



## Environmental Audit Committee

### Oral evidence: Environmental impact of microplastics, HC 179

Tuesday 24 May 2016

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Written evidence from witnesses:

- [British Plastics Federation](#)
- [Marine Conservation Society](#)
- [Environmental Investigation Agency](#)
- [Fauna and Flora International](#)

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Members present: Mary Creagh (Chair), Geraint Davies, Zac Goldsmith, Caroline Lucas, John McNally, Rebecca Pow.

Questions 65 - 164

*Witnesses:* **Francisco Morcillo**, Public & Industrial Affairs Manager, British Plastics Federation, **Dr Laura Foster**, Head of Pollution, Marine Conservation Society, **Sarah Baulch**, Oceans Campaigner, Environmental Investigation Agency, and **Daniel Steadman**, Marine Plastics Projects Manager, Fauna & Flora International, gave evidence.

**Q65 Chair:** I call the Committee to order and welcome our witnesses here this morning. This is our second evidence session on microbeads and our witnesses today are Francisco Morcillo, Public & Industrial Affairs Manager at the British Plastics Federation, Dr Laura Foster from the Marine Conservation Society, Sarah Baulch, Oceans Campaigner at the Environmental Investigation Agency, and Daniel Steadman from Fauna & Flora International. You are all very welcome.

I am going to kick off the questioning today, if I may. We heard last time that most major multinational cosmetic brands have made public statements and voluntary commitments to phasing out microbeads. How detailed do you think are those commitments and do they go far enough? Are the comprehensive enough? Can we start maybe with the NGOs and then we can ask the industry?



**Daniel Steadman:** Thank you. Yes, you are absolutely right to say that lots of companies have already made positive commitments towards doing something, but there are still a large number that haven't and there are some that have made them but haven't gone far enough. So, for us, there is a difference between a progressive commitment to phase out microbeads and one that just pays lip service to the issue. Fauna & Flora International have been working on evaluating these commitments for around the last three years, and while we have seen that there is the potential for organisations at every scale, national or multinational, to make robust commitments, there is also a version of a commitment that isn't satisfactory.

When we are evaluating a commitment we look for seven key things. The first of all is that it applies to all solid plastic ingredients, regardless of their function, so it is not limited by the type of solid plastic; also that it should apply to all down-the-drain products, so everything that goes down the drain; fourthly that it should apply to all brands in that company's portfolio and all markets in which their products are sold and that it also applies to all future formulations of those products. Finally, we would ask that there be no exemptions made for biodegradable plastic alternatives and that there be no lower size limit on the particle being phased out.

That level of detail is evident in some of the commitments that we have seen, but in this evaluation work we have done we have seen that there are at least seven major multinational brands that fail on at least one of these criteria. That is not to denigrate those brands in particular. It might be that they made these commitments when the understanding of the issue wasn't at maturity, but the key thing for us, certainly as NGOs, is that this causes consumer confusion. They might be aware that their favourite brand has phased out microbeads, but actually what that company's definition of microbeads is is too narrow to be adequately dealing with the problem.

**Q66 Chair:** What are those seven brands?

**Daniel Steadman:** We are in the process of having conversations with those brands, so we would prefer not to name them at this point, but, suffice to say, they are some of the largest brands in the world and in the top 10 global cosmetics manufacturers.

**Q67 Geraint Davies:** Did you say seven multinationals or seven brands?

**Daniel Steadman:** Seven multinational brands.

**Geraint Davies:** That is what I thought, of brands?

**Daniel Steadman:** Yes.

**Geraint Davies:** Individual brands. Sorry, Chair.

**Q68 Rebecca Pow:** Of just cosmetics or much wider products than that?

**Daniel Steadman:** Well, this is where you get into the nuance and the devil being in the detail. So they are all cosmetics brands that I am referring to, and it might well be that there are some products in their portfolio that go down the drain or contain solid plastics that are not covered by their commitment.



**Q69 Chair:** Is there a not a common definition of what a microbead is? Is that what you are saying?

**Daniel Steadman:** That is part of the issue, yes. I would say as much as you have all heard about microbeads it is quite an unhelpful term, so it is most commonly used from a marketing perspective to describe a solid piece of plastic that exfoliates, but when Fauna & Flora International have been monitoring products for their solid plastic ingredients, we have found that solid plastics can perform a range of functions, so they can form the film that makes the product look a particular way. They can determine its viscosity. So that is the difference between saying, “We are phasing out microbeads,” and, “We are phasing out all solid plastic ingredients.” If what we are talking about is marine litter and if we conclude that solid plastic particles are marine litter then simply saying that you phase out microbeads without committing to what that actually means is not a sufficient response to this issue.

**Q70 Zac Goldsmith:** I do not know if we are talking about this later, but can I pick you up on the biodegradable point?

**Daniel Steadman:** Of course.

**Zac Goldsmith:** You don’t want any exemptions at all. Can you explain why?

**Daniel Steadman:** I would say it is for a couple of reasons. The first would be that we haven’t seen compelling evidence that suggests that there are biodegradable plastic alternatives that degrade in the marine environment, and that is key. Your definition of biodegradable is most often going to be determined by whether it biodegrades in an industrial composter or at high heats. However, you are not going to see those conditions replicated once that thing reaches the marine environment.

Just as a more general point in terms of the plastic pollution issue that we all work on, I would refer you to a United Nations Environment Programme report from last year simply titled “Biodegradable Plastics Are Not the Answer to Marine Litter”, in the sense that, if you make something biodegradable, you are incentivising the throwing away of that product by saying, “Once it is out there it will biodegrade and we will get away from it.” For us the solution is prevention at source. If there are applications of plastic particles that could potentially cause harm to the marine environment then we need to stop that application, rather than thinking about making it degrade once it is there.

**Q71 Chair:** Professor Galloway from the University at Exeter, who came to our initial evidence session, said we have so many talented polymer scientists that, once we identify the things in the plastic that may cause harm, we are able to design these polymers to be safer to degrade into something that does not cause harm. Are you saying she is wrong?

**Daniel Steadman:** I am not necessarily saying she is wrong, and I am certainly not talking against innovation in this sector. I think on plastic pollution as a whole we need innovation, whether that is designing washing machines so they catch microfibers, whether it is designing products inherently so they are not made to be thrown away. But I think in that whole system where we are encouraging a reduction in the wastage of plastic, we have to accept that there are some applications that are not appropriate for plastics, and

putting small plastic particles, whether they are biodegradable or not, into cosmetic products just has to be something that we innovate away from.

**Q72 Rebecca Pow:** Can I pick you up on that? A couple of companies use apricot kernel. That is biodegradable. So would you say that that was not useful? They have replaced their microbeads with kernels.

**Daniel Steadman:** Yes.

**Rebecca Pow:** I would have thought that was a good thing and that it would break down in the sea.

**Daniel Steadman:** Just to clarify the point, some companies are moving towards what they refer to as biodegradable plastic alternatives. We do not fully understand what happens when you put lots of apricot kernels in the marine environment or riverine environment, but at least we understand a bit more about how it degrades and what happens when it breaks down into its constituent pieces, principally that it can be absorbed safely by multiple species at every level of the food chain.

**Q73 Chair:** Yes, that is what I mean; it is an organic substance. That is the issue. That is what our marine scientists told us last time round.

Can I move on to the Smartphone app, “Beat the Microbead”. How effective do you think it is in encouraging behavioural change? Have you any evidence of it encouraging behavioural change?

**Daniel Steadman:** Behavioural change among consumers or among corporates?

**Chair:** Consumers.

**Daniel Steadman:** To be honest, probably one of the reasons the three of us have all gotten into this particular source of microplastics, say, compared to another source, is that there is a really, really strong public feeling against this, and all three of the organisations at this table have also worked with Greenpeace on a public UK petition, which has now attracted over 300,000 signatures from people who do not want small pieces of plastic in their cosmetic products. I think, as soon as you demystify the issue for an individual, they completely understand it. Immediately, they understand that if they have a product that they put on their face and that then gets washed down the drain that, like a plastic bag or a bottle, that that little bit of plastic will persist in the marine environment and potentially cause environmental harm, and they do not want to be associated with it. So, yes, and FFI has been working in this space for a long time. We have produced a guide called “The Good Scrub Guide”, which celebrates plastic-free face scrubs. As soon as you give that to someone they are very happy to change their consumer choices.

**Q74 Geraint Davies:** Can I ask why you do not want to name the seven multinational brands?

**Daniel Steadman:** I think it is primarily that we do not necessarily feel it is helpful to single out a particular brand. We are more interested in promoting those people who either

never use solid plastics in any of their products and showing that there are basically a range of categories in which you can not use solid plastics, and that is principally it.

**Q75 Geraint Davies:** If we as a Committee wanted to get publicity to stop the manufacturing, get consumer power to get manufacturers to do what should be done, surely that would be more effective than doing everything in private and few people know about microplastics at all.

**Daniel Steadman:** I am more than happy to liaise with the Committee and write to them afterwards to clarify those brands and those positions.

**Chair:** Thank you.

**Q76 John McNally:** Could you tell me, for example, about hair products? There are so many dyes out there and huge companies that everybody uses, and I know there are a lot of organic products that you use to dye hair, but the dyes themselves that are put on your hair, do they contain these plastics?

**Daniel Steadman:** I am not aware of hair dyes that contain solid pieces of plastic. If it would be helpful to the Committee, I can read you a list of product types that we have found some plastics in.

**Chair:** I think submit it. Let's just submit it.

**John McNally:** Perhaps only natural—

**Daniel Steadman:** Pardon.

**John McNally:** A natural app. Sorry.

**Q77 Chair:** Right. **If I can ask Mr Morcillo: from the first hearing Dr van Seville, from Imperial College London, said producing alternatives to microbeads is not necessarily a “cost issue but more a shelf-life issue.” How viable and cost-effective are products with alternative particles? Can you give some examples or do you just want to represent the plastics?**

**Francisco Morcillo:** For us, we are against the use of microbeads in cosmetic products. We do not think there is an application for plastics there. Having said that, this is more like a cosmetics industry issue as such. We would not be aware of the formulation issues that they have like replacing one element with another. Obviously, plastics are widely available, and that is why the use of plastics is so easy.

**Q78 Chair:** How about Dr Foster or Ms Baulch, do you have anything to say on this shelf-life versus—

**Dr Foster:** We understand that putting natural products, like kernels, does change the shelf-life and that was one of the reasons it was introduced, but it was also because consumers apparently liked the fact that plastic produces a more consistent feel on the skin, and that was the other reason cited. I think the fact that we used to have them means that that formulation exists and most companies will have those formulations and they can use the old knowledge, for want of a better description, to help with that reformulation. I

personally do not think that it is a big issue and so many companies have now done it, suggesting that it is not really an issue.

**Q79 Chair:** How long do you think microbeads have been an issue? When did they emerge?

**Dr Foster:** I think there is a patent from 1974, if I am correct.

**Daniel Steadman:** I think there might even be an older one.

**Dr Foster:** Yes. I think 1974 was the first one for the scrubs and there are earlier ones, as Dan says.

**Q80 Chair:** When did they become mass marketed?

**Dr Foster:** I would say probably the 1990s.

**Daniel Steadman:** Yes. We are aware of the mid-1990s as what we have heard as a common alternative.

**Dr Foster:** Yes.

**Sarah Baulch:** There are some brands that have never included microplastics in their products, so clearly they have managed to deal with the issues of shelf-life and so on.

**Chair:** Yes, they made different choices.

**Sarah Baulch:** Yes.

**Daniel Steadman:** People like Neal's Yard Remedies, for example, who will have sent in written evidence to your inquiry; that is across a huge product portfolio. You are not just talking about face scrubs. You are talking about all of their makeup, all of their blushers, all of their deodorants, all of their toothpastes. They have never had to use any solid plastic particles in any of those.

**Q81 Chair:** What percentage market share do you think they have of the UK cosmetics market?

**Daniel Steadman:** I am not entirely sure.

**Q82 Chair:** £13.50 for a shampoo. Do you think that is what your average—

**Daniel Steadman:** I would not like to comment on their pricing policy.

**Zac Goldsmith:** Who are we talking about?

**Chair:** Neal's Yard Remedies.

**Dr Foster:** I would like to add, though, in the research that FFI and we have done is that it is a range of products in different price categories, so everything from the luxury to the other end, the more budget part of the market.

**Chair:** St Ives is the apricot scrub, £3.50.



**Dr Foster:** Yes.

**Zac Goldsmith:** You have done your research.

**Chair:** Yes, those of us with teenagers. Right, we will move on to question two.

**Q83 Caroline Lucas:** A question for Mr Morcillo. In your evidence you argue that the voluntary commitment of the cosmetics industry means that a ban should not be necessary and it would involve what you say is an unnecessary expenditure of taxpayer money. How much is it going to cost, do you think, in order to go for a proper ban? What would a ban mean for your industry and the costs associated with it?

**Francisco Morcillo:** Obviously, with us we will support a voluntary commitment before trying to ban a specific product. We have experience that some of the voluntary commitments have worked. Obviously, this has to be looked at case by case. In this case, for example, on voluntary commitment, you have probably done more research than we have. Our point of view is that it is at a bit of an early stage to say whether it is working or not. Most of the major brands have already said that they will stop using microbeads.

**Q84 Caroline Lucas:** If that is the case, surely that is an argument for simply moving straight to a ban. If some companies have been able to get rid of it fairly easily then in the meantime the evidence of what harm is being done does not seem to be in question, so why would we not just move to a swift ban? Why would we wait?

**Francisco Morcillo:** We have to evaluate the volumes used at the moment, whether that volume is going to reduce significantly. If we put that into perspective, the volume remaining of the brands that have not already phased them out—and we have to evaluate as well the effect of that volume of microplastics—that is still with the academic research. It is still questionable, so implementing a ban without scientific evidence of what the effect will be in the environment is having a disproportionate—

**Q85 Caroline Lucas:** It cannot have a negative impact, can it? So, surely, what you are arguing for is not following the precautionary principle and not looking at the evidence that we already have of harm caused and, therefore, perpetuating that harm, while you search for more research that we probably do not need.

**Francisco Morcillo:** No. I am saying that we have to evaluate the effects we have. If at the end of the evaluation, we come to the conclusion that a ban is what we should do then obviously we would be in favour of that. It is about the scientific evidence and evaluation of the volumes and the effects of the volumes.

**Q86 Zac Goldsmith:** Could I ask you for an example of what you would expect from research that would justify not doing a ban? If you did all this research, what would be the thing that would convince you that a ban is not the right option, for example?

**Francisco Morcillo:** We have to see what kind of measures we take to tackle marine litter. If we think that this is one of the main priorities, keeping the volumes down and the effects that it has on the environment, then that is right. That is fine. Research: I haven't seen any indication showing that this should be a priority; that we should be tackling the marine litter issue.



**Q87 Chair:** Can we hear from the other two witnesses?

**Dr Foster:** I have a couple of key points. I would like to read something out from the California Act, which I think is succinct. It talks about plastics as “an environmental and human health hazard and a public nuisance”. They also say that, “Microplastics that are 5 millimetres or less in diameter become bioavailable as soon as they enter the marine environment and are ingested by marine organisms”. They also go on to talk about persistent organic pollutants that are attracted, so they are absorbed to the microplastics, and they go on to say, “many of which are recognised to have serious deleterious impacts on human health or the environment, including DDT, DDE, PCBs, and flame retardants”. I think that is really important. We are talking about the kind of precautionary principle within that.

In terms of looking at the products and voluntary commitments, Cosmetics Europe have put out a voluntary recommendation and the report published by Eunomia quoted that that voluntary commitment covers 36% of the market. They quote that 40% of the market is not covered in that. The remaining part of the market does not have microplastics according to that, and I think what is key is the fact that we as NGOs are basically chasing those products. When we started we talked about face scrubs. Then we got to shampoos and now we have gone to looking at the fact that there are deodorants that have microplastics in them, wet wipes have it in and detergents. Consumers cannot make an active choice, so if it is in cosmetics, such as face scrubs, providing they have a reasonable understanding of chemistry, they could look at the ingredients on the back, and they have some time in the supermarket to do that—I suspect the average person does not have a couple of minutes to look over ingredients—but when it comes to things like detergents, when it comes to wet wipes, people are buying those. I should say that the wet wipes are the ones that say “flushable”, so those are going straight into our sewage system and many of those, if not all, contain plastics within them.

**Caroline Lucas:** We will come back to you in a minute, but if we—

**Sarah Baulch:** You will have heard from the academics last week that there have been a number of laboratory studies that have shown impacts, particularly on marine invertebrates, showing impacts on feeding behaviour, the way they allocate energy, and that feeds through to impact on growth, reproduction and so on.

**Francisco Morcillo:** Yes, so what we have been investigating is not just microplastics. It is about plastics in general. Microbeads are just a small element. On the proportion of it in the guts of animals, there is no evidence of how much there is. That is my whole point. It is not about—we don’t want to ban that. For example, I have a report with me, which is from a group of experts on the scientific aspects of marine environmental protection. They came to the conclusion that there is not enough evidence, so we need to do a bit more research in terms of—

**Q88 Caroline Lucas:** Who came up with that conclusion?

**Francisco Morcillo:** Sorry?

**Chair:** Marine experts.





**Francisco Morcillo:** Yes. Sorry, that was in our response, but I will send it to the Committee. What they found out is, obviously, there is the need for a lot more research because the organic pollutants that are absorbed by plastics, they are absorbed at the same rate on the microorganisms. So they could not make a direct relationship between the particles that they ingest and the amount of pollutants that they have in their tissue.

**Q89 Caroline Lucas:** You are not seriously challenging the widespread scientific recognition of the dangers and harms caused by microplastics though?

**Francisco Morcillo:** Yes.

**Caroline Lucas:** You are?

**Francisco Morcillo:** That is not the question. The question is—

**Q90 Caroline Lucas:** If you are accepting that then why would you not accept the precautionary principle?

**Francisco Morcillo:** No, the question is not about the organisms ingesting plastics because we have no doubt of that. That should not even be discussed. It is about the pollutants absorbed by plastics. That is the only thing we are arguing here; not the actual plastics that they ingest but the pollutants that the plastics absorb.

**Q91 Caroline Lucas:** Forgive me, I still do not see why that is an argument against a ban, but maybe Daniel Steadman can—

**Daniel Steadman:** I suppose for us as NGOs a useful point here might be the fact that plastic, as a pollutant, confounds all of our traditional notions about pollution and how you deal with it. Traditionally, you identify a level of a particular pollutant that is a threshold over which harm occurs. Plastic is everywhere, so in all of these systems, whether they be coastal systems, as we heard potentially from Dr Kelly a couple of weeks ago, actually airborne systems, so disentangling the effects of plastics when they are everywhere is nigh on impossible. As well as using the evidence-based approach that all of us work from, I think we would all appeal to a sort of moral imperative that this is a material that is out of place. It does not belong in these places, so our efforts to prevent it getting there are based both on evidence and the idea that, even if microplastics in cosmetics represent a small proportion of the overall load, they are a source that we can do something about right now. There is a clear role for the UK Government to play in providing guidance and providing a level playing field of what we are actually talking about here, and then we have dealt with the first source and we can learn from it and move on.

**Q92 Caroline Lucas:** Can I ask those people who do favour a ban, what is your reaction to the Government's announcement that they will consider a unilateral ban if the EU does not prohibit their use? I am asking: how useful is a unilateral ban rather than an EU-wide ban or should we be holding out for the EU-wide?

**Dr Foster:** I think we should take a proactive approach because I think the more proactive Government can be—we have a commitment to deliver through the Marine Strategy Framework Directive that talks about microplastics specifically. I think we should be looking at making a proactive part of that delivery being microplastics and showing that

the UK can do something with this. We are seeing public support. We have had over 300,000 people sign the petition, which includes ourselves plus Greenpeace, so there is significant weight behind the issue. Consumers want to know that what they buy is not directly polluting the marine environment.

**Q93 Geraint Davies:** Can I ask Mr Morcillo: clearly, if we do not have a ban as a voluntary agreement, the overall volume of microplastics can grow, can it not? I know you have challenged the evidence, but we have heard this sort of challenge from the tobacco manufacturers who say, “Oh, we’ve got to find out more information before we can do things.” In the case of sugar and diesel and that sort of thing, left to their own devices, industries just make money and grow problems. So is there not a compelling case for a ban to send a clear signal to industry?

**Francisco Morcillo:** It is not that we oppose a ban. It is that we favour a voluntary commitment rather than a ban to start with. If we prove that voluntary commitment is not working and the volumes are high—obviously, we are completely against the use of microbeads in cosmetic products—we will support a ban.

**Geraint Davies:** You do support a ban?

**Francisco Morcillo:** If the voluntary commitment does not work.

**Geraint Davies:** Well, it isn’t.

**Daniel Steadman:** Francisco, are you happy with the terms of the voluntary commitment at the moment are robust enough?

**Francisco Morcillo:** You mentioned earlier the definition of microbeads, which does not help. To start with, for example, in the United States and Canada, two countries that have a ban, they have different definitions of microbeads, so that does not really help for us to propose a ban on something because we would not know how to—

**Q94 Chair:** Just to be very clear, the research is that there are 4,500 tonnes of plastic microbeads going into the marine environment in the EU every year and Professor Galloway told us that about 8 million tonnes of plastic enters the marine environment every year, so it is a small figure but we could do something about it. It accumulates obviously because each year it is in and in and in. Your querying of the research is about whether these toxins accumulate on that plastic. Am I correct?

**Francisco Morcillo:** No, I was just pointing—because obviously if that kind of information comes up, and there is no scientific evidence to prove that those pollutants are going to transfer into the organisms then that is not an argument that we should be discussing. That was my only argument.

**Daniel Steadman:** But there is evidence to suggest that the toxins themselves can be transferred. We are not necessarily talking about the top of the food chain, but we are certainly talking about transfer from lower-level organisms.

**Chair:** Perhaps you can have that discussion and educate—

**Daniel Steadman:** Yes, fine.



**Chair:** We ask the questions, so keep it through the Chair, please; through the Chair. Zac.

**Q95 Zac Goldsmith:** I am trying to understand what the basis for your opposition to the ban is, and I have not heard an argument yet. You said I think “we” rather than “I”; that the British Plastics Federation completely opposes microbeads in cosmetics, so I am trying to understand then, what is the point of the research that you are looking for? If your position is already to oppose the use of microbeads in cosmetics, I cannot decipher from what you have said why you would then oppose a ban. I have not understood that reasoning.

**Francisco Morcillo:** It is merely just a position on: would a ban really help in this case?

**Q96 Caroline Lucas:** How could it not?

**Francisco Morcillo:** Because a ban, for example, in our point of view is a bit of a restrictive measure.

**Caroline Lucas:** Obviously.

**Francisco Morcillo:** If the cosmetics industry is already committed to phasing them out then—

**Chair:** But we have heard from the NGO sector that there are weaknesses with the so-called voluntary ban and those seven things, so we will make our own judgments on that, I think. If we can move on.

**Q97 John McNally:** I am very grateful to the Committee and to Professor Tamara Galloway who was here a couple of weeks ago. Last Friday, I was just following up on a wee bit of research with Dr Madeleine Bell of Fidra and Dr Rebecca McKinlay. We went down to the River Cairn, and we were quite shocked at what we found on the beach. You could not really call it a beach. It was a bit of the river where it washes in, but these were pellets that were found there. I would like to praise them. They have the great Nurdle Hunt going on now, which is part of Operation Clean Sweep. I think we are all quite shocked by what we found there. So thanks again to everybody. There is a map of all of these pollutants that are around all of our beaches. We do not want to get alarmist about it, but I think we have to deal with the reality of this situation and we need to understand the ecological impact of microplastic pollution on organisms and the marine environment.

**We heard that the small size of microplastics means that they can be ingested into marine life—there has been a lot of investment into marine life: shellfish, salmon fishing, in particular in the Scottish area—which should be concerning us. So what harmful effects can this have on the marine environment and are these ecological effects irreversible?**

**Dr Foster:** Yes. I will start then and others will come in. No doubt, as Maddy will have told you, there is a recent study published by Fidra that was done by Eunomia, which talked about pellet release. It found that in the UK there are 5.3 billion tonnes to 53 billion being released into the marine environment. In terms of production, that is 0.001% to 0.01% of the total plastic production. That is significant because previous estimates have gone up to being at 1%. To give you an idea, that means if you take a plastic bottle you are

going to have 12 pellets lost for every plastic bottle produced, so that is a significant amount.

I know that there has been things like Operation Clean Sweep that the plastic industry have cited, but Dan did the calculation and it looks about 17% of those people have signed up to that. That is the industry saying that they will clean up what they are doing. But for us the challenge is that there is no independent audit of that. They can sign up and say that they are doing it, but we do not have any transparency in terms of what they are actually delivering from that, and given the high numbers that we are talking about and the potential effects of that, if we look at the fishing industry, you look at the aquaculture, it is estimated that it is 0.2% to 0.7% of the economic cost. So the value of the fisheries is reduced by that. That is a significant amount of money that is potentially impacted. That includes all microplastics, to be clear, but obviously if you are looking at the pellets, which are about 12% of the emissions, if you take out secondary microplastics and if you also take out tyre emissions, which there is some discussion about whether or not they should be included, you are looking at 26% being down to these pellets being emitted into the marine environment in terms of that constitutes the microplastics. So it is a huge amount and it is something that we want to see a much more proactive push on. If people started opening bags of pellets on the street, I am sure it would be classed as litter, but when I talked to the Environment Agency they do not monitor it. There are no permissions required. You can effectively emit as much pellets as you like legally as far as I understand from the Environment Agency, because it is not considered a hazardous substance.

I am sure Dan will talk a little bit more about his experience with Operation Clean Sweep.

**Daniel Steadman:** John, I am very glad to see you brought props because I also brought props.

**John McNally:** I have more.

**Daniel Steadman:** Oh, you have more; nice to see.

The thing about pellets is that, as Laura has already alluded to there and as you have seen, they are the microplastics that you can go and see on your beaches. They are around 5 millimetres in size. Generally, they reach the marine environment through handling errors or being spilt and ejected through into drains. This is not just a UK issue. This is from the Westerschelde estuary on the Dutch-Belgium border. This is from the other side of Scotland, so in the Firth of Forth. You are not going to see pellets on every single beach you go to—they are not like plastic bottles and plastic bags—but in highly industrialised estuaries, often when they are downstream from a big plastic production site, these can be dominant pollutants.

We speak to a colleague in France who knows of beaches downstream from the Seine where you are talking about 75% pellets and 25% sand at some point, so—

**Q98 Rebecca Pow:** Can I just ask you about the Severn estuary, which is near my constituency of Taunton Deane? It is the second biggest site for over-wintering wading birds



that come to stir in the mud and find molluscs. Are they ingesting lots of these micro pellets, do you think?

**Daniel Steadman:** Pellet ingestion has been demonstrated in a number of species and mostly those kinds of birds you are talking about, so wading and seabirds. You have Little Terns. You have some species that are protected under European legislation that have been found with pellets in their stomach, and while there might be some contention over how transfer works and that sort of thing, at the very least we have to understand that these pellets are taking up a part of their stomach that they should be using for food that can contribute to their growth and correct feeding. So they should not be in birds, like they should not be on beaches.

**Q99 John McNally:** One of the comments Dr Madeleine made is that their stomachs are filled but they are starving to death. It could be any kind of small bird—puffins, in particular, I think maybe because of the way they feed and other ones, as you said.

Your own evidence suggested plastic pollution could amount to a cost of something like €60 million to the EU fishing industry. On what basis did you come up with that figure? That sounds an enormous figure?

**Dr Foster:** That figure will have been from the Eunomia report. I used the percentage report in terms of talking about the UK rather than from the EU. That was not—

**John McNally:** That was from the UK.

**Dr Foster:** But that looked at the relative cost. We know that if there are no microplastics—there has been a cost-benefit analysis looking at that—the cost-benefit analysis of not having microplastics in the environment, including aquaculture, would be 250 million, so there is a significant cost-benefit analysis that has been done.

**Q100 Chair:** What is the cost to the UK fishing industry? Can you disaggregate it out of that?

**Dr Foster:** Yes. It is 0.02% to 0.7% of the value of the aquaculture, taking a nominal value. I think it was 300—

**Q101 Chair:** What is that in figures?

**Dr Foster:** That will be 300 million.

**Sarah Baulch:** In the UK shellfish industry, it was between 60,000 and 2.2 million per year.

**Q102 Rebecca Pow:** Sorry, that is quite a big range. If we did not have them, that is what we would gain. Is that what you are saying or is that the cost?

**Sarah Baulch:** That is the potential economic cost.

**Chair:** That is the costs of the damage.

**Sarah Baulch:** In the UK shellfish industry, it was between 60,000 and 2.2 million. It is a huge range.

*Dr Foster:* I think the huge range is because one of the challenges is to work out, first, the concentrations looking at the effects, and I think there is a variance, but it comes back to the precautionary principle. We could be looking at the higher end of that in terms of an economic cost. There is a lot of evidence in terms of ingestion of microplastics in aquaculture. We have seen impacts in terms of oysters. If you look at the reproduction, there is a reduction of about 36% in terms of reproduction, size and number. So we do know that it has a negative impact and we also know that an average European consumer consumes 11,000 bits of microplastic per year.

**Q103 Chair:** How can you do a cost-benefit analysis if you don't know what the costs are? You say the cost-benefit analysis is 250 million, but you have given a massive range for the costs, so the cost-benefit analysis must also have a range, surely.

*Dr Foster:* Yes. That was produced in the Eonomia report and that was taking the average number that they have quoted within that as—

**Q104 Chair:** Is that an annual cost-benefit or over a five or 10 year period?

*Dr Foster:* That is annual.

*Sarah Baulch:* Part of the issue at this point is not knowing how consumers would respond either, so it is unknown how much of an issue it would be to consumers.

*Dr Foster:* Yes.

**Q105 Rebecca Pow:** Mr Morcillo, the British Plastics Federation support the Operation Clean Sweep to pick up the microbeads, so hearing this evidence and seeing my colleagues' beads here, do you not feel obliged to bring in a ban?

*Francisco Morcillo:* It is two different issues. It is not that we would oppose a ban; we would favour a voluntary commitment. With a pellet, for example, that is preproduction, basically the raw material; it is not something that you put into a manufactured product or into the formulation of a product. So, it is two different issues.

Operation Clean Sweep is something that we have run since, I think, 2010. It started in the United States and it is an initiative just to raise the profile of the issue of pellet loss in the manufacturing of plastics. So it is two different issues. Operation Clean Sweep: we have worked with all the NGOs to raise the profile of the issue and to take measures to focus on avoiding pellet loss in manufacturing.

**Q106 John McNally:** I understand the difference between the pellets being disposed of in production, and I understand again that the sector is looking after itself. It is watching itself and spillage in particular was mentioned earlier on. But we have a huge investment on the West coast and roundabout Scotland in shellfish and, as I said earlier on here, we want to protect that at all costs. We have a clean and green image and we want to protect the image that we have worldwide of our water and there is no question about that whatsoever.

Aside from the fishing industry, what other sector costs should we expect from microplastics pollution?

**Dr Foster:** If we look at cost, this is where it starts to get more challenging because we start to look at clean-up costs, because it also depends whether or not in the future that we are looking at an absorption effects because then you start getting into—

**John McNally:** The absorption effects of toxins?

**Dr Foster:** The absorption of persistent organic—yes.

**John McNally:** The toxins going—

**Dr Foster:** Yes, basically toxins going—so if at that point you decide that you need to do a clean-up, a clean-up is obviously quite expensive. As you have seen, the quantity already in Fife and around Scotland is quite dramatic.

**John McNally:** Yes.

**Dr Foster:** So I think that is one of the challenges. When we are talking about microplastics one of the challenges is this concept that you can clean up the ocean and it is really challenging, even the concept that you can do it. That is what we are coming back to; that we want to see it stopped at source rather than this concept of cleaning up.

**John McNally:** At source, yes.

**Daniel Steadman:** There is also I suppose the tourism industry, very relevant to this. That probably applies more to plastic pollution in the round, but nurdles, or pellets I should say, are also a pollutant that you can see, so a beach looks pretty degraded if its strandline is covered in pellets, so there are potential impacts there.

**John McNally:** Well, certainly, once your eyes—

**Daniel Steadman:** You cannot see anything else can you, once you see them?

**John McNally:** That is right, yes; you just get drawn to it.

**Chair:** Thank you. We are going to move on to the human health thing with Geraint.

**Q107 Geraint Davies:** Yes. Can I ask in particular, Sarah Baulch? You said in your evidence that there was a clear risk of microplastics in terms of posing a threat to human health. However, we have heard there is little academic evidence of this. There is a case obviously for a precautionary approach, and I think Dr Foster is suggesting, unless I misheard her, that we ingest 11,000 bits of plastic a year. But can you just remind us what are those risks and on what basis did you come to that conclusion?

**Sarah Baulch:** Yes, of course. We know that microplastics are present in a number of seafood species. For example, there have been studies of Norway lobster in the UK where they found around 83% contained microplastics. Also there was a sampling of species in the English channel and they found around 36% of the fish contained microplastics. We also know that there are obviously risks related to the absorption of pollutants. I think at this stage the science is not there to be able to quantify what that risk is. We need to better understand whether chemicals are transferred and also the rate of transfer of microplastics within the marine food chain.



**Q108 Geraint Davies:** Can I just press you on this? Professor Kelly of King's College also said that microplastics could be inhaled by humans. What we have established, I think, is that they are all in the food chain in abundance and they get into us, either through ingestion or through inhaling, but we don't quite understand how much harm they can do. So your position is that they are getting in, but we should adopt a precautionary principle?

**Sarah Baulch:** Yes.

**Geraint Davies:** Or is there more evidence that they cause cancers and all this sort of stuff?

**Sarah Baulch:** No. I would say the evidence is not there yet, but from a precautionary principle—

**Geraint Davies:** We just know that we are ingesting this stuff that we should not really have?

**Sarah Baulch:** Yes.

**Daniel Steadman:** I do not think we can doubt the exposure at all. I think that is what we are saying with the environment and that is what we are saying with humans as well. There is contention around impacts and effects, but this is potentially everywhere and there is, therefore, as strong a moral imperative to do something about it as there is a scientific one. Microplastics should not be out there.

**Q109 Geraint Davies:** There was a suggestion that oyster reproduction is 36% down, so we seem to know more about oyster impacts than human impacts. Then, on birds, you mention those protected birds that are ingesting.

**Daniel Steadman:** Yes.

**Geraint Davies:** Do you imagine there is scope for any legal action by the EU saying, "We are protecting the birds. You should fine the plastics manufacturers," and, for that matter, if Swansea beach is covered in these pellets and it is undermining my tourist income, are there legal opportunities to fine? There is clear damage to the environment and to the wider ecosystem.

**Daniel Steadman:** We have considered that as a potential approach and there does seem to be some legs to it. Part of the difficulty would be working out which sectors were implicated. Microplastics can reach the marine environment and reach a bird's stomach from a variety of different sources. You have already heard about pellets. You have heard about microbeads. You have heard about microfibers. You have heard about larger plastic items that degrade. So, to work out where that legal challenge should be entrained, you are probably covering a multitude of sectors that are requiring innovation from all of them. That is what draws you down the line of looking at which of the sources is the most abundant, but we would argue that the most important thing is to consider microplastics in the round as something that should not be in the marine environment or in the human body and, if there is a source that we can start with and that we can prevent upfront, that that is how we should prioritise our need. We should base it on feasibility as well as on the evidence of how much there is in the environment.



**Q110 Geraint Davies:** So we want the precautionary approach and we want more research, but I still do not quite understand why we have this data on oysters and we do not have it on anything else. Do we not have anything else?

**Dr Foster:** There have been a number of studies looking at marine organisms and the impact because, effectively, you can culture in the lab and you can feed them microplastics and see what the impact is, but obviously when it comes to humans that would be considered slightly unethical. If you consider that there might be a risk factor, I suspect that that would not be permitted under human experiment. I think that one of the challenges is to split out what is the impact of microplastics on humans versus you can do experiments on things like oysters. The reason that people have chosen oysters is obviously because they have the aquaculture industry interest in terms of potential impacts on that. While there is not the kind of human, very direct health link—that has not been proven—I think what we are seeing is there are a number of organisms, everything from looking at the zooplankton to larger marine organisms, which are showing an impact of having ingested microplastics. I think that is important and hence why we say we want to see the precautionary principle.

**Geraint Davies:** Like the endocrine disrupting chemicals.

**Dr Foster:** Yes.

**Daniel Steadman:** Please do not be discouraged that there is no research going into this at all. People are trying to replicate how plastic particles move through cell walls and replicating the conditions that you would find in the human gut or in the human lungs to show whether passage is even possible between organs, so I am sure after the—

**Q111 Geraint Davies:** Who is doing that? Is anyone doing any research?

**Daniel Steadman:** I think we can send you something. I am not aware of them off the top of my head, but I know it is happening. There is a recent United Nations report published, literally just a couple of days ago, about the risks to human health of microplastics. That would be a good place for the Committee to start.

**Q112 Chair:** We did also hear from Professor Kelly. What they said was that the risks are reduced, for example, by pulling out the guts of the fish or pulling out the long spine, the black bit in the langoustine or whatever it is. So they were very clear about it being a risk in seafood. It would be less of a risk in fish. Is that correct?

**Daniel Steadman:** When you say “seafood” do you mean shellfish and things where you eat the whole organism, effectively?

**Chair:** I mean shellfish, yes.

**Daniel Steadman:** Yes, I think that is borne out by the current evidence and the evidence seems to suggest also that fish are perhaps less exposed than some of the other species and they might be able to egest the plastics more effectively. We are a nation kind of founded on shellfish production and we have detected it in mussels, in oysters, in scallops. So, to say that the shellfish sector being implicated in microplastics ingestion is not

necessarily a risk compared to other species we eat, we would not feel necessarily would be fair, particularly given the fisheries that our nation is founded on.

**Sarah Baulch:** It has also been found in things like sea salt and so on as well.

**Chair:** Sorry?

**Sarah Baulch:** Microplastics have also been found in sea salt as well, so there are a number of—

**Chair:** Sea salt?

**Sarah Baulch:** Yes.

**Dr Foster:** The only other one thing that I would add is that microplastics have been seen as a kind of vector, so a way that a pathogen can enter. That is also something that is being looked at in terms of it being a vector for pathogens. That research is just starting. There has been a very preliminary study that I could send to the Committee.

**Q113 Geraint Davies:** Which pathogens?

**Dr Foster:** They looked at a range of bacteria within that. So, again, people are looking to see if you can get bacteria and viruses effectively using the plastic as a way into the gut because obviously, again, that is changing the fauna and flora.

**Rebecca Pow:** We had surfers against sewage; now we have to have surfers against plastics on my Cornish holiday.

**Chair:** Do you want to move on to question 6?

**Q114 John McNally:** We have heard of the deterioration of the Great Barrier Reef. Would you have any idea if plastics could be affecting that and the organisms that live on the reef? I know Australia is looking at this again in a voluntary capacity. Have you any ideas?

**Dr Foster:** Again, this is a global problem in terms of input. I know that Australia looked towards a voluntary ban, and they were going to review it this summer to see whether or not they felt that the commitments from the voluntary phase had been sufficient.

**Q115 John McNally:** Would that affect growth of coral, would you know?

**Sarah Baulch:** They have been known to ingest microplastics, and it did have negative effects. I cannot remember whether it is growth specifically.

**Q116 Geraint Davies:** Defra said that microplastics are more likely to be inhaled than consumed through food. Is there any evidence you know of to support that claim?

**Sarah Baulch:** None that I know of.

**Daniel Steadman:** As far as I am aware, Dr Kelly's work is leading the way on this.

**Q117 Chair:** If it is true, what do you think the implications are? It is from an unpublished paper in the Netherlands, and it was about sewage sludge being spread on fields and then drying out, and then the plastics entering the air.

**Dr Foster:** I personally could not comment; that is not my expertise, in terms of inhaling it. That would be what I would say. But I would say that we do spread sewage sludge on farmland within the UK. So it is getting into the soil. It is getting into water courses. Obviously, if it is getting into the air as well, that is an additional problem that I was not aware of.

**Q118 Chair:** Although we did hear that most water companies do not effectively trap microbeads. So it is whether or not they are trapping it, because they would have to trap it before they could spread it. We will look into that in greater detail, thank you.

Can we go back to the economic costs, please? Some of the estimates go as high as £500 million per year. Can you tell us where those estimates come from? What assumptions are you making on that? Can we just drill into that a little bit more?

**Dr Foster:** Yes. Again, these are not our calculations. This is from a published report, and that looks across aquaculture; it looked at beach cleaning; it looked at the tourism. So it looked at a variety of different sectors. Then, as I say, there is quite a broad breadth of estimates for that, and £250 million comes at the half way, the average between £1.5 million and £499 million. That is where that number comes from. I think Sarah has some specifics in front of her.

**Sarah Baulch:** Yes. That was just for the UK shellfish industry, and they separated it out. I think they looked at shellfish, tourism, and potential clean-up costs.

**Dr Foster:** Yes.

**Q119 Chair:** We have evidence from CEFAS, which is Defra's marine research organisation, making their first attempt at defining the economic impacts on the oyster industry in the channel, and the cost is between £1.5 million and £500 million. Again, that enormous range, but £500 million is a pretty big number, is it not?

**Dr Foster:** Yes.

**Chair:** So it is tourism; it is cleaning; it is impacts on the shellfish industry. Okay, that is helpful, thank you.

**Q120 Rebecca Pow:** We have looked at the economic consequences—a few of the costs of preventing—but which prevention measures do you think would be the best ones to opt for now? Shall we start with Daniel?

**Daniel Steadman:** Yes. I would reiterate the need to consider feasibility in this. There are lots of ways and lots of sources of microplastics, as we have already heard, and the beauty of microplastics and microbeads in cosmetics is that it is a very, very simple one. We have to stop putting them into products, because they do not belong there.

I would say, with some of the other sources, there are going to be significant challenges to come. Microfibres, for example: we have just started working on a project with some of

our European colleagues called Ocean Clean Wash, which is looking at innovation in the fashion industry to produce clothes that do not shed fibres as easily; working with the washing machine industry to fit washing machines with filters that catch microfibrils; a host of innovations that will require multi-sector change.

But again, I would come back to microbeads and pellets: we need to stop putting small pieces of plastic into cosmetic products, and we need to make sure that we do not spill, and that we contain pellets. They are as good a two sources to start with if you are interested in microplastic strategy at large.

**Q121 Rebecca Pow:** Can I put it to you then, as someone who uses an exfoliant—

**Daniel Steadman:** Yes. It is not a crime.

**Rebecca Pow:** I have tried to do some research and it is very difficult to look at the packaging and discover whether there are microbeads contained in it. I have just started tweeting these things, if anyone wants to follow.

What is your view on that, because surely, if we the consumers want to choose, we need clearer indications as to what to choose?

**Daniel Steadman:** I point you to the last three years of work that Fauna & Flora International have done on this. This is not just staff members; it is volunteers; it is people going out to shops; it is people transcribing whole ingredient lists of entire brands and trying to work out from the published literature which of those ingredients are solid and plastic in form.

We look for six key ingredients. Polyethylene is the one that you probably will have heard of, but we also look for PET, PTFE, polypropylene, PMMA and nylon. All of these things are quite shocking—that they are even found in these products—but then there is a host of another hundred or so ingredients that can be solid in form and that we also regularly find in these products. So even if you are the most conscientious consumer in the world, it is very, very hard to be completely sure that there are no solid plastics.

**Q122 Rebecca Pow:** I will throw in that lots of them are in different languages. If I am allowed to mention any brands—Clarins, it is all in French in the most minuscule print you could ever see. It is impossible to see whether there are any of these products in it. Would you agree that that is not helpful?

**Daniel Steadman:** I would agree, and I would say that is also an interesting way of considering the other potential down-the-drain products that could contain these things, where there is not even any legal requirement to list those ingredients.

**Q123 Rebecca Pow:** I tried to look on some of the washing products as well, and it is an almost impossible task. Am I right in saying it is an almost impossible task?

**Daniel Steadman:** Very much so, yes, and we have an enormous database of 1,300 products that have been transcribed over years and years, which would support the idea that it is difficult.



**Q124 Rebecca Pow:** Mr Morcillo, are your companies finding ways of making it difficult for us to understand whether there are microbeads, do you think? Are they blinding us with—

**Francisco Morcillo:** We do not represent the brands, so for us it is a tricky situation. Obviously, plastics are widely available to buy, so brands can buy from the companies that we represent and put them in their product. The plastic industry is against the use in these products, in cosmetic products, but it is not something that we can influence. It is the cosmetic industry that has to find a replacement for it.

**Geraint Davies:** Can I ask one question to Daniel Steadman? Clearly, as Rebecca Pow has said, there should be an obligation to ensure consumers understand what is in their products. Would it be possible for you to drop us a note—obviously, the EU packaging legislation should be introduced now to packaging; we are going to do a number of recommendations—and have your recommendation on what should be the minimum declaration on these products about what is in them, so that people have a simple proposition? There are microplastics in this, or whatever. Obviously, you may want to ban them.

**Q125 Rebecca Pow:** Mr Morcillo, this has been put to me by some people in the industry. Are you finding there certain countries or groups of people through your federation that are keener to introduce a ban than others countries?

**Francisco Morcillo:** We are aware already of the US and Canadian ban. I think the Netherlands is another country that is putting something forward.

**Q126 Rebecca Pow:** I only say this because an awful lot of the leading cosmetic brands are in fact French, are they not?

**Francisco Morcillo:** Yes.

**Rebecca Pow:** Are you finding any—

**Francisco Morcillo:** Not that I am aware of.

**Rebecca Pow:** Any views about their approach?

**Francisco Morcillo:** I would not know.

**Daniel Steadman:** That is why, in our work, we try to encourage the brands we engage with to commit to phasing out in all the markets that they are active in, so that it is an absolutely clear, global position for consumers.

**Q127 Zac Goldsmith:** Just to be clear, the US ban applies to any products imported to the US as well?

**Daniel Steadman:** I believe so.

**Q128 Zac Goldsmith:** So French products now that contain these things cannot be sold in the United States, as of last year. Is that right?

**Francisco Morcillo:** As from next year, I think.

**Daniel Steadman:** However, the difficulty with the US ban is that it is not anywhere near as progressive as we think it could be. Once again, it is constrained by its definition of what the problem is. The US ban refers to plastic particles that exfoliate and cleanse, and we have the data to show that there are other types of solid particles that therefore would not be covered by that ban. It also specifically limits itself by product types, so it specifically mentions scrubs and toothpastes. Again, we have evidence that it is across a range of different categories, and therefore it is targeting one subset of the problem, rather than holistically dealing with the entire problem.

**Francisco Morcillo:** Yes. The Canadian ban, for example, is slightly different. The particle size that they mention is smaller than the US size. Canada is defining microbeads in cosmetics, non-prescription drugs, and natural health products. They are widening the scope of the ban. They are both bans, but very different, which makes things a bit more confusing.

**Q129 Rebecca Pow:** On the converse, from the side of industry, has anybody discussed or calculated what they are saying the cost to them would be of removing all these products, because, clearly, we want the economy to still operate? Any views on that?

**Daniel Steadman:** We do not necessarily have cold, hard figures, but we do have examples from a range of different brands of different size that have done this, ranging from a small British brand called Beeline, who had, I think, four products that had solid polyethylene in them. They were able to do it in three months. They were able to do it across all those products that were implicated, and they did not view it as something that was a negative externality that they had to absorb. It was something that they wanted to do.

**Q130 Zac Goldsmith:** I was going to press on the US ban, but I am not sure we have time.

**Chair:** Yes. That is fine, if you want to.

**Zac Goldsmith:** I am interested in how that happened because the US, on the whole, is not generally seen as a leader in environmental legislation. What was the process there? How was that campaigned to success? Were any of you involved in it?

**Sarah Baulch:** We were not involved, but there were a number of state-level bans, and there was a great deal of discrepancy between them in terms of how progressive they were, and because there was such a diverse number of commitments, they then moved to get a US-wide ban that was—

**Q131 Zac Goldsmith:** So that same process surely applies now across the board? If you have a situation where the big markets like Canada and the US, and likely others to follow, are already banning to greater and lesser degrees microbeads in cosmetics, surely from the industry point of view, it would be easier to have a clearer and more homogenous approach, would it not? I still so struggle to understand why your position is to oppose a ban, because I have not heard any real arguments against it.



**Francisco Morcillo:** Obviously, we do not represent the cosmetics industry, we represent the plastics industry. For us the amount of plastic sold into the cosmetics industry is completely insignificant.

**Q132 Zac Goldsmith:** But you have a position on whether or not microbeads should or should not be banned in cosmetics?

**Francisco Morcillo:** We have position that microbeads should not be used in cosmetics.

**Zac Goldsmith:** But banned?

**Francisco Morcillo:** About the ban?

**Zac Goldsmith:** Yes.

**Francisco Morcillo:** If a voluntary commitment does not work, then we would support the ban.

**Rebecca Pow:** It is not working.

**Q133 Zac Goldsmith:** Thank you. I am going to move on from there.

During the last hearing that the Committee had, we heard that the microbeads cause more environmental damage because of their relative greater surface area; but obviously, the bigger chunks of plastic break down in any case to microbeads. So how do we use that fact when it comes to shaping policy making? What does that mean in terms of where the policy focus should lie?

**Daniel Steadman:** There are two issues at play there that you have alluded to. The first is degradation of larger items becoming smaller pieces of plastic, and that is something we should of course do something about, but it is something that requires innovation in waste management. It is something that requires changes in consumer behaviour. There is then a separate issue about small pieces of plastic that are used at size in particular industries, and how we evaluate which ones of those pose environmental risk or not.

With microbeads, the case is so strong, in that there are proven studies that show that they have reached the marine environment. There are proven studies that show they impact the species that live in those environments, and there is a clear solution. That is, to my mind, why we should direct policy to start with microbeads, because of the presence of a solution.

**Q134 Zac Goldsmith:** If we develop the policy that you are asking for in relation to microbeads, then logically you would have to find a policy response to the fact that big bits of plastic effectively become microbeads. So the question then is, what would that mean for the industry? How would the industry respond were these microbead bans to come in place?

**Francisco Morcillo:** That is the complication of a ban; depending on how you define microbeads, there will be an effect or not.

**Q135 Zac Goldsmith:** I am saying if you assume the ban happens, you assume that microbeads are banned in cosmetics and that that ban grows, logically, you would have to expect that the next step would be to look at other forms of plastic as well?

**Francisco Morcillo:** For the plastics industry, such a ban, it would not have any effect at all.

**Q136 Zac Goldsmith:** It would not have any effect?

**Francisco Morcillo:** It would not have any effect. We are talking about 3,000 to 4,000 tonnes of plastics in the European cosmetics industry out of 59 million tonnes of plastic produced. So for the plastics industry, that would not have any effect. For the cosmetics industry, I do not know what would be the cost. But we have to differentiate. We are not the cosmetics industry. We do not formulate the products that wash off.

**Q137 Zac Goldsmith:** No, I understand. But what I am saying is that if you have that microbead ban then, logically, you could not then turn a blind eye to the fact that microbeads are effectively created by the normal decomposition of larger bits of plastic.

**Francisco Morcillo:** Yes.

**Zac Goldsmith:** So the policy response would have to then focus its attention on other forms of plastic, and that would have an impact on the industry. So my question is, how would the industry respond to that? You must surely know that this is on its way

**Francisco Morcillo:** We are talking about the sources of microplastics. One is primary microplastic, which is plastic pellets, microbeads, for example. The other is secondary microplastic, which is plastic breaking down into smaller sizes. The only way to be able to tackle that is prevention of waste.

**Q138 Zac Goldsmith:** I want to come back to another point. Can I ask you to respond to the point that Daniel Steadman made earlier in relation to biodegradable plastics? Do you share that analysis?

**Francisco Morcillo:** We do share that. Biodegradable plastics do not belong in the ocean. There have been a lot of studies and reports that they do not biodegrade in the marine environment, and we completely agree with that.

**Q139 Zac Goldsmith:** But that would not be true of—you were talking about kernels earlier, was that right, apricot kernels? Yes. That would not be true of things like apricot kernels?

**Francisco Morcillo:** Obviously, we are talking about biodegradable plastics.

**Q140 Zac Goldsmith:** Biodegradable alternatives to the microbeads: is that an area that the industry is putting enough research into?

**Francisco Morcillo:** If it is not plastics, it is not something that we would be—





**Q141 Zac Goldsmith:** I want to move back, so I am jumping around, but I think, Dr Foster, it was the Marine Conservation Society; you did an analysis of litter found on beaches, and you found that 44% of the items could not be identified, could not be categorised?

**Dr Foster:** Yes.

**Q142 Zac Goldsmith:** From a policy point of view, that makes solving the problem so much harder than it otherwise would be. What is your reaction to that, and what is your suggestion to us?

**Dr Foster:** What you have to think about is those unidentified—effectively those break down and seven tenths is plastic or polystyrene—so those are the pieces, for want of a better description. That is why they are unidentified, generally. That is what the majority makes up, and 960 pieces of plastic and polystyrene are found per kilometre.

What we need to look at is the top 10 items that we find, typically, of that sort of microplastic we are talking about—and other litter, not just plastic, but the majority of those top items are plastic. So we want to talk about bottle deposits, things like that: cups; on-the-go litter, things like that. We want to incentivise people to do the right thing. A lot of people try to do the right thing, but other people, for whatever reason, do not, and then you have to look at financial incentives to persuade them that they want to do differently and change their behaviour.

**Q143 Zac Goldsmith:** Why do you think then, despite Government initiatives and the kind of campaigns that John McNally was talking about earlier, that there has been so much more emphasis and attention paid to this issue, but according to the figures we have, the amount of plastic litter has more than doubled in the last 20 years in the UK. Why is that? Is that even more products, or is it—

**Dr Foster:** Yes. If we look at the causality of the increase what you can see is this is an increase in on-the-go plastic litter. You are talking about plastic bottles; you are talking about takeaway—polystyrene takeaway clam shells, things like this. We are living in a single-use, disposable culture, and we are seeing the litter that reflects that, because it does not break down in the marine environment.

**Q144 Zac Goldsmith:** Moving away from the microbead issue, if you were in charge of Defra, how would you refine their approach to reverse these trends?

**Dr Foster:** I would look at proactive steps that could be done. Things like the deposit return system would be a big step, because we find a lot of drinks bottles. To be fair, that does not just include the plastic, but the plastic makes up a considerable proportion of that.

**Daniel Steadman:** It is enormously effective as well, is it not?

**Dr Foster:** Yes. We have seen evidence that shows you see massive reductions in the amount of bottles, because suddenly the product has a value, and that is the challenge. We use a single-use item, and that product is then viewed as having no value. So you have to create a value somehow. If the consumer does not feel it has a value then you have to create a value. If you look at takeaway cups, could you have a reduction if you bring in your own cup? Things like that; encourage businesses that they should be doing things like



that. When you speak to small businesses and they talk about takeaway cups, it costs them money. So if people were in the habit, businesses, particularly small businesses, would flourish under that scheme. Things like that we can look at.

**Q145 Rebecca Pow:** Can I come in there? I gather, and I would like your view on it, that there is a proposal that the Government is going to reduce to industry the recycling targets for plastic bottles. What is your view about that?

**Daniel Steadman:** I believe what you are referring to is under the innovations in the circular economy package. I think we can all get on board with the idea that we need to be less wasteful about plastic, and we need to discourage those irresponsible uses of plastic that Laura has already alluded to. So, yes, anything that involves watering down recycling targets is something that we would discourage.

**Q146 Rebecca Pow:** That seems completely contrary to everything that we are talking about here.

**Daniel Steadman:** It is certainly contrary to the spirit of the circular economy, which is about retaining the value of these things. I do not know if anyone on the Committee has ever seen some of the first advertising on plastic products from the 1940s and the 1950s, and it was this promotion of throwaway culture. There are literally photographs of people taking all their plastic items and throwing them in the air. So the business we work in is overturning half a century's worth of perception that plastic is made to be thrown away, and realising that it does have a material value and that throwing it away has an economic and an environmental cost.

**Q147 Rebecca Pow:** If that does come forward—reducing the targets—what sort of message is that giving to industry to get behind what we are talking about and what Zac is saying? It is the bigger bits of plastic that end up being the small bits of plastic, so we do have to start with those.

**Daniel Steadman:** It is the wrong message, really, is it not?

**Francisco Morcillo:** We need to look at the details of why targets are being reduced for this year. But, nonetheless, they are going to be extended after 2020. Then, with the circular economy, there are some higher targets for 2025. In reality—

**Q148 Chair:** So what are the reasons?

**Francisco Morcillo:** The reason is because the baseline of the amount of plastics in the market was overstated, so we were recycling more. The targets initially, in the past, have been set up with a wrong baseline. That was one of the reasons why the targets have been changed now.

**Q149 Rebecca Pow:** Do plastic bottles come under your remit?

**Francisco Morcillo:** Yes.

**Q150 Rebecca Pow:** So when you say microbeads are nothing to do with you, in fact they are, because plastic bottles do eventually end up being microbeads, do they not?

**Francisco Morcillo:** Not within the microbeads.

**Q151 Chair:** They do, because we heard from our experts last time that they break down into smaller and smaller particles.

**Francisco Morcillo:** Into microplastics, but the definition of microbeads in here is plastics that are used in cosmetic products. That is the only thing that we can—

**Chair:** Okay—microplastics, microbeads.

**Q152 Zac Goldsmith:** Can I have one short question, because I know you are going to wrap up now? I absolutely accept the position of all campaigns, all expert voices on this, that the key is prevention, that that has to be the priority. But I do want to ask you whether or not you think the plastics industry is doing enough to at least explore the various ways in which we might begin the process of clearing up the waste that already exists? Could I ask our three campaign organisations first?

**Sarah Baulch:** Particularly looking at, for example, the circular economy strategy, there is a lot that companies could be doing about ensuring that products are recyclable from a design perspective, either reusable or recyclable, preventing waste and minimising packaging and also incentivising collection. Laura mentioned there are a number of potential policy options there in terms of putting deposits on certain products so that it incentivises people to recycle and return them.

**Daniel Steadman:** There is a range of industry responses. We have worked with the British Plastics Federation on their specific source that is in their purview, so the microplastic pellets. We have made some progress, but we are still talking about an industry where in the UK only 17% have signed up. So there is clearly a role to be played boost that and make that more ambitious.

In terms of the cosmetics industry, yes, we have seen a lot of good progress, but in terms of the scale of the issue, you are still talking about something pretty enormous. We have talked a lot about tonnages today. How many tonnes of microplastics go in the sea? It does not necessarily tell you the whole story, and we prefer to work with particles, and the published studies around microbeads show that there is around 0.1 microbeads per litre of sewage effluent, which is put into our rivers and seas.

That does not sound like a lot, but when you think that we process 11 billion litres of waste water every day, that gives you 550 million microbeads going into UK rivers and potentially the marine environment every day; 400,000 a minute.

**Q153 Zac Goldsmith:** I suppose what I was looking for was reassurance. We have 100 million tonnes of plastic in the Pacific alone, according to the figures that I have seen, and that story is true all over the world. Are you saying that there is no hope on the horizon, that there is nothing we can look to for hope in terms of clearing up the problems that already exist, as opposed to just dealing with the prevention? I am not diminishing—

**Daniel Steadman:** I understand that.

**Zac Goldsmith:** I completely agree with you that we do have this huge problem. Is it not worth looking at that at the moment?

**Daniel Steadman:** That is a great big innovation challenge and, in spite of the fact that we all have a shared position around prevention, I would say that we would not discourage anything that presents a feasible, workable solution for removing plastics from the marine environment.

**Q154 Zac Goldsmith:** But there is nothing on the horizon at the moment?

**Daniel Steadman:** There is nothing that we think is a compelling case that could do this at large scale. In fact, there are published studies that show that there is a disproportionately large effect with comprehensive beach-litter cleaning on the amount that goes into the marine environment. So what the Marine Conservation Society are out there doing is the very front line of this issue.

**Sarah Baulch:** Perhaps for some specific items like fishing gear, clean-up is more viable and cost-efficient.

**Q155 Chair:** Can I ask Mr Morcillo what innovations the plastic industry is taking to make your products less likely to biodegrade into microplastics?

**Francisco Morcillo:** Prevention is one of the things that we are working on—

**Chair:** I said “innovations”.

**Francisco Morcillo:** So those products do not end up as waste, and may end up recycled into new products.

**Q156 Chair:** That is not the question. I asked about innovation.

**Francisco Morcillo:** That is avoiding the plastic product breaking down into smaller particles. That is a huge innovation and challenge.

**Q157 Chair:** I am asking, are you doing any work on that?

**Francisco Morcillo:** I am not aware of any innovation in that sense. This is opinion, but I am not sure if that is possible.

**Q158 Rebecca Pow:** Maybe running along the panel, do you think our Government and the European Government are taking this issue seriously enough, and are they taking the action they ought to be taking now?

**Daniel Steadman:** There has been a range of member state responses, to be perfectly honest. There are several that have published things like a microplastics footprint on a country-by-country basis. They have said, “This is the size of our relative industries that emit plastics into the sea, and here is an identification of each.”

**Q159 Rebecca Pow:** I am particularly interested in our Government, what we do.



**Daniel Steadman:** We are not aware of something that does that, and then that translates what we have learned about how much microplastic we emit into an actual strategy to say, “This is how will mitigate each of these.”

**Q160 Rebecca Pow:** My question is, is Defra, I think it comes under their hat, taking this seriously?

**Daniel Steadman:** We are aware of the litter strategy, for example. But as far as I am aware, that does not have a particular purview around microplastics.

**Dr Foster:** It would be relatively telling that Fidra, as a charity, produced the estimate on loss to the marine environment through the plastic pellets rather than Defra. You would have an expectation that a Government body would be looking at losses to the marine environment through highly preventable pollution; but instead, it is a charity that has been funding that. I think they are not looking in terms of how they deliver it, and they have the commitment under the Marine Strategy Framework Directive to deliver something. This is one of our criticisms at the moment, that we are not seeing enough proactive delivery from Defra in terms of reducing marine litter, because we are seeing through our beach watch survey that we do every September that the amount of litter we find in the marine environment is going up each year.

**Q161 Rebecca Pow:** Would a ban help that, if the ban was brought in?

**Dr Foster:** Yes, of course. To answer Zac’s question about cleaning up, I heard an academic describe it as taking a teaspoon to a bath, where the taps are on full flow, and then trying to empty it. The effect of that is what you currently do, and so you need to look at preventing that inflow, and then you can probably start to concentrate on the cleaning up. I am not saying that clean-ups should not happen simultaneously, but in terms of that focus we need to look at the focus on innovation and prevention.

**Q162 Chair:** Our last panel told us that the charge on carrier bags had had a big impact. Have you seen that?

**Dr Foster:** In terms of the beach watch data, we still have not seen a concrete reduction. But we would not expect to because, obviously, there is quite a legacy impact in terms of marine litter. Again, we would need maybe five years’ worth of data to say that statistically what you are seeing is down to a reduction. But I know from evidence from Keep Britain Tidy that they are reporting a reduction in the amount of plastic bags that they report on land. So we would expect that that would then start to see a reduction. I think that is an important thing to note. We are looking now and there is going to be a legacy effect of whatever we do now, so we need to change now because there is still going to be plastic in the environment for some time to come.

**Chair:** John, do you want to ask the final question?

**Q163 John McNally:** Yes, but there are so many questions it is incredible.

Before I move on to my final, final question, would you say that the microplastics are led by the cosmetic industry? For example, if the cosmetic industry were not asking for these microbeads, would you be producing them?

**Francisco Morcillo:** I am not sure if I can answer, because that is raw material that is widely available. So they can buy the raw material and put it in their products. So it is not something like a lead product. Honestly, the volumes are so small that plastic producers would not have a problem not producing that.

**Q164 John McNally:** No. I am just looking at the chicken-and-egg situation. Who is asking who to do what here? Is the cosmetic industry asking the plastic manufacturers to make these microbeads, or are you making them and then selling them directly to the cosmetic industry? I would quite like to know the answer to that question, principally.

But what I would finalise by saying is that, certainly in Scotland and the UK, if you want to change the world, you get busy in your own little corner, and I think we are starting to do that. You have seen all these things all around about the coast. But what I am concerned about is the trans-boundary nature of these microplastic pollutions. We have touched on that earlier on, about it how it is going all over the world and it requires international co-operation. In your opinion, what further developments are needed in this area?

**Francisco Morcillo:** For example, in this particular issue, with Operation Clean Sweep, we work with the European association, and they are co-ordinating the different actions from the different countries in Europe. Last year, for example, we achieved that the Chinese association and the Russian association signed to Operation Clean Sweep, so they are working as well to take steps to tackle this issue, to raise awareness within the industry and trying to try to take steps to tackle it. We are looking now, for example, at including not just the industry, but also ports and ships, to encourage them to sign into Operation Clean Sweep. This is something that we have seen is another potential source of microplastics in the ocean.

**Chair:** Great. Thank you all very much indeed for coming. That concludes our public session. Thank you all very much for taking the time to attend.