HOUSE OF COMMONS

Environmental Audit

Oral evidence: Environmental Impact of Microplastics, HC 179

Tuesday 14 Jun 2016

Ordered by the House of Commons to be published on 14 Jun 2016.

Watch the meeting

Members present: Mary Creagh (Chair); Caroline Ansell; Zac Goldsmith; Carolyn Harris; Mr Peter Lilley; Caroline Lucas; Rebecca Pow.

Questions 287-400

Witnesses

George Eustice MP, Minister of State for Farming, Food and the Marine Environment, DEFRA, Dr Gemma Harper, Deputy Director for Marine and Chief Social Scientist, DEFRA, and Thomas Maes, National & International Monitoring Programmes Co-ordinator, Centre for Environment Fisheries and Aquaculture Science.

Written evidence from witnesses:

- DEFRA
- Centre for Environment Fisheries and Aquaculture Science

Examination of witnesses

Witnesses: George Eustice MP, Dr Gemma Harper and Thomas Maes.

Q287 **Chair:** I would like to give a warm welcome to George Eustice, Minister of State at DEFRA, Dr Gemma Harper, deputy director for marine and chief social scientist at DEFRA, and Thomas Maes, national and international monitoring programme co-ordinator at CEFAS. Thank you all for being here today. Perhaps I may kick off with a question to the Minister. On 9 March you said, in a written answer, that DEFRA has been working with other countries to secure the voluntary phasing out of microplastics in personal care and cosmetic products, but you have also said recently that you would consider a unilateral ban on plastic microbeads. Will you set out the Government's current position on microbeads?

George Eustice: We supported and played quite a key role in getting the OSPAR agreement, the Convention for the Protection of the Marine Environment of the North-East Atlantic, in 2014. This committed governments to putting pressure on the cosmetics industry to get a voluntary phase-out, and there have been discussions with Cosmetics Europe since to deliver that. We have always been clear that we did not rule out any regulatory action. Since then—in particular since the decision by the United States to introduce a ban itself—we have made it clear that we support a ban now on microbeads in cosmetics, and that we are working with other European countries to get that on the agenda at European level. But we do not rule out doing it at national level if that falls short or fails to progress.

Q288 **Chair:** The OSPAR regional action plan on marine litter to which you are referring said that if a voluntary agreement proved not to be sufficient, then OSPAR would prepare a proposal to call on the EU to introduce appropriate measures. Has that happened?

George Eustice: No. OSPAR have not made that call, but I think that the reality of these things is that most of the cosmetics companies have signed up to say that they do want to phase these out anyway. Once you get to that point, quite often the simplest thing is just to put a ban in place, so that if there are any remaining cosmetics companies that are refusing to sign up to the ban, then they are caught by it.

Q289 **Chair:** On what basis will you decide whether or not a voluntary ban is adequate? We took evidence last week, and we have not heard from the cosmetics industry directly; we have heard from their representatives. What evidence base are you using? The end date is 2020—do you think that is too far away?

George Eustice: If you look at what the US has done, that has slightly changed the nature of the debate. When we met in OSPAR in 2014, the feeling was that we should push for a voluntary ban on cosmetics, and, to be fair to Cosmetics Europe and other organisations representing them, they have been up that, they have been quite favourable towards that.

But what has happened in the US has changed the dynamics of this, and it is right now for us to say, "Let's progress and proceed with a ban instead." The US are introducing a ban over three years, starting with a ban on using it in manufacturing, and ending with a ban on sale as well.

Q290 **Chair:** The only forum in which a ban could be made effectively, given our contiguous waters, is the European Union, is it not?

George Eustice: We think, while we are in the single market, yes, because otherwise you wouldn't have the power to introduce a ban on sale. What we could do nationally, if we wanted, would be to introduce a national ban on using microbeads in manufacturing within our territory, within the UK. Our view is that it would be better to try to progress this at a European level and get other countries to do the same.

Q291 **Chair:** Do you know what percentage of the UK cosmetics market UK manufacturing accounts for? We could not get that figure from the cosmetics industry. Have you any idea?

George Eustice: I don't have that figure to hand. I am not sure whether either of my officials do—no. Perhaps we can try to find that out, or make our best estimate and let you know.

Chair: That would be great. Thank you very much indeed for answering those questions, Minister.

Q292 **Zac Goldsmith:** I am sorry, just to be clear—if we were to have a unilateral ban, it would apply to the manufacturers of these products in the UK; it would not apply to the things that we import to the UK. Is that right?

George Eustice: That's right.

Q293 **Zac Goldsmith:** Even from countries outside of the EU?

George Eustice: That's right. While we are in the EU—as we all know if we follow the debate—the EU controls trade issues and the sale of goods. It is open to us to introduce a national ban on manufacture, but not on sale. That is something that would have to be addressed at a European level.

Q294 **Mr Lilley:** That was going to be my question. So, we cannot unilaterally introduce a ban on the sale of products containing microbeads? Just nod your head. That is what you are saying, I think, yes?

George Eustice: That's right. Because we are in the European Union and the single market, trade issues are decided at a European level.

Q295 **Mr Lilley:** Even though it is an environmental objective that we would be seeking to meet?

George Eustice: Yes, but while trade is an exclusive EU competence, you would need to pursue that at an EU level.

Q296 **Mr Lilley:** How effective would a unilateral ban on manufacturing including microbeads be? Is there much manufacturing in the UK that

includes microbeads?

George Eustice: As I say, that's the figure that we need to get back to you on. There are cosmetics companies and drugs companies that operate in the UK, but to get a handle on the precise numbers and statistics, we would need to—

Chair: That was what the cosmetics industry was asked about last time, and they were also making the very important point about imports from production in countries like China.

Q297 **Rebecca Pow:** I just wanted to reiterate Peter's point. Actually, I believe that quite a lot of manufacturers here are organically going down the route of ceasing to use microbeads. The majority of cosmetics are imported from large, Europe-based cosmetics companies. Surely, if you are taking this seriously, you are not really dealing with the problem if you introduce a ban just on our manufacturing, but cannot do anything about all the products flooding in here, which are still going down our drain and into our sea.

George Eustice: That's why our position is that we are working with other European countries to try to get an EU-wide ban. As I said, the EU controls trade issues at the moment, therefore the right way to approach this from within the EU is to try to get change at an EU level. That's why it's our starting point, but we have been clear that if it doesn't progress, or something goes wrong, we definitely don't rule out a national ban.

Q298 **Mr Lilley:** Unless the vote goes in a happy way on the 23rd, in which case we would be able to introduce a sales ban unilaterally.

George Eustice: Well, I am representing the Government view at the moment, and the Government view is obviously that we should stay in the EU.

Mr Lilley: Delete the word "happy". If we were—against the Government's advice—to leave the European Union, we would then be able to introduce a unilateral ban on the sale of microbeads.

George Eustice: If you look at what is happening in the US and Canada, yes, those are countries that control their own trade and those are the two countries so far which have progressed on a ban on both manufacture and sale.

Q299 **Mr Lilley:** And if we remain in, how long are you prepared to give them before you go to the fall-back position of introducing a ban on manufacturing microplastics?

George Eustice: My understanding is—and I might ask Gemma to come in—that we think that the right mechanism to do this is the EU circular economy package. I think that that is now shaping up and is expected to come in in 2017. By later this summer we will have a sense of how that is shaping up and whether or not they are likely to get the support of other countries to progress such a ban.

Q300 **Mr Lilley:** Do you have any feel for which other countries might support such a ban?

George Eustice: Again, I might ask Gemma, but from memory I think that Holland in particular were very keen on this. Holland were first of all to push this, and we have come in behind them. Gemma, are you aware of any other countries?

Dr Harper: There is widespread support from member states for the packages being put forward as part of the circular economy proposal.

Chair: I am sorry, could you say that again? I didn't hear.

Dr Harper: There is widespread support from member states as part of the package that has been put forward for the circular economy proposal that is being discussed this month.

Q301 **Chair:** May I just press you on the microbead issue? There is the Netherlands, but are there any other particular countries with which we can form alliances on this? Are any other countries particularly agitated about the issue of microbeads?

George Eustice: We will probably need to write to you, but our understanding is that there is quite a strong consensus for progressing this.

Chair: Obviously, if we were to leave next Thursday, we wouldn't be pulling out of our EU trading agreements for the next couple of years.

George Eustice: That's right.

Chair: By which time, maybe the voluntary ban would have taken effect, and so on. Thank you very much.

Q302 **Caroline Lucas:** Thank you. I am trying to resist the temptation to enter into a debate with Peter about the fact that we would also lose our influence to persuade our colleagues in Europe to have a ban. I want to ask about inconsistencies in the approaches taken by different companies in phasing out microbeads due to different definitions of what exactly microbeads are. I wondered if you have had the opportunity to give any thought yet to how a legislative ban would account for different definitions, and in particular to what extent a ban on microbeads would cover the broad range of different types of plastic as well.

George Eustice: As I understand it, the discussion at the moment at the European level is very much focusing on microbeads in cosmetics. We are aware, though, that there is also concern about microbeads in other products, such as washing powders, and this was highlighted by the OSPAR analysis. There are even concerns as well about microfibres coming off sweaters when they are washed, and that kind of thing. So there is definitely a broader issue there around microbeads used in other products and microfibres coming from other products, but at the moment the focus is very much on microbeads in cosmetics, because that is an easy starting point. It's very easy to target and it's very easy for them to find

alternatives. Once you get into working out how you manage microfibres coming off sweaters when they are washed, it gets more complex.

Q303 **Caroline Lucas:** We will come to fibres in a minute. When it comes to microbeads in other products where it is much easier to define what they are, and for which we have heard that it is relatively easier to find alternatives, is there not an argument to be banning microbeads across all household products?

George Eustice: I think there is. I might ask Thomas to come in, because I know he has given quite a bit of thought to this. There definitely is an argument, and when OSPAR met in 2014 they identified microbeads in other products as being potentially problematic. They said that we needed to do more work and research in those areas, which we are doing. There is discussion and consideration of that, but the immediate discussion around introducing a ban is very much focusing on cosmetics at this stage. Obviously, we don't rule out broadening that once we have assessed the scale of the problem in other areas. There is discussion and consideration of that, but the immediate discussion around introducing a ban is very much focusing on cosmetics at this stage. Obviously, we don't rule out broadening that once we have assessed the scale of the problem in other areas.

Q304 **Caroline Lucas:** Is that the easiest way to do it—to have a narrowly focused ban first and then broaden it? It always seemed to me that if the big concern is about microbeads getting out into our waterways, that is going to be the same whether it is coming from other household products or whether it is coming from a cosmetic.

George Eustice: Yes.

Q305 **Caroline Lucas:** I don't quite see why it is so difficult to have that broad definition sooner.

George Eustice: If you are trying to progress legislation at a European level, the broader you make it, the more complex you make it, the slower you make it to get a decision, so my argument would be that if there is a consensus of acting expeditiously on microbeads in cosmetics, that is what we should do. That does not, in any way, prejudice that you might return to then subsequently deal with the issue on those other products. I think the more you broaden it out, the more complex it gets, the more likely it is to get bogged down and the more likely it is that progress will be slow.

Q306 **Caroline Lucas:** And is research going on right now from your Department into the impact of microbeads from other household products?

George Eustice: I am going to ask Thomas here because I know CEFAS has done quite a lot of work with Richard Thompson as well.

Thomas Maes: We looked at monitoring of microplastics in the UK offshore area. We also looked at impacts of microplastics but they were not specifically microbeads. A lot of them are spherical because you can easily buy them off the shelf, so a lot of them in experiments are actually

nice spherical balls. What has not been done is a study that looked at different types of microbeads. Most of them use a general type, which you can buy, which is also fluorescently labelled, so they can easily find it back. But there is a whole wide range of microplastics: you can have microbeads, which are nice; you can have fragments; you can have fibres; so depending on what type, there will be different effects. For the moment, most evidence is looking at the more spherical ones.

Q307 **Chair:** You said you can read it on the back of the label, plastics, you said that with microplastics you can work it out, but only if you are good at Latin—and I have got A-level Latin—but I discovered after Carolyn's session last week that I was using a product with polyethylene in it when I checked. I think the cosmetics industry is trading on consumer ignorance of Latin words to describe what these products are and using different words for them. What is the definition? We have Johnson & Johnson saying "polyethylene microbeads", Unilever defining it as "plastic scrub beads". Do the Government have a definition?

Thomas Maes: We consider it is mostly polyethylene beads that they put in cosmetic products, but there are different types of polymers, different combinations possible, so I think—

Q308 **Chair:** Different Latin names?

Thomas Maes: Yes, but it is also the case for the chemical compounds they put in, they will also be in Latin, so that is not just uniquely for plastics.

George Eustice: One of the conclusions of the research being done by Plymouth University, which Thomas might have alluded to, is that a lot of the environmental impacts are actually the chemicals that are attached to the microbeads. That could be anything to deliver different particular types of polythene textures, or a particular type of plastic, or even a particular colour. So there is a multitude of different chemicals that attach to the microbeads and some of the evidence is that they cause the most harm to the marine environment.

Chair: We are going to come on to some of that in our questioning. Thank you.

Q309 **Carolyn Harris:** It seems to me that this reluctance to put everything in plain English and to warn people what is in the products is protecting the cosmetics industry, not the environment and certainly not the consumer. Would it not be appropriate for some kind of warning to go on these products to highlight the contents in plain English?

George Eustice: I think my view on that would be that—my chemistry and my Latin wasn't great, I've got to be honest, but I know what polyethylene is and a lot of people know that is a polythene plastic polymer. I am not sure. I guess the reason now the debate has moved on, in my view—and that we are talking about, firstly, a voluntary ban since 2014 and now about moving to an absolute regulatory ban—is that actually, once you have decided that these have harm on the

environment, you should just get on and take action on it and move beyond just putting something on a label and leaving it in the consumer's hands to deal with it. If we put a ban in place and we stop microbeads being used in cosmetics, that solves the problem of having to rely on consumers to read—

Q310 **Carolyn Harris:** But in the interim, nothing is happening. It is not plain English. I don't know what poly—whatever it is called—means.

Thomas Maes: Is there not a name for polyethylene in plain English? For me as a scientist, polyethylene is a very good definition.

Carolyn Harris: Dangerous to the environment. Simple.

Q311 **Rebecca Pow:** But it is not just polyethylene. There are six different plastics, aren't there? They are all "poly" this, that and the other, and you actually have to have an electron microscope to be able to read the writing, let alone its being in Latin. I have tried. I have been looking at them all. It is not helpful to the consumer, so in the end that is not helpful to the environment.

Carolyn Harris: Order an app, Rebecca.

Dr Harper: There is an app called Beat the Microbead.

Carolyn Harris: That's what I found.

Dr Harper: Yes, and that is actually helpful to consumers.

Q312 **Caroline Lucas:** How many people walk around the supermarket with an app? Even those of us who really care about this are probably not going to do it, so I still cannot see why we could not be moving on the labelling as a parallel and complementary strategy.

George Eustice: There has been a lot of discussion. There has been media coverage of this, and as I say, there are these apps in place. My own view is that you can quite easily get distracted by relying on the consumers and trying to chivvy people to change labelling on their products, which in itself would take time—years. Actually, what we probably should do is just focus on delivering a ban, given that we have concerns about microplastics in the marine environment.

Q313 **Caroline Lucas:** Can I clarify two very last things? I am still not quite clear what kind of timescale you are looking at to look at microbeads in other products. Can you clarify that?

George Eustice: I think the UN has a group that is looking at evidence on microbeads in other products. Is that right, Gemma?

Dr Harper: Yes.

George Eustice: I am not sure when that concludes, but they are looking at it at the moment, so we could probably work on it when that comes

back. In the meantime, if we can get a ban on microbeads in cosmetics in place next year through the EU circular economy package, that would be quite good progress.

Q314 **Caroline Lucas:** You mentioned earlier the synthetic fibres contained in clothing. Have the Government made any assessment about how to follow up that angle?

George Eustice: I am going to ask Thomas, because he gave me a very good briefing on this yesterday, but it is definitely much harder, because we know that microfibres that come off clothing, for instance, and polymers are even in the atmosphere, so people can breathe them in, and we do not quite know the full impacts of that either. It is a complex area and much more difficult to deal with, because when you wash clothing and textiles that have these polymers, it is harder to deal with that and harder to introduce any kind of ban that would handle it. Thomas, do you want to give a bit of an explanation about the difference and the extent to which we think these might be a problem?

Thomas Maes: There was a study that showed that every wash of one garment provokes 1,900 fibres to be released.

Q315 **Chair:** What does that garment have to be made of, in plain English?

Thomas Maes: I was going to say polyacrylic, but is polyester easier?

Q316 **Chair:** Polyester. That is a word we recognise. Thank you. So one wash of a polyester fleece or any other thing can release a couple of thousand microfibres of plastics.

Thomas Maes: Yes. There was a study done by Mark Browne in 2010.

Q317 **Rebecca Pow:** This is not on fibres, but if we are thinking of a ban in cosmetics, what constitutes cosmetics? Is it just our make-up and the exfoliants, or can we include toothpaste and shower gel in that?

Carolyn Harris: Yes.

Rebecca Pow: How wide is it?

Thomas Maes: It is as wide as you just said.

Q318 **Rebecca Pow:** How would you define that in the ban?

George Eustice: I am not sure—is there a legal definition of cosmetics in the round? It would cover all those personal—

Q319 **Rebecca Pow:** Because I wouldn't normally have called toothpaste a cosmetic.

Dr Harper: There is a phrase: personal care rinse-off products. If they can end up in the water system, they will be of concern. It is worth noting that the proposals for the circular economy package do not focus just on microbeads; they say that they are going—and we are pushing for this to be as wide as possible—to look at the variety of sources.

Q320 **Chair:** Does that include microplastics like baby wipes?

Dr Harper: They haven't specified, so at the moment we have not listed all the different possible types. I think their wording at the moment is "as appropriate", so we have focused initially on microbeads and we will then look at what the Commission can recommend in terms of a mechanism for taking that forward and see what other kinds of products could fall within that mechanism.

Q321 **Chair:** Minister, you said earlier that there were atmospheric microplastics. This is something that the Committee was very interested in, but we couldn't find a great deal of evidence about it. We heard that some of this could end up in sludge and spread on fields and so on, but we didn't find a lot of evidence when we cross-examined scientists about the atmosphere being used as a vector to carry microplastics. Could you or perhaps Dr Maes enlighten us a bit on that, please?

George Eustice: There are big evidence gaps in some of these areas. So we can have concerns, but we don't know for certain how big a problem this is and how big the health risk is. Thomas, is there any research, specifically on the atmosphere?

Thomas Maes: A very recent study was done in Paris which looked at atmospheric deposition of microplastics. As the Minister has just mentioned, there are some gaps in some of our evidence. It is only very recently that they found that there is also a route via the atmosphere and there is only very limited evidence, but it has been proven.

Q322 **Chair:** One recent study from France.

Thomas Maes: I think there have been two articles from recent research in France that have looked at this.

Q323 **Chair:** Did they find that it was in the atmosphere?

Thomas Maes: Yes, they found the atmospheric deposition of microparticles. Probably if you do this on your jacket, which may have polymers, you create some polymers which go in the atmosphere and are picked up and distributed by the air.

Chair: Okay. It's a whole new world opening up to us.

Q324 **Caroline Ansell:** May I ask a question, if this whole new world is opening up? I completely understand why we focused on microbeads, because perhaps it is the lowest hanging fruit. I think it is readily understood by the public too. In terms of your comments around fibres now released into the air, do you get a sense—it's very embryonic—of the extent to which microbeads are representative of the issue, and the scale and scope of the problem? It is early days, perhaps, but we are focusing on that one thing. There is a much broader picture, how much of that picture do microbeads really inhabit?

George Eustice: We know—it was probably some of the evidence you have had—estimates about the amount of microplastics, which is obviously all plastics, that comes from microbeads. It is probably relatively low in

the scheme of things. I think it is a big range from 0.01% to around 4%. That is not a reason for not acting on it, because it is one that we can easily target and deal with and there are other ways of doing it.

Q325 **Caroline Ansell:** Although we are saying that that is our starting place.

George Eustice: That's right. We are not clear on the next thing, which is why we have commissioned two pieces of work. One is the work being done by Plymouth University, which is going to be published shortly. It looks at the actual impacts of microplastics on marine life. I know you said you might return to that later in the session.

The other is a separate piece of research work funded by NERC called RealRiskNano, which is trying to assess the real risks of microplastics in the environment. While we have grounds for concerns, and certainly some of the laboratory work and the modelling that has been done suggest that we ought to be concerned about this, there are still evidence gaps and that is why the RealRiskNano project funded by NERC is looking at this issue.

Q326 **Rebecca Pow:** I would like to look at some of the solutions for preventing the plastic from getting into the water in the first place, or out to sea or past our water treatment works. We had Dr van Sebille here and he said that a lot of the filters currently used by the water treatment plants were inadequate for stopping the fibres or microbeads going through. Can you tell us what action the Government are taking to work with the water industry to look at this problem?

George Eustice: I might ask Gemma to come in on this. Obviously, the pricing plans that are negotiated between Ofwat and the water companies require them to make certain investments to upgrade and improve their facilities on an ongoing basis, linked to any ability to increase their prices.

Q327 **Rebecca Pow:** Are they factoring adequate filters into that pricing plan?

George Eustice: My understanding at the moment is that there are two problems. Filtration goes through various phases and filters out more and more of the plastics. Frankly, it is incredibly difficult and a big undertaking to filter microbeads out, because you need quite expensive sand filtration systems. It is therefore probably easier to try to stop putting them in the sewer in the first place, rather than putting them in and trying to work out how to take them out. There is a second problem, though, which is where you have combined sewer discharges and the outflows from flood incidents. They have no option but to release it directly into the water, and then you can get plastics and all sorts of cosmetics that end up going into the watercourses that way. Clearly there are other challenges and issues around water quality there, too. That has been the priority focus.

Q328 **Rebecca Pow:** Can we go back to the sand system that you mentioned? Even that is problematic, I believe, because once you have used the sand to filter out the beads, you then have to do something with the sludge. Have you looked at that, because that will still contain the beads?

George Eustice: That will still contain the beads, yes. I have not looked at that, but I think it underlines the point that, even if you spend all the money on such sand systems, you might temporarily stop it getting into the environment, but you have still got a problem with it.

Q329 **Rebecca Pow:** Okay, so no one's really looking at that yet, though.

George Eustice: Thomas, is there anything to add on that? Basically, it is quite complex to do these sand filtration systems.

Q330 **Rebecca Pow:** It is complex, but we are then spreading it back on our agricultural land to grow our food.

Thomas Maes: Which is one of the possibilities you can use it for. Alternatively, you can create sludge pellets that you can use for incineration and electricity production, which is what Crossness sewage treatment works is moving to. They are making pellets out of the sludge, which they can burn for energy.

Q331 **Rebecca Pow:** So we are then burning the plastic.

Thomas Maes: The microbeads that might be in your sludge, yes, but they do have filters in their exhausts, I believe.

Q332 **Rebecca Pow:** Okay. Is anyone monitoring all this? I gather that it is very difficult to monitor what the water companies are doing and how many microplastics and microbeads they are able to remove. Is anyone looking at that?

Thomas Maes: We have done a study on the sewage treatment works in Crossness, where we looked at the incoming water, the outgoing water and the sediments in front of the pipe to see what the amount of microplastics was, which then helped inform advice to the Government.

Q333 **Chair:** What were the results?

Thomas Maes: The incoming amount was about 160 microplastics per litre.

Q334 **Chair:** Per litre?

Thomas Maes: Yes. The effluents contained only 30 microplastics per litre, so that was an almost 85% reduction, which is quite good. In the sediments in front of the pipeline, you find around 986 microplastics per kilogram of dry weight or per litre.

Q335 **Rebecca Pow:** So do you call that a lot, or do you call that good?

Thomas Maes: Well, I don't know how you define "good".

Q336 **Rebecca Pow:** You don't know how many are in there in the first place.

Thomas Maes: Well, there is an 85% reduction, so that is good news.

Q337 **Rebecca Pow:** An 85% reduction. That was with one water company.

Thomas Maes: That is with the best facility we have in the UK, which is Crossness.

Q338 **Rebecca Pow:** The best facility. So, Minister, looking at that example, would you be saying, "This is a great example. This is the kind of mechanism that we should be putting in place"?

George Eustice: Yes, but I think our conclusion all along is that the best thing to do is to stop putting them in the cosmetics in the first place, and that is why that has got to be the starting point.

Q339 **Rebecca Pow:** I agree, but it will take a very long time to get there, so wouldn't it be useful to be filtering it out?

George Eustice: Well, it probably would not take as long as trying to upgrade every sewage works in the country. We are constantly trying to improve sewage works, but the emphasis tends to be on reducing those combined sewer discharges, which are a huge problem and bypass filtration pretty much altogether. That is one step.

Q340 **Rebecca Pow:** Are the Government gathering together with water companies to discuss the issue? Have you called a summit?

George Eustice: We have not. I can suggest that. The sewer end and the water quality end of the debate tend to sit with my colleague Rory Stewart, but we will want to digest this evidence digest and take it on board to see whether lessons can be learned. If there are issues that we should build into the pricing plans that Ofwat is looking at in the future, we can do that, if it can be done in a cost-effective way.

Q341 **Chair:** I am sorry, but just to go back to that experiment, which water company was it? Was it sand filtration? Where was the sewage works?

Thomas Maes: It was Thames Water at Crossness, which is on the eastern side of London. It deals with 2 million to 3 million people's water. It was only secondary treatment. There was no tertiary treatment.

Q342 **Chair:** So it was not sand filtration, or it was? It was ordinary treatment work.

Thomas Maes: Well, ordinary—it is one of the best ones we have in the UK. It got upgraded in 2014, I think.

George Eustice: To that point, it didn't—tertiary means sand filtration.

Chair: Ah. So that was just with the standard—

George Eustice: It included secondary filtration, which is using—is that right?—all sorts of different filters, short of sand filtration.

Thomas Maes: Yes.

Q343 **Rebecca Pow:** May I ask something on that? Normally, I gather from Wessex Water, they can filter out with their screens things that are 6 millimetres in diameter, but lots of the microplastics are smaller than that. Did Thames Water have some much tighter, finer screens?

Thomas Maes: I think they also use flocculation techniques. They add flocculation enzymes so that it all comes together and sinks down to the

bottom, so even if they don't have finer screens, they are still able to capture smaller particles by coagulating them together and letting them sink to the bottom.

Q344 **Rebecca Pow:** Do you think that it was microbeads from cosmetics that they were catching 85% of, or did that include the fibres from the clothes?

Thomas Maes: That is a very good question. In the activated slush in the effluents, we only found fibres but, surprisingly, in the sediments outside of the pipe we did find fibres and spheres.

Q345 **Rebecca Pow:** In the sediments?

Thomas Maes: The pipe came in with only fibres, the pipe came out with only fibres, but in the sediment surrounding the pipe, we did find both, which indicated that if you want to do these types of studies, you need long-term observations. You need to do it over a long time period, because if you do it at 8 in the morning that creates a different pattern—you can imagine all the people flushing the toilets or pulling their bath plugs in London. If you want to get objective results and be clear on what type of sources they might come from, you should do this monitoring over a longer time period to be sure that you are not just capturing a peak because it is 8 o'clock in the morning or a low peak at 11. We did this study at 11 in the morning, which is actually low peak, so these numbers are probably best-case.

Q346 **Chair:** It sounds as though the microbeads were not being captured. The particles and the fibres of the clothing were, but the microbeads were not. Is that what you are saying?

Thomas Maes: That's—I can't make any conclusion there. It could just be that, at the time when we sampled, there were no spheres present, or the spheres that were present were heavier and denser and were maybe sinking. I am unclear what exactly happened, but it does show that you do have to do it over a longer time period. We only took nine samples as well, which is a very limited amount.

Q347 **Rebecca Pow:** You said it filtered out 80%. It was only 80% of what was going down the drain at 11 o'clock, which wasn't the most serious time, was it?

Thomas Maes: But it is speculation. We don't know. They might change something. If you really want to have a conclusive answer on that, we should study it over a longer time period.

Q348 **Rebecca Pow:** So would it be right for it to be recommended that the Government should put in place some more experiments to gather some more evidence?

George Eustice: Well, we are doing more and more experiments on this all the time. As I said, there are two big pieces of research that we are funding on the impacts on the marine environment and CEFAS are

constantly doing work in this area as well. As you can see, we have already been doing some work on this and clearly that will continue.

Q349 **Caroline Ansell:** My question relates to human health. We are talking about the marine environment, but this is about human health. We have been told in the course of this study by the Marine Conservation Society that human consumption of marine microplastics could pose a risk to human health. Understanding that that research is limited and still quite new, what steps are the Government taking to assess that potential risk?

George Eustice: It is a difficult area. Obviously, with some fish the plastics would be in the gut, which would be removed and not be eaten and so, in those instances, you are not going to get microbeads getting into humans. It is different on some of the others—shellfish, for instance, where the potential impacts could be greater. It is a matter for the FSA. Gemma, I am not sure if they are planning any work in this area?

Dr Harper: I am aware that there is an academic conducting research in this area.

Thomas Maes: There is lots of research available from the other side—the medicine side. They use microplastics as carriers for medicines, for example, so there is a whole set of evidence already of the impacts of microplastics on the human body, which comes from the medical side of science. They use them as vectors for delivering medicines to those areas where they want them to be active. So there is some evidence there. In terms of real risk assessments to humans, I don't think there is much being done at the moment.

Q350 **Caroline Ansell:** Is there not some opportunity for synergy there and for some sort of crossover in terms of research fields?

Thomas Maes: That is what we try to do so that we know about the impacts.

Q351 **Caroline Ansell:** But at this point there hasn't been any work undertaken around the risk to human life?

Thomas Maes: I think the first thing that science is now trying to do is to find what types of sources we have for other types of plastic in the environment—fibrotic concentrations and where we can find hot spots. So, science is only gradually building the basis of coming to what might be human health in the end, but I don't think we're there yet. There is not much research.

George Eustice: There has been some work done. The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection—GESAMP—is a UN advisory body. They did an evidence review on microplastics in 2015. That included looking at potential impacts on human health and they actually concluded that they were relatively new and there was basically a large degree of uncertainty about them. Basically, what they were saying is that because this is a very new body of research, it's too early to draw conclusions.

Q352 **Caroline Ansell:** Given that it's still early days but you anticipate that there is potential harm and potential risk, what steps would the Government take, granted that you talk about a ban in the first place, to stop it getting into watercourses? What other potential actions and mitigations could there be from Government?

George Eustice: Obviously, we have got a whole range of things. There is the ban on microbeads, which we are now supporting through the European Union—

Q353 **Caroline Ansell:** That's just 4%. I don't know if there is any equivalent in terms of the water, as opposed to air or any other way—it's tiny.

George Eustice: We have got a range of other projects, everything from fishing for plastics, which is a scheme supported by the Crown Estate and others, basically to pay the costs for fishermen to bring back rubbish that they drag up in their nets. We have got the national litter strategy, with work going on to try to stop litter being left on beaches. Basically, there is no single magic bullet on this; we have to pursue a whole range of issues to try to reduce littering.

That is because what we believe at the moment is that the vast majority of microplastics that get into the marine environment are coming from terrestrial sources, and a lot of that is plastic bottles and plastic bags. We introduced the 5p carrier bag charge, which has been a success. We just need to pursue on every level trying to reduce the amount of plastics that are on the terrestrial environment and then getting into the marine environment subsequently.

That is because the difficulty with the plastics is that once they are in a marine environment, you are stuck with them and they just break down over time. Big pieces become small pieces of plastic, and eventually become microbeads, but you cannot get them out of the marine environment once they are there.

Q354 **Caroline Ansell:** I will ask one further question, moving from the water. The Government's evidence suggests that people are more likely to inhale microplastics than to eat them. Academics who we heard from were not familiar with any evidence to support that claim. So, what evidence base would that stand have been built on?

George Eustice: I think that, as Thomas alluded to, and he might want to expand on it, there was work done in Paris recently, by a French university, that looked at the impact of microfibres getting into the atmosphere from textiles. So there is some evidence base there, but again it's quite early—

Q355 **Caroline Ansell:** Is that quite small-scale, though, and quite localised, in terms of research, the evidence and then the findings?

George Eustice: It's very early days, so there are lots and lots of evidence gaps in this area, but clearly there are some studies and there is some evidence that—

Q356 **Caroline Ansell:** And are there plans already in formulation to address those research gaps?

George Eustice: Thomas, are there any?

Thomas Maes: Yes, there are plenty of research activities going on, but another one, to come back on your question—

Q357 **Caroline Ansell:** Specifically to address the gaps as they emerge in this new field?

Thomas Maes: Yes. You have JPI Oceans, or Joint Programming Initiative Oceans, which are European-led; I think that's an FB7 one. And there are four initiatives, or projects, going on, I think for a total of 6 million euros, where they look at degradation of microplastics and plastics—how that happens. They also look at standardisation of techniques across the world and they look at impacts on animals. And I think the fourth one is specifically at toxic transfer and how that behaves—so, how do toxic groups go round?

Q358 **Caroline Ansell:** Do the Government, though, have any sort of role where they look at the whole research landscape and have a position on where these gaps are emerging, as they relate to Government priorities, because much of this research will be driven by a particular academic niche? Is there a construct that brings it all together and that commissions research, rather than just waiting for research to happen organically?

George Eustice: Yes, there is. Our chief scientist, Ian Boyd, has been working on a project that is looking at the entire research landscape to make sure that we are not duplicating things, to make sure that we can get more efficient deployment of resources. We have got a science advisory council as well which helps identify these areas and priorities for research. Gemma, is there anything to add?

Dr Harper: We do fund monitoring, and CEFAS is involved in looking at seabed monitoring, which Thomas can tell you about. We have been funding R&D, and you have heard from Plymouth University about that. Importantly, we partner with the research councils—particularly NERC—on major strategic programmes of research, and we influence international research collaborations through having government, DEFRA, CEFAS and membership of various working groups so that we can influence the key questions.

Q359 **Caroline Ansell:** And yet it strikes me that there is very little with direct connection to human health. The Department of Health was not mentioned in that list of partners. Is that not a gaping hole in the research?

Dr Harper: The evidence is very limited, as we have said.

Q360 **Caroline Ansell:** Are we commissioning more evidence to address that limitation?

Dr Harper: On human health specifically?

Caroline Ansell: Yes.

Dr Harper: Not at the moment. We have looked at the United Nations conclusion about the limitations of the evidence, and we are digesting that along with the wider research gap analysis as part of the forward programme. I think the comment that Thomas made, that there is a fair amount of evidence already in the medical community through use of visas—vectors—for the delivery of treatment, is definitely worth us looking at.

Q361 **Chair:** What does that evidence say? Does it say that the treatment delivery is a safe vector? Presumably it must be if they are dosing it out to people.

Thomas Maes: Yes, but it also shows it could transfer to several layers of the human body, in simple layman's terms.

Q362 **Chair:** Transfers what to where?

Thomas Maes: If it can transfer to certain tissues to deliver the medicine then it could also transfer to the tissues without the medicine, I would assume.

Q363 **Rebecca Pow:** Are you not concerned about this? Is this a worry or is it something that is fine, as they use it in medicine and we all have plastics in our body. What is the feeling about it?

Thomas Maes: We live in a world where we are exposed to lots of different pressures ranging from hazardous substances, to plastics, to bad atmospheric air. So I think that in the bigger spectrum it is an issue, but the evidence that we are sorting out is to do with trying to define how big an issue it is. Is it one of the biggest problems, or is it a lesser problem if you compare it to pharmaceuticals getting into our water or other stuff? We are trying now to find the basis for this problem.

Q364 **Zac Goldsmith:** We have already heard from you and in previous sessions that—because of the size of these things—they are very easily ingested by marine life, with implications for the marine environment. We heard from the Environmental Investigation Agency that we have seen a reduction of 36% in the reproduction of oysters, we have seen other studies showing that for Norway lobsters in the UK, 83% of those tested have contained microplastics. So I am interested in knowing, first from the Minister, how much credence do you give to that research? How much credence do you give to that evidence that has been provided? What measures are the Government taking to try to reduce the impact of these things on the fishing industry?

George Eustice: As I said, because we wanted to understand these threats to the marine environment, we commissioned a piece of research from Plymouth University which is going to be published shortly. But Professor Thomas—who was involved in that research—has already written a couple of articles on it. Broadly, it showed that the effects of microplastics are higher on warm-blooded marine animals than on cold-blooded fish. There is a larger effect. Also, that when it comes to most

marine wildlife, most of the impacts come from either the chemicals that are attached to the microbeads—these could be chemicals that were, for instance, additives used in the plastic originally to provide colouring and such things—or it could be that once the microplastics are in the marine environment, then other pollutants in the marine environment attach to them and are then ingested. So the threat in most cases comes from chemical pollutants that attach themselves to microbeads, or microplastics.

The final thing it shows is that there are some cases—particularly marine worms—where if they ingest quite a lot of these then it has a slightly different effect, in that they exhaust energy foraging, eating plastics, trying to digest them and getting no nutritional value out of them. That has a slightly different effect, one that is much more physiological rather than an effect from a chemical pollutant, in that they are expending energy eating plastics which are of no use to them.

Q365 **Zac Goldsmith:** If the figures that we have heard are even close to being true, that will already be having a massive impact on the fishing industry and on agriculture. CEFAS has cited the MICRO project as making the first comprehensive attempt to define and calculate the economic impacts on agriculture, in particular on the oyster industry in the Channel region. It puts the range between £1.5 million and £500 million, so there is a gap between the two figures. I am interested to know why you think that there is such a big range, such a huge discrepancy. What further research can we do, and what are you doing to try to get a more accurate picture?

Thomas Maes: I might repeat some of what the Minister just said, but basically there are two types of effect. There is the direct effect, which is the particle toxicity. If the particle is a nice spherical shape it might go straight to your guts, but if it is fragmented, for example, or has spikes on it, it might get lodged somewhere. That is one part of it—the particle toxicity. The other is the indirect effects which are provoked by the additives or persistent organic pollutants which are soaked into the particle. So there are already two types of effects which could occur.

The other question was the concentrations which are used in all the studies you just highlighted, and whether they are actually relevant. The problem is that if you use environmental concentrations they are very low in the UK. For example, the concentration is 0.14 particles per cubic metre in total in the offshore area, which is very low. If we used that in a lab it would take ages before we saw results, so we do crank up the concentrations to see more quickly what might occur at high concentrations. Some of the studies are not always using concentrations which you would find in the environment.

Q366 **Zac Goldsmith:** Sorry, may I stop you for a second? In lab conditions, how can you recreate the natural, real-world conditions? As the Minister has just said, one of the big health impacts for our fisheries is the ancillary stuff—the chemicals binding with these microplastics and using them as carriers. How do you recreate that in laboratory conditions?

Thomas Maes: We spike them with certain contaminants: we load certain polychlorinated biphenyls—PCBs—on them so that we can then see what the effects are of the particle. You would feed the particles alone, and then see what the effect would be if you fed the particle with the contaminant, and what the effect would be of the contaminant by itself. You can compare all three to each other.

George Eustice: If I might add to that, that is also the reason to get a laboratory experiment that looks at impacts, because it is very hard to measure how that translates to a real-world environment. That is why the RealRiskNano project that the Natural Environment Research Council is funding is so important. That project is looking at some of that laboratory research and then trying to assess what the real impacts would be in the real marine environment.

Thomas Maes: If you have different types of forms of microplastics and different types of contaminants, then you already have millions of possibilities in terms of what might occur in the environment. In the environment you will have different types of contaminant available and you will have fragments coming from polystyrene and polyethylene, which might be spherical or they might be spiked. So there are a whole lot of possible combinations. At the moment there is evidence for some bits, where they have spiked a lot of spheres to an oyster and saw an effect, for example. But there are so many possibilities that it is quite difficult to already tell you that this is the exact result of what might happen in the environment. It gives you a flavour of what might be occurring, but some of these numbers have to be taken with some—

Q367 **Zac Goldsmith:** I have one disconnected question for the Minister. I know the Government's position; they are pushing for a European Union-wide ban. Are the British Government leading the way on this issue of microbeads? Are we the biggest advocate for an EU-wide ban, and if not, who else is out there really banging the drum on this?

George Eustice: Yes, we are. We are pushing and we are absolutely clear about this, and have been for months. We are now pushing for a ban at the EU level. As I said, the Netherlands were also there and some other countries as well. We know that France, Belgium and Austria are now also supportive of that.

Q368 **Zac Goldsmith:** Are there any countries that are actively resisting?

George Eustice: Not that I am aware of at the moment. There will be some countries that have reserved their position at this stage and haven't made their decision, but I am not aware of any that have come back to say that they are opposed to this.

Q369 **Zac Goldsmith:** Is the Government being lobbied by the industry to slow down on their call for a ban?

George Eustice: No. On the contrary, the industry and the key players—and Cosmetics Europe, the industry body that represents them—to be fair to them have been saying, "Yes, we want to do this." They have been very

constructive following the OSPAR resolution in taking forward a voluntary ban. To be honest, this is what you find in these situations. If the big, responsible companies are saying, "We will voluntarily get rid of these anyway", frankly it does not matter to them any more if you decide to put in place a ban. If anything, it gives them the reassurance that they will not be placed at a disadvantage from a few companies that might decide not to.

Q370 **Carolyn Harris:** Call me naive, but it seems a bit ironic that we charge people 5p for a carrier bag to encourage them to reuse it and then we pump cosmetics full of plastic beads and we do not let the public know that they are in there. The British Plastics Federation argues that the voluntary ban will be effective. We heard evidence last week from representatives of the cosmetics industry and, when questioned as to whether they would be prepared to put some kind of warning notice on their products, the answer was: "If we put that on, it will be telling the consumer to not to buy this product." Therefore, saying that we do not need a ban is very optimistic of the Minister and the industry. What will a ban cost us financially in enforcement and implementation?

George Eustice: You make a good point, which is why the debate has moved on. If there was very strong resistance to doing anything in this area—any kind of ban—I do not think it is very effective to be in a position where you are just relying on consumers to avoid certain products and have to label them. I think we could waste a lot of time on that and that is a distraction, to my mind. The debate has moved on. We are now in the territory of saying, "We want to progress a ban on the use of microbeads in cosmetics" and we should focus our efforts on delivering that.

In terms of what it would cost, I am not sure that impact assessments have been done at this stage, but we have a formal procedure and once we get to the stage of having a final, firm proposal, yes we go through impact assessments and at that point we would assess the costs. I suspect that if you had a ban and there was a transitional period so that people could use any stock they have already manufactured, there would be familiarisation costs and those types of things, but I suspect the costs would not be that high because there are other ways and products that can get the same effect.

Q371 **Carolyn Harris:** I appreciate that, but I am concerned about the existing products and the companies who are not removing beads from their products yet. A phenomenal amount of this product is left out there, which will be sold, and people do not know what they are buying. So it was not a long-term solution to have some kind of sticker or something on the product; it was to raise awareness so that people knew that what they were buying contained something that is dangerous to the environment. I was not suggesting that instead of a ban. What assessment has been made of the cost of implementing different measures to prevent microplastics from entering the environment?

George Eustice: As I said, we have reached a view now that we want to progress a ban at a European level, and once we have a firm proposal, an

impact assessment will be done. When it comes to enforcement, I think it is relatively straightforward because you are talking predominantly about a handful of big manufacturers and there would be inspection regimes around them anyway—probably quite rigorous inspection regimes if they are in pharmaceuticals and products of that nature. So I think once you have a ban in place, given the nature of the industry—you are talking predominantly about a relatively small number of quite large players—enforcement is probably quite straightforward.

Q372 **Carolyn Harris:** And how long before we see the ban?

George Eustice: As Gemma said earlier, we believe the right way to progress it is through the EU's circular economy action plan that is being devised now—discussions are live now. If things go well and it has a fair wind, it is quite possible you could have something in place next year, during 2017.

Q373 **Carolyn Harris:** But between now and then any products on the shelves will be sold and the consumer will be completely oblivious. Unless they speak very good Latin or have micro-eyesight, they will not know that they are buying a product that is dangerous to the environment.

George Eustice: That is a fair point. We cannot do things overnight, so I am not going to pretend otherwise. That is the case, but in the scheme of things, if we could deliver a ban by next year—during 2017—knowing how slowly things can move, that would not be too bad. In my mind, that would be quite a good result.

Q374 **Carolyn Harris:** But are cosmetics companies still producing products with these microbeads in, even though there will potentially be a ban on them this time next year?

George Eustice: Well, you would probably approach it the way that the US has; there would initially be a ban on the manufacture. That is where you start.

Q375 **Carolyn Harris:** But they are making them now. They are still producing them now.

George Eustice: Some of them will be, almost certainly, but I am not sure, Gemma, whether we are aware of others who have already voluntarily—there has been discussion about voluntary phase-out. I am sure that some may already—they know what is coming, so they will already be thinking about changing their production methods and looking for alternatives.

Q376 **Carolyn Harris:** Thinking and acting are two different things. If they have not removed it from their production, they are still producing it now, so there will potentially still be stuff on the shelves past the date of the ban.

George Eustice: Yes, there potentially will be, but sometimes if you send a clear enough signal that you intend to bring in a ban—bear in mind we have been working on this since 2014, when we first had the voluntary approach agreed at OSPAR. That obviously is a much wider grouping than

the European Union and includes many other countries, so it has less power to actually require things, but there was nevertheless good progress made at OSPAR. The writing has really been on the wall ever since then, because OSPAR itself highlighted the potential for a regulatory ban, so I think that will have moved the companies. I am not sure whether we have it now, but we could find out whether there are examples of companies that have already voluntarily stopped using microbeads.

Carolyn Harris: We have, and they don't want to talk to us.

Chair: We have. Unilever say that they have, but they don't want to come.

Dr Harper: There are 25 major UK companies that have declared that they will discontinue the use of microbeads or maintain being microbead-free. There is progress in the industry itself and as we have said, we are pressing for the Commission to develop proposals for a ban, and we expect to have those proposals confirmed by next year.

Q377 **Rebecca Pow:** Before I go on to my official question, I wonder whether the Minister might recommend a voluntary naming and shaming campaign. You can see that that pressure would force the manufacturers to change. The Minister could photograph his whitening toothpaste in the morning and say, "Does this have microbeads in it?" and if it did, perhaps the company making it would not be so keen to put them in.

George Eustice: Yes, we could. You also have your report, and you will have an opportunity to do any naming and shaming you feel is appropriate at that point.

Q378 **Rebecca Pow:** I am talking more about policies. If we are going to take action, we have to focus on the policies. I was looking particularly at beach litter. The Marine Conservation Society has recently shown that 44% of the litter items that come up on beaches cannot be categorised, so in order to make policies to reduce the production of this plastic or reduce its being thrown away in the wrong places, the Government need to know more about this. Are you looking at that? What sorts of challenges does that present, Minister?

George Eustice: I think that the work that the MCS do annually with their beach cleaning events up and down the country is fantastic. I have twice gone out with volunteers on beaches in Cornwall myself—I have some wonderful beaches in my constituency—and taken part in that survey work. It is a difficult area, because one of the problems is that as plastics break down in the environment and big bits of plastic become small bits of plastic—it is a compound problem as well, because it is always in the environment—it is sometimes difficult to measure the true effect. You might end up with larger numbers of smaller plastics, because they are broken down over a period of time. Some of that could have been in the marine environment for many years or even decades. But I have found when I have done it that they have categories for all sorts of things, from bits of rope and string that have clearly come from fishing gear right through to sanitary products. All sorts of things are categorised, and there

are all sorts of different sizes of plastic. Clearly, once plastics start to break down, whether a bit of plastic came from a bottle or a bottle top or, indeed, from a lobster pot or something gets harder and harder to tell the smaller it gets.

Q379 **Rebecca Pow:** We know that Minister, but have you got enough evidence to show you how many of each category there are, so that you can then target the different industries—

George Eustice: The Marine Conservation Society do a large number of these volunteer things, and we support them financially for that. We give them an annual grant to do that work. There is then a subset where they have their real experts on this to make sure they get a consistent picture; because obviously if you have got different groups of volunteers in different parts of the country there will be some variation in the way things are recorded and categorised.

Thomas Maes: There are several hundred beaches where they use just the public to clean the beach. Then they have a subset of beaches—around 10 beaches where they have their experts, as you call them, to monitor specifically for OSPAR, which then gets fed back to the European marine strategy framework directive, to report on the amounts of litter on the beach. Nevertheless, 10 stations is a very limited number, especially if you take into account that there is huge variability year after year. It might be that actually we have to do a power study to see how efficient that monitoring is, to see if we need more stations in place or fewer, because as there is so much variability we want to make sure that we don't measure a fluke in the data, if that makes sense.

Q380 **Rebecca Pow:** Given that we have got, for example in the Minister's area of Devon and Cornish beaches, that 90% of litter collected is plastic—do we, Thomas, need more experts and more beaches being surveyed? And Minister, are our encouragements to reduce plastic working at all? Clearly it is an enormous problem.

George Eustice: I think we are making progress in that we are seeing a dramatic reduction, for instance, in single use carrier bags, through the 5p charge. We are starting to get progress on a national litter strategy. I think increasingly local authorities recognise the importance of doing regular beach cleans so you don't get plastics in the environment; and we are having this discussion about how we tackle microbeads now. The difficulty is that it is a compound problem, so even though we can take action now to reduce the amount of plastic getting in the marine environment, a vast amount of plastics have gone into the marine environment over the last few decades, since plastics became widely used. That continues to be there, continues to break down, and continues to be a challenge.

Q381 **Rebecca Pow:** I am particularly looking at the policies we can make to stop it going in there in the first place, now. So do you think we need more of Thomas's experts on more beaches?

George Eustice: Well, the Marine Conservation Society did quite a comprehensive project, but, as Thomas said, even if you have got real experts who are consistently categorising the plastic in exactly the same methodical way, you will get variations depending on weather and other things. It could be affected by—for instance, the last time I did it, unbeknown to anyone, the day before, the local authority, Cornwall Council, had been through and cleaned the beach, which is great, but it clearly distorts your data if you have got a local authority that might have cleaned the beach the day before, or two weeks before. It can make quite a difference.

Q382 **Rebecca Pow:** I am sorry: are you already getting enough evidence to show you if sanitary products—I am getting really basic here; you know, tampons with the plastic bits round them—are causing a problem or are turning up on the beach, or is it just plastic bottles? Now it's not carrier bags, which is great. Then surely you can take that already and say to that industry: "This is not acceptable. It is turning up on beaches."

Dr Harper: We have got some evidence from the seabed mapping monitoring survey that Sea First undertakes, both in relation to a decrease in plastic bags and fishing gear. Is that right Thomas?

Thomas Maes: Yes.

Dr Harper: We are also required to conduct an assessment of our seas under the marine strategy framework directive. The next one is due in 2018. There will be an intermediate assessment through OSPAR in 2017, and that also includes marine litter measures. Thomas, do you want to add to that?

Thomas Maes: Yes, what do you want to hear first: the sea floor litter or the OSPAR assessment?

Dr Harper: OSPAR assessment's most useful.

Thomas Maes: We monitor on the back of our fisheries cruiser, so we go out to monitor the amounts of fish in the sea. We also capture lots of litter, because we use trawling nets which scour the sea floor. Based on that information we also do litter monitoring. We started that in 1992, so we have got almost 25 years of data on amounts of litter on the sea floor.

Q383 **Rebecca Pow:** But it is increasing.

Thomas Maes: Well, that's the funny thing; we don't see an increasing trend there.

Q384 **Chair:** In volume or nature?

Thomas Maes: In number of items, or in volume. So it is disappearing somewhere. There are several theories you can form about where it is going: it is breaking down, being cast on beaches or accumulating in the middle of the gyre. There are different options for where the litter might be going, but it does not show us a current increase over 25 years.

Q385 **Rebecca Pow:** On the beach?

Thomas Maes: On the sea floor.

Q386 **Rebecca Pow:** On the sea floor. But it is from there that it is going somewhere else.

Thomas Maes: It is being broken down into micro-particles. It goes through the mesh size of our nets, because they are 4 cm and if the litter goes below 4 cm it will go through, so that part we will not be measuring any more. Or it might be accumulating in areas outside UK waters. We already know that there are gyres in the ocean where we get massive accumulations, so it might all be going to that middle point.

Q387 **Rebecca Pow:** So you are not saying that we reduced it; you are saying that it is just going somewhere else and you have not been able to count it. Is that right?

Thomas Maes: Yes. Since we have been monitoring in the UK, we have not seen an increase in the trend of litter on the sea floor, which means that it is breaking down into smaller bits, which we do not capture any more, or it is accumulating in other regions of the oceans of the world.

Q388 **Caroline Lucas:** What do you do about capturing the ones that have broken down so small that you do not capture them?

Thomas Maes: We also did a case study of the amount of microplastics in UK waters, to see whether we would, first, find a possible reason or explanation for what we do not see, because we monitor big items on the sea floor, stuff bigger than 4 cm that needs to be captured by a fishing net. We do not see an increase there, but we do see microplastics in UK waters, so it might be that it is being broken down by UV action, or by being crushed against rocks—physical and wave action. There might be different reasons for the breaking down.

Q389 **Rebecca Pow:** Finally, Minister, on the UK's marine strategy—it is great that we have got one—your written evidence said that once you had better understood marine litter and its impacts, you would consider whether we will need any additional measures to tackle it. Will you reveal to us when the moment will arise that you think you will need to consider additional measures?

George Eustice: You are asking a litter-specific question?

Dr Harper: This will be in relation to the two assessments that I referred to. The first assessment that we are preparing for is in 2017, through OSPAR, and then the main assessment is in 2018, through MSFD. Thomas, do you want to give any detail about the assessments?

Thomas Maes: OSPAR has come up with common indicators. It has checked which type of monitoring is going on in all the different contracting parties to OSPAR. If the majority of people are already using a technique or monitoring programme, it is called a common indicator. So there is one for beach litter, one for sea-floor litter and one for plastic in fulmars—the only ones for which OSPAR has decided to make an

assessment, because enough data are available. Those three are now in a draft phase and will be shown to the OSPAR Commission in June. Once they get signed off, they will be made available.

Q390 **Rebecca Pow:** Are those recommendations?

Thomas Maes: No, those are draft assessments of the current status of marine litter in different matrices—one of them is looking at marine litter on beaches, one at marine litter on the sea floor and the other at plastics in fulmars, which are birds. Those three are being pushed forward by OSPAR. As the Minister has highlighted, there are also the MSFD assessments, which are taking place later, where you have to show that there is good environmental status.

Q391 **Rebecca Pow:** So all that is coming through and you will have that up together by June. Did I get that right?

Thomas Maes: The OSPAR ones are now in a draft stage, and will be signed off by the OSPAR Commission in June. They will be published on the OSPAR website—the OSPAR folders and the outreach documents they have.

Q392 **Rebecca Pow:** And then the Government will be looking at it and considering whether you have to make some other implementations.

Thomas Maes: In 2017, OSPAR, yes, and in 2018, MSFD.

Q393 **Chair:** I have a last question. Do you think we are leaving it too long? You talk about an intermediate analysis with OSPAR in 2017, then the next analysis is for the EU marine strategy framework directive. How often are we meant to be looking at this marine strategy directive? Is it every five, three or two years? Do we need to be a bit more lively about it? If you could answer that—rhythm and nature.

Dr Harper: The marine strategy framework directive is on a six-year cycle.

Q394 **Chair:** Six is quite a long gap in which things could emerge, isn't it?

Dr Harper: That is why we have the intermediate assessments—

Q395 **Chair:** And how often does the OSPAR intermediate thing happen?

Thomas Maes: There is one in 2017, which is to do with the draft version for what contracting parties are going to send to the European version in terms of the MFSD. The MFSD has decided that regional sea conventions could step in to deliver parts of the marine strategy framework directive because they already have agreements or monitoring in place. They are going to use the OSPAR assessments for the MFSD European regional assessments, so OSPAR is an intermediate product in terms of the final European assessment.

To add to that, marine litter had been highlighted in "Charting Progress 2", which was published in 2010, so the UK has already been looking for quite a while at marine litter. It has been on the agenda since 2010.

Q396 **Chair:** Finally, we have heard about the circular economy package which, with a fair wind, could be in its draft, signed and agreed form by 2017. Minister, you said we want them to use up their stocks. Is not the point that we do not want them to be putting in this stuff in the first place? Do you not think that you are being a bit kind to the cosmetics manufacturers, who are playing on ignorance to get us to keep buying what are, essentially, marine-polluting products? Are we being too nice?

George Eustice: No, I don't think we are being too nice. We have moved quite quickly to say, "Let's have a ban on these things." Whenever you introduce any change in law, you have to have some sort of transitional period. You have to give people a chance to change their production methods, change their factory and invest in new plant and equipment. With anything like that—

Q397 **Chair:** They won't be investing in new plant and equipment, though. All they will be doing is taking out the little powdery plastics that we saw from Plymouth University last week and putting in ground walnut shells. There is high substitutability, is there not?

George Eustice: But it is a change in production. It will be for the detail for how quickly they phase it in, but in the US, for instance, they have chosen to do this over three years. They have moved as early as they can with a ban on manufacturing, and subsequently there will be a ban on the sale.

Q398 **Chair:** If the circular economy directive is agreed and signed off next year, what do you think the timescale will be in terms of an EU-wide ban?

George Eustice: We think it would be 18 months for a ban on the manufacturing, and shortly thereafter you would be introducing a ban on the sale. The other thing is that there is a global market in this. The fact that the US and Canada have taken a lead has in itself sent a signal. If you have companies that want to export their products to the US market, they will already be influenced by the fact that the ban is coming into place. I suspect we will see regulation driving the pace on this, but I also suspect you will see all the cosmetics companies quite quickly reorganising themselves and changing things so that, by the time you get to the point of having a ban, you may find that most of the main ones have already stopped using these things.

Q399 **Chair:** But there will always be a tail of people who simply will not do it without that regulatory stick.

George Eustice: That's right, and that is why we have moved to the idea of a ban. That is always the weakness of a voluntary scheme—you can get good, responsible companies to be a part of that, but you might always get a few refuseniks at the end. Having the ban and the certainty that we are pursuing a ban is absolutely right, because it is the strongest signal that you can give people to say, "Start changing now."

Q400 **Chair:** So it looks like, from what you are saying, there would be a ban on manufacturing from halfway through 2019, if there was this 18-month window for them to use up their stocks.

Dr Harper: At the earliest, probably.

Chair: And that is with a fair wind. Okay. Thank you all very much indeed. It has been fascinating.