



Open Public Consultation Summary Report

Supporting project “Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products.”

Simon Hann
Liza Papadopoulou
Mathilde Braddock

24/11/2017

Contents

1.0 Introduction	3
2.0 Summary of results	5
2.1 General Conclusions	5
2.2 Summary of Results for the Sources of Microplastic Emissions	6
2.2.1 Road Tyres	6
2.2.2 Pre-production Plastic Pellets.....	6
2.2.3 Clothing and Textiles	7
2.2.4 Artificial Sports Turf.....	7
3.0 Results from the Consultation	8
3.1 Information about the respondents	8
3.2 Gauging Awareness and Concern for Microplastic Pollution.....	9
3.2.1 Summary of Other Sources of Microplastic Emissions	10
3.3 Reducing Microplastics Pollution	11
3.3.1 Road Tyres	11
3.3.2 Pre-production Plastic Pellets, Powders and Flakes	14
3.3.3 Clothing and Textiles	17
3.3.4 Artificial Sports Turf.....	20
3.4 Intentionally added microplastics	23
4.0 Written Responses	25
4.1 Summary of responses	25
4.2 Major sources of microplastics	26
4.3 Key data provided and data gaps.....	27
4.3.1 Data provided.....	27
4.3.2 Data gaps and research needs	32
4.4 Suggested approaches and measures for addressing microplastics	33
4.4.1 Additional research	34
4.4.2 Providing clarity in relevant definitions.....	34
4.4.3 Emphasis on measures aimed to control pollution at the source	35
4.4.4 Measures should be proportionate and source-specific	36

4.4.5	<i>Investing in R&D and encouraging innovation across sectors</i>	36
4.4.6	<i>Multi-level governance and stakeholder involvement in discussions on potential measures</i>	36
4.4.7	<i>Legislative / regulatory measures</i>	37
4.4.8	<i>Consumer choice measures</i>	38
4.5	<i>Voluntary initiatives</i>	39

1.0 Introduction

This report summarises the results of an open public consultation (OPC) developed by Eunomia Research & consulting on behalf and hosted by the European Commission. The main objective of the OPC was to support the project 'Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products' under Framework Contract No ENV.C.2/FRA/2016/0017.

The consultation ran from 26th June 2017 to 16th October 2017 and the total number of respondents was 487.

The following text was provided as an introduction for the respondents-

Marine litter, much of which is plastic, is found in marine and coastal habitats throughout the world, washed ashore, floating or accumulating on the seafloor. Significant surface accumulation zones occur in subtropical oceanic zones (gyres) and are sometimes also referred to as a "plastic soup" of waste. Recent research identifies the Mediterranean as an accumulation zone with a plastic particle distribution and density largely equivalent to that found in the oceanic gyres.

Microplastics are of particular concern.

The definition of a microplastic that should be used as the basis for all responses in this consultation is;

- Synthetic polymer-based materials including thermosets (resins) and elastomers (rubbers),
 - including petro-based and bio-based analogues (e.g. bio-PE from sugar);
 - including bio-based, bio-degradable polymers (e.g. PLA, PHA, PCL);
- Not liquid or gas at ambient temperature (in the environment);
- Sized below 5 mm in all directions (lower size limit of PM10); and,
- May contain non-polymeric additives, oils or fillers. The mass of these inherent ingredients is included in the overall mass of the microplastic.

The small size of microplastics and their material characteristics facilitate adsorption of toxic substances from the natural environment and increase their potential bioavailability to organisms throughout the food-chain. Their impacts can therefore be disproportionately high relative to the overall tonnage. They are used either intentionally in products (such as exfoliating components in cosmetics, in detergents, or as industrial blasting abrasives) or generated during the life cycle of products (for example during production of plastic products, through tyre wear or the washing of clothes). Microplastics can be partially treated in some waste water treatment plants or dispersed by the wind or via waste water effluents, rain drainage systems and/or rivers to reach the coastal and marine environment.

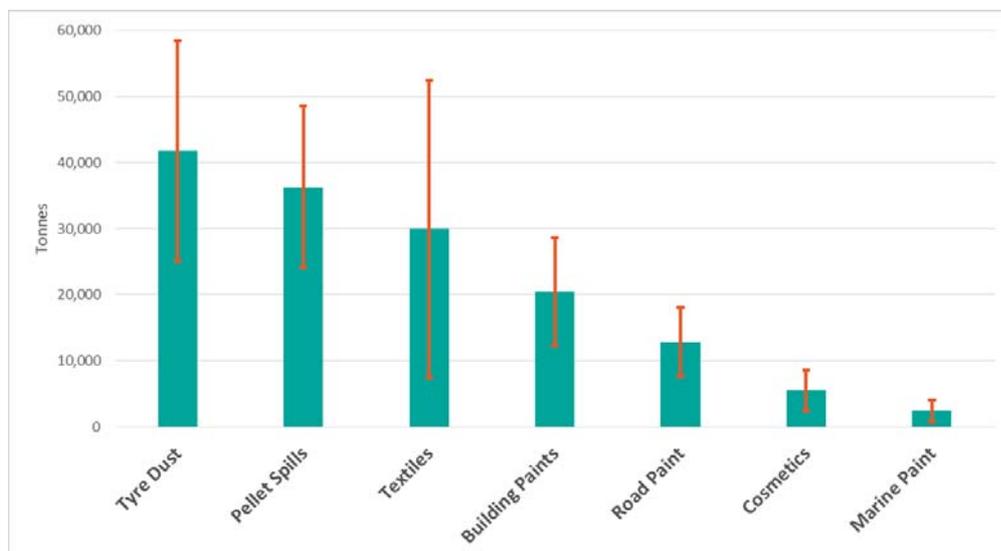
This internet-based consultation is part of the European Commission's efforts to understand the citizens' and stakeholders' views on the need for and possible range of

measures which could be undertaken in order to reduce microplastics entering the marine environment under the basis of the precautionary principal.

According to the Precautionary Principal¹;

“The Community has consistently endeavoured to achieve a high level of protection, among others in environment and human, animal or plant health. In most cases, measures making it possible to achieve this high level of protection can be determined on a satisfactory scientific basis. However, when there are reasonable grounds for concern that potential hazards may affect the environment or human, animal or plant health, and when at the same time the available data preclude a detailed risk evaluation, the precautionary principle has been politically accepted as a risk management strategy in several fields.”

Some of the main sources of microplastics were identified in a previous Commission study (see below graph). As part of the study that this consultation is supporting these sources and estimates are being investigated and fine-tuned.



The objectives of the consultation were:

- to inform and enable feedback, giving the possibility to a broad range of stakeholders to provide views, feedback and perceptions on the concern around microplastics emissions and possible options for reduction; and

¹ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52000DC0001>

- to gather information and data that cannot be found through desk research and additional sources of evidence as regards to the sources and policy options for the reduction of microplastics emissions.

2.0 Summary of results

2.1 General Conclusions

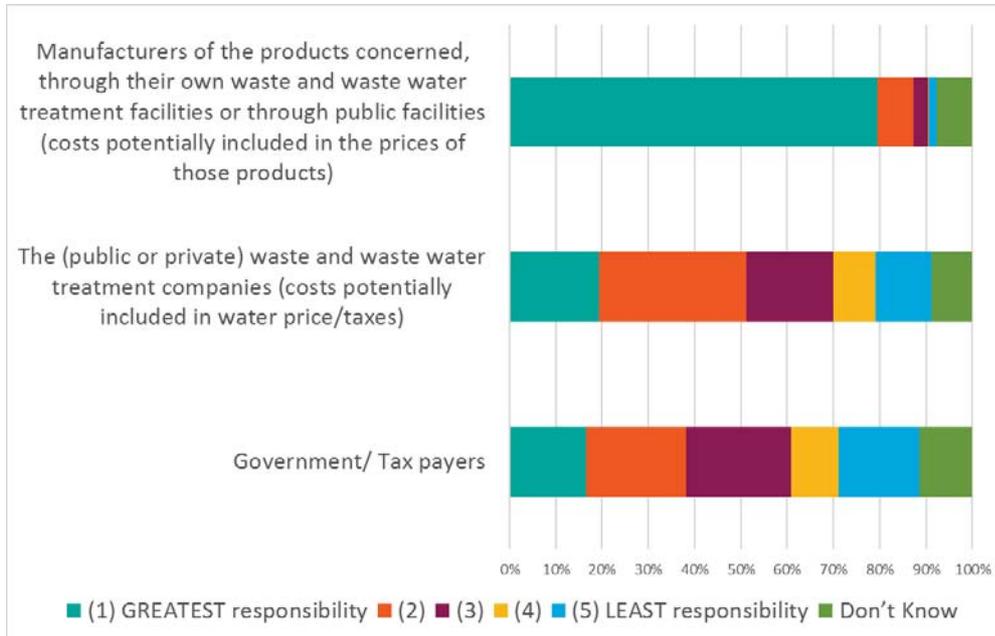
Overall, just under two third of the responses came from interested individuals/citizens, and over one third came from stakeholders/experts. The results described in the sections below are based on answers from all respondents. The results were also analysed using the separate data from individuals and stakeholders in order to establish whether there were differing views between the two groups. No strong differences were noted, so in the interest of succinctness, only the overall results are shown in the figures in the following sections.

There are, however, some general observations around some of differences between individuals' and stakeholders' responses;

- Stakeholders showed a greater level of awareness of the possible sources of microplastics than individuals.
- Stakeholders were also more likely to respond "Don't Know" to questions, showing a greater level of caution for expressing their opinion on matters they were not experts in.
- Individuals showed a higher level of environmental concern than stakeholders and were more likely to response "Very effective" to the proposed measures, which, again reflects the higher level of caution exhibited by stakeholders.
- The top three microplastic sources which were of most environmental concern to individuals were clothing/textiles, cleaning products and cosmetics, whereas those of most concern to stakeholders were clothing and textiles, road tyres and pre-production pellets.
- The sources of least environmental concern for individuals were building paints, road paint and artificial sports turf, whereas for stakeholders, there were agricultural mulch films, industrial abrasives and artificial sports turf.

There was a consensus between individuals and stakeholders that the manufacturers of products concerned should bear the financial responsibility for reducing microplastics emissions to the marine environment, followed by the (public or private) waste and waste water treatment companies (costs potentially included in water price/taxes) and finally governments and tax payers (see Figure 2-1).

Figure 2-1: Attributing financial responsibility for reducing microplastics emissions to the marine environment



2.2 Summary of Results for the Sources of Microplastic Emissions

2.2.1 Road Tyres

The measure that was thought to be the most effective to **reduce the wear rate of tyres** was legislation requiring producers to increase the durability of their tyres (including phasing out the least durable tyres over time).

The measure that was thought to be the most effective to **increase the capture of tyre particles** was the development and installation of technologies that are proven to capture microplastics in a municipal waste water treatment plant and prevent them from entering effluents (and subsequently surface waters).

The weight of responsibility for reducing tyre microplastic emissions was primarily attributed to the tyre industry.

2.2.2 Pre-production Plastic Pellets

The measure that was thought to be the most effective to **prevent supply chain loss through implementation of industry recognised best practice** was legislation at the EU

level requiring all companies placing plastics on the EU market to demonstrate that their supply chain adheres to best practice as outlined in Operation Clean Sweep guidance.

The measure that was thought to be the most effective to **increase the capture of plastic pellets** was to mandate the installation of technologies that are proven to capture microplastics on manufacturing locations or sites handling pellets.

The weight of responsibility for reducing pre-production plastic pellets emissions was primarily attributed plastic pellets producers and plastic pellet converters.

2.2.3 Clothing and Textiles

The measure that was thought to be the most effective to **reduce the propensity of synthetic textiles to be shed from clothing** was the development of a mandatory requirement for the progressive reduction of microfiber release that must be adopted by manufacturers of clothing sold in the EU.

The measure that was thought to be the most effective to **increase the capture synthetic textiles shed from clothing** was the development and installation of technologies that are proven to capture microfibres in a municipal waste water treatment plant and prevent them from entering effluents (and subsequently surface waters).

The weight of responsibility for reducing synthetic fibre emissions was primarily attributed to textiles/fibres manufacturers and clothing manufacturers.

2.2.4 Artificial Sports Turf

The measure that was thought to be the most effective to **bring changes to handling and management of infill** was to mandate the installation of technologies that are proven to capture microplastics on sports turf sites e.g. drain traps or onsite waste water treatment.

The measure that was thought to be the most effective to **bring changes to the nature of the infill** was a ban on the use of polymer based infill as an infill material for artificial sports turf.

The weight of responsibility for reducing emissions from artificial sports turf was primarily attributed to the artificial turf manufacturers and installers.

The detailed results from each question of the consultation are presented in the following sections.

3.0 Results from the Consultation

3.1 Information about the respondents

Figure 3-1: Responses to the consultation

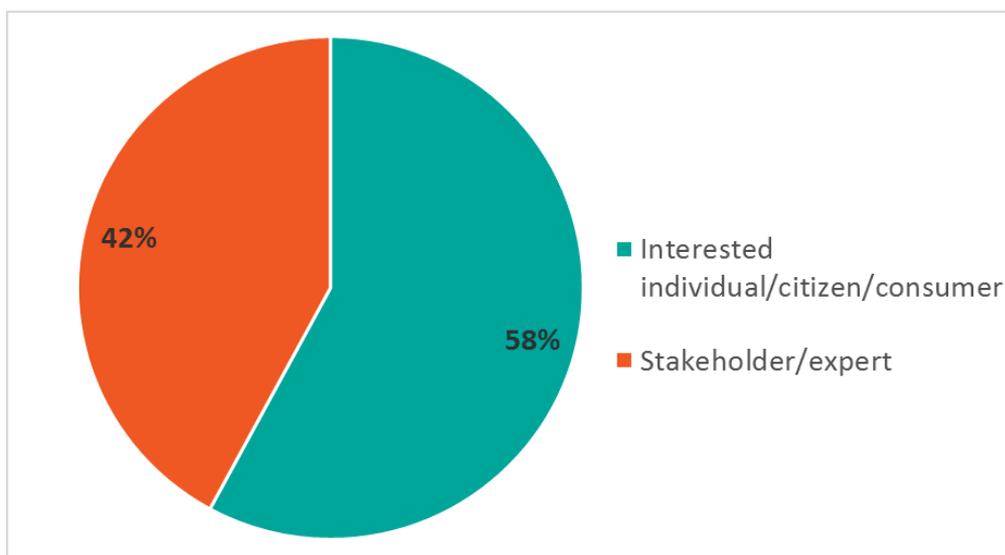
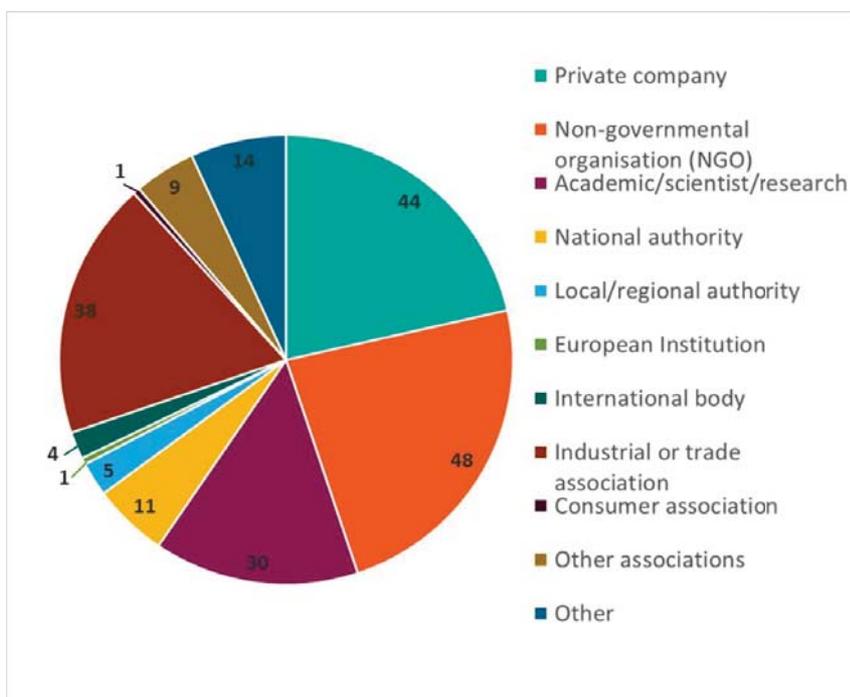


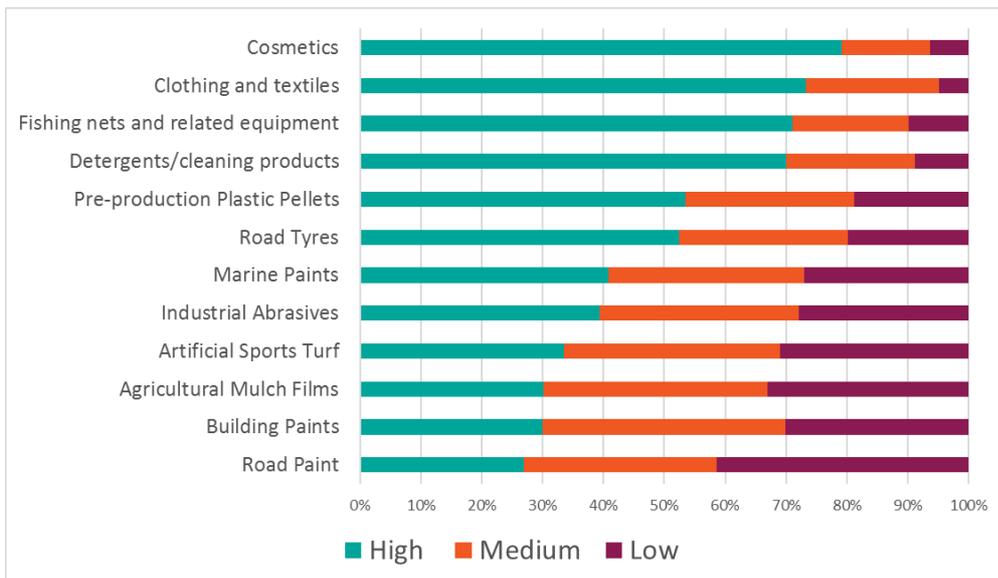
Figure 3-2: Number of respondents by sector (stakeholders/experts)



3.2 Gauging Awareness and Concern for Microplastic Pollution

2.1 On a scale of (1) HIGH awareness to (3) NO awareness, what was your awareness level of the following possible sources of microplastic emissions to the environment before starting this survey?

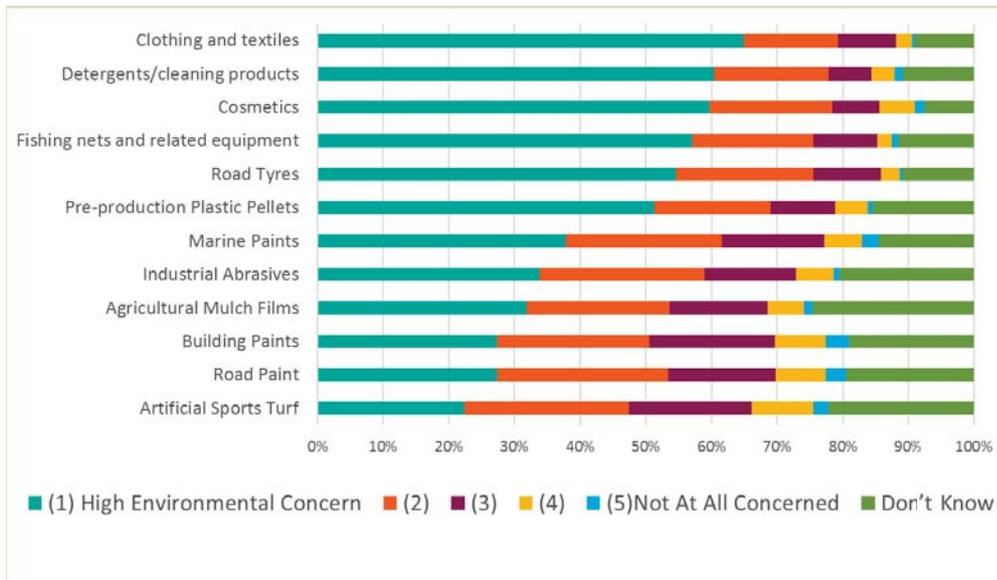
Figure 3-3: Awareness levels of possible sources of microplastic emissions



2.2 On a scale of (1) MOST concern to (5) LEAST concern, which sources of microplastics

emission sources are of most ENVIRONMENTAL concern to you?

Figure 3-4: Level of environmental concern from different sources of microplastic emissions



3.2.1 Summary of Other Sources of Microplastic Emissions

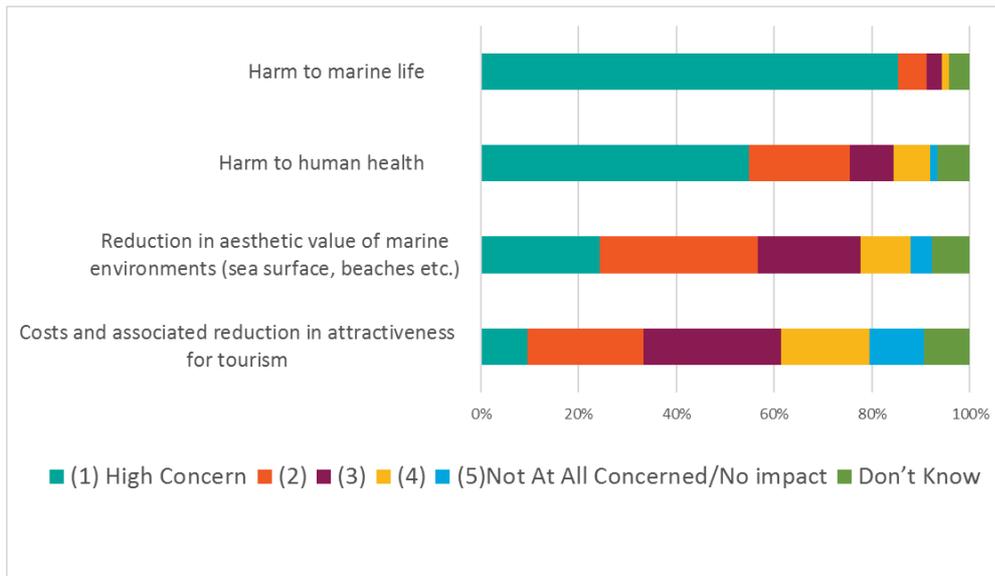
2.3 Are there any other sources of microplastics emissions to the environment, not already listed above about which you are particularly concerned?

A number of other sources of microplastic emissions to the environment were mentioned by respondents. A number of respondents cited the formation of microplastics from the breakdown of larger items such as plastic bottles and bags. As these are not in scope for the consultation these are not reported in this summary report. The items/products mentioned by respondents fall under the following categories:

- Rubber covering of playgrounds;
- Carpets (if not included in textiles sections);
- Tea and coffee filter paper;
- Dust emissions from plastic recycling and processing;
- Bio-beads used in waste-water treatment plants;
- Brake-pads; and,
- Shoe soles.

2.4 On a scale of (1) MOST concern to (5) LEAST concern, which are the potential impacts of microplastic emissions that are of most concern to you?

Figure 3-5: Level of concern over potential impacts of microplastic emissions



3.3 Reducing Microplastics Pollution

For each of the four sources of microplastics listed below, respondents were presented with approaches to reduce emissions to the marine environment and were asked to give their opinion on their effectiveness. They were also asked to give an indication of who carries the greatest responsibility for reducing the emissions from each source.

The results shown in the figures below represent the answers from **all respondents**. A breakdown of the answers by stakeholders and individuals was also compiled, but no particularly strong differences were noted, so in the interest of succinctness, those results are not shown here.

3.3.1 Road Tyres

3.3.1.1 Proposed Measures

3.1 a. **Road Tyres** – Please express your opinion on whether you believe that the

following possible approaches to reduce road tyre microplastic emissions to the marine environment would be effective. If you do not have a firm view or understanding of the particular measure select 'don't know'.

Respondents were asked to give their opinion on a number of measures to address emissions from road tyres, grouped into two separate categories:

- Measures to reduce the wear rate of tyres (see Figure 3-6); and,
- Measures to increase the capture of tyre particles (see Figure 3-7).

Figure 3-6: Effectiveness of measures to reduce the wear rate of tyres

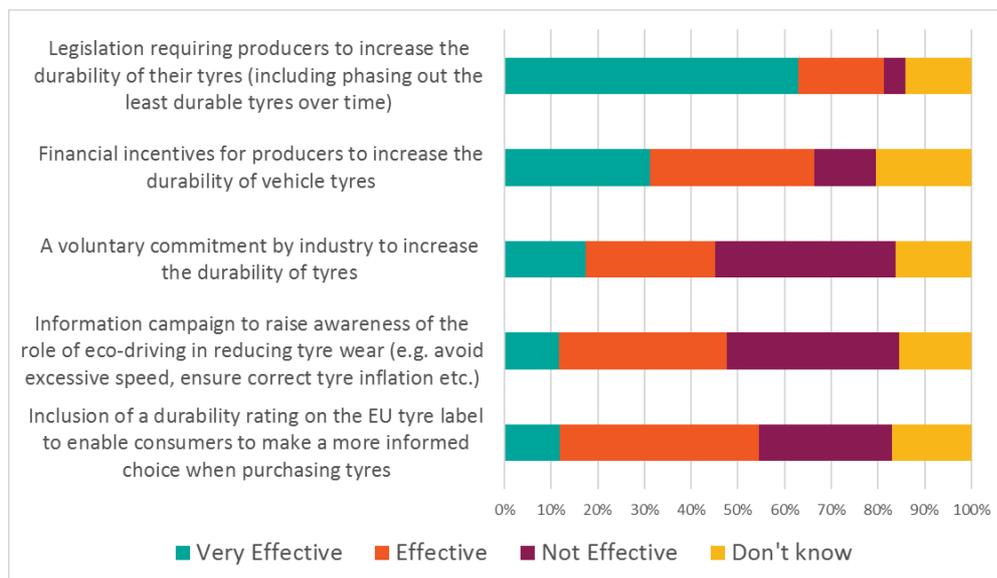
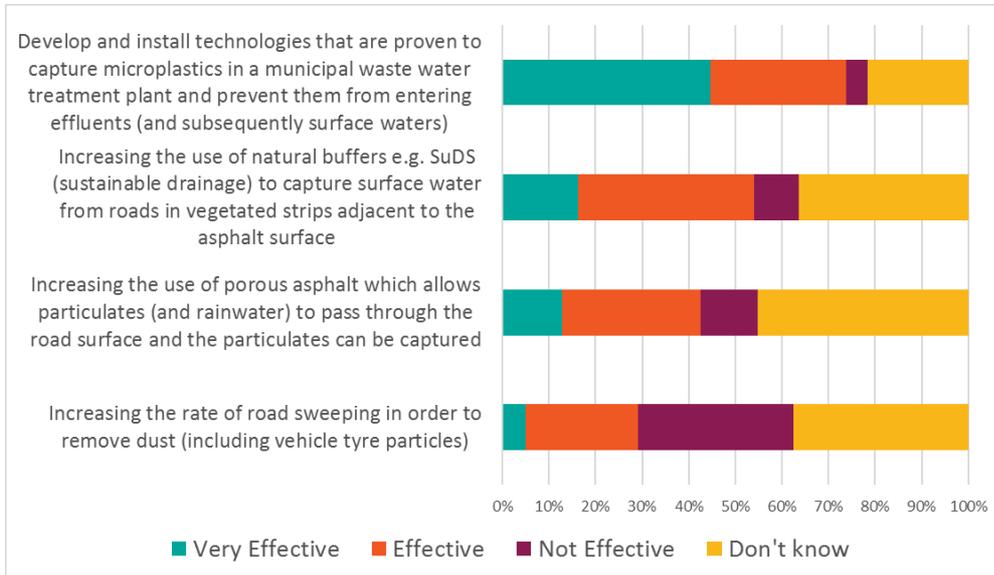


Figure 3-7: Effectiveness of measures to increase the capture of tyre particles



3.3.1.2 Respondent Suggestions of Other Measures

3.1 b Are there any other approaches to reducing tyre microplastics emissions to the marine environment that you believe would be effective?

A number of other approaches to reduce microplastic emissions from tyres to the marine environment were suggested by respondents. These fell principally under the following categories:

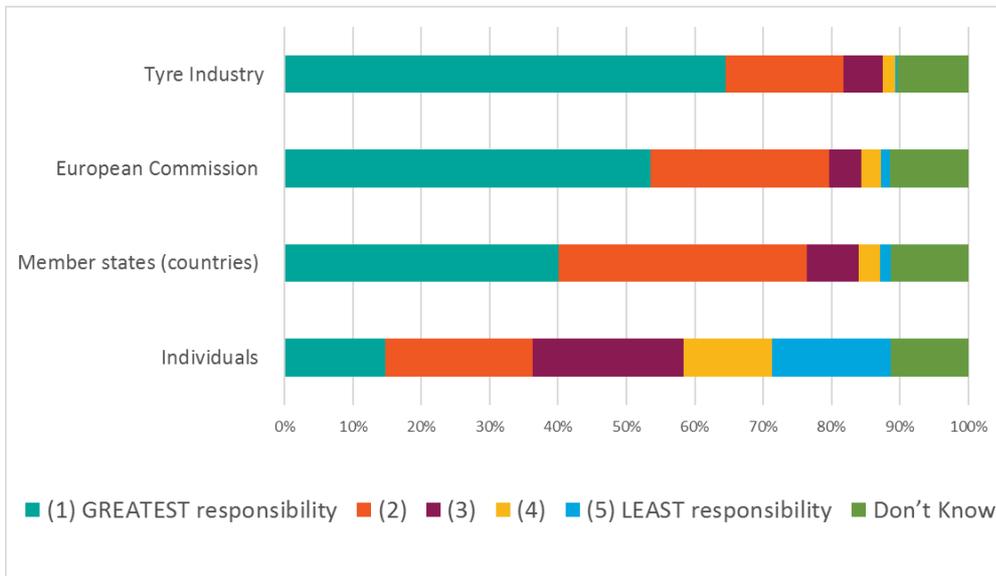
- Incentivising alternative options to road travel (e.g. improving public transport through legislative and financial measures, road tax, carbon tax on fossil fuels, policies on teleworking to discourage commuting, rail alternatives to truck commercial transport);
- Investing in research to develop more sustainable tyre materials and tyre design;
- Extended producer responsibility for tyre manufacturers with eco-modulated fees;
- Prioritise asphalt over concrete surface roads; and,
- Raise awareness on impact of use of winter tyres during summer months, tyre pressure (improve tyre pressure monitoring systems and facilities to pump tyres).

3.3.1.3 Attributing Responsibility

3.1 c On a scale of (1) GREATEST responsibility (5) LEAST responsibility, who do you think

should take action for reducing tyre microplastics emissions to the marine environment?

Figure 3-8: Attributing responsibility for taking action for reducing tyre microplastic emissions



3.3.2 Pre-production Plastic Pellets, Powders and Flakes

3.3.2.1 Proposed Measures

3.2 a **Pre-production Plastic Pellets, Powders and Flakes** - Please express your opinion on whether you believe that the following possible approaches to reduce pre-production plastic pellets emissions to the marine environment would be effective. If you do not have a firm view or understanding of the particular measure select 'don't know'.

Respondents were asked to give their opinion on a number of measures to address emissions from pre-production plastics, grouped into two separate categories:

- Preventing supply chain loss through implementation of industry recognised best practice (see Figure 3-9Figure 3-6); and,
- Measures to increase the capture of plastic pellets (see Figure 3-10).

Figure 3-9: Effectiveness of measures to prevent supply chain loss through implementation of industry recognised best practice

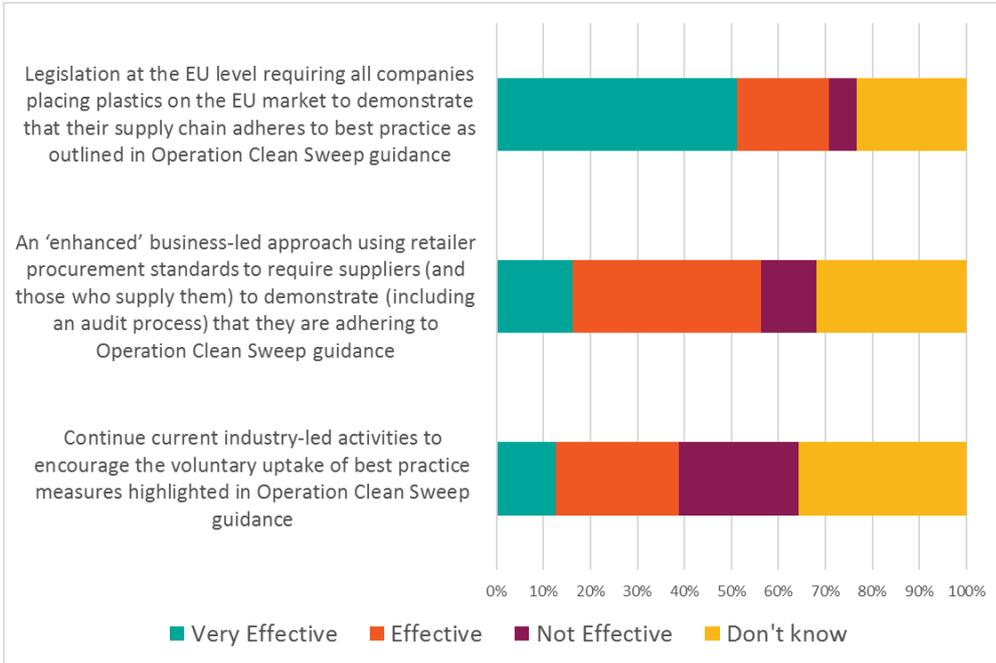
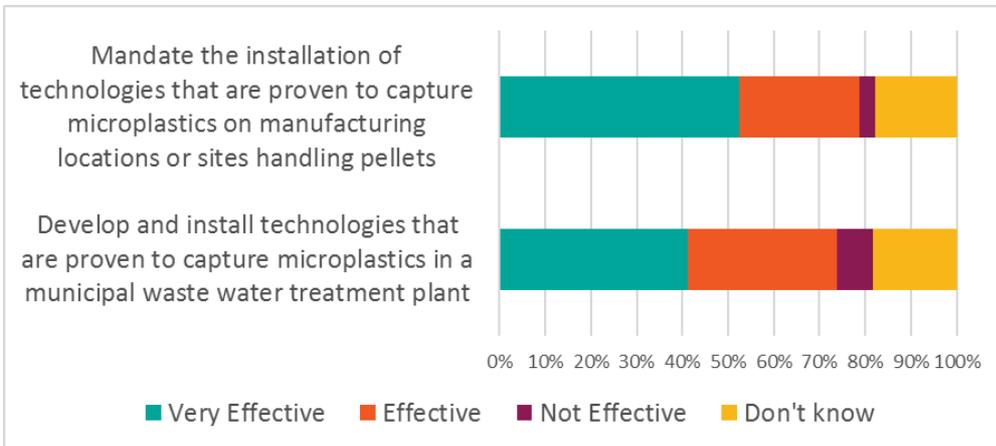


Figure 3-10: Effectiveness of measures to increase capture of plastic pellets



3.3.2.2 Respondent Suggestions of Other Measures

3.2 b Are there any other approaches to reducing pre-production plastic pellets emissions to the marine environment that you believe would be effective? Please state

and explain why.

A number of other approaches to reduce pre-production pellets emissions to the marine environment were suggested by respondents. These fell principally under the following categories:

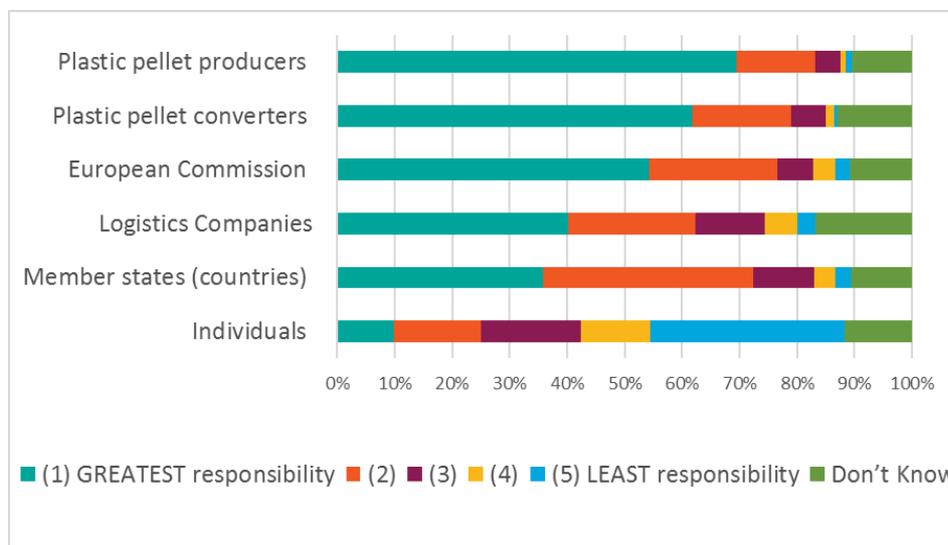
- Expanding Operation Clean Sweep to the whole value chain by implementing a better control of the logistics network surrounding pellets transport: closer monitoring of product loss during production and transport, redesign and control of handling/loading processes to avoid leakages (control similar to that of hazardous waste),
- Mandate improved quality packaging of pellets in transit;
- Strong polluter-payer laws: audits and fines for non-compliance; and,
- A tracing mechanism for each producer.

Comment [MB1]: These might already be covered in Operation Clean Sweep. I'm unfamiliar with the guidance.

3.3.2.3 Attributing Responsibility

3.2 c On a scale of (1) GREATEST responsibility (5) LEAST responsibility, who do you think should take action for reducing pre-production plastic pellets emissions to the marine environment?

Figure 3-11: Attributing responsibility for taking action for reducing pre-production pellets microplastic emissions



3.3.3 Clothing and Textiles

3.3.3.1 Proposed Measures

3.3 a. **Clothing and Textiles** – Please express your opinion on whether you believe that the following possible approaches to reduce microplastic (synthetic fibre) emissions from clothing and textiles to the marine environment would be effective. If you do not have a firm view or understanding of the particular measure select 'don't know'.

Respondents were asked to give their opinion on a number of measures to address emissions from textiles, grouped into two separate categories:

- Measures to reduce the propensity of synthetic textiles to be shed from clothing (see Figure 3-12); and,
- Measures to capture synthetic textiles shed from clothing (see Figure 3-13).

Figure 3-12: Effectiveness of measures to reduce the propensity of synthetic textiles to be shed from clothing

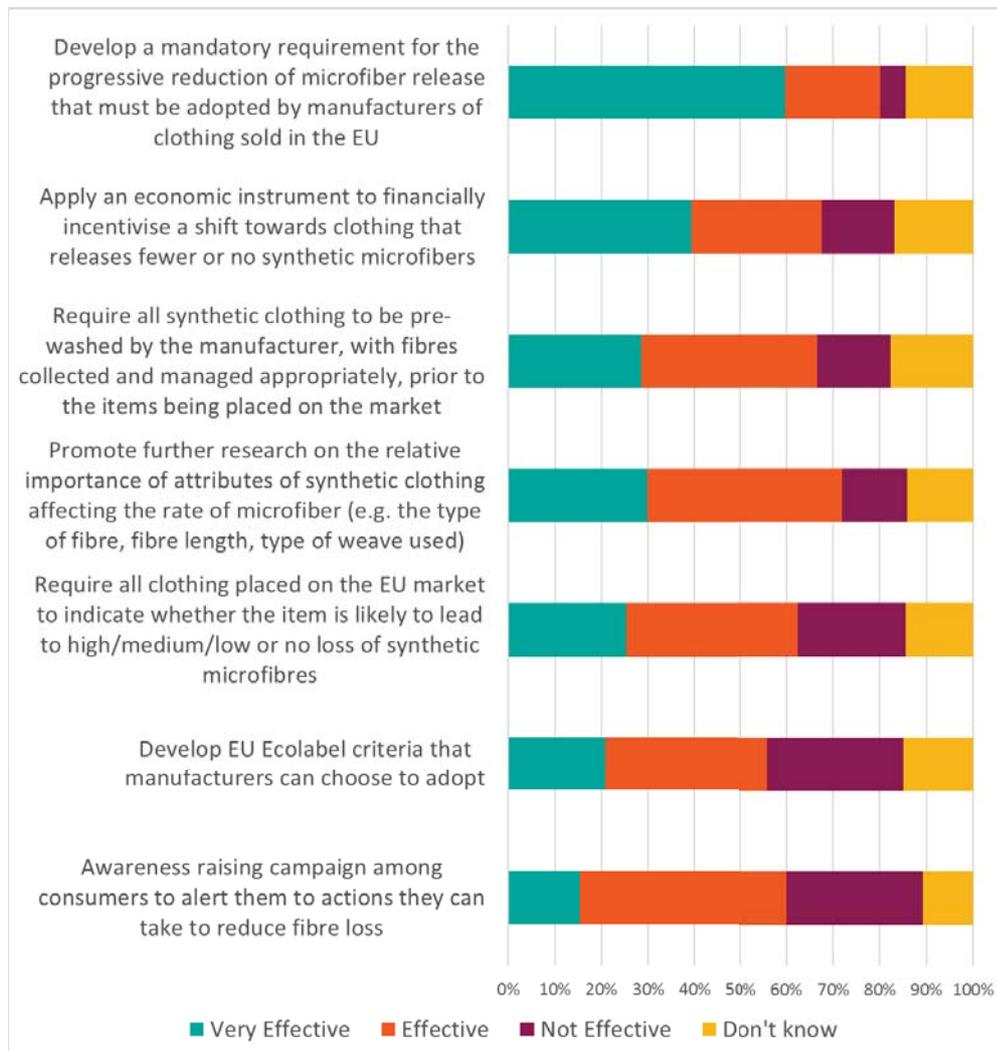
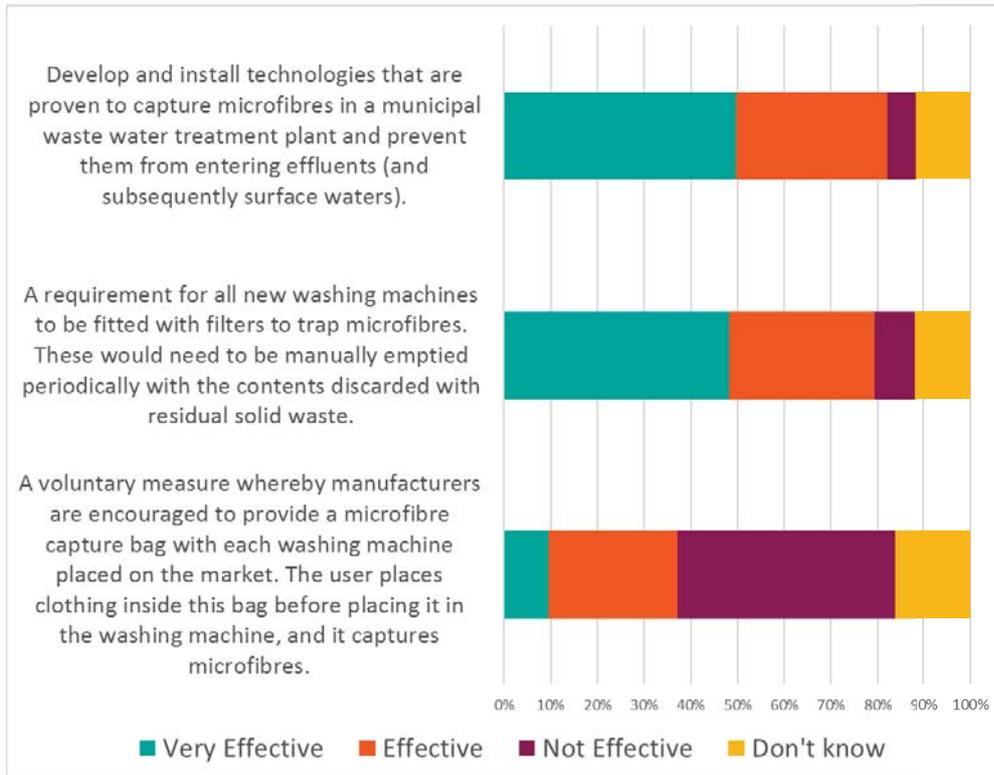


Figure 3-13: Effectiveness of measures to capture synthetic textiles shed from clothing



3.3.3.2 Respondent Suggestions of Other Measures

3.3 b Are there any other approaches to reducing microplastics (synthetic fibre) emissions to the marine environment from clothing and textiles that you believe would be effective? Please state and explain why.

A number of other approaches to reduce synthetic fibre emissions to the marine environment from clothing and textiles were suggested by respondents. These fell principally under the following categories:

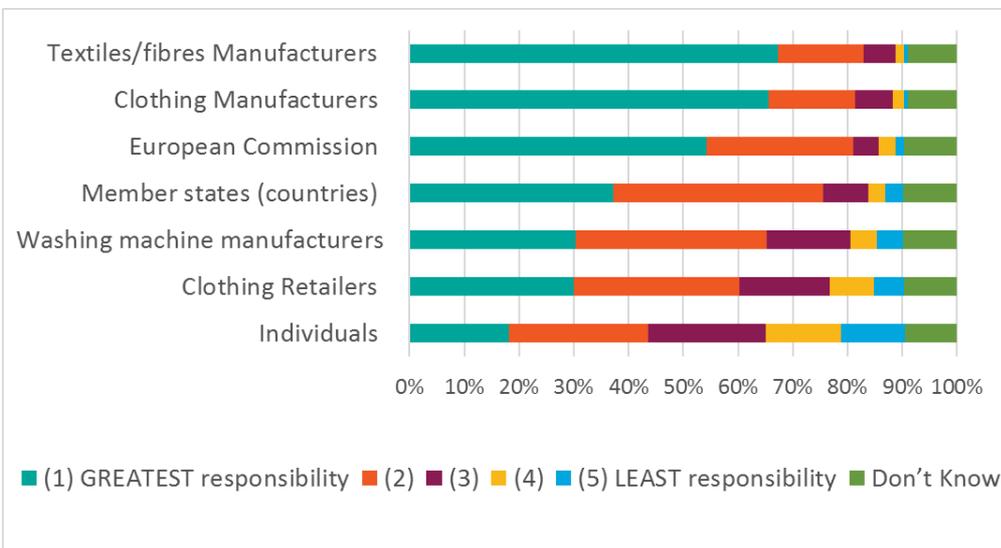
- Promote the use of natural fabrics (cotton, wool, linen);
- The use of ultra-sonic washing machines;
- Reduce the mixing of fibres in clothing (e.g. polycotton) to improve recyclability of garments;
- Treat clothing to increase garment lifetime;
- Extended producer responsibility for textile manufacturers with eco-modulated fees;

- Green Public Procurement (choice of textiles and laundry facilities for public sector); and,
- All textiles, not just clothing. Carpets were mentioned several times.

3.3.3.3 Attributing Responsibility

3.3 c On a scale of (1) GREATEST responsibility (5) LEAST responsibility, who do you think should take action for reducing microplastics (synthetic fibre) emissions to the marine environment from clothing and textiles?

Figure 3-14: Attributing responsibility for taking action for reducing synthetic textiles microplastic emissions



3.3.4 Artificial Sports Turf

3.3.4.1 Proposed Measures

3.4 a. **Artificial Sports Turf** – Please express your opinion on whether you believe that the following possible approaches to reduce microplastic emissions from artificial sports turf to the environment would be effective. If you do not have a firm view or understanding of the particular measure select ‘don’t know’.

Respondents were asked to give their opinion on a number of measures to address emissions from artificial sports turf, grouped into two separate categories:

- Changes to handling and management of infill (see Figure 3-15); and,
- Changes to the nature of the infill (see Figure 3-16).

Figure 3-15: Effectiveness of measures to change the handling and management of infill

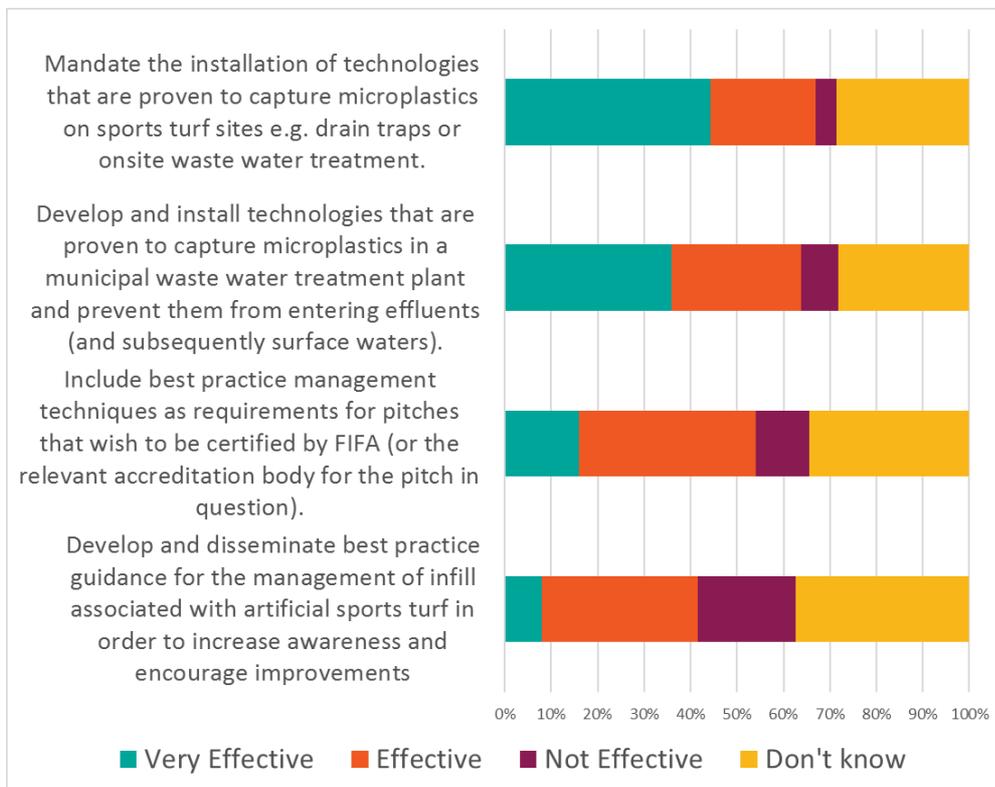
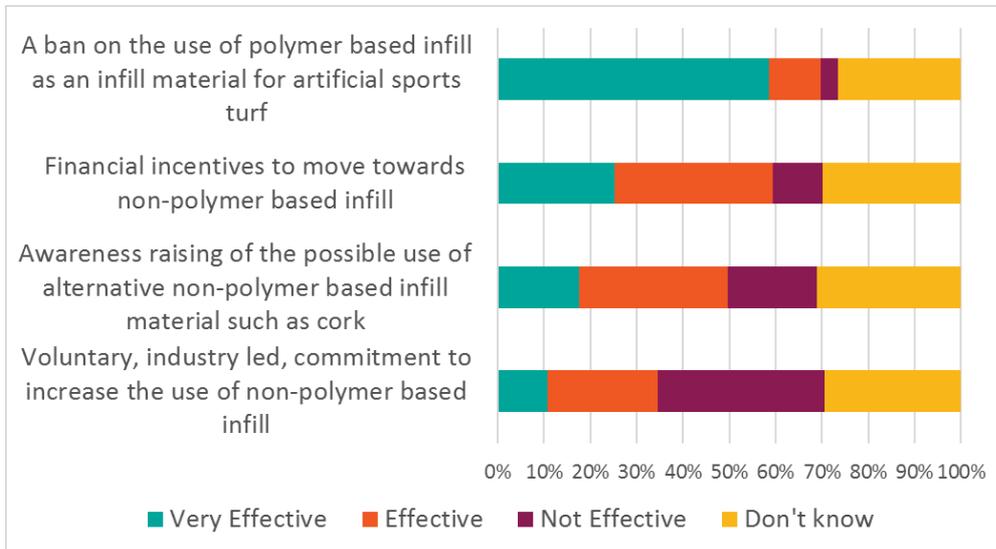


Figure 3-16: Effectiveness of measures to change the nature of infill



3.3.4.2 Respondent Suggestions of Other Measures

3.4 b Are there any other approaches to reducing microplastics emissions to the marine environment from artificial sports turf that you believe would be effective? Please state and explain why.

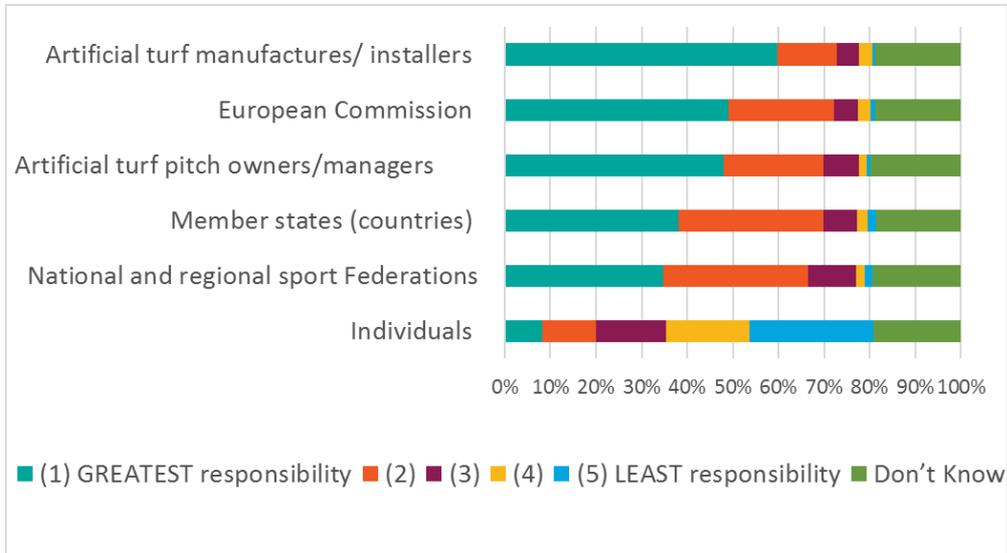
A number of other approaches to reduce microplastic emissions to the marine environment from artificial sports turf were suggested by respondents. These fell principally under the following categories:

- Require most common/popular sports to lead by example;
- Environmental taxes for artificial sports turf; and,
- Not only sports turf, also horse-riding centres artificial grounds.

3.3.4.3 Attributing Responsibility

3.4 c On a scale of (1) GREATEST responsibility (5) LEAST responsibility, who do you think should take action for reducing microplastics emissions to the marine environment from artificial sports turf?

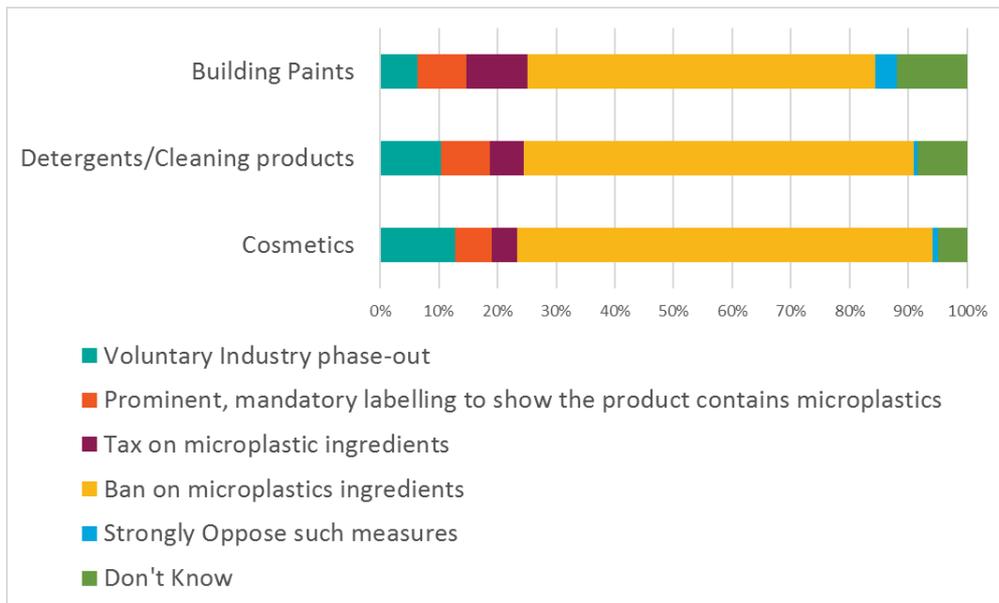
Figure 3-17: Attributing responsibility for taking action for reducing synthetic textiles microplastic emissions



3.4 Intentionally added microplastics

3.5 Which is for you, the most efficient and effective way to address individual sources of microplastics that are intentionally added into the following products?

Figure 3-18: Effectiveness of measures to address sources of intentionally added microplastics



3.4.1.1 Respondent Suggestions of Other Products

A number of items other than the three listed in the question were mentioned by respondents. There were:

- Tea and coffee filter paper;
- Glitter; and,
- Insulation material.

4.0 Written Responses

The following section details the written responses provided by consultees. They were given the opportunity at the end of the survey to provide their own written evidence up to a maximum of 4 pages.

4.1 Summary of responses

Information presented in the additional documents provided by consultation respondents indicated that there is a strong element of commitment to reducing the impact of microplastics on the environment and an appreciation of the importance and severity of the issue overall.

In their entirety industry stakeholders emphasised their **commitment** to reducing the impact of their operations to the environment with common references to the **circular economy** and the constant drive for optimisation of existing inputs, materials, processes and outputs and the impact these have on the amount of microplastics found in the land and aquatic environment.

Among the responses received to the consultation there were **76 stakeholders** who provided additional documentation in support of their response. These documents varied from policy briefs to position statements and summaries of survey results. Table 1 shows the number of responses with additional documents sent by stakeholder category. Responses received originated mainly from private companies, industrial or trade associations and NGOs.

Table 1: Number of 'additional document' responses per stakeholder category

Stakeholder category	Number of responses
Industry stakeholders²	36
Non-governmental organisation (NGO)	21
Interested individual/citizen/consume	7
Academic/ scientist / research	5
Local / National authority / State-owned enterprise	3
European Institution / International body	3
Other association	2

4.2 Major sources of microplastics

In responses received from industry stakeholders and trade associations there was a strong urge to the European Commission to **identify all major sources of microplastics** and consider the **proportionality of contributions** to the issue by different sources and sectors prior to decisions on additional measures or restrictions. A number of other considerations, beyond proportionality, were also identified and are discussed in the context of stakeholders' recommendations and suggested solutions to the European Commission (see Section 4).

Noting that further research and science-based evidence is required, a relatively large number of stakeholder responses **objected the ranking of major sources as well as the sectoral contributions** to microplastics. As long as uncertainty remains, there was a recommendation that this should be acknowledged and clearly communicated by the European Commission.

Looking at **sources of microplastics** pollution from a **geographic** point of view, the overwhelming majority of stakeholders referred to the importance of a **harmonised approach across European countries**. This was thought to be crucial to ensure efficiency, coherence and prevent the multiplication of national restrictions which can impede the function of the single European market and constitute a barrier to trade. A smaller number of stakeholders (mainly trade associations) argued that a European approach would not be adequate quoting studies on the relative contribution of non-EU countries showing that a small number of Asian countries³ account for 2/3 of global inputs to microplastics (Jambeck et al., 2015)⁴. This was found to be particularly the case for stakeholders in the textile and garment industry.

² Includes 'Private companies' and 'Industrial or Trade associations'

³ Namely China, Indonesia, Philippines, Vietnam, Sri Lanka and Thailand

⁴ Jambeck et al. (2015). Plastic waste input from land into the ocean. *Science* 347(6223), 768-771, February 13th 2015.

On the issue of **industry specific sources of microplastics**, most stakeholders in their responses referred to a range of sources suggesting that a **cross-sectoral approach** involving actors and stakeholders throughout a product’s life cycle and supply chain would be most effective.

In addition to the sources discussed in the consultation a large number of stakeholders across categories referred to **macroplastics** and macroplastic fragmentation as the most important source of microplastics, and questioned why this wasn’t included in the survey. Another source that was thought to be missing was **waste water** and untreated discharges from Waste Water Treatment Plants (WWTP). It should be noted that opinions on waste water were slightly contradicting, with a large number of stakeholders noting that WWTPs can capture between 85% - 99%⁵ of microplastics by implementing main flow advanced filtration treatment (e.g. membrane ultrafiltration techniques). In relation to waste water, the use of treated **sewage sludge** in agriculture (currently 50% in EU according to responses) was highlighted as a concern. There was consent across stakeholders that research would be necessary to establish sewage sludge concentration in microplastics as agricultural application implies their release and distribution in the environment. Only a limited number of studies were identified that explore sewage sludge as a potential pathway. One of the sources, shared by a stakeholder who wished to remain anonymous, discusses results showing that in tests conducted⁶ 98% of the microfibers were captured through wastewater treatment. These results were accompanied by a warning, as improved filtration may lead to increased concentration of microplastics in sewage sludge. Industry representatives also commented that this may impact on farmers’ willingness to use sewage sludge, which would imply disposal methods would need to be considered (e.g. incineration) and nutrients would be lost (Scottish Water).

4.3 Key data provided and data gaps

4.3.1 Data provided

Table 2 below summarises relevant data provided in stakeholders’ responses⁷. It is worth noting that a large number of documents reviewed provided references and links to studies that included relevant data but as such results were not quoted these are not included in the table below.

Table 2: Data provided in stakeholder responses

Stakeholder	Data	Document the data refers to

⁵ Range across responses

⁶ University of Osnabrück, Institute of Environmental Systems

⁷ The table does not include data provided in previous work conducted by or for the European Commission as these are considered known.

<p>Cosmetics Europe, Cefic, AmCham, SPT, SOS Mal de Sein, Dow, British Plastics Federation, Polish Union of Cosmetics Industry, Johnson & Johnson and more. (Across stakeholders)</p>	<ul style="list-style-type: none"> • 82% reduction in plastic microbeads used for exfoliating and cleansing in wash-off cosmetic and personal care products, comparing use in 2012 with the use in 2015 • 3600 tons of plastic microbeads used for exfoliating and cleansing have been substituted and removed from wash-off cosmetic and personal care products between 2012 and 2015. 	<p>Cosmetics Europe membership survey conducted in 2016</p>
<p>Cosmetics Europe and AmCham (Industrial/ trade associations)</p>	<ul style="list-style-type: none"> • The contribution of the cosmetics and personal care sector to the total amount of marine plastic debris was estimated to be between 0.1 % and 1.5 % in 2012 	<p><i>Gouin et al (2015) Use of Micro-Plastic Beads in Cosmetic Products in Europe and Their Estimated Emission to the North Sea Environment</i></p>
<p>Cosmetics Europe (Industrial/ trade association)</p>	<ul style="list-style-type: none"> • 99% of microplastics are captured by the waste water treatment plants before they enter the aquatic environment 	<p><i>Magnusson and Norén, (2014) Screening of microplastic particles in and down-stream a wastewater treatment plant; Murphy et al. (2016) Wastewater Treatment Works (WwTW) as a Source of Microplastics in the Aquatic Environment</i></p>
<p>Fauna & Flora International (NGO)</p>	<p>The use of microplastics in some leave-on products may be "ubiquitous":</p> <ul style="list-style-type: none"> • Study estimates that between 3,800 and 7,500 tonnes of microplastic might be used each year in Europe in these products. • A recent study in the Netherlands found suspected plastic ingredients in 10 out of over 400 tested abrasive floor cleaners on the Dutch market and documented indications that persistent and non-soluble polymers are being used in certain laundry detergents • 'Leave-on' products are frequently disposed of into drainage: <ul style="list-style-type: none"> • 60% of people who use 'leave on' products such as sun lotion or moisturiser wash this off directly down the drain; • 45% of people who use face, lip, or eye make-up either wash this off directly down the drain or dispose of any tissues or wipes they use down the toilet 	<p><i>House of Commons Briefing Paper - Microbeads and microplastics in cosmetic and personal care products (4 January 2017)</i></p> <p><i>Verschoor et al (2016). Emission of microplastics and potential mitigation measures - Abrasive cleaning agents, paints and tyre wear. RIVM Report 2016-0026. National Institute for Public Health and the Environment – Ministry of Health, Welfare and Sport: Bilthoven.</i></p> <p><i>Polling undertaken in the UK by YouGov</i></p>

<p>Fauna & Flora International, Greenpeace</p> <p>(NGOs)</p>	<ul style="list-style-type: none"> • Of 50 products spanning 10 product categories available on the UK market, research highlighted known microplastic ingredients in 7 industrial hand cleaning products and in 1 floor cleaning product and unverified polymeric ingredients of concern in 33 cleaning products (across 6 product categories) 	<p><i>Preliminary online review of published ingredient lists for domestic and industrial cleaning products and industrial hand cleaners available in the UK, conducted by FFI and Greenpeace UK (2016).</i></p>
<p>Fidra (in collaboration with Fauna & Flora International and the Environment Investigation Agency)</p>	<p>The Great Nurdle Hunt, a citizen science project by Fidra, encourages members of the public to look for pellet pollution on beaches.</p> <ul style="list-style-type: none"> • Across more than 250 volunteers participating in hunts in 9 countries, 69% of hunts found pellets, with over a third finding more than 100 pieces • A similar event held in the UK in February 2017, had comparable results with pellets found in 73% of hunts, with almost half (46%) finding more than 100 pellets 	<p><i>The Great European Nurdle Hunt results:</i> www.nurdlehunt.org.uk/images/Leaflets/Results-140717.pdf <i>The Great Winter Nurdle Hunt results:</i> https://www.nurdlehunt.org.uk/images/Leaflets/TGWNH_Results.pdf</p>
<p>Finnish Environment Institute SYKE</p> <p>(NGO)</p>	<ul style="list-style-type: none"> • 1% of microplastics present in wastewater from our homes is eventually released into the aquatic environments, while the other 99% ends up in the sewage sludge created during wastewater treatment. • During a study in the treatment plant in Helsinki the highest daily loads of microplastics in treated wastewater amounted to hundreds of millions of particles. The plant discharges an average of 270,000 cubic metres of treated wastewater into the Gulf of Finland every day. • Laboratory experiments show differences in the number of textile fibres released during wash between polyester fabric types (presented in a chart) 	<p><i>Studies conducted at the Viikinmäki wastewater treatment plant in Helsinki</i></p> <p><i>Finnish Environment Institute</i></p>
<p>AmCham EU</p> <p>(Industrial/ trade association)</p>	<ul style="list-style-type: none"> • One the main sources of littering to the aquatic/marine environment is the untreated discharges from storm sewage overflows from waste water treatment plants. This phenomenon is documented in the sources provided and represents a significant source of contaminants (biological, chemical and physical material) to the aquatic environment. 	<p><i>Assessment of impact of storm water overflows from combined waste water collecting systems on water bodies (including the marine environment) in the 28 EU Member States</i>; Charles Axelsson & Erik van Sebille (2017). <i>Prevention through policy: Urban macroplastic leakages to the marine environment during extreme rainfall events.</i></p>

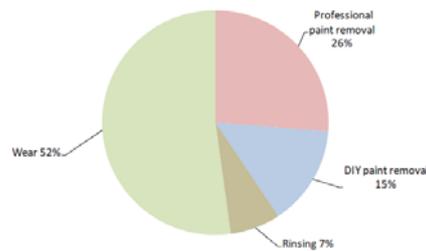
<p>A.I.S.E. (<i>International Association for Soaps, Detergents and Maintenance Products</i>)</p>	<ul style="list-style-type: none"> The total amount of microplastic intentionally added in detergents and maintenance products in the EU market is less than 150 tonnes per year. Considering a total production of detergents and cleaning products of 11.4 million of tonnes per year, this corresponds approximately to the 0.001% of the total production of the sector and to the 0.0015% of the total microplastics estimated to be released in the environment per year 	<p>AMEC survey based on feedback from companies accounting for about 70-75% of the total EU market.</p>
<p>Bavarian State Office for the Environment and Consumer protection (Local/ regional authority)</p>	<p>Selected rivers and lakes in Bavaria are being investigated for microplastic. Available results from water samples from the rivers Altmühl, Danube, Isar and Inn show that:</p> <ul style="list-style-type: none"> the proportion of the smallest size fraction of 300 µm-20 µm in the majority of the samples is more than 90% The most common types of polymers were polyethylene and polypropylene. Most microplastic particles were in the form of fragments. <p>Experimental studies on the effects of microplastics on mussels indicate that:</p> <ul style="list-style-type: none"> native mussels kept for more than 6 months in the treated waste water of a Wastewater Treatment Plant absorb small microplastic particles (<50 µm)(predominantly PVC particles) mussels exposed to PVC particles for 4 weeks under standardized laboratory tests, also resulted in an accumulation of very small PVC particles. If the animals were then kept in PVC-free spring water for a further 4 weeks, almost no PVC particles were detectable. 	<p>"Pathways, Occurrence and Distribution of Microplastic Particles in Bavarian Waters and Possible Effects on Aquatic Organisms". Bavarian State Office for the Environment (LfU) in cooperation with the University of Bayreuth and the Technical University of Munich, on behalf of the Bavarian State Ministry for the Environment and Consumer Protection. [Ongoing research including pathological investigations, microplastic-induced organ changes and the potential endocrine effects of additives are currently carried out – no results are publicly available at the moment]</p>
<p>SPT (Danish Industry association)</p>	<ul style="list-style-type: none"> Studies in Denmark show 99% of the microplastic is caught in a purification plant before it enters the aquatic environment 	<p>Screening of microplastic particles in and downstream a waste water treatment plant: Magnussen and Norden 2014, Microplastics in Danish wastewater. Sources, occurrences and fate: Vollertsen and Hansen 2017</p>

RIVM

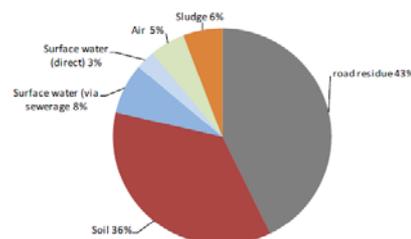
(Academics / research)

Findings from the prioritisation of land-based sources:

- **Detergents:** screened >400 (abrasive) cleaning agents of six market-leading companies and found that ten products were suspected of containing microplastics. Based on market data, it was estimated that the total emission of microplastics from abrasive cleaning agents is 2.6 tons/year, which is almost completely discharged into the sewer. Emissions to surface water are estimated to be 1.2 tons/year.
- **Paints:** Applications in the building (490 tons/year) and shipping (200 tons/year) sector were responsible for the largest part of emissions. Emissions from the building sector to surface water were estimated to be 130 tons per year. The chart below shows the contribution of professional and DIY sectors



- **Rubber tyres:** Road transport vehicle tyres were estimated to contribute 1,800 tons of particles per year into surface water and 6,200 tons per year into soil. Additionally, another 900 tons per year of fine particulate matter from tyres are released to the air, and 7,400 tons per year are captured in open asphalt concrete roads. The chart below shows the distribution of car tyre wear amongst environmental compartments.



[RIVM inventory and prioritization of land-based sources of microplastics \(2014\). For the Dutch Government.](#)

<p>SOS Mal de Sein (NGO)</p>	<p>Observations of the river system and initial assessment of the coast in France revealed that:</p> <ul style="list-style-type: none"> • Microplastics pollution is not limited to industrial ports, but also exists on islands far from all industries • Areas of shellfish farming activities are affected <p>Samples to quantify the presence rate or leakage rate of industrial plastic granules revealed:</p> <ul style="list-style-type: none"> • In Seine, rates greater than 100g of granules (137g) were calculated per liter of sediment in the Port of Le Havre. • Using a more sensitive method measurement samples were taken from a depth of 3cm included up to 75 grams of granules in a liter of fine sand (beach of a seaside resort on the Opal Coast) • In streams, downstream of possible pellet leaks, a maximum flow of 16 grams per minute was calculated. This adds to 23 kilograms per day if the flow remains constant.⁸ 	<p><i>SOS Mal de Sein – independent investigations since 2009</i></p>									
	<p>There is limited evidence on the effectiveness of any pellet loss prevention measures or how effectiveness is evaluated at company or facility level:</p> <ul style="list-style-type: none"> • Measuring pellet levels within facilities and in surface water drains, before and after OCS implementation in 10 companies, whilst all facilities demonstrated improvement, pellets were still recorded. <table border="1" data-bbox="411 1335 837 1431"> <thead> <tr> <th></th> <th>Pre OCS (no. pellets)</th> <th>Post OCS (no. pellets)</th> </tr> </thead> <tbody> <tr> <td>In all facilities</td> <td>42.7 million</td> <td>10.5 million</td> </tr> <tr> <td>In all drain inserts</td> <td>0.2 million</td> <td>0.09 million</td> </tr> </tbody> </table>		Pre OCS (no. pellets)	Post OCS (no. pellets)	In all facilities	42.7 million	10.5 million	In all drain inserts	0.2 million	0.09 million	<p>US NGO Algalita Pre- and Post-sign up auditing and monitoring of 10 polymer converters facilities that had signed up to OCS in Los Angeles (2005)</p>
	Pre OCS (no. pellets)	Post OCS (no. pellets)									
In all facilities	42.7 million	10.5 million									
In all drain inserts	0.2 million	0.09 million									

4.3.2 Data gaps and research needs

Issues around data gaps and the need for **further research in the sources, release pathways, amounts and impacts of microplastics**, dominated the concerns of stakeholders across all categories. Addressing a number of gaps and shortcomings was

⁸ This sampling was made after a rainy episode that mobilized the pellets spread in the environment. Other experiments carried out in dry weather gave flow rates 100 times weaker.

highlighted as crucial to the quality of the public debate and the policy response to address the issue. Across industries, from tyres to cosmetics, industrial stakeholders suggested there is insufficient or unsubstantiated scientific evidence as to the impact and of their industry and overstatements of their contribution.

The main gaps, as identified by respondents, included:

- Knowledge gap regarding the **sources of origin of microplastics**. This includes a **lack of baseline data** as this is a new area of research.
- Knowledge gaps in the **volumes** of microplastics currently present in the environment.
- **Lack of a harmonized measurement / calculation models**. Available studies use a range of calculation models which, depending on the underlying assumptions, present huge discrepancies and inconsistencies in the volume of microplastics released in the environment. That was thought to be particularly accurate for the textile sector.
- **Significant scientific uncertainty on the impacts** of microplastics. For example, a number of industrial stakeholders noted that the suggestion that microplastics *“facilitate the adsorption of toxic substances from the natural environment and increase their potential bioavailability to organisms throughout the food-chain”* has not been scientifically validated. queried the data available to confirm the microplastics desorption in organisms and hence accumulation in the food chain, noting such studies are limited and only offer initial indications.
- Lack of monitoring and evaluation **of existing practices and voluntary initiatives**.

These knowledge gaps and relevant concerns give rise to the recommendations in Section 4, where they are discussed in more detail.

4.4 Suggested approaches and measures for addressing microplastics

Most of the recommendations formed by stakeholders are applicable across industries and are summarised below.

1. Additional research
2. Clear and agreed definitions
3. Emphasis on measures aimed to control pollution at the source
4. Measures that are proportionate and source-specific: no one-size-fits-all approach
5. Investment in R&D and support in innovation across sectors
6. Multi-level governance and stakeholder involvement
7. EU-wide regulatory measures aimed at limiting the use and release of microplastics
8. Consumer choice measures
9. Voluntary industry initiatives

4.4.1 Additional research

In response to the shortcomings highlighted earlier, almost all stakeholders across categories highlighted the need for more **research** to cover knowledge gaps, clarify uncertainties, produce reliable data and provide EC with a robust scientific base and imperative for action. Industrial stakeholders highlighted that this step should be a **precursor to any regulatory measures being considered** or implemented.

In this context, and to allow cross-sectoral cooperation and the formation of an international solution, the **development of international standardised methods** for sample collection and analysis was suggested to allow comparison and interpretation of the data gathered by the scientific community and industry alike. Similar suggestions on harmonised processes to detect and assess pollution levels but also standardise sampling procedures were found essential in order to generate valid environmental data that could support any corresponding regulatory measures (ECOS).

In addition to the above, a small number of industry stakeholders representing mainly the tyre and chemical industry also noted that a sound impact assessment must be carried out, which proves the overall ecological benefit of any measures considered. One of the examples provided in this context was that of polymers in industrial paints. The Association of the Chemical Industry of Austria (FCIO) noted that polymers in surface coatings reduce fuel consumption through low-friction surface properties or increase the durability of the paint which means less frequent renewal of the paint resulting in both environmental and economic benefits. Alternative materials in the synthesis of such products will have an impact on their efficiency and durability.

4.4.2 Providing clarity in relevant definitions

There is a need to develop and use **clear, comprehensive, evidence-based definitions**. Apart from providing clarity in communications and ensuring a common understanding definitions are crucial to ensure focus on the key issues and to avoid unintended consequences and disproportionate impact of regulation. The lack of a common definition was found to undermine possible future efforts to engage with stakeholders in addressing the issue. Key definitions that would be required, **such as those of plastics, microplastics, microbead, polymer, particle and more**, were suggested by a large number of stakeholders who raised this as an issue.

There were typically differences in the definitions proposed by respondents. For example, regarding a definition of microplastics some suggested it should be based on a size range of 3-5 mm whereas others suggested a '5 mm or less' view.

The responses indicate that decisions about the appropriate definitions should build on existing scientifically-based and industry-endorsed definitions. Any changes or clarifications in definitions should also be reflected in legislation, and should include, according to a few stakeholders, a distinction between plastics and polymers to avoid disproportionate measures that add regulatory burden without providing additional benefits to the environment.

Another distinction, that was found useful, and was used by some stakeholders in their responses, was that of between primary and secondary sources of microplastics.

4.4.3 Emphasis on measures aimed to control pollution at the source

A considerable number of stakeholders argued for a source control approach as the first and most important step and where the weight regulatory effort should be, if any regulation was to be introduced. The arguments for such an approach, as opposed to an end-of-pipe approach, included environmental, economic and feasibility arguments.

At-source measures were thought to be in accordance with the **polluter pays** and **precautionary** principle. Suggestions on what these measures would be varied depending on the stakeholder and particular industry but were all based on the premise of eliminating or reducing the release of plastics in the environment at their source. These solutions included a mix of legislative and voluntary industry measures and dependent considerably on the stakeholder category: **NGOs were supportive of bold regulatory action whereas industry stakeholders were strongly in favour of a voluntary approach.**

For the majority of other stakeholders, end-of-pipe solutions were simply identified as a supplementary measure, which although characterised by some as necessary, were commonly seen as ineffective and inefficient. These solutions could include anything from the installation of advanced filtration systems to improvements in the waste management of microplastics.

The development of end-of-pipe measures was thought to involve a high cost, while any resulting improvements would not necessarily be applicable for the range of actors and technologies used. This was commonly referenced by waste water industry stakeholders who pointed to a variety of production processes and site layouts which render a 'one size fits all' solution impossible. This argument was used to support voluntary initiatives which allow the flexibility to individual companies to select a portfolio of measures that would be most suited and effective to them.

4.4.4 Measures should be proportionate and source-specific

A predominant concern of industry stakeholders, given the data gaps discussed, was that measures should be proportionate to the contribution of the source of microplastics.

It was predominately among industry stakeholders that explicit suggestions were found on a source-specific approach for the different microplastic sources. The response of PlasticsEurope summarises the general sentiment in ensuring “...*The degree of financial liability of the different stakeholders should change according to the microplastics source identified.*”

4.4.5 Investing in R&D and encouraging innovation across sectors

Innovation across industries should be encouraged and so should R&D if changes in microplastics are to be introduced that could impact on products’ effectiveness and industrial processes’ cost-efficiency. Examples were provided across sectors and included:

- Innovative / improved technologies - e.g. laundry washing
- Innovation in systems – e.g. development of efficient waste management systems, including effective infrastructures for collection and sorting of waste or waste water treatment plants with stronger retention rates
- Innovation in materials – e.g. alternative materials for infills such as cork
- Innovation in chemical synthesis – e.g. alternatives to chemical additives currently used in plastics

Further investments were suggested in areas where additional improvements can be achieved, such as, investments in tertiary waste water treatment equipment.

4.4.6 Multi-level governance and stakeholder involvement in discussions on potential measures

The challenge of microplastics and the nature of the issue, similar to a number of environmental issues that cross boundaries, is a global, complex issue thus needing a multi-stakeholder approach across the value chain.

PlasticsEurope notes that “...that tackling the impact of microplastics and preventing their release into the environment must be a shared responsibility among all stakeholders”. A number of industrial stakeholders, as well as, NGOs agree with the above despite applying different weights to the contribution of different actors.

Overall in discussions on potential measures the following should be considered:

- Multi-level governance
- Stakeholder involvement
- Coordination of regional and national actions
- Cross sectoral cooperation

- Coherence between other relevant EU legislative instruments (Directives) and Conventions
- Feasibility to implement, enforce, monitor and assess effectiveness of measures
- Existing voluntary industry initiatives

Some NGOs and industry associations explored potential structures and partnerships that could support the implementation of any measures, voluntary or not, and allow industries and actors to share best available practices in an area where research and development and the level of knowledge is still growing. An existing example offered was Operation Clean Sweep which is discussed under Voluntary industry actions.

4.4.7 Legislative / regulatory measures

Any changes in legislation should be grounded in a risk-based scientific approach and scientific evidence on each sector or source's impact on microplastic pollution, in order to avoid unnecessary regulatory costs and burden.

Such measures were supported strongly by NGOs, calling for a **bold regulatory response**, a number of academics and concerned individuals and a very limited number of private companies that explored or supplied innovative technologies.

Key suggestions are briefly presented below:

- **Inclusion of microplastics in REACH legislation**, following a clear definition of what classifies as 'microplastic'. The European Commission was urged to take the initiative to review the exemption of polymers in REACH and take steps accordingly to include polymers in registration and evaluation procedures.
- Introduction of **new ban**, the most common of which was an **EU-wide ban on intentionally added microplastics**, such as, microbeads in cosmetics, personal care and detergents. National bans exist for instance in the United States (Microbead-Free Waters-Act, 2015) and France for rinse-off cosmetic products. (multiple NGOs)
- Changes in ecological criteria for the award of the **EU Ecolabel** to include microplastics (small number of NGOs)
- Legislation setting **limits for maximum acceptable concentrations** of microplastics – e.g. in sludge
- Setting targets, such as, **EU-wide binding waste reduction at source target or industry specific recycling and reuse targets**. It was noted however that baselines should be established before targets can be set. (multiple NGOs)
- **Levies to discourage the manufacture and use of single-use plastic** and subsidies to promote the use of alternatives (ClientEarth), such as, the introduction of a 5p mandatory charge on plastic cups.
- **Enforcement to the full extent of existing regulatory frameworks**, such as, the waste treatment regulatory framework

- **Industry-specific regulatory action**, such as, stormwater management regulation to reduce microplastics and macroplastics runoff and improve receiving waterbodies quality (mentioned by a small number of NGOs)
- Following the **polluter pays** principle, a mandatory Extended Producer Responsibility (EPR) programmes designed to *“provide incentives for change as well as generate financial resources, especially through fees escalating over time”* (Greenpeace)
- **Full application of waste legislation** and related actions to reduce direct waste losses

Regulatory measures were more commonly recommended as a solution for **intentionally added microplastics**, such as, microbeads, abrasives, and other microplastics. For these a mandatory phase out period was suggested by some NGOs, while others pushed for an immediate ban. Greenpeace in their response noted that period should be *“commensurate with the time frame needed for alternative material substitution implementation”*.

For a number of respondents, mainly industrial stakeholders, it was deemed too early to discuss legislative action in light of uncertainties and gaps in knowledge and there was a concern that legislative action at this stage may lead to unintended side effects, or may not be proportionate to the goals to be achieved. More research, as well as learnings from voluntary action by business was found to be, by many, the appropriate action in the shorter term. Further, in sectors such as cosmetics, where voluntary actions have been widely referenced, there was a stronger sentiment against any form of regulation.

It is worth noting that in addition to those who raised concerns regarding substantive cost of regulation making a case for proportionate measures, there was a smaller number of those who dismissed regulatory measures on the grounds of these introducing unnecessary complexity, administrative burden and cost that may be disproportionate, particularly for SMEs. (EuropePlastics)

4.4.8 Consumer choice measures

The majority of responses referred to some sort of education and awareness raising for the public. These responses were frequently linked with the responses identifying macroplastics as the key source of pollution. However, the majority of responses identified this measure as complementary.

One of the key issues with measures aimed at influencing consumer behaviour is that they tend to be slow to yield results and frequently require parallel support from the industry, for instance, the provision of viable economical alternatives to enable a change in purchasing behaviour.

Similar measures included:

- **Use of Eco-labelling** - mentioned in a small number of responses. One of the NGO respondents clarified that while this measure has the potential to slowly shift behaviours, a dialogue should first be initiated on existing labels before introducing a new label (EU Ecolabel) which was found inappropriate for sectors that it is not currently commonly used (e.g. garments). (EuroCommerce)
-
- **Raising consumer awareness and education** – considered useful but not necessarily enough as a standalone measure. Still it was referenced particularly with reference to littering which some identified as *“the primary route by which plastics leak into the environment”* (Ancham).

In this category, measures to encourage the appropriate handling and disposal of products (recycling) were also mentioned.

4.5 Voluntary initiatives

A number of stakeholders, across industries, mentioned the need to recognise voluntary initiatives as one of the key tools that can engage stakeholders and provided data and references to recent attempts (see examples below and relevant data in Table 2) contributing to reductions in the microplastics used and released in the environment.

While these initiatives were welcomed across stakeholders, there were considerable differences as to the extent that these voluntary initiatives were thought to be adequate or indeed effective. Concern was expressed by a considerable number of NGOs, with Fauna & Flora International, Fidra and Greenpeace, covering the majority with the following:

- 1) There is still a large number of companies that do not participate
- 2) A number of companies have made unclear or inadequate public commitments that use ambiguous and narrow definitions of microplastic ingredients
- 3) Commitments, in some cases, appear only to apply to a very limited range of products or microplastic ingredients⁹
- 4) In some instances, microplastic ingredients have been replaced with ‘biodegradable’ plastics for which there are no standardised tests to ensure full marine biodegradability
- 5) Some companies have shown disregard for the need for timely phase out of microplastic ingredients
- 6) There are lifetime memberships which are not reviewed on an annual basis
- 7) The absence of published progress reports limits transparency in practices across the plastic industry

⁹ Fauna & Flora International (FFI) further provided evidence on leave-on products included in Table 2

- 8) There is a lack of independent third party audits assessing implementation and compliance with best management practices.

On the contrary, industrial stakeholders were keen to emphasise the benefits of self-regulation firmly expressed the opinion that they can achieve real benefits for the environment while minimising regulatory costs. Voluntary programmes recorded are presented below by sector.

Cosmetics & personal care products:

- A number of voluntary initiatives and commitments have been taken by individual companies to **phase-out the use of microbeads in cosmetic products**. Building on that Cosmetics Europe recommended to its membership a discontinuation of synthetic, solid microbeads in wash-off products by 2020. According to a recent survey by Cosmetics Europe the industry expects to achieve its objective before 2020 (Cosmetics Europe, Cefic, AmCham, SPT, SOS Mal de Sein, Dow, British Plastics Federation, Polish Union of Cosmetics Industry, Johnson & Johnson and more)
- At national level the industry also cooperates with public authorities to define and implement new sectoral agreements. The Belgian and Luxembourg association of producers and distributors of cosmetics, cleaning and maintenance products ([DETIC](#)) will report yearly on the phase-out and the government can perform spot checks. Further phase-outs and actions could be considered according to the evolution of science. (AmCham)

Tyre industry

- **Tyre Industry Project (TIP)**: The TIP brings together the leading tyre manufacturers under the umbrella of the World Business Council for Sustainable Development (WBCSD). Since 2006, TIP has been working to identify and address the potential health and environmental impacts of materials that are associated with the making and use of tyres. Based on the methods and knowledge developed by TIP, the European tyre and rubber manufacturer association (ETRMA) commissioned in 2017 an extensive research on the quantity of tyre and road wear particles released into the environment. (AmCham)

Pellets, powder and flake

- **Operation Clean Sweep (OCS)**: By far the most frequently mentioned initiative, OCS is a voluntary international programme designed to prevent resin pellet, flake, and powder loss and help keep this material out of the marine environment – both protecting the environment and saving valuable resources. The goal is to help every plastic resin handling operation implement good housekeeping practices. Member companies, have demonstrated their commitment by signing the “Pledge to Prevent Resin Pellet, Flake, and Powder

Loss” with a goal of zero pellet loss. The British Plastics Federation, running OCS in the UK, noted in their response, that they are currently “*exploring options with different standards institutes to develop a standard for the industry based on the Operation Clean Sweep® manual. This standard is the next logical step for the industry to show its commitment and add robustness to the initiative. It is also worth noting that a standard is likely to apply only to some part of the supply chain due to practicalities, therefore only some potential sources of plastic pellets will be addressed.*” (Cefic; AmCham; PlasticsEurope and more)

- Some NGO criticism existed over the effectiveness of the initiative noting that a significant portion of the more than 60,000 registered plastic companies in Europe are not affiliated with a trade body and as such have not and are not likely to, sign up to OCS. (Fidra, FFI, Greenpeace and more)

Water Industry

- **AMP7 Chemical Investigations Programme:** Due to take place in the UK to better understand the occurrence, fate and concentration of microplastics in the water recycling process. (Anglian Water)

-

Overarching / Cross-sectoral

- **Joint Declaration on Marine Litter Solutions:** Signed in 2011 aiming to address the root causes of plastic litter it includes voluntary signatories from 69 plastics organizations and allied industry associations in 35 countries. Since 2011, more than 260 marine litter solutions projects have been planned, put into action, or completed - a 165% increase in marine litter projects since the declaration was created. These included initiatives to advance education and research on marine litter, promote best policies, enhance plastics recovery and recycling, as well as ensure proper plastic pellet containment. (Cefic; PlasticsEurope)

A number of other partnerships were also mentioned by respondents, such as:

- Global Science Task Force on Micro Plastics, an international group of leading polymer chemists, environmental scientists, regulatory professionals and industry associations (PCPC)
- The Ocean Conservancy¹⁰
- Trash Free Seas Alliance¹¹
- the Recycling Partnership¹² and Ellen MacArthur Foundation’s New Plastics Economy Initiative¹³

¹⁰ <https://oceanconservancy.org/>

¹¹ <https://oceanconservancy.org/trash-free-seas/plastics-in-the-ocean/trash-free-seas-alliance/>

¹² <https://recyclingpartnership.org/>

¹³ <https://www.ellenmacarthurfoundation.org/publications/the-new-plastics-economy-rethinking-the-future-of-plastics>

- The World Business Council on Sustainable Development (WBCSD), Roadmap to Eliminate Ocean Waste¹⁴, to document and communicate the business case for private sector engagement on the marine debris matter.
- The World Business Council on Sustainable Development (WBCSD), Roadmap to Eliminate Ocean Waste to document and communicate the business case for private sector engagement on the marine debris matter
- Materials Recovery for the Future¹⁵ industry collaboration, a group working to increase the recovery of flexible packaging

Finally, intermediate solutions were also proposed (EuropePlastics) whereby voluntary programmes could be combined with a business-led audit and certification scheme for transparency.

¹⁴ <http://www.wbcsd.org/Clusters/Circular-Economy/Roadmap-for-reducing-Ocean-Waste>

¹⁵ <https://www.materialsrecoveryforthefuture.com/>