients included?[72]	All product types reaching domestic or industrial drainage?[73]	"Biodegradable plastics" exemption absent?	Deadline for implementation	Ingredient definition	Product type definition
Ideal microplastic ingredients legislation (i.e. "gold standard")	✓	✓	✓	Two years from announcement	any solid, water insoluble, plastic particulate ingredient of 5 millimetres or less in size, performing any function in a product	any product that is, or can be, discharged to domestic or industrial drainage after its use
US Microbead Free Waters Act 2015[12]	✗	✗	✓	2017 (two years from announcement)	"any solid plastic particle that is less than 5 millimeters in size and is intended to be used to exfoliate or cleanse the human body"	"rinse-off cosmetics…(the term `rinse-off cosmetic' includes toothpaste)"
Cosmetics Europe voluntary phase-out recommendation[54]	✗	✗	✗	2020 (five years from announcement)	"synthetic, solid plastic particles used for exfoliating and cleansing that are non-biodegradable in the marine environment"	"wash-off cosmetic products" *(no further details given)*
Defra proposals to ban the use of plastic microbeads in cosmetics and personal care products in the UK (published in December 2016)[70]	✓	✗	✓	2018 (two years from announcement)	"solid microplastic ingredients < 5mm in size in every dimension"	"rinse-off cosmetics and personal care products including but not limited to exfoliating scrubs, shower gels and toothpastes"

6. FFI'S PRINCIPLES OF A ROBUST CORPORATE COMMITMENT OR NATIONAL LEGISLATION RELATING TO MPI USE

6.1 Evolution of the FFI principles

Given the apparent disparities between published position statements on MPI use across the sector regarding the definition of MPIs and scope of phase out commitments, FFI developed a set of seven guiding principles to ensure that the use of MPIs – in any product sector and by any company – does not add to the growing environmental problem of marine litter.

The seven principles are intended to act as guidance for both commercial entities and policymakers to ensure that their attempts to either phase out or ban MPIs are robust, future-proof and that there is consistence and a 'level playing field' across the industry. The principles and founding rationale are presented in Table 3. For an in depth review of the information that shaped each rationale – including references to relevant evidence sources – please see detailed principle guidance in Appendix 6.

In addition to robust corporate commitments, effective and expansive national legislation is vital to ensure MPIs do not become marine litter.

Table 3: FFI's principles of a robust corporate commitment or national legislation relating to MPI use.

Principle:	Rationale:
1. Restriction of all microplastic ingredients	Any plastic that reaches the environment can become marine litter. Many different plastic polymers are used as MPIs in household, consumer and industrial products. Only the use of the term "all microplastic ingredients" to describe what is being removed in a corporate commitment or being banned in a piece of legislation is adequate.
2. Application to all 'down the drain' products'	Any product containing MPIs that can be proven to be disposed of (either by design or user behaviour) down a drain poses an environmental risk. Only the use of the term "all 'down the drain' products" to describe the product range that a corporate commitment or piece of legislation applies to is adequate.
3. No exemption for non-marine-tested synthetic solid ingredients	Encouraging the use of "biodegradability" as a solution to marine plastic litter has consistently been viewed with caution by the scientific community. There are no known replacements for MPIs that are synthetic and have been conclusively demonstrated to fully biodegrade in marine environmental conditions. In restricting or removing MPIs, policymakers and corporates should not encourage the introduction of solid, water-insoluble synthetic materials that have not been shown to fully biodegrade in marine environmental conditions.
4. No exemption for plastic ingredients below a certain size	Any plastic particle, of any size less than 5mm, is a microplastic. Previous corporate and trade body definitions of MPIs have sought to apply a minimum size limit. No exemptions should therefore be made for MPIs below a certain size.
5. Implementation within an ambitious timeframe	Several multinational brands have set implementation timelines – albeit of imperfect MPI phase-out commitments – of two years from the date of announcement. This is the timeframe of the US ban. It therefore seems reasonable this become the standard timeframe for either legislation to be enacted or corporate commitments to be fully implemented.
6. Applies to all brands in a company's portfolio	*(NB does not apply to restriction of MPIs, only corporate removal).* Discrepancies have occurred between brands in company's portfolios. A robust corporate commitment should therefore come from parent company level and apply to all brands in the company's portfolio.
7. Applies to all future formulations of products	*(NB does not apply to restriction of MPIs, only corporate removal).* A robust corporate commitment should obviously apply to all future formulations of products.

7. SUMMARY

7.1 Key learning outcomes of work to date

FFI's work on microbeads and its work with corporate businesses have grown organically over the past five years. FFI has worked diligently to remain well-informed, constructive in its approach and participatory in all matters relating to this field of work. Despite establishing a clear link between the use of MPIs and marine microplastic pollution, the nuances of this subject are varied and significant. For example, simply defining a 'plastic' ingredient proves challenging in a multi-stakeholder environment[37]. Similarly, defining product types to review (i.e. rinse-off or leave-on products[71]) is challenging depending on point of view.

7.2 Purpose of FFIs principles and guidance

Overall, there has been a notable step-change in corporate position relating to MPI use with many sectors now openly working together to effectively solve this issue. Despite this promising progress, evidence gathered during FFI's latest monitoring of product ingredient lists has revealed that in the UK, the issue is still far from being resolved (as of January 2017):

- out of 58 down-the-drain PCCPs that contained known MPIs in 2012-2015, 28 or nearly half were still found in UK shops with the same known MPIs in September-December 2016 and
- out of the other 30 products, which used to contain common MPIs in 2012-2015 but in September-December 2016 were found in UK shops with new formulas no longer containing any known MPIs:
    - 16 (more than half) contained unverified polymeric ingredients of concern which could be MPIs and
    - only 14 (less than half) contained no known MPIs or unverified polymeric ingredients of concern (see Appendix 3 for a more detailed summary).

FFI's principles of a robust corporate commitment or national legislation relating to MPI use are intended to guide and inform companies and policymakers intending to reduce the potential for MPIs in consumer and industrial products to become marine plastic litter.

We ask that these principles are considered by any company, brand, product formulator or ingredient manufacturer that wants to reduce the accumulation of marine plastic litter by phasing out microplastic ingredients from their products.

We also ask that the principles are considered by any regional, national or international policymaker that wants to reduce the accumulation of marine plastic litter by banning the sale, manufacture or import of microplastic ingredients (and/or products containing them).

8. LIST OF APPENDICES

Appendix 1	Examples of demonstrated/potential impacts of marine microplastic pollution on biodiversity
Appendix 2	Summary of published definitions of microplastic ingredients (MPIs)
Appendix 3	Summary of microplastic ingredient (MPI) data from UK product database
Appendix 4	Recorded examples of unverified polymeric ingredients of concern found in personal care and cosmetic products (PCCPs) or cleaning products on the UK market
Appendix 5	Voluntary corporate commitments provided to Fauna & Flora International and the Marine Conservation Society by UK and/or international companies with regard to microplastic ingredient (MPI) use
Appendix 6	Detailed guidance on FFI's principles, including evidence sources, designed to support delivering of effective legislation governing microplastic ingredient (MPI) use

9. REFERENCES

[1] In accordance with the definition widely accepted by the international marine litter scientific community, we define "microplastic" to be any piece of solid synthetic polymer of 5mm or less in size. We define "primary microplastics" as pieces of solid synthetic polymer of 5mm or less in size that are manufactured at that size, as opposed to "secondary microplastics", which we define as pieces of solid synthetic polymer of 5mm or less in size resulting from the degradation of larger plastic items.
In order to address all polluting plastic ingredients that are relevant to the marine litter debate, we define "solid, water-insoluble microplastic ingredients" as any solid, water-insoluble synthetic polymers of 5mm or less (with no lower size limit), used in any personal care and cosmetic product or domestic cleaning product, for any function. "Microbeads" have often been defined as any solid, water-insoluble synthetic polymers of 5mm or less (with no lower size limit), used in specific personal care and cosmetic products – including, but not limited to, face scrubs and body scrubs – for the specific purpose of skin cleansing and exfoliation. Given our focus on "reducing the marine environmental input" of polluting plastic ingredients, we focus on all product categories that can reach the marine environment i.e. those whose most common use involves their disposal via domestic drainage.

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[72] Given that the term "microbeads" has no universally accepted definition, legislation on their use (mostly from examples across various levels of US administration) has tended to try to define them. Definitions have commonly been limited by the function of the particle in the product (i.e. "exfoliating" or "cleansing") rather than solely the physical state of the plastic particle (i.e. any solid plastic particle). Solid plastic particles – performing any function – that are discharged to domestic drainage can become marine litter. "Gold standard" legislation would therefore not discriminate by the function of the ingredient, only that it is 5mm or less and in solid, water-insoluble form.
[73] The use of plastic particle functions to define "microbeads" in existing legislation has also necessarily limited the categories of product implicated in the legislation. "Exfoliating" and "cleansing" functions apply, for example, to plastic particles in face scrubs, body scrubs, foot scrubs, hand scrubs, soaps and toothpastes, but this definition is challenged by other product types that are also discharged to domestic drainage after use but whose plastic particulate ingredients could be interpreted as not performing these functions e.g. bath products (bubble bath etc.), deodorants, shaving gels/foams and product types whose plastic particulate ingredients may perform these functions, but not on the human body e.g. kitchen cleaners, detergents. The use of the terms "consumer" product and "domestic" drainage are also necessarily limiting, in that they do not implicate those products that use plastic particulate ingredients that perform exfoliating and cleansing functions on the human body but are discharged to industrial drainage e.g. industrial hand cleaners. The key terms limiting product type definitions are "rinse-off" and "wash-off", both of which attempt to define implicated product types by the method by which they are used and then by which they reach domestic drainage after use. There may be some product types – e.g. make-up – where solid plastic ingredients are widely used but are not considered "rinse-off"; these product types may pose environmental risk in that consumers may still emit them to drainage – i.e. by washing with soap and water or by following product directions to rinse them off – even if product manufacturers do not intend this method of disposal for the product. "Gold standard" legislation would therefore define an implicated product type as any that is, or can be, discharged to domestic or industrial drainage after use.

APPENDIX 1. EXAMPLES OF DEMONSTRATED/POTENTIAL IMPACTS OF MARINE MICROPLASTIC POLLUTION ON BIODIVERSITY (KEY PUBLISHED STUDIES AS OF APRIL 2016)

Primary impact mechanism	Secondary impact mechanism	Demonstrated/potential impacts(s)
Direct ingestion or uptake via water column of plastic particles by organisms (demonstrated in over 50 marine species[1])	Release of adsorbed hydrophobic marine chemicals into organism tissues	• **Mortality** of marine worms as well as **reduced burrowing ability** and **internal injuries** when exposed to adsorbed hydrophobic chemicals on polyvinyl chloride (PVC)[2] • **Hormone disruption** and **tumour formation** in adult freshwater fish when exposed to adsorbed hydrophobic chemicals on Polyethylene (PE) pellets[3] • **Transfer to and accumulation in tissues** of adult freshwater fish when exposed to absorbed hydrophobic chemicals on PE microbeads[4] • **Inhibition of neurotransmitters** and **oxidative stress** in common gobies (prey species of cod) when exposed to mixture of PE microspheres and hydrophobic pyrene (environmental contaminant)[5] • **Reduced immune system response** and **genetic mutation** in blue mussel exposed to PE and PS microplastics and hydrophobic pyrene (environmental contaminant)[6]
	Release of inherent chemical additives into organism tissues	• **Mortality** (at high concentrations) and **decrease in fecundity** (at all concentrations) in planktonic crustaceans when exposed to various sizes of polystyrene (PS) microparticles *(NB impact mechanism was not examined)*[7] • **Mortality** of marine worms as well as **reduced burrowing ability** and **internal injuries** when exposed to additives leaching from PVC[8]
	Persistence/elevated presence in digestive organs of organisms	• **Potential starvation/reduced body condition** in 15 species of surface-feeding European seabirds[9] *(NB cited study only records increasing frequency of presence, not observed impact)* • **Deterioration/inflammation of tissues** in blue mussels when exposed to high-density polyethylene (HDPE) pellets[10] • **Reduced feeding activity** and **reduced energy reserves** in marine worms when exposed to sediment containing microscopic unplasticised polyvinylchloride (UPVC)[11]
	Trophic food web transfer from low to high level organisms	• **Potential reduced health of commercial organism** when blue mussels transfer PS microspheres to brown crabs *(NB cited study only records transfer of PS, not observed impact)*[12] • **Potential multi-generational mortality and reduced health** when PS microspheres transferred between low trophic level worms and copepods to higher trophic level shrimp *(NB cited study only records transfer of PS, not observed impact)*[13]
	Intergenerational transfer	• **Potential multi-generational reduced health and size** and **potential perforation of digestive organs** when various polymers transferred between adult and fledgling Cory's shearwater *(NB cited study only records transfer, not observed impact)*[14]
	Concentration in high trophic level organisms	• **Potential population level threat (given observed declines)** in fin whales ingesting variety of microplastics and adsorbed/leached contaminants *(NB cited study only records presence of microplastics and contaminants, not impact)*[15] • **Potential mortality** in True's beaked whale with microplastics in digestive tract *(NB cited study only records presence of microplastics and contaminants, not impact)*[16]
Presence in intertidal or subtidal habitats	Provision of altered and/or supplementary habitat	• **Increase of marine bacterial density and resulting potential for invasive species transport** observed in North and South Pacific, North Atlantic and in various microbial species i.e. microplastics acting as vector for high concentrations of potentially invasive organisms[17,18,19] • **Increased egg density and resulting alteration of ecosystem structure** observed in a marine insect in habitats with high microplastic loads[20]
	Release of inherent chemical additives into organism tissues (without ingestion)	• **Increase of anomalous larvae development** of sea urchins when exposed to additives leaching from PE pellets[21]

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APPENDIX 2: SUMMARY OF PUBLISHED DEFINITIONS OF MICROPLASTIC INGREDIENTS (MPIS)

Source	Context	Scope	Criteria				
			Composition	**Physical state**	**Size**	**Solubility**	**Degradability**
Leslie (2014)[1]	Marine litter science	It should be noted that many synthetic polymers in cosmetic formulations do not fulfil the criteria for microplastic (e.g. polymers that are liquids at normal environmental temperature ranges; water soluble polymeric substances) and that we limit the discussion here to the solid particles that would be considered to be marine litter if they were to reach the marine environment.	• Synthetic • Made from plastic	Solid phase materials (i.e. solid particulates, not liquids)	Small size (up to 5 mm, although they can be even smaller than 1 µm, i.e. nano-sized)	Insoluble in water	Nondegradable (e.g. according to standardized tests)
Leslie (2015)[2]	Marine litter science	Synthetic polymeric ingredients in PCCPs that can be regarded as a 'microplastic', as defined by the international marine litter scientific community[3,4]	Synthetic polymers and/or copolymers (plastics)	Solid phase materials (particulates, not liquids)	Small size (maximum 5 mm, no lower size limit is defined)	Insoluble in water	Nondegradable* *Nondegradable refers to the lack of ability of the material to decompose or mineralize at measurable rates. The consequence of being nondegradable is that the material is persistent. No material is expected to last indefinitely.
Ooms et al. (2015)[5]	Business practice and policy	Included are:	Synthetic materials - conventional plastic materials (also biobased)	Solids and semi-solids: melting T > 20°C	< 5mm	Insoluble in water	Both non-biodegradable and biodegradable
		Recommended for inclusion:	Expansion to elastomers and silicone rubbers	-	100 nm – 5mm	< 1 mg/L	-
		Reservations for future considerations:	Expansion to other anorganic polymers	-	-	Research the 1 mg/L threshold	Development of criterions for biodegradability within representative conditions
Verschoor et al. (2016)[6]	Regulation	A review of existing proposals and working definitions indicates that there are five major elements that should be specified in order to determine whether a compound is a microplastic:	Synthetic polymer-based materials	A substance that is not a liquid or a gas	< 5mm	<1 mg/L	Compartment / Half-life Marine water / < 60 days Fresh or estuarine water / < 40 days Marine sediment / < 180 days Fresh or estuarine sediment / <120 days Soil / <120 days
		Selected threshold values were adopted or derived from widely used and accepted legal frameworks:	ISO[7], REACH[8]	UN-GHS[9]	MSFD[10]	REACH[11]	REACH[12]

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APPENDIX 3: SUMMARY OF MICROPLASTIC INGREDIENT (MPI) DATA FROM UK PRODUCT DATABASE

Data collection, through online and in-shop monitoring of full product ingredient lists, commenced in 2012 and now includes records of ca. 1500 products across over 10 product categories. We have found ingredient names commonly associated with microplastic ingredients (MPIs), such as polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET), polymethyl methacrylate (PMMA), polytetrafluoroethylene (PTFE) or nylon, in more than half of the product categories reviewed. We have also found over 90 unverified polymeric ingredients of concern (see Appendix 4), which could be MPIs in some product formulations, in products across more than half of the product categories reviewed. Over the course of 2016, FFI has been systematically reviewing the data it holds, updating records where appropriate. These updates could reflect changes to ingredient lists in line with voluntary corporate commitments to phase out MPI use or they might reflect corporate change due to increased public awareness on the issue or due to the introduction or proposal of relevant legislation in other countries.

All information below was correct to the best of our knowledge in January 2017.

Table A1. Summary of data collected online and/or in shops in the period from 2012 to 2015. The aim during this period was to grow our product and ingredient list with information about known or common MPIs and also about names of unverified polymeric ingredients of concern (see Appendix 4) which could be MPIs in some product formulations.

Intended application of product	Route to drainage	Product category	Product counts								
			Containing known MPIs commonly used in solid, water insoluble form						Containing both known MPIs and unverified polymeric ingredients of concern	Containing unverified polymeric ingredients of concern (see Appendix 4)	Without any known MPIs or unverified polymeric ingredients of concern
			PE	PP	PET	PMMA	PTFE	Nylon			
Applied to human body	*Intended removal from skin involves drainage emission and product directs users to emit to drainage*	Bath product	0	0	3	0	0	0	3	61	166
		Body glitter	0	0	0	0	0	0	0	3	17
		Body scrub	44	0	0	0	0	0	21	44	132
		Deodorant	4	0	0	0	0	0	0	0	3
		Face mask	0	0	0	0	0	0	0	0	3
		Face scrub	131	2	0	2	0	6	40	87	135
		Fake tan	0	0	0	0	0	1	1	1	0
		Foot scrub	3	0	0	0	0	0	1	3	11
		Hand scrub	2	0	0	0	0	0	1	2	11
		Industrial hand cleaner	1	0	0	0	0	0	0	0	0
		Shampoo	0	0	0	0	0	0	0	32	224

		Shaving product	0	0	0	0	2	1	2	23	26
		Shower gel	0	0	0	0	0	0	0	1	5
		Soap	1	0	0	0	0	0	0	0	40
		Toothpaste	8	0	0	0	0	0	2	13	109
	Some users remove to drainage in practice and removal products direct users to emit to drainage	BB cream	0	0	0	0	0	2	1	3	0
		Foundation	1	0	0	1	0	2	2	4	2
		Lipstick	6	0	0	0	0	0	4	4	2
		Mascara	1	0	0	0	0	0	1	6	1
		Powder	0	0	0	0	0	1	1	1	0

Table A2. Summary of data collected online and/or in shops in 2016. The aim during this period was to learn about the range of products in which MPIs can be found and also to monitor for changes in ingredient lists that were already in our database (see Tables A3 and A4 below for summaries of observed changes).

Intended application of product	**Route to drainage**	**Product category**	**Product counts**								
			Containing known MPIs commonly used in solid, water insoluble form						**Containing both known MPIs and unverified polymeric ingredients of concern**	**Containing unverified polymeric ingredients of concern (see Appendix 4)**	**Without any known MPIs or unverified polymeric ingredients of concern**
			PE	**PP**	**PET**	**PMMA**	**PTFE**	**Nylon**			
Applied to human body	*Some users remove to drainage in practice and removal products direct users to emit to drainage*	Body scrub	3	0	0	0	0	0	2	2	0
		Deodorant	1	0	0	0	0	0	1	1	0
		Face mask	1	0	0	0	0	0	0	6	8
		Face scrub	9	0	0	0	0	0	2	6	14
		Fake tan	0	0	0	0	0	0	0	1	0
		Hairspray	0	0	0	0	0	0	0	1	0
		Industrial hand cleaner	6	1	0	0	0	0	0	0	0
		Shaving product	0	0	0	0	4	0	4	15	1
		Shower gel	0	0	0	0	0	0	0	2	2
		Toothpaste	0	0	0	0	0	0	0	4	0
		BB cream	2	0	0	0	0	2	4	8	0
		Blusher	0	0	0	0	2	0	2	2	0

		CC cream	1	0	0	0	0	0	1	2	1
		Concealer	0	0	0	0	0	1	1	1	0
		Eyeshadow	0	0	0	0	0	2	0	0	0
		Foundation	0	0	0	0	0	0	0	2	0
		Highlighter	1	0	0	1	0	1	1	1	0
		Lip balm	1	0	0	0	0	0	0	0	1
		Lipstick	3	0	1	0	0	0	3	3	0
		Mascara	0	0	1	0	1	2	2	2	0
		Moisturiser	0	0	0	1	1	2	3	11	5
		Powder	0	0	0	1	0	1	0	0	0
Inserted into domestic or industrial washing machines or dishwashers	*Emitted to drainage directly via washing machine or dishwasher*	Dishwasher cleaner	0	0	0	0	0	0	0	1	1
		Dishwasher detergent	0	0	0	0	0	0	0	3	0
		Fabric stain remover	0	0	0	0	0	0	0	13	8
		Laundry detergent	0	0	0	0	0	0	0	12	4
		Washing machine cleaner	0	0	0	0	0	0	0	3	0
Applied to domestic or industrial surface	*Intended removal involves drainage emission*	Floor cleaner	1	0	0	0	0	0	0	0	1
		Multipurpose cleaner	0	0	0	0	0	0	0	1	0

Table A3. Summary and assessment of potential change or lack of change observed in 2016 in product ingredient lists that contained known MPIs, commonly used in solid, water insoluble form, in the period 2012-2015. The 2016 statuses of products were verified both through online ingredient list searches and through checking the ingredient lists on the products' packaging in UK shops.

Intended application of product	Route to drainage	Product category	Observed potential change or lack of change		
			2012-2015 status: contains known MPIs → 2016 status: still contains known MPIs	**2012-2015 status: contains known MPIs → 2016 status: no longer contains known MPIs but contains unverified polymeric ingredients of concern**	**2012-2015 status: contains known MPIs → 2016 status: without any known MPIs or unverified polymeric ingredients of concern**
Applied to human body	*Intended removal from skin involves drainage emission and product directs users to emit to drainage*	Body scrub	3	3	3
		Deodorant	3	1	1
		Face scrub	28	15	17
		Soap	0	1	0
		Toothpaste	1	0	2
		All product types (total change)	**35 (44.9%)**	**20 (25.6%)**	**23 (29.5%)**

Table A4. Latest evaluation of potential change or lack of change observed in the last four months of 2016 in product ingredient lists that contained common known MPIs in the period 2012-2015. The statuses of products in the period September – December 2016 were verified both through online ingredient list searches and through checking the ingredient lists on the products' packaging in UK shops.

Intended application of product	Route to drainage	Product category	Observed potential change or lack of change		
			2012-2015 status: contains known MPIs → Sep-Dec 2016 status: still contains known MPIs	**2012-2015 status: contains known MPIs → 2016 status: no longer contains known MPIs but contains unverified polymeric ingredients of concern**	**2012-2015 status: contains known MPIs → 2016 status: without any known MPIs or unverified polymeric ingredients of concern**
Applied to human body	*Intended removal from skin involves drainage emission and product directs users to emit to drainage*	Body scrub	1	3	2
		Deodorant	3	1	1
		Face scrub	24	11	11
		Soap	0	1	0
		All product types (total change)	**28 (48.3%)**	**16 (27.6%)**	**14 (24.1%)**

APPENDIX 4. RECORDED EXAMPLES OF UNVERIFIED POLYMERIC INGREDIENTS OF CONCERN, WHICH COULD BE MICROPLASTIC INGREDIENTS (MPIS) IN SOME PRODUCT FORMULATIONS, FOUND IN PERSONAL CARE AND COSMETIC PRODUCTS (PCCPS) OR CLEANING PRODUCTS ON THE UK MARKET IN THE PERIOD FROM 2012 TO 2016

In Section 4.1 of FFI's guidance document entitled 'Removing or Restricting Microplastic Ingredients or "Microbeads" from Consumer and Industrial Products' FFI introduced the concept of *unverified polymeric ingredients of concern*. Unverified polymeric ingredients of concern are ingredients that could manifest as solid, water insoluble plastic particles (therefore falling under the definition of marine litter) in some products and liquids or water soluble substances (that are beyond the scope of what can be considered marine litter) in other products. Several cited references also contain examples and explanations regarding such unverified polymeric ingredients of concern[1,2,3].

The names of unverified polymeric ingredients of concern as determined by the International Nomenclature of Cosmetic Ingredients (INCI) do not reveal whether the substances are used in solid, liquid, water-soluble or water-insoluble form – this can only be determined on a case by case basis by product manufacturers or formulators (NB INCI naming conventions do not apply to cleaning products). A list of over 110 examples of unverified polymeric ingredients of concern that we have found in the ingredient lists of consumer and industrial products on the UK market in the period from 2012 to 2016 is included in the table below. It is important to note, however, that there can be no exhaustive list of such ingredients.

Recorded Ingredient:	Recorded use in PCCPs/cleaning products:
Acetates Copolymer	Bath Product
Acid/MA Copolymer	Laundry Detergent
Acrylamide/Sodium Acryloyldimethyltaurate Copolymer	Body Scrub, Face Scrub, BB Cream, Moisturiser
Acrylate Copolymer	Fabric Stain Remover
Acrylated/C10-30 Alkyl Acrylate Crosspolymer	Bath Product, Body Glitter, Body Scrub, Deodorant, Face Scrub, Foot Scrub, Moisturiser, Mousse, Shaving Product, Toothpaste
Acrylates/Beheneth-25 methacrylate copolymer	Shampoo
Acrylates Copolymer	Bath Product, Body Glitter, Body Scrub, Deodorant, Face Mask, Face Scrub, Foot Scrub, Foundation, Hand Scrub, Lipstick, Mascara, Moisturiser, Mousse, Shampoo, Shaving Product, Shower Gel
Acrylates/Aminoacrylates/C10 30 Alkyl PEG-20 Itaconate Copolymer	Face Scrub
Acrylates/ammonium methacrylate copolymer	Face Scrub, Face Wash
Acrylates/Dimethicone Copolymer	BB Cream, Foundation
Acrylates/Palmeth-25 Acrylate Copolymer	Body Scrub, Face Scrub
Acrylate / PEG-10 Maleate / Styrene Copolymer	Bath Product
Acrylates Crosspolymer-4	Bath Product
Acrylates/Steareth-20 Methacrylate Copolymer	Bath Product, Face Scrub
Acrylates/Stearyl Acrylate/Dimethicone Methacrylate Copolymer	Foundation
Acrylic Acid/Isobutyl Acrylate/Isobornyl Acrylate Copolymer	Lipstick

Acrylic Copolimer	Washing Machine Cleaner
Acrylic Copolimer Emulsion	Fabric Stain Remover
Acrylic Polymer	Fabric Stain Remover
Acrylic/Sulphonic Copolymer	Dishwasher Detergent
Alkyl methacrylates crosspolymer	Face Scrub
Ammonium Acryloyldimethyltaurate / Carboxyethyl Acrylate Crosspolymer	Face Scrub
Ammonium Acryloyldimethyltaurate/VP Copolymer	Face Mask, Face Scrub, Shaving Product
Ammonium polyacrylate	BB cream, Body Scrub, CC cream, Moisturiser
Anionic Polyurethane	Fabric Stain Remover
Bis-isobutyl peg/ppg-20/35/amodimethicone copolymer	Shampoo
Butylene/ethylene/styrene copolymer	Body Scrub, Lip Balm
Calcium Divinylbenzene Styrene Copolymer Sulfonate	Laundry Detergent
Capryloyl glycerin/sebacic acid copolymer	Moisturiser
Carboxylated Copolymer	Washing Machine Cleaner
Cera Microcristallina	Body Scrub, Face Mask, Face Scrub, Foundation, Lipstick, Shaving Product
Copolymer Acryelate	Industrial Hand Cleaner
Copolymer of Acrylic and Sulphonic Acids	Dishwasher Detergent
Co-polymer of PEG / Vinyl Acetate	Laundry Detergent
C30-45 Alkyl Cetearyl Dimethicone Crosspolymer	Shower Gel
Dimethicone Crosspolymer	Face Mask, Deodorant
Dimethicone/Divinyldimethicone/Silsexquioxane Crosspolymer	Foundation
Dimethicone/Methicone Copolymer	BB Cream, Foundation
Dimethicone/Peg-10/15 Crosspolymer	BB Cream, Mascara, Shower Gel
Dimethicone/Phenyl Vinyl Dimethicone Crosspolymer	BB Cream, Face Scrub
Dimethicone/Polyglycerin-3 Crosspolymer	BB Cream, Foundation
Dimethicone/vinyl dimethicone crosspolymer	Body Glitter, Deodorant, Face Scrub, Fake Tan, Foundation, Moisturiser
Dimethylacrylamide/Sodium Acryloyldimethyltaurate Crosspolymer	Face Scrub
Diphenyl Dimethicone/Vinyl Diphenyl Dimethicone/Silsesquioxane Crosspolymer	Foundation, Pressed Powder
Ethylene/propylene/styrene copolymer	Body Scrub, Lip Balm
Ethyltrimonium chloride methacrylate/hydrolyzed wheat protein copolymer	Shampoo
Gelatin Crosspolymer	Deodorant
Gylcereth-7 hydroxystearate/IPDI copolymer	Body Scrub
Glyceryl Acrylate/Acrylic Acid Copolymer	Bath Product, Body Glitter, Face Mask, Face Scrub, Mascara, Moisturiser, Shaving Product, Shower Gel

Hdi/Trimethylol Hexyllactone Crosspolymer	Blusher, Face Scrub, Lipstick
Hydrogenated Polyisobutene	BB Cream, Body Scrub, Face Scrub, Lipstick, Shaving Product
Hydrogenated Styrene/Methyl Styrene/Indene Copolymer	Lipstick
Hydrogenated Styrene/Isoprene Copolymer	Lipstick
Hydroxyethyl Acrylate/Sodium Acryloyldimethyltaurate Copolymer	Body Scrub
Hydroxyethyl Acrylate/Sodium Acryloyldimethyl Taurate Copolymer	BB Cream, Body Scrub, Face Scrub, Fake Tan, Lip Balm, Moisturiser, Shaving Product
Lauryl Methacrylate/Glycol Dimethacrylate Cross polymer	Face Scrub
Methyl Methacrylate Crosspolymer	Face Scrub, Moisturiser
Modified Styrene/Acrylic Copolymer	Fabric Stain Remover
Octylacrylamide/Acrylates/Butylaminoethyl Methacrylate Copolymer	Hairspray
Palmitoyl Hydroxypropyl Trimonium Amylopectin/ Glycerin Crosspolymer	Face Scrub
PEG-2M	Shaving Product
PEG-7M	Foaming Cleanser, Shaving Product
PEG-14M	Face Scrub, Shampoo, Shaving Product
PEG-20M	Toothpaste
PEG-23M	Shampoo, Shaving Product
PEG-45M	Shampoo
PEG-90M	Shaving Product
PEG-8/SMDI Copolymer	Shampoo
PEG/PPG-116/66 Copolymer	Toothpaste
Peg-12 Dimethicone Crosspolymer	Mascara, Shower Gel
PEI-2500	Laundry Detergent
Poloxamer 184	Body Scrub
Poloxamer 407	Face Scrub, Shampoo, Toothpaste
Polyacrylamide	BB Cream, Body Scrub, Face Scrub, Moisturiser
Polyamide-2	Shampoo
Polyacrylate	Laundry Detergent, Fabric Stain Remover
Polyacrylate-13	Face Scrub
Polyacrylate-1 Crosspolymer	Face Scrub
Polyacrylate-33	Industrial Hand Cleaner
Polyacrylate Crosspolymer-6	Face Mask
Polyester	Fabric Stain Remover
Polyethylenimine	Dishwasher Detergent, Dishwasher Cleaner
Polyglyceryl-2 Isostearate/Dimer Dilinoleate Copolymer	Lipstick

Poly(Glycol Adipate)/Bis-Hydroxyethoxypropyl Dimethicone Copolymer	Foundation
Polyisobutene	Face Scrub
Polylactic Acid	Body Scrub, Face Scrub
Polymer/Solids	Body Scrub
Polypropylene Terephthalate	Face Scrub
Polysilicone-1 Crosspolymer	Foundation
Polyurethane-40	Foundation
Polyvinyl Alcohol	Dishwasher Detergent, Dishwasher Cleaner, Fabric Stain Remover, Laundry Detergent
Polyvinylalcohol Crosspolymer	Foundation
Polyvinylpyrrolidone (PVP)	Bath Product, Fabric Stain Remover
PPG-17/IPDI/DMPA Copolymer	Mascara
PPG-51/SMDI Copolymer	Face Scrub
PVM/MA copolymer	Body Glitter, Shampoo, Shaving Product, Toothpaste
Styrene/Acrylamide Copolymer	Bath Product
Sodium Acrylate/Acryloyldimethyl Taurate Copolymer	Face Scrub, Shaving Product
Sodium acrylates copolymer	Fabric Stain Remover, Face Mask, Face Scrub, Moisturiser
Sodium Acrylic Acid/MA Copolymer	Laundry Detergent
Sodium Gluconate Acrylates Copolymer	Shaving Product
Styrene/Acrylates Copolymer	Bath Product, BB Cream, Body Scrub, Deodorant, Fabric Stain Remover, Face Scrub, Mascara, Shampoo
Sodium polyacrylate	Body Scrub, Dishwasher cleaner, Face Mask, Face Scrub, Foot Scrub, Mascara, Laundry detergent, Moisturiser, Multipurpose cleaner, Serum, Shampoo, Shaving Product, Sunscreen Washing machine cleaner
Sulfonated Polyethylene/Polyethylene Terephthalate	Laundry Detergent
Sulfonated Polymer	Dishwasher Cleaner, Washing Machine Cleaner
Synthetic beeswax	Face Scrub, Mascara
Synthetic wax	Body Scrub, Face Scrub, Hand Scrub, Sunscreen
Taurate/Vp Copolymer	CC Cream, Face Mask, Face Scrub, Shaving Product
VA/Crotonates/ Vinyl Neodecanoate Copolymer	Hairspray
Vinyl Dimethicone/Methicone Silsesquioxane Crosspolymer	BB Cream
VP/DMAPA acrylates copolymer	Shampoo
VP/Eicosene Copolymer	Lipstick, Mascara
VP/Hexadecene Copolymer	Lipstick, Mascara
VP/Methacrylamide/Vinyl imidazole copolymer	Shampoo
VP/VA copoylmer	Shampoo

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APPENDIX 5: VOLUNTARY CORPORATE COMMITMENTS PROVIDED TO FAUNA & FLORA INTERNATIONAL AND THE MARINE CONSERVATION SOCIETY BY UK AND INTERNATIONAL COMPANIES WITH REGARD TO MPI USE

Good Scrub Guide

Brand Commitments
December 2016

Parent Company	Brand Name	Website	Public position statement	Date Received
Africology	Africology	www.africology-uk.com	"At Africology, we are acutely aware of environmental issues impacting our planet today. We are always conscious of the natural world when formulating our products. We are mindful of the footprint microplastics have on our environment. They are cheap, easily available but once washed down the drain cause plastic particle water pollution. Most wastewater treatments do not filter out microbeads and they get discharged into waterways ultimately damaging gulfs, inland waterways and seas worldwide. As part of our environmental commitment we choose to use jojoba beads as opposed to plastic microbeads. Jojoba beads are a natural, biodegradable exfoliant. Their smooth, spherical shape ensures that they gently exfoliate without creating microscopic tears on the surface of the skin. Africology believes that great products can only go so far towards creating radiance but by respecting the individual, the planet and animals, we can create something truly special. Africology products have always and will always be free from all solid microplastic ingredients."	2-Sep-2016
Ali Mac Skincare Ltd	Ali Mac Skincare	www.alimacskincare.com	"Ali Mac Skincare Ltd. Evolved from truth and awareness in the power of Nature; Our Company's position with regard to microplastic ingredient use is that such ingredients are cruel and unnecessary; If nature didn't design it then you won't find it in our products; we are against cruelty to animals and conduct our business using the highest possible ethical standards. We live in this world and aim to protect it into the future for generations to come.... It's not for money that we exist we are in the business of true natural beauty, health and sustainability. Ali Mac Skincare Ltd produce a beautiful range of Natural and Organic Skincare whose product range ingredients are entirely free from all solid microplastic ingredients (including but not limited to polyethylene, polypropylene, polyethylene terephthalate, polymethyl methacrylate, polytetrafluoroethylene and nylon) I can Confirm that Ali Mac Skincare's entire product range was developed with an awareness, not always evident in the beauty and skincare arena and have Always been free from microplastic ingredients and will always be free from microplastics. We consider our environment and truly believe that maintaining the range as closely as possible to How Nature intended is better for us and our environment."	1-Jun-2015
ALL NATURAL SOAP Co.	ALL NATURAL SOAP Co.	www.allnaturalsoap.co.uk	"ALL NATURAL SOAP Co. always has been and always will be entirely opposed to the use of plastics and microplastics in its soap products. Our entire soap range is not only 100% plastic free; all our soaps and the exfoliating agents we use are also totally biodegradable. Examples of the scrubbing particles we use are poppy seeds, carrot powder, various seaweeds and flower petals. These are all entirely natural and not even 'nature-identical' like, for example, micas. We draw our ingrdients only from nature, and handmake soaps with varying degrees of texture (including smooth) to suit every skin type and exfoliating preference."	1-Jun-2015

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Parent Company	Brand Name	Website	Public position statement	Date Received
ARK Skincare	ARK Skincare	www.arkskincare.com	"ARK Skincare is proud that our facial exfoliators are free-from microplastic ingredients. We have made a commitment to always exclude microplastics from all new products. This includes our new Triple Effect Exfoliator, launching Summer 2015. We can confirm that the new product range launching in 2015 will be entirely free from microplastics."	29-May-2015
Asda	All own brands, including Asda, Skin System and exclusive tertiary products	www.asda.com	"We take our responsibility to the environment seriously, so much so we produced our own Climate Change report last year which looked at what businesses, including ourselves, should be focussing on when tackling environmental issues. As such we understand the importance of removing Microplastics from all of our own brand products and have been working hard to do so. Our commitment by the end of 2015 is that all new & existing products will be free from Microplastics."	28-Apr-2015
B-Line Health and Beauty	B-Line	www.b-linebeauty.com	"As a small independent British company B-Line is proud to be among the first to respond to the growing environmental concerns about the use of solid microplastic ingredients in the beauty industry. Having researched alternatives B-Line Body and Sole Exfoliant has therefore been re-formulated using natural bamboo powder to create an effective 'scrub' effect. Bamboo powder is our preferred alternative to microbeads, enabling us to maintain our high quality standards while helping support the Beat the Microbead campaign. It replaces our previous formulation from November 2015. We can confirm no other B-Line products have ever contained, or do contain, solid microplastic ingredients, nor will they be used in any future product development."	19-Oct-2016
Boots	All own brands, including Boots exclusive Beauty and Personal Care products	www.boots.com	"At Boots UK we are committed to bringing our customers great health and beauty brands that they can trust. All our products are subject to strict European safety regulations and our team of formulation experts carefully assess sustainability issues and test all Boots own brands and Boots exclusive products before they go on sale. While plastic microbeads are only used in a tiny proportion of our products we have been working with Cosmetic Europe to understand and address this industry wide issue. As a responsible company, and ahead of any regulatory changes, we stopped using plastic microbeads in the development of all new Boots own brands and Boots exclusive Beauty and Personal Care products in February 2014. In addition we are already reformulating our Boots own brands and Boots exclusive Beauty and Personal Care products by replacing all plastic microbeads, as defined below, with ingredients that do not have an adverse sustainability impact. Reformulation will be complete and manufacture ceased by the end of December 2015 at the latest, with the majority completed well in advance of this deadline. We are also carefully managing our stock to ensure that the vast majority of old-formulation products will be out of stores well before the end of December 2015. Notes: Plastic microbeads are designated as synthetic non-biodegradable solid plastic* particles >50µm and <5mm in size used to exfoliate or cleanse in rinse-off cosmetic products. *Plastic in this context is defined as synthetic material made from linking monomers through a chemical reaction to create an organic polymer chain that can be processed into various solid forms retaining their defined shapes during life cycle and after disposal."	28-May-2015

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Parent Company	Brand Name	Website	Public position statement	Date Received
Botanical Brands	All own brands, including Blend Collective, Botanicals, Lippy Girl, Living Nature, Natural Being, Pulpe de Vie and Songbird	www.botanicalbrands.com	"As a distributor of organic and natural skincare, Botanical Brands are committed to sourcing brands with the highest ethical standards and as such all our brands have always been free from microplastic ingredients and always will be free of microplastics. In particular, Living Nature and Botanicals who produce exfoliating scrubs and masks always opt for safe, natural ingredients which will not harm the skin or the environment. This is a no-compromise issue for us and we are proud to support this initiative."	28-May-2015
Bulldog Skincare For Men	Bulldog	www.meetthebulldog.com	"Bulldog Skincare For Men have never used microplastic ingredients in any of our products and we can confirm that the quality of our products do not suffer due to the absence of microplastics. Furthermore, many of our customers are reassured that they are not contributing to the growing problem of microplastic pollution by using our products."	24-Apr-2015
Clarins	Clarins	www.clarins.com	"As a leading cosmetic house, Clarins greatly values its image as being a leader in social responsibility and will continue to work tirelessly to offer the best products in terms of safety and efficacy for our customers, together with the sustainability for our planet and our environment. Last year, concerns were raised about the usage of plastic micro-beads in cosmetic products for their exfoliating properties. While they are completely inert, very effective and extremely well tolerated by the skin, in view of the known impact that plastic micro particles have on the environment, we ceased manufacturing any products within the Clarins range containing this ingredient in December 2014. We can confirm that Clarins research has found an alternative to substitute micro-beads with more respectful components. The new component is Cellulose, which is 100% natural, as well as being equally efficient, perfectly tolerated and maintaining our stringent quality and safety requirements" Clarins Laboratories	24-Jun-2015
Collinsworth	Elements Natural Skincare For Men	www.collinsworthltd.co.uk	"Elements Natural Skin Care for Men by Collinsworth fully supports the Good Scrub Guide initiative. I can confirm that all products produced by Collinsworth Ltd are free from solid microplastic ingredients. Collinsworth have never used microplastics in any products and I can guarentee that we will never use microplastics in any future formulations. Keep up the good work!" Gillian Whitworth - Co-Founder	21-May-2015

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Parent Company	Brand Name	Website	Public position statement	Date Received
The Co-operative	All own brands	www.co-operative.coop	2015 statement: "The Co-op do not have any own-brand products that contain microbeads. The Co-op's policy is not to use solid microplastics and only use natural or biodegradable alternatives." 2016 update: "We don't use microbeads in any of our products. We took this decision before 1998 making us the first retailer to do so. The detail is that we don't use solid microplastics in any products, and would only use naturally biodegradable materials, or alternatives that are demonstrably biodegradable in the marine environment. We also stopped sourcing branded products containing microbeads from September 2016. There may still be some branded stock on shelf in some stores for a while."	27-Apr-2015 & 23-Nov-2016
Derma e	Derma e	www.dermae.com	"One of derma e's primary concerns when choosing ingredients to formulate is how our choices affect the environment. We have never even considered using the controversial plastic microbeads in our formulas. We have always chosen to use natural exfoliants such as apricot seed powder, corn meal, walnut shell powder and; minerals, magnesium oxide and aluminum oxide. derma e whole heartedly supports the ban of these environmentally toxic beads. Our products do not contain and have never contained any type of plastic microbeads. Microbeads per the Micro Beads Water Act 2015 is defined as, "any solid plastic particle that is less than five millimeters in size and is intended to be used to exfoliate or cleanse the human body or any part thereof." Our products have never contained plastic microbeads ingredients or any kind of solid micro plastic including polyethylene (PE), Polypropylene (PP), polyethylene terephthalate (PET), poly methyl methacrylate (PMMA) and nylon. Therefore, our brand is 100% free of environmentally toxic micro plastics and beads." Dr. Linda Miles L. Ac., D.O.M., Owner and Chief Formulator, derma e® Natural skin care	10-Feb-2016
Faith in Nature	Faith in Nature	www.faithinnature.co.uk	"At Faith in Nature, we are committed to looking after the environment and therefore we do not use microplastic ingredients in any of our products, and have never done so. Based on our principles of using the best quality ingredients that nature has to offer, we use blackcurrant seeds as the exfoliant in our beautiful Faith in Nature Exfoliating Face & Body Polish."	14-Jun-2016
The Green People Company	Green People	www.greenpeople.co.uk	"Green People are happy to confirm that all of their products are free from solid plastic, and any new formulations will also be free from solid plastic."	16-Apr-2015

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Parent Company	Brand Name	Website	Public position statement	Date Received
Juniper Australia Pty Ltd	Juniper	www.juniperaustralia.com.au	"Juniper Australia Pty Ltd, has never used and will never use microplastic ingredients such as microbeads in any of our products. We are ethical and strong environmentalists about everything we do in business and have always felt that ingredients such as microplastic ingredients (including but not limited to polyethylene, polypropylene, polyethylene terephthalate, polymethyl methacrylate, polytetrafluoroethylene, nylon and solid co- and cross-polymers) have never been necessary in either skincare of cosmetics, but have been a cheap alternative to corporations more concerned about their profit than the planet. We stand by our strong commitment to the planet and publically make the statement that our products will always remain plastic free!" Signed on the 6 day of April 2016, Jayne Shepherd – Juniper Australia Pty Ltd	6-Apr-2016
Marks & Spencer	All own brands, including Formula and Pure	www.marksandspencer.com	"M&S has committed to removing plastic microbeads from M&S own brand personal care products. All existing and new products and formulations manufactured from 2016 onwards will be free from plastic microbeads."	13-Mar-2015
Morrisons	All own brands	www.morrisons.com	"We are aware of the growing concerns over the environmental impact of plastic micro-beads. None of our Own Brand health and beauty products contain these microplastics and our Chemicals Policy prohibits their use. During our Own Brand development process we will always look to use alternative naturally sourced exfoliants that are available and approved for use within the cosmetic and toiletry industry." Paul Broadhead - Technical Manager	6-May-2015
Neal's Yard Remedies	Neal's Yard Remedies	www.nealsyardremedies.com	"Neal's Yard Remedies is a proud supporter of the Good Scrub Guide and the Beat the MicroBead campaign. As a leading ethical and organic retailer, Neal's Yard Remedies pride ourselves on using ingredients with honesty, integrity and transparency. We firmly believe that microplastic ingredients do not belong on our faces and do not belong in our oceans. For this reason, Neal's Yard Remedies has never - and will never - use plastic ingredients in any of its products and would strongly encourage all companies to end this unsustainable practice. "	1-Jul-2014
Pai Skincare	Pai	www.paiskincare.com	"At Pai, we're committed to making the most ethical and sustainable choices wherever possible. None of our products ever have, or will, contain solid microplastic ingredients."	21-Sep-2015
E. T. Browne Drug Company	Palmer's	www.uk.palmers.com	"We are proud of our plastic free scrubs for face and body and I confirm that the entire product range of Palmer's is free from all solid microplastic ingredients. Palmer's have never used and will never use microplastics in any of our products. I think that the Good Scrub Guide is a great initiative. It is important to let our customers know that our scrubs are not only kind to skin but also kind to our environment." Zahira Beddou	2-Jun-2015

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Parent Company	Brand Name	Website	Public position statement	Date Received
PHB Ethical Beauty	PHB Ethical Beauty	www.phbethicalbeauty.co.uk	"PHB Ethical Beauty has never and will never use microplastic ingredients in any of its products. We confirm that our entire product range is free from all solid microplastic ingredients (including but not limited to polyethylene, polypropylene, polyethylene terephthalate, polymethyl methacrylate, polytetrafluoroethylene and nylon). We confirm that all our products have always been free from microplastic ingredients and will always be free from microplastics." Rose Brown - CEO PHB Ethical Beauty	27-May-2015
PZ Cussons	All own Beauty and Personal Care brands, including: • Charles Worthington • Fudge • Fudge Urban • Sanctuary Spa • St. Tropez • Carex • Cussons Baby • Imperial Leather • Luksja • Mum & Me • Original Source • Premier • Robb	www.pzcussons.com	"In recent years, PZ Cussons has shared the growing concern around the use of plastic microplastic beads in personal care and cosmetic products because of their potential to pollute our oceans and harm precious marine life. As a business, we strive to conduct our operations with integrity and in a way that does not impact negatively on the environment. We believed that other companies' target of 2017 was too long to wait and instead, prompt action was needed to remove or replace this ingredient with natural alternatives in all PZ Cussons products globally. We worked quickly and with determination to reformulate those products which did contain microplastic beads and, despite it often being a lengthy process to properly validate safe alternatives, we are proud to have managed this ahead of our target deadline of mid-2015. This achievement extends to all plastic ingredients (including but not limited to polyethylene, polypropylene, polyethyl terephthalate, polytetrafluorethylene, polymethyl methacrylate and nylon) across all PZ Cussons brands and product lines. Natural alternatives to microplastic beads include nut kernels such as those obtained from almonds and walnuts, as well as a special grade of silica which is very fine sand with a mild polishing action. For most of our products with exfoliating properties, for example the Original Source body scrubs, we have already been using natural alternatives such as almond shell. All of the brands in the PZ Cussons portfolio including Sanctuary Spa and St.Tropez have been part of this replacement work and have had natural alternatives approved for some time and new reformulated variants are already available. It is important to note that there will still be some older products containing microplastic beads in the supply chain and these are identifiable by checking the labelling back of pack. But to confirm we no longer use microplastic beads in any PZ Cussons products globally."	29-May-2015

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Parent Company	Brand Name	Website	Public position statement	Date Received
Repcillin	Repcillin	www.repcillinpure.co.uk	“Here at Repcillin, we are obliged to produce products that are not only attractive and functional, but sustainable products with the smallest possible ecological footprint which, as a result, will make the world just that little bit healthier. Repcillin brand is proud of the fact of not using microplastic ingredients in any of our skincare products and can guarantee that we will never use microplastics in any future formulations. We aren’t perfect, but we do love the earth, and try to make our environmental footprint as small as we can.”	16-Dec-2015
Sainsbury's	All own brands	www.sainsburys.co.uk	“We take our responsibilities to protect the environment very seriously which is why we led the way by stopping the production of Sainsbury’s personal care products containing micro-plastics in 2013. Following this, we expect any of our products containing micro-plastics to be sold through within the next year.”	15-Apr-2015
Sodashi	Sodashi	www.sodashi.com	"Sodashi maintains a focus on sustainable, environmentally-minded practice in every aspect of our business. We believe wholeheartedly in the damage done to the environment and natural ecosystems by the manufacture and use of microplastic ingredients. Sodashi does not condone the use of microplastics in personal care products of any sort: we never have, and never will, use microplastic ingredients in any of our products."	14-Apr-2015
Sukin Organics Pty. Ltd.	Sukin - Australian Natural Skincare	www.sukinorganics.com	"There's no grey area in regards to a commitment to sustainable skincare, and certainly no blurred lines when it comes to our ingredients. Our face and body scrubs are free from damaging plastic beads and instead are replaced with natural, bio degradable resources such as nut shells, bamboo and jojoba ester beads to form gentle exfoliation for our skin and for the earth."	2-Jun-2015
Superdrug	All own brands, including Superdrug, Superdrug Extracts and B.	www.superdrug.com	"Superdrug takes its position as a responsible retailer seriously and in 2014 launched a new policy that no new Own Brand products should include microplastics. In addition we have committed to reformulate all Own Brand exfoliators, the only products to include microplastics, to remove them. This work is in progress and will be complete by the end of 2016."	21-Apr-2015
Tesco	All own brands, including Tesco, Tesco Kids, Along Came Betty, My Skin and Pro Formula	www.tesco.com	“Tesco is committed to removing all plastic microbeads from across our own-brand project range by 2017. Any new formulations or new products we launch from 2016 onwards will be free from plastic microbeads.”	10-Mar-2015

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Parent Company	Brand Name	Website	Public position statement	Date Received
Trilogy	Trilogy	www.trilogyproducts.com	"For Trilogy, sustainability is a journey that began when we began and continues on into the future. Our brand is built on foundations of ethical, environmental and social responsibility and holds NATRUE Natural Cosmetics Certification. Our entire range of natural skincare products has always been and will always continue to be free of plastic microbeads. There are effective natural and biodegradable alternatives available, which are so much kinder to our skin and our world. Wouldn't you prefer using jojoba wax spheres instead of petrochemicals to exfoliate your skin? We've been a supporter and proud participant of The Good Scrub Guide from the outset and we're delighted to see such an important initiative gaining profile and momentum for change. Here in New Zealand, our beaches, coastlines and oceans are ingrained in our culture and we're passionate about keeping them clean and healthy."	4-Jun-2015
Waitrose	All own brands	www.waitrose.com	"Waitrose is happy to confirm that all its own brand products in all its range are free from solid plastic, and any new formulations will also be free from solid plastic."	10-Apr-2015
Westlab	Westlab	www.westlabsalts.co.uk	"As a natural product Westlab uses high-grade premium mineral salt as a highly effective cleansing and exfoliating ingredient. Westlab products contain no synthetic additives nor micro plastic particles so its consumers can be reassured they will not be contributing to the worldwide issue of microplastic pollution when using their products. Westlab have always been microplastic-free and will remain to be so in the future."	8-Jun-2016
Wilko Retail Ltd	All Own Label Health & Beauty brands	www.wilko.com	"Here at Wilko, we take our pledge to be a Responsible Business seriously. As part of this responsibility, we do our very best to source ingredients for our Own Label products that don't harm people or the environment. And it's why we've made the decision to remove all solid microplastic ingredients from our Own Label Health & Beauty products. We're working hard to re-formulate all of our current range. By the end of 2015, we're pleased to tell you that we'll have removed the plastic ingredients from most of these products and replaced them with lovely, natural alternatives. But our work doesn't stop there, and by 2017, all of the Health & Beauty products you'll find in our stores and online won't contain any plastic ingredients at all. We're a business that's passionate about our products and we'll continue to make sure that any new Health & Beauty products we share with you are also free from microplastic ingredients."	2-Jun-2015

	Applicable to legislation as well as corporate commitments?	Detailed rationale:	Reference(s) for rationale details:
1. Restriction of all microplastic ingredients	✓	MPIs are manufactured for use as exfoliants in cleansing and scrubbing products	• Leslie 2014 Review of Microplasitcs in Cosmetics report[1] • UNEP 2015 Plastic in Cosmetics report[2] • Evidence from laboratory tests of cleansing or scrubbing products[3,4,5] • DuPont's polyethylene particles[6] • Honeywell's polyethylene particles[7] • Omya's polyethylene particles[8] • Prospector ingredient database listing for polypropylene[9] • MatWeb ingredient database listing for nylon[10]
		MPIs are manufactured for other uses in non-cleansing and scrubbing products	• Leslie 2014 Review of Microplasitcs in Cosmetics report[1] • UNEP 2015 Plastic in Cosmetics report[2] • Ooms et al. 2015 test[11] • CIR safety data sheet for polyethylene terephthalate (PET)[12] • Lush USA blog[13] • MicroPowders data sheet for polytetrafluoroethylene (PTFE)[14] • Prospector ingredient database listing for polymethyl methacrylate (PMMA)[15] • CIR safety data sheet for nylon[16]
		When used to exfoliate, MPIs are often (but not always) made from the polymer polyethylene (in solid form) and referred to as "microbeads"	• DuPont's polyethylene particles[6] • Honeywell's polyethylene particles[7] • Omya's polyethylene particles[8]
		Polypropylene is manufactured as an exfoliant (in solid form)	• Prospector ingredient database listing for polypropylene[9]
		Polyethylene and polypropylene are used in solid form in industrial hand cleaning products	• Selden industrial hand cleaner with polyethylene beads[17] • Power maxed industrial hand cleaner with polypropylene beads[18]
		Polyethylene terephthalate (PET) is manufactured (in solid form) as an exfoliant, a bulking agent, a hair fixative, a viscosity increasing agent and a glitter	• CIR safety data sheet for PET[12] • Lush USA blog[13]
		Polymethyl methyl acrylate (PMMA) is manufactured (in solid form) to increase smoothness, fluidity and lubricity	• Prospector ingredient database listing for PMMA[15]
		Nylon is manufactured (in solid form) as a bulking and opacifying agent	• CIR safety data sheet for nylon[16]
		Polytetrafluoroethylene (PTFE) is manufactured (in solid form) to aid in dispersibility, lubricity and feel	• MicroPowders data sheet for PTFE[14]
		Many other synthetic polymers, cross-polymers and co-polymers can be manufactured to be solid in form (i.e. a plastic) and used in products	• Leslie 2014 Review of Microplastics in Cosmetics report[1] • UNEP 2015 Plastic in Cosmetics report[2] • Ooms et al. 2015 test[3]
		Many existing corporate "microbead phase-out" commitments specify that they will only remove one or more named polymer, rather than all MPIs	• Greenpeace East Asia 2016 report[19]
		Many existing corporate "microbead phase-out" commitments specify that they will only remove MPIs with a specific function, rather than all MPIs	• Greenpeace East Asia 2016 report[19]
		The European "voluntary phase-out" recommendation by trade body Cosmetics Europe only encourages removal of MPIs with a specific function	• Cosmetics Europe 2015 voluntary phase-out recommendation[20]
		The US Microbeads ban only restricts the use of MPIs with a specific function	• US Microbead-Free Waters Act[21]

2. Application to all 'down the drain' products'	✓	MPIs are included in products that are used on users' skin and direct users to dispose of the product in whole or in part to drains after use	• *Appendix 2 of this report*
		MPIs are included in products that are used on users' skin and are intended by manufacturers to be removed to non-drain waste (bins)	• *Appendix 2 of this report*
		Products that manufacturers intend to be removed to non-drain waste are emitted in whole or in part to drains after use, through user behaviour/choice	• US survey of consumer behaviour[22]
		MPIs are used in products that are used on surfaces that are then emitted in whole or in part to drains after use	• *Appendix 2 of this report*
		MPIs are used in products that are used in washing machines that are then emitted in whole or in part to drains after use	• *Appendix 2 of this report*
		Many existing corporate "microbead phase-out" commitments specify that they will only remove MPIs from specific categories of product ("rinse-off")	• Greenpeace East Asia 2016 report[19]
		The US Microbeads ban only restricts the use of MPIs in a specific category of product ("rinse-off")	• US Microbead-Free Waters Act[21]
3. No exemption for non-marine-tested synthetic solid ingredients	✓	MPIs have been replaced by some companies with alternatives that are non-organic (synthetic)	• Greenpeace East Asia 2016 report[19]
		Synthetic alternatives to plastic ingredients can be labelled as "biodegradable", but it is not known whether they are biodegradable in conditions relevant to the marine environment	• UNEP 2015 Biodegradable Plastic and Marine Litter report[23]
		The only known standard assessing marine environmental biodegradability of plastics (ASTM D7081-05) has been deprecated	• ASTM Website[24]
		One company has publically acknowledged using a plastic ingredient with supposed "biodegradable" properties in its reformulation process; this replacement is known to not be fully marine biodegradable	• Company phase-out report[25]
4. No exemption for plastic ingredients below a certain size	✓	MPIs ranging from 0.0003mm up to 0.5mm in size have been found in products	• Dow Chemical sunspheres data sheet[26] • Napper et al. 2015 study[27] • Tanaka & Takada 2016 study[28]
		Some corporate commitments have specified a lower size limit for the MPIs they will remove	• Greenpeace East Asia 2016 report[19]
		The European cosmetic trade body Cosmetics Europe had previously considered only MPIs above 0.001mm to be "microbeads"	• Eunomia 2016 report[29]
5. Implementation within an ambitious timeframe	✓	Many corporate "microbead phase out" commitments do not set an implementation date	• Greenpeace East Asia 2016 report[19]
		The European "voluntary phase-out" recommendation by trade body Cosmetics Europe only requires compliance within five years of being issued	• Cosmetics Europe 2015 voluntary phase-out recommendation[20]
		The US Microbeads ban requires compliance within two years	• US Microbead-Free Waters Act[21]
6. Applies to all brands in a company's portfolio	X	Some corporate commitments are different between and within their brand portfolio	• FFI correspondence[30]
7. Applies to all future formulations of products	X	Some completed corporate commitments have resulted in reformulating products with synthetic ingredients that perform in the marine environment comparably to plastic	• Company phase-out report[25]

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[30] Private correspondence between FFI and several multinational brands has demonstrated confusion as to whether a parent company's microplastic ingredient policy applies to its entire portfolio and whether a subsidiary company's microplastic ingredient policy also applies to the parent company. Additional confusion has arisen where the policies issued by a parent company and one or more of its subsidiaries appear to be misaligned or inconsistent with one another.