HOUSE OF COMMONS

Environmental Audit Committee

Oral evidence: Governing the marine environment, HC 551

Wednesday 29 January 2025

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Watch the meeting

Members present: Mr Toby Perkins (Chair); Olivia Blake; Barry Gardiner; Chris Hinchliff.

Questions 53 - 121

Witnesses

I: Dr Gemma Harper OBE, Chief Executive, Joint Nature Conservation Committee; Jennifer Godwin, Chief Executive Officer, Seabed User and Developer Group; and Gareth Cunningham, Director of Conservation and Policy, Marine Conservation Society.

II: Professor Melanie Austen, Professor of Ocean and Society, University of Plymouth; and Professor Heather Koldewey, Lead, Bertarelli Foundation's Marine Science Programme, Zoological Society of London.

Examination of witnesses

Witnesses: Dr Gemma Harper OBE, Jennifer Godwin and Gareth Cunningham.

Q53 **Chair:** Welcome, everybody, to the latest meeting of the Environmental Audit Committee and particularly to our inquiry on governing the marine environment. We are very grateful to our panellists for joining us today. I will start by asking you to introduce yourselves and your organisations and interest in this area, starting with Ms Godwin.

Jennifer Godwin: Thank you very much for inviting me along today. My name is Jennifer Godwin, and I am the Chief Executive Officer for the Seabed User and Developer Group. We are an informal grouping of some of the UK's key marine industries. We bring together the trade body organisations for the port sector, the subsea cable sector, offshore renewables, oil and gas. We have leisure boating and marinas, aggregate extraction, and carbon capture and storage. I hope I have remembered them all. I will be in a lot of trouble if I have not. We bring everyone together and we are primarily united with a desire to deliver sustainable marine development. We look across the piece at different government policy that impacts the marine environment and try to seek win-win solutions so that we can have thriving marine industries and a thriving marine environment at the same time.

Dr Harper: Good afternoon. It is a pleasure to be here. I am Gemma Harper. I am the Chief Executive of the Joint Nature Conservation Committee. JNCC is the UK statutory adviser on nature.

Gareth Cunningham: Gareth Cunningham. I am Director of Conservation and Policy at the Marine Conservation Society.

Q54 **Chair:** Excellent. Thank you again. Our marine protected areas are designed to provide an ecologically coherent and well managed network to support the protection of our marine environment. I will start with Dr Harper. To what extent do you believe they are doing that and what do you see as the role that they play in UK waters?

Dr Harper: I will start by saying that in the middle of the last century we did not have any marine protected areas, so we have come a long way. It has taken time. The science has taken time, the identification of sites, the designation and now well into management measures. It is something to be very proud of that the UK has 38% of our waters in marine protected areas. That designation is based on identification using OSPAR, which is the Regional Seas Conventions principles. As you mentioned, being ecologically coherent is incredibly important. We have a scientifically robust set of principles that underpin a representative UK network of marine protected areas, so we have the identification and we have the designation.

The domestic, regional and international commitments, though, are not just about quantity; they are about quality, and so it has been important

to ensure effective management measures in the marine protected areas. Various bodies are in the process of establishing that, whether that is fisheries management measures through byelaws or regulation in another form.

We have come a long way with designation, but we have further to go with management. The latest assessment by OSPAR is that about 22% of those marine protected areas are moving towards the protection that they are intended to have, and about another 39% or 40% are partially there. We are not yet at 100% of the 38%.

Q55 **Chair:** Yes, and obviously with the 30% commitment, we have 22% of the 38%. Mr Cunningham, from your perspective, what would you add to what we have just heard there, and how well do you think it is working at this stage?

Gareth Cunningham: I think that Gemma has given a really comprehensive answer of what they cover. As we have heard, management is the key issue for progress. We are almost there with designation. There are some gaps, typically around seabirds, in the network there that are holding up some of the developments, which Jennifer may talk to.

The other thing we need to remember is that MPAs do not exist in isolation. We have talked about a coherent network, but that is also part of the delivery for good environmental status and one of the 11 descriptors we need to deliver against. We cannot just focus on delivery of MPAs. It is important—they are the jewels within the crown—but we need to make sure that we manage the rest of our seas to enhance those areas and ensure we achieve good environmental status.

Q56 **Chair:** Ms Godwin, from your perspective, how well do you think the marine protected areas approach is working? Is there clarity for your very diverse membership about what that means?

Jennifer Godwin: It is a very good question. I think that to an extent there is clarity in the theory, but when it comes to the practice not all industries necessarily have all the information that they need when they are going through the process. What I am getting at there is that in designation, we have a complete suite of different types of protected areas. We do not have a clear picture for understanding exactly what is going on in those protected areas, understanding the status and how those habitats are evolving, because we do not have a lot of monitoring activities. Often it is put into the responsibility of industry as they are going through an application process to collect data on the protected sites. From an industry perspective, we would like to see more active management of the sites, and that would support industry members in going through their consent processes.

Q57 **Chair:** On communication and mutual knowledge, do you feel that your membership would consider that Government and those who are

primarily interested in marine conservation understand each other's mutual needs and expectations for marine protected areas? Do you think there is a good enough dialogue between the multitude of different actors in this space?

Jennifer Godwin: Another good question. The industry members that I work with and lots of the senior colleagues within arm's length bodies and government have a good understanding of each other and each other's perspective. There are lots of fantastic people in Gemma's organisation, the MMO and Natural England. The challenge comes from a lack of understanding more at the coalface with the licensing process. There is not always that understanding throughout, but I think at the strategic level more so.

Q58 **Chair:** Dr Harper, could you give us a sense of how the UK Government compares with some of the similar sized nations in the approach we have taken to this area?

Dr Harper: We compare very favourably from a science perspective, absolutely. We have some of the best scientists in the world, and you will hear from some of them in the next panel. Our marine science capability and capacity is at the cutting edge. JNCC, which is a science organisation, and our partners work very closely with OSPAR and invest a huge amount of time and energy into supporting OSPAR assessments. We do particularly well from that perspective.

The outcome perspective for the marine environment relates back to my first point about how it is fantastic that we have the designation—from a designation point of view, we have already exceeded the 30by30 target—but that is only part of the picture. We still must progress further with management measures, and we also must be able to adapt to new science as it emerges. Adaptive management is incredibly important. We may well come on to whether it is features-based or whole site-based.

Our understanding of the ecosystem and our dependency on it has never been better. I think that has informed the Global Biodiversity Framework, which was heralded as the Paris moment for nature, and I absolutely think it is. The target on 30by30 is at least 30% of the global ocean in protected and conserved measures by 2030. We have the right ambition and the UK Government have been at the forefront of that ambition, whether through the Global Ocean Alliance or the High Ambition Coalition. Politically the appetite has been there and scientifically the appetite has been there. I think what we will come on to is the gap between implementation and delivery.

Q59 **Chair:** Yes. On that topic of implementation and delivery, it is great to hear that we have world-class science and world-leading legislation, but how does what we have delivered for the marine protected areas and the quality of that compare on the global stage?

Dr Harper: I could not give you a direct set of figures, but we are very happy to follow up on that. We are putting in place fisheries management

measures that aim to be effective. Where we have evidence, where you take particular measures, such as banning bottom trawling in Lyme Bay, you can see that that is effective in nature recovery. Timescale is a challenge here. These ecosystems have developed over a very long time. It will depend on the amount of damage that is done to them, the extent to which you need the right set of management measures to recover. It takes time to evaluate and compare.

I could not give you a league table of where the UK is in relation to other countries. We have all the right ingredients and all the right foundations, but we need more co-ordinated governance and more adaptive management, and we most definitely need spatial prioritisation.

Q60 **Chair:** We will come on to that. Mr Cunningham, you referred to seabirds as one omission. Are there any other ecosystems that are essential to the UK's marine environment that you feel are not properly covered by the current framework?

Gareth Cunningham: As I say, broadly we have the majority of what we call the features of conservation interest covered within the network. Scotland has recently designated a great number of sites, which marries that up, and I know Wales is looking to complete its part of the network towards the end of next year, after its elections. As I say, we are very much there with coverage.

Going back to OSPAR, one of the key things is resilience and replication and making sure we have redundancy. Climate change is something we cannot address very quickly so we must make sure that where we have sites, we are looking after them, but we also need to think about other effective conservation measures that can complement the network, not instead of. I am slightly concerned that we are still talking about designations and not really ramping up the talk about management. We are absolutely exceptional at producing plans and policies, and they are really good, but where they fall down is on the delivery. In some parts, that is not the fault of the statutory agencies because they are not funded enough to deliver this. We have seen a decrease in that funding, and that is what is really needed to ensure that we ramp up the ambition and start to get these networks in good condition.

Q61 **Chair:** Today we have heard an announcement from the Chancellor—I do not know if people have had the opportunity to hear it—on new designations. It was spoken about in the context of growth and offshore wind. Is that something that you welcome or that you are concerned by? What was your reaction to that?

Gareth Cunningham: I have only briefly seen it, but my initial reaction is it is always good to see progress on things that have lagged behind. In response to the ambition for offshore wind, I think the biggest barrier we have is not knowing where any remaining gaps will fall, so developers have uncertainty there. Are they investing in an area that may have future restrictions? We will get to it, I imagine, but marine planning is not

there in the form that it needs to be to support this. What we are doing currently is identifying areas to protect but then not really thinking about what activities are suitable or the cumulative impact of existing activities.

Q62 **Chair:** Ms Godwin, are you aware of that announcement? What is your response to it?

Jennifer Godwin: It is very welcome from an industry perspective. As I understand it—I only had a chance to glance at it—it is linked to the challenges of delivering offshore wind farms. Identifying these new sites will be directly linked to the strategic compensation that will come through under the habitats regulations for new wind farms. It is a very specific need, and of course it is necessary to compensate for the impact that those projects will have on the existing sites.

Chair: Those are existing sites in a marine protected area?

Jennifer Godwin: Yes.

Q63 **Chair:** Dr Harper, do you think this is a necessary catch-up or does it cause you concern about the undermining of existing areas?

Dr Harper: The announcement today from Minister Hardy is very welcome. I think we all know that we are not going to achieve net zero without nature recovery and we are not going to achieve nature recovery without net zero. We must go high nature and low carbon, so it cannot be acceleration of offshore wind at any cost, and I do not think anyone is suggesting that. Anything that helps us get that double win is welcome.

As with anything, the intent looks really strong and really good. It will be the implementation and then the management within those marine protected areas or extended areas, and, importantly—the point that Gareth made—the monitoring. If we do not monitor effectively, we are not going to know what is happening and we are not going to know if management measures are effective or whether we have achieved national or international targets. Investment in monitoring is an important aspect of this.

Q64 **Barry Gardiner:** You are silver-tongued, you two. Just three weeks ago the Office for Environmental Protection announced that it was investigating DEFRA about its suspected failure to take the necessary measures to achieve or maintain good environmental status. That goes to the fact that of the 15 descriptors of good environmental status for the marine environment, they found that only six were improving. That is improving, not where they should be. It is just improving. The distinction that you rightly make between designation, management and implementation, and monitoring that management and implementation—when we do monitor it, as the OEP has done, we find that we are not doing what we should be. We are falling down on the implementation. That is why so many people look at this and say that you can call it what you like, but it is just a line on a map. It is a paper park.

I want to ask you about the question that the Chair put to you on how it is that we have just seen announced these new marine protected areas, to get 16 GW of offshore wind. What we need to know, surely, is where that 16 GW of offshore wind will be. Will it be on our only three highly protected marine areas, Allonby Bay, North East of Farnes Deep or Dolphin Head—my understanding was that they could not be utilised for that—or will it be on some of the MPAs? When the public look at this they say, "It is a marine protected area. That means it is protected" but we all know that that does not mean that it is protected. It means that it has certain things that may be protected in it.

Can you give us any further information about what it is, where the 16 GW of offshore wind will be sited, what we will lose by it and what will replace it? Under biodiversity net gain, we should be gaining here, not losing.

Dr Harper: Am I one of the silver-tongued?

Barry Gardiner: You both are.

Dr Harper: We are part of nature, so nature conservation is about conserving us as much as it is about conserving every other species on this planet.

Q65 **Barry Gardiner:** I think our species has done more damage to the rest of nature than any other species that has ever lived, and we are in danger. If you look at the world wildlife curve, 69% of species populations have been depleted in the last 50 years. I do not think that the preservation of us should be the top of our list. We preserve ourselves by preserving nature.

Dr Harper: I absolutely agree. What I am trying to articulate is that I do not think it has been helpful for us to externalise nature from us in the past.

Barry Gardiner: Absolutely right.

Dr Harper: That links to the point about spatial prioritisation. If we have limited space, whether that is at sea or on land, and multiple uses of that limited space, we need to see a movement from marine planning that is simply descriptive of those multiple uses to marine planning that is much more prescriptive about how that space should be used. That will depend on what we as a society value. Apologies, Mr Gardiner; I cannot answer the specifics about where these are going to be right now, but I can assure you that JNCC's role is to provide the scientific evidence as to whether proposals about where this development is going to be will cause environmental damage. We will do so, and we will do so with integrity.

The challenge is that that is the advice to the regulators. The regulators do not need to act on our advice. Sometimes we do not know, because it is not transparent enough, what has happened to that advice, and therefore the process through which that advice has been considered and evaluated.

Q66 **Barry Gardiner:** That is very interesting. Is that something that you would like to see this Committee recommend—that when the JNCC gives advice, the Government, or the regulator in this case, should be obliged to respond to that advice and say how they have accounted for it and taken it on board? Would that be helpful?

Dr Harper: Yes.

Gareth Cunningham: I agree with that as well. I think one of the key things we are talking about here is the absence of a clear hierarchy of decision making. We have decisions made around how much energy we require. That is not always collated against other targets we have within government, and that creates a conflict for space but also on an already degraded ecosystem. We have talked to net gain there. That is in addition to the mitigation compensation hierarchy. If we are looking to designate new sites to offset damage to current ones, that is not gain; that is replacement, and that is where we start to fall down on delivering a coherent network. We are only then replacing what we have lost, not the additionality.

Q67 **Barry Gardiner:** Again, if this Committee were making comment in that area, we should emphasise that there must be net gain not only to offset the damage but to provide increased benefit and sustainability.

Under the Marine and Coastal Access Act 2009 and the habitats regulations there is the possibility for derogation on some of the marine protected areas. Can that derogation apply to our three highly protected marine areas?

Gareth Cunningham: That is a really good question. I do not think it has ever been brought to case law. We have seen it in the habitats regulations. On principle, it should not. They are meant to be strictly protected. Of course, that may be a different view from a legal perspective, which I do not think I could talk to. I think the other crucial thing is if we go back to the habitats regulations, obviously derogation is de minimis—I think that is the terminology we use. So 1% is okay, but if that happens 100 times, the site is gone and we have seen the cumulative impacts. We really need to get a hold on what is the need for the environment, the ecological head room, and make space for that and not just for more development.

Q68 **Barry Gardiner:** That is a really important point about cumulative impact. How would we take that on board in this Committee and make that a recommendation to Government?

Gareth Cunningham: I think Gemma will be able to talk to that, because JNCC is currently developing the piece of work around it.

Barry Gardiner: That would be really helpful.

Dr Harper: I think it is incredibly important. Sectors have evolved largely separately, and we understand the reasons for that. It comes

back to the point about how they are regulated. They are regulated often by separate bodies, so you have quite a fragmented way of governing the marine environment. We know that there are a number of pressures on the marine environment, which I am sure you have already received evidence about. We are often thinking about dealing with those pressures individually, but it is the cumulative effect and the multiplicity of those pressures—coming back to the spatial prioritisation—that will help us within any given space of sea, seabed, and if you want to take a whole site approach, which we should, through the water column and the wider ecosystem so that we have a better understanding through modelling those multiple impacts. That would then lead you to a potentially different set of options about where you locate new development.

Q69 **Barry Gardiner:** Thank you. That is really helpful. I do not want to pass over the equally important point that you made, where you talked about how at the moment we have designation of features, rather than adopting a whole site approach. It would be extremely helpful if you wanted to suggest to the Committee in writing afterwards recommendations that we could make that would pick up both of those things.

The Benyon review of highly protected marine areas welcomed the three that we have but said that ultimately we needed to implement many more than the three initial sites. I think its recommendation was that at least 10% of English waters within the wider MPA network should be highly protected, the ones where derogation could not apply. What is your view about the Benyon review and what it said there?

Jennifer Godwin: From an industry perspective, we welcomed the Benyon review, and one of the celebrated parts of it was that industry were very involved in the designation process. We have welcomed the three sites that have been designated, but I would definitely say that the industry feeling on this is that we need to make sure that those sites are working first before we start to look for further opportunities to designate.

Q70 **Barry Gardiner:** The difficulty with that, though, Ms Godwin, is that in the meantime other potentially important sites for highly protected marine areas could be disintegrating while we wait and see how it is going with the highly protected ones. I would have thought the precautionary principle should cut in and we should say, "These are the ones we are thinking about protecting. Let us not do anything there for the moment. We will see how the highly protected ones go and then we can make a more informed decision about the ones that we are thinking about." Do you not think that would be a better approach?

Jennifer Godwin: I think that we need to have a pragmatic and balanced approach. We could possibly identify large areas of the sea and say, "There is potential here", but then it comes back to the conversation about what we want from our seas, what we want from our marine industries and how we balance those two pressures or choices. I think,

yes, the precautionary approach applies to an extent, but we already have—

Q71 **Barry Gardiner:** We are only talking about a maximum of 10% of the English waters, are we not? That is what the Benyon review recommended. If we are talking about establishing that, it leaves you 90% for our balanced approach, which I wholly support.

Jennifer Godwin: I will cycle back to some of the previous discussions that we were having about the broader holistic plan of where everything should go. I think we are making some important progress at the moment in considering that. We have talked briefly about prioritisation, and I do not think we have progressed that completely yet, but the work that the Crown Estate is doing on the whole of seabed and gathering evidence, and the Marine Delivery Routemap, starts looking at these potential important areas and is mapping them alongside potential important areas for marine development.

We are starting to build that evidence base. We do not have the framework in place yet with Government to make the decisions, and it still needs work, but we are starting to build the evidence base that could inform that.

Q72 **Barry Gardiner:** We have heard that we have the best marine science in the world, so I am sure the evidence base is out there. Maybe we just need to gather it together a bit quicker.

We have touched on regulation and enforcement, the implementation and the management regimes. I think you have said that currently they are perhaps less than perfect. Could you highlight, Dr Harper or Mr Cunningham, any of the particular weaknesses that you see in the current regime? We have talked about features rather than whole site designation, and that may well be one.

Gareth Cunningham: I am happy to start. Let us move away from offshore wind and look at the other impacts we have. Obviously fishing is one that will be very interesting.

Barry Gardiner: One of my colleagues will be asking a question about that.

Gareth Cunningham: I was going to move away from fishery, don't worry. One of the big gaps we have is that we do not yet currently monitor to the extent that we should. There are recommendations from OSPAR, and announced today in Minister Hardy's announcement, about the impacts of chemicals and water quality, but we are not doing enough to address that. There are an awful lot of promises and there is significant progress through the Water (Special Measures) Bill but, for example, we are not matching up with the REACH initiative from Europe. Forever chemicals and other toxins have a huge impact on the marine environment and do not respect site boundaries. There is a large gap in

tackling those at source but also monitoring their impacts in the longer term.

Q73 **Barry Gardiner:** You are not talking about the dredging in the north-east that saw the die-off there—or that did not see the die-off there?

Gareth Cunningham: I think that is a good example where we need more monitoring to get to the bottom of what the issues are. Let us be honest, spoil will be an issue as we increase the depth of our harbours and we construct more on the seas. We need to understand where that goes and also what the impacts are in addition to all the other chemicals that are going into the sea.

Dr Harper: Our assessment is that we have good legislation and a good set of regulations. It is a permissive system, and rightly, in the sense that it has to be about sustainable use of natural resources, as we are part of nature and we depend on nature for a good number of things. The question really is whether all of that is effective. You have already said, and I completely agree with you, that whether it is the UK marine strategy or OSPAR marine assessments, the UK's seas are in poor condition.You have already cited not meeting the basket of measures.

At the same time, we have lots of legislation, lots of regulation and amazing science. We have poor outcomes, and we have growth in development and industry and competing requirements of our marine environment. We are not turbocharging, or whatever the right phrase is, nature recovery. HPMAs are the latest in the evolution of our understanding about how if you take an ecosystem approach, you may get better outcomes. On the point about HPMAs, we very much welcome the Benyon review and would love to see it fully implemented.

It must be about how you do what we have already committed to doing—the environmental principles in England, or the equivalent in the other countries—and integrate nature into every decision. How do you take account of nature? How do you ensure that there is good understanding of why nature matters? Coming back to the public understanding of this, nature matters in and of itself, but nature matters for a lot of other reasons as well. I do not completely love the analogy, but if we start to think about natural blue and green systems as national infrastructure, if we understand it as national infrastructure and if we evaluate it and value it as national infrastructure, as we do for everything else that we depend on economically and socially, and if we integrate that, we probably will be in a better place. It does not completely work, because it still externalises nature from people, but it is probably the best way to proceed.

Q74 **Barry Gardiner:** Thank you. I think the Dasgupta review sets out very clearly our dependence, and how we should be regarding natural capital as national infrastructure, in that sense.

I want to press you on the fact that you seem to be saying that we have all the ingredients and we know what the recipe is, but somehow we are

not getting the cake right. Is that because we are just bad chefs? Is it because there is a lack of resource being put into this? Is it because we are not enforcing strenuously enough or we do not have the baselines in place that we need? With all the good things that you have said, what is stopping us achieving the outcomes that we seek?

Dr Harper: At the risk of torturing the analogy, there are too many cooks. We absolutely need a just transition for both climate and nature. It needs to be equitable and to take a communities-first approach. We know that marginalised and racialised people here and around the world will suffer the most. This is not a point about equity, but it is a point about a fragmented system. Where you have that level of fragmentation and this level of complexity, it is very difficult to articulate to anyone how the marine environment is governed, because it is so complex. You have this level of fragmentation, this level of complexity, and you have competing requirements, whether it is coming from industry or elsewhere. That is a recipe for inaction. It is too confusing.

Q75 **Barry Gardiner:** Who should be doing it, and what recommendation should this Committee make to Government?

Dr Harper: The UK Government have made a commitment to all 23 targets of the Global Biodiversity Framework. Under target 1, they have committed to an ocean sustainability plan. The development of that ocean sustainability plan should address a much simpler, co-ordinated governance system using what we have. Let us not create more governance and more bureaucracy. Let us simplify it and co-ordinate it better. Let us make sure that we build in the ability to adapt to new science. Let us make sure that we spatially prioritise and that we invest in monitoring.

Barry Gardiner: I think there are some great recommendations for us there.

Gareth Cunningham: If I may add to that, I think that is really sensible. We have had the Marine and Coastal Access Act since 2009. Creating more policy and co-ordinating that into a really quick and easy way to deliver is brilliant, but we must not forget that there are some easy recommendations being put forward that can make a significant change now. We should not pause those to write more policy. We must get on and act.

Funding absolutely is crucial to this. We have missed the 2020 targets and we are likely to miss the 2030. The public purse alone will not pay for this. There are a lot of bills for the Government to pay. We need to be smart about how we bring in sensible, high-integrity investments to ensure that the marine environment does become a natural asset that we enhance and use to underpin the environment.

Jennifer Godwin: All these things would need to be captured in an update to the UK Marine Policy Statement, which I think is over 11 years

old. We need that clear vision for how we, as the UK, want to use our seas and what the various targets are across the different Government Departments and how it all comes together in the marine space. There is a real lack of holistic planning in the marine system and a lack of understanding, perhaps, between how policy is developed on land and how that might have implications for the marine.

Q76 **Barry Gardiner:** A simplified and holistic view?

Jennifer Godwin: Yes.

Q77 **Chris Hinchliff:** Dr Harper, can you tell us a bit about how the UK Government work with devolved nations to deliver commitments such as 30by30 in the marine space?

Dr Harper: It will be a pleasure to. JNCC was born out of devolution, and we are constituted by the UK Government and the devolved Governments, so we are as much Scottish as we are English, as much Welsh as we are Northern Irish. The statutory nature conservation bodies of the four countries makes up the JNCC board. This is in our DNA. Joint committee, which is the board of JNCC, is one of the areas where the four countries come together. There are members of the statutory nature conservation bodies on our board.

There is a whole lot of governance related to that from a statutory nature conservation perspective. We have very good co-ordination among the conservation, and indeed with NGOs, industry and academia within the four countries.

There is an inter-ministerial group, which you will be aware of. I had the pleasure of attending that when it met before Christmas and was chaired by the DEFRA Secretary of State. It was a very positive meeting, very open, and commitment to collaboration is really important. We have seen that in response to the Global Biodiversity Framework. We need to see that continuing in the marine environment. We have a UK marine strategy. We understand that the marine environment is really dynamic. It does not respect 12 nautical miles or even 200 nautical miles. It is a global ocean, and it is one global ocean circulating around this planet. That is a really important message. We name different bits of it, but it is all connected. It is all the lifeblood of the planet.

Environmental policy is devolved. What that gives you is a greater sensitivity in country to what is going on in that area and in the marine environment, notwithstanding that it is a dynamic environment. It also gives you the opportunity for natural experiments, because we all have the same outcome—23 targets in the Global Biodiversity Framework—but each of the countries is doing things slightly differently, which is absolutely legitimate. You can then look at what is working here and what is working there. For Scotland, for example, there is a commitment on deep sea reserve. It will be really interesting to see what works there. In Wales there is the Well-being of Future Generations (Wales) Act, and that

is being applied to policymaking. You have the environmental principles in England. I think there are differences we can learn from.

Having been at JNCC for four years, I will say that we need stronger co-operation and collaboration at the political and policy level to match what we have at the scientific level. There is the point that we have a diversity of voices and a diversity of policies, but it is one global ocean and we all should be pushing in the same direction. There is governance between the devolved Governments and the UK Government. There is the inter-ministerial group and the science that wraps around that. We would only want to see that co-operation strengthened, and we do not want to see compromise as a failure. Compromise can move us forward if it is done in a collaborative and co-created way.

Q78 **Chris Hinchliff:** Thank you very much. I can see some nodding on either side of you there. This is slightly broader now, and I welcome contributions from anyone, but would you say that the approach across the four nations is integrated and aligned? Is there any room for improvement in the collaboration, and are there any opportunities for this Committee to make recommendations for improving those ways of working? Mr Cunningham.

Gareth Cunningham: I am sure that Jen has some thoughts too. There is always room for improvement, let's be honest. While we share the legislation, particularly England and Wales, the delivery is not always the same, and at times we see a curtailing of ambition to go further. For example, within fisheries the minimum landing size may differ depending on where you land your fish, whether it is in Devon or Swansea, yet it is the same species of fish. We need join-up there; it is the same ecosystem.

The marine planning system is not identical yet. We do not have full devolution around the deployment of offshore energy, and that can create conflict in the resourcing within nations to assess that from an environmental point of view. Wales has far fewer civil servants to address that, which causes hold-ups for the developers and also for nature decisions.

I think that a strong recommendation would be greater resourcing to do fuller recommendations and investigations around offshore wind. That will take some of the burden off the industry and also give other interested parties the confidence that it is being done from a third party point of view and funded through the public purse, rather than a developer having to pay for that.

Q79 **Chris Hinchliff:** Before I move on, can I pin you down? It sounded like you were making a recommendation for a joined-up approach on species and shared ecosystems that could be improved.

Gareth Cunningham: Absolutely. For example, we have some cross-border sites in terms of management. They tend to lag behind because

there is not always agreement on how best to approach that. There are sites that I am sure Gemma can point to in the offshore area where we do not have the greatest alignment. Some of the regulation 35 packages are not written yet, so we need to have those management recommendations in place. That requires cross-border consideration and join-up.

Q80 **Chris Hinchliff:** Would you write to the Committee to set out the areas where these policies have not been written yet?

Gareth Cunningham: Absolutely.

Jennifer Godwin: I will add from an industry perspective that it feels like there is a lot of room for better join-up between the devolved nations, mostly on the consenting side of things. A lot of marine projects will span large geographic areas. You might have a wind farm in the Celtic sea where they are bringing the power ashore in Wales. The projects are connected across the different environmental components, sometimes across different devolved nations. The more consistency we have in approach, the better, if we want to deliver these large-scale infrastructure projects at pace. From a governance perspective, it would be better for industry and for the environment if we had better join-up between the devolved nations.

Dr Harper: Can I add another quick thing about standards? JNCC has an important role in working with the four countries on establishing common standards. I refer to the OSPAR principles that underpin the UK marine protected area network. These have to be agreed. There are some things that must be agreed across the four countries, and they have been, so we would like to see continuation of co-operation and collaboration to ensure that we are comparing the same things when we are asked about the effectiveness of these measures.

Q81 **Chris Hinchliff:** Thank you; that is very clear. The MPA network covers 69% of Wales's inshore waters. That sits at 51% for England and 22% in Scotland. Would you say that the commitments across the four nations are assigned in a fair and equitable way?

Gareth Cunningham: I think that the approaches are different. Not to correct your figures, because they are absolutely right, but the other thing we need to remember is that Wales has not designated any sites in the offshore yet, so there is a job to do there. The site designations have been led by where the features are, but when we look at the marine conservation zones, the opportunity for socioeconomic considerations to be brought into where the safe boundaries were finally decided upon was worded differently in different countries, and that has led to less optimal sites sometimes.

In the habitat regulation sites, special areas of conservation and special protected areas, economic and social interests were put into the management part, so the designation of the site was based on what

features needed to be delivered. When we got down to marine conservation zones, or NCMPAs, as they are in Scotland, the variances began to come through, because they were underpinned by slightly different legislation. I have lost my train of thought. I will pass over to Gemma and it may come back to me.

Dr Harper: What it means to be equitable is dependent in this case on the environmental outcomes we are looking for. On the point about whether you necessarily need to see 30% in each place, probably not. The UK has committed to 30% of UK waters. Environmental policy is devolved because it must be responsive to the location—the geographical area—so I think that is probably less of an issue that the JNCC is concerned about. It is more about whether the areas that are designated are being managed and monitored effectively, so that we know what works. At the moment in the offshore we are monitoring one site per year, of 78.

Gareth Cunningham: I have remembered my point. On equitability, the main issue that we have with management is that the funding for the statutory bodies is driven by central Government process around the various conventions. That does not map directly with the area that you need to manage. In Wales, a large inshore area is covered and its budget is set centrally by Government. We need a greater distribution of wealth around what needs to be managed rather than whether that comes from your designated Government's budget. There should be a central budget to cover that, and I think that would help the JNCC manage more than one site per year in the offshore.

Dr Harper: Survey one site.

Gareth Cunningham: Sorry; yes, survey.

Chris Hinchliff: That sounds like a very good recommendation as well.

Dr Harper: We do not need to survey all of them. There are very well-established sampling techniques. There will be sentinel sites that help us understand what is happening in the wider ecosystem and there are multiple ways in which you can generate good evidence using expert judgment and proxies. There is good technological innovation on what is happening in those environments, and undoubtedly AI can help, but all of that is in its infancy and needs testing. We need to make sure that we move forward understanding what is there and what is not there, using whichever methodology is most appropriate for the question.

Q82 **Olivia Blake:** First, a question to Mr Cunningham. There is a vigorous campaign at present to ban bottom trawling in UK marine protected areas, on the basis that there is pretty good evidence that this type of fishing is environmentally damaging. Can you explain to us what sort of damage this practice does to the UK marine environment?

Gareth Cunningham: Yes. To be fully clear, there are different views across the NGOs about where that is necessary, and it is a mixture of

views. I can come back to that happily. In terms of damage, with benthic tugging we are generally talking about otter trawls and large, heavy bags or pieces of wood dragged behind, which rake through the seabed and in turn scare up the fish, or in some cases scallops, and catch that. Obviously, dragging a heavy thing across the seabed causes damage in an area that might have been designated for a benthic feature. I say might have been, because not all sites are designated for the same reasons. That can cause damage directly to the features that the site is meant to be protecting, and that is where "Is that really compatible with the purpose of the site?" is a very good question.

Q83 **Olivia Blake:** You say that there is a bit of a mixed view about why the activity is still allowed within the UK MPAs. Can you explore that a bit more for me?

Gareth Cunningham: Absolutely. The first thing we need to know is that the fishermen are not acting illegally. It is perfectly legal, but it is not compatible with what the site is designated for. We had a review of the offshore English benthic MPAs. Stage 1 and stage 2 were undertaken, and stage 3 and stage 4 were reported upon but the recommendations have not been progressed. That simply means that of the 23 sites that were consulted upon so far, only four have new management measures, so 19 are lacking any change in management.

The other side of this is that we need to think about what happens to that fishing pressure. Removing it from a protected area does not remove it from the sea. That creates competition between the industries, but it also means they are being pushed into areas where they may not have fished previously or into areas where it may not be suitable, for example into an area where there may be subsea cables. We need to have a conversation about how much fishing effort is enough from an ecological point of view and how much is enough from an economic point of view.

To touch on the inshore approach, because I think there needs to be a difference for that, there is a very good example from the Sussex IFCA where they took a byelaw review of their entire region, including their MPAs, and also the areas outside of it, looked at the ecological need of that area and then consulted with the industry to restrict, through byelaws, bottom-towed gear where it was necessary. That was not just bound by MCZ boundaries, but looking at what nature needed, and it has led to a very positive outcome. That is one of 10 IFCAs that has taken that approach, so we need to see a similar consultation elsewhere.

Q84 **Olivia Blake:** That is an interesting example. You have hinted at this, but what would be the immediate environmental impact of a complete ban?

Gareth Cunningham: The immediate one would be removing that pressure. It takes a long time for these seabed habitats to recover. Many of them will take 50 years, so the immediate effect is not straightforward. However, if we were looking at this from a net zero point of view, we

need to remember that the sea is our biggest carbon sink. Every time you impact that, you release carbon dioxide, and that will undermine our net zero ambitions. The immediate impact would be helping deliver towards net zero.

Q85 **Olivia Blake:** I am going back to an answer that you gave earlier. You mentioned the need to raise the levels of all our marine areas. What is your view on the Government's recently announced change in view on the disposal of unexploded ordnance, or sea blasts? Do you think that is a good example of actions that the Government can take to support not only affected areas but organisms across boundaries?

Gareth Cunningham: I will have to draw a blank on that, because at the moment I cannot remember what the announcement was about.

Dr Harper: The JNCC played a role in co-ordinating the four countries. It is a really good example of where you need a common understanding and a common standard associated with noise thresholds. It is a good requirement and a good set of evidence informed and agreed across the four nations. That takes a huge amount of effort and time, but it is well worth it. It is about giving clarity to the industry and signalling what is acceptable and what is not acceptable for environmental recovery.

Q86 **Olivia Blake:** Ms Godwin, do you feel that that example has helped industry to know what is coming down the track?

Jennifer Godwin: Whenever we get strong, clear messages from Government, it helps industry. As Gemma has pointed out, certainty and clarity are the things that industry likes most. On that particular example, lots of the conclusions of the work pointed towards best practice within industry that often was already happening. There were some advances made as well, but it is welcome.

Dr Harper: May I add something? We can provide you with a global analysis about how seabed habitats recover if you ban bottom trawling.

Olivia Blake: That would be really helpful for the Committee.

Gareth Cunningham: Just transition is a key point here. We have to make sure that we support the industry to move away from the current practices. We had £100 million from the seafood improvement programme in 2019 for all four nations. That is an extremely small amount of money to support what could be an extremely responsible and sustainable business, aquaculture as well as fisheries. If you compare that with the amount of money being put into supporting farmers to be more ecologically friendly last year—to the tune of £2 billion and something—there is obviously a disparity there. There is an opportunity for the UK, if we are looking at areas of growth, to invest in responsible and sustainable aquaculture in particular and give an opportunity for the industry to reskill, retrain and be future-proofed.

Q87 **Olivia Blake:** A very good point made, and it links to my next question.

Are the economic, social and environmental and scientific demands on the marine environment adequately balanced in the context of marine spatial planning? That is obviously a context here. Do you think that the current system has the correct balance? I will start with Ms Godwin and move across.

Jennifer Godwin: To an extent, yes. Again, I think we can go further. We are balancing different things. We are balancing the natural environment, the habitat and the species and human pressures, but then there is also the balancing act between the different types of human pressures. Juggling all those different things at the moment is a bit haphazard. We do not have a clear vision about what should take priority or what the direction for the UK should be. We operate with a first come, first served basis currently. To an extent, when an individual decision is being made about a project you are weighing up all of those different considerations.

The regulations we have are really strong, robust and good but they fail to take into account the broader strategic approach that we need. It comes back to my point that we need holistic planning for the marine space, we need an updated UK marine policy statement and we need to build in the evidence base that has been collected through the Marine Delivery Routemap and the Whole of Seabed Programme. We need the connection to what is going on terrestrially and what is happening in the marine environment.

We have touched on a lot of the failings in our marine protected areas but one of the big gaps is looking at global pressures: climate change, ocean acidification, what is coming down from our rivers. If you look at how different marine industries are regulated and the impacts they have on the marine protected sites, I think it is a fair and just process. Quite rightly industry are questioned about the impacts they are having and they must appropriately mitigate and compensate for those impacts, but it is not all within the gift of one developer or one project to solve climate change or address ocean temperatures rising or think about what nutrients are coming down the river. We have this bigger global problem, and we need to have a strategic way of dealing with that.

Barry Gardiner mentioned biodiversity net gain. The UK Government are working on marine net gain. Industry is really supportive of having a policy on marine net gain and we are working closely with the UK Government to try to bring that forward, but we need to bring it forward quickly. There is a lot of potential, a lot of good things happening, but it all needs to be joined up with a clear vision of where we are heading in the UK. I don't think we have that join-up at the moment.

Q88 **Olivia Blake:** Are there any industries that you feel are not fully involved in the discussions covering marine spatial planning? I am thinking about recreational organisations, perhaps.

Jennifer Godwin: I think that the MMO is very good at engaging all of the different marine industries and it knows who the different industries are, but one of the problems that we have at the moment is other policy areas are moving faster. For example, DESNZ is working on the Strategic Spatial Energy Plan, which has marine components. I do not think all marine industries are plugged into those conversations, yet that is moving very quickly. If we have a Strategic Spatial Energy Plan that points to parts of the sea that have to be used in a certain way, yet we do not have a marine plan coming forward to meet it, that means that whoever goes first, whoever shoots first, decides what happens.

Q89 **Olivia Blake:** Do you think that there needs to be more joining up between different plans, basically, within government?

Jennifer Godwin: Absolutely. I was looking at the foundations for the Environmental Audit Committee and I think one of the things that I read was that you look across the different Government Departments and try to see where the join-up is on environmental issues. From my perspective, in the different processes that I am involved in we could do a lot better on joining up. There are so many Government Departments that have an influence on how we use our sea. We have a digital strategy that influences how our telecoms cables are laid. We have the DFT, Department for Transport, that is influencing how ports are evolving or developing policy for ports. We have DESNZ, so that is carbon capture, oil and gas and offshore wind, but there are silos within those Departments. We have DEFRA, which has the responsibility for managing the marine environment. There is the MOD.

There are so many different activities going on and different areas of policy being developed. We could definitely do better in joining them up.

Q90 **Olivia Blake:** That is very helpful. Do either of the other witnesses want to comment on that?

Dr Harper: Yes. The question of balance is an interesting framing in the context of globally at least 1 million species at risk of extinction, and we are on track to breach the Paris agreement this decade. Balance does not adequately describe the action that needs to be taken as society to deal with those challenges. Mr Gardiner referred to Dasgupta. It is very clear the economy is within nature. The resilience and health of marine natural systems—of all natural systems—are beneficial for our economies and our societies.

The question then is: do we understand which ecosystems have the most impact, and which pressures have the most cumulative impact? How are we going to prioritise through spatial planning to ensure that we get resilient ecosystem services that enable economic growth and societal prosperity through whichever industries, from recreation to fisheries to cables, oil and gas, and renewables? There is a slight reframing to be done there.

It absolutely needs to be cross-sectoral, so working together—not just the four nations working together, but each of the sectors working together—using the best available evidence to be much more prescriptive in the marine plans. A huge amount of work has gone into marine plans, and it is a very good inventory of all the various policies and activities that are taking place in any given spatial area. What it does not tell you is what is right for the outcome that you want to achieve.

We have a vision for the UK marine environment to be—I am hoping I can remember—clean, healthy, safe, productive and biologically diverse. That is a well-established vision. It is quite long and that is why no one can remember it. But the point about is that it has to be adaptive to changing climate, to climate breakdown. Everything will change. We need to be ready to adapt to it. We need to invest in our marine and our terrestrial natural systems in a way that builds their resilience to help us adapt to climate change. I argue that what is needed is a much more adaptive approach that draws on the best scientific evidence, is cross-sectoral and is courageous about the things we need to do.

Gareth Cunningham: I absolutely agree. To pick up a key point there, we need to stop just looking at the environment from a protectionist point of view and look at investing in it, because it can deliver a great deal for the economy and for people as well. Gemma summed it up far better than I did.

Olivia Blake: May I quickly ask one more?

Chair: Let me bring in Barry Gardiner, and if your question has not been asked after that, you may.

Q91 **Barry Gardiner:** The MMO, the Marine Management Organisation, was supposed to be completing stages 3 and 4 of the review on destructive activities, namely bottom trawling and dredging, as we were talking about. That was supposed to come in when? When should it have been done by?

Gareth Cunningham: In the previous Government. I think the deadline was around 2020. No, sorry, 2024 was the ambition to manage that.

Barry Gardiner: Stages 3 and 4 should have been done by the end of last year. Do we have any update on when we are expecting that? In that case, would you like to see this Committee make a recommendation that they get on with the job?

Gareth Cunningham: Yes.

Q92 **Barry Gardiner:** You talked about the extent of the time that it took for areas to recover once destructive activity such as bottom trawling had ceased. Can you recall how long it took for Lyme Bay to recover?

Dr Harper: Years.

Gareth Cunningham: I think technically it would still be in recovery.

Q93 **Barry Gardiner:** Yes, but there has been a marked improvement in a period as small as five years, has there not?

Gareth Cunningham: It varies vastly by species. Some recover quicker than others.

Q94 **Barry Gardiner:** Indeed, such that the local fishermen have been amazed at just how quickly it has recovered. I wanted to push back gently against the idea that you will not see anything for 50 years.

Gareth Cunningham: I was thinking it will take a long time in the context of the full ecosystem recovery. Individual species, absolutely much quicker, depending on the species.

Q95 **Chair:** Dr Harper, is there a final point you wanted to make?

Dr Harper: It is on the point about uncertainty and also related to the precautionary principle. There is a lot of uncertainty in the science; of course there is. The job of science is, in a sense, to reduce that uncertainty. The more we are finding out, the more uncertainty there is in the system, because we are understanding about how everything is connected to everything else. If we think of natural systems as national infrastructure, the model we might want to look at is how do we deal with that in health, in aviation, in the nuclear industry? Uncertainty does not stop us doing things. Uncertainty and the precautionary principle would say that we need to take a view that the resilience of these systems is more important than not taking action because we are uncertain about the science.

Q96 **Olivia Blake:** I will ask quickly about workforce, given that you have been explaining this as infrastructure. Do you think that we understand the workforce that is needed to improve monitoring and maintenance of these areas, or do you think that is a question for another day?

Gareth Cunningham: We understand the requirements, but—this is where it comes back to cross-government—we are not setting ourselves up to do that, so it needs to go down to GCSEs, A-levels and university options. When we look at steel, for example, we have a mandate for a number of welders and that then filters down to colleges: how many courses can we deliver? We are not doing that for our other marine industries, whether that is monitoring, surveying, oceanographers or marine planners. We really need to think about how we link the education system and the career prospects to the vision we want to see.

Olivia Blake: Thank you. That is useful.

Dr Harper: I completely agree with that. I will add that I am a social scientist, so we need a much more interdisciplinary approach to this, and an approach that is not linear. You have all the different sciences around the table helping to articulate the problem together. That is how you will

get a just transition. I am sure you will hear from the eminent academics you have in the second panel that there is an ecological skills supply shortage in this country, and that needs to be invested in.

Olivia Blake: Thank you very much.

Jennifer Godwin: I can add that industry have that same issue. The same ecologists who start their career in Natural England or JNCC might move on to a consultancy or a developer, and there is a constant shortage of skills. Industry are also taking steps to try to go back to the root and make people aware of the fact that you can have fantastic careers in marine.

Chair: Thank you very much. One day we will have a panel here who say we have plenty of people in our area of work, but that happy day is not today. Thank you so much, Ms Godwin, Dr Harper and Mr Cunningham, for your evidence. We will bring this first panel to a close.

Examination of witnesses

Witnesses: Professor Melanie Austen and Professor Heather Koldewey.

Q97 **Chair:** Welcome to the second panel of today's Environmental Audit Committee. It is nice to be joined by our panellists, Professor Austen and Professor Koldewey. Could I ask you to introduce yourselves and your area of interest in this whole subject, please?

Professor Austen: I am Mel Austen. I am Professor of Ocean and Society at the University of Plymouth. I am also, for the record, on the board of Natural England and the committee of JNCC. I chair the partnership of the UNESCO Biosphere Reserve in north Devon. I have just joined the trustees of the British Ecological Society, and I am the director of the Centre for Doctoral Training for Sustainable Management of Marine Resources. I bring that in because we were talking about whether we are training the people for the future, and we have just started training 44 PhD students. There is a desperate need for more of them. We would love the Government to recommend a need for more expertise in this area.

Chair: Excellent, thank you. That has been heard.

Professor Koldewey: Hello, I am Heather Koldewey. I lead the Bertarelli Foundation's Marine Science Programme. I am based at and employed by the Zoological Society of London. I am also an honorary professor at the University of Exeter Penryn campus. I live in a coastal community in west Cornwall, with the marine conservation zone on the doorstep. I am a trustee of the Marine Biological Association, Surfers Against Sewage and a small social enterprise called Coast 4C. My expertise is primarily in the UK overseas territories.

Q98 **Chair:** Excellent, thank you both. I will start with Professor Koldewey. In your view, what are the priority areas in terms of ecosystems for effective restoration of the UK's marine environment to meet the coming Montreal 30by30 commitment?

Professor Koldewey: There are two ways of looking at priority areas. The first is protecting what we have and the second is restoring what has been depleted and destroyed over time. In the context of climate change, we need to think about the habitats that are particularly important in the context of carbon storage. That is things such as saltmarshes, seagrass, mangroves and also the deep-sea environment where we are learning more and more about its importance for carbon storage.

All habitats are important, and in the context of the UK overseas territories, there has been a huge contribution by the UK Government to biodiversity conservation on a massive scale of 4.4 million square kilometres, including the best coral reefs in the Indian ocean region. The importance there is how we ensure that protection is effective and that we think at an ecosystems scale. We have already heard that many systems are connected. One species may be born in one area, move to another, feed in another, and so on. It is not always as simple as thinking about one habitat. That is why the point raised about protected areas looking at ecosystems rather than just specific things or features is so critical.

Q99 **Chair:** Thank you. Professor Austen, on that same question, what do you see as the priority areas for 30by30?

Professor Austen: I view this through a systems thinking lens of natural capital and ecosystem services. What are the habitats that provide most of those ecosystem services? That is the underpinning biodiversity that delivers those. One habitat that we give poor shrift to is offshore coastal deep-sea sediments.

Going to an earlier question, what happens when you trawl the seabed? The seabed is a three-dimensional structure full of little wriggly things that bring nutrients down from the overlying water, turn them around, store some of them and turn them back up again. It is a really dynamic, busy system in its best pristine state. We have organisms that go down to a metre, that have big burrows. They are very complicated with huge microbial fauna around them doing stuff that supports the whole fish, cetaceans, whales, dolphins and everything above. We do not tend to think about that. We are protecting for the features. There might be a sea-pen or something that people see as significant, but that whole system, that whole structure of sediment is one of those things that we need to think about.

It goes back to your whole system thinking. We need to think about these as a whole system that needs protecting and not just bits of it. We need to think about the ones that might be important. As has been mentioned before, it is a huge blue carbon repository as well. Rather than

taking things piecemeal, we need to think a bit bigger about what we do. I still think that is compatible, though, with the sectoral use.

Q100 **Chair:** We heard in the last session the suggestion that the UK Government in some ways are world-leading on their commitment to marine protected areas, but that the bigger questions were not about the number of designations but about the quality of implementation within those designated areas. Do you think that the UK Government's current approach is adequate to support restoration of the marine environment to meet those 30by30 commitments, Professor Austen?

Professor Austen: All of us would have liked to have seen something that happened a lot more rapidly beyond that. There was designation and then it has taken a long time to get to what designation means. What do we actually manage and how do we manage it? We are making a lot of progress. Somebody mentioned the precautionary principle earlier. We probably could have employed that a lot sooner, and then said, "Okay, for an adaptive management, have we been over the top? Can we now step back and say yes, maybe other things can happen and maybe we can do things?"

Reducing pressures is the key thing if we want nature recovery, particularly in the offshore areas. There is not a lot we can do about implementing seagrass planting or saltmarsh restoration-type activities offshore. It is just too difficult. The only thing we can really do is take some of those pressures away. We have been slow to take the pressures away and slow to think about what we actually want from those bits of marine environment that are protected as well as those that are not.

Q101 **Chair:** Do you have any sense of whether that criticism has changed under the new Government or have things broadly continued business as usual for the last six or seven months?

Professor Austen: I am not sure I really know the answer to that question.

Q102 **Chair:** Okay. I don't want you to guess. Turning now, Professor Koldewey, to the same question but in the context of the overseas territories, to what extent do you think that the current approach is adequate for delivery and implementation there?

Professor Koldewey: The UK Government have had a world-leading role in the context of the UK overseas territories, and that is delivering a huge amount in the context of international commitments. The key is that that has been really dependent on Blue Belt and Darwin Plus funding that is, say, static, and it is probably delivering some of the best conservation outcomes for the best value for money. It works out about £2 per square kilometre of ocean protected. The key thing there is sustaining and increasing with inflationary levels that level of funding to support the locations that have started off, the Chagos archipelago being

the largest marine protected area in the world for some time—a competition that I think it is good to lose, with other, bigger ones.

The change and the opportunity for the new Government is thinking about the community role that has been a shift from perhaps more top-down to bottom-up approaches. We are really seeing remarkable leadership from within the UK overseas territories that have identified their priorities based on their place, their culture and what is appropriate.

There is also a lot to learn in a domestic context that I have to say I found unbelievably complicated. If you look at the recent reports on how 30by30 is going generally for marine protection, we know highly protected marine areas work. There are hundreds of scientific papers that show that. We do not need to keep proving that in every single site. That is bad use of science resource. We know that and have plenty of evidence. We need to look for that high protection to be happening here in our domestic waters. We need to dramatically simplify how we go about managing to achieve those targets.

As we heard earlier, in the course of my lifetime we have lost nearly three quarters of wildlife. That is from ZSL and WWF's Living Planet Index. Another 4% has gone in just two years. We need action, slowing down, precautionary principles, keeping moving. That is a worry if you say that in six months, there is still a significant opportunity to lose more. In all, we are seeing and experiencing it weekly with climate-driven disasters and biodiversity loss and failing to meet every international target. We do not really have the time. We have the scientific evidence; we just need to act on it.

Q103 **Chair:** I will go back to what you said at the start about the effectiveness of the UK Government with the overseas territories. A recent area of consideration and concern has been around the Chagos Islands, which are incredibly important for their marine diversity. Does the possibility of the status of the Chagos Islands changing cause you real concern?

Professor Koldewey: Most marine protected areas and those thinking about protecting marine biodiversity are worried about political change within governments. To go through sovereignty changes, obviously, would be the first chance. However, we have worked very closely at ZSL and other organisations with the Mauritian Government. Environment is important to everybody. Meeting those targets is important to every country, and looking at retaining that ambition. It would be a new marine protected area, of course, under Mauritian sovereignty, but with the data and evidence and the opportunity to finance that based on nature versus exploitation, there are encouraging opportunities for that. Obviously, nothing is certain.

The biggest concern I have at the moment is that the environment is dropping down the agenda of discussion. Security and other issues are incredibly important in that area, but it is the most important site in the Indian ocean. It provides fish and coral larvae to the whole of east Africa

and Indonesia, north to the Maldives. There is a bunch of superlatives. I can say it is one of the most important ocean areas on the planet, so that is what needs to go through any new arrangement and new treaty. That also applies if things do not change. I cannot emphasise enough the importance of that location, backed up by about 200 scientific papers that say the same.

Q104 **Chris Hinchliff:** There are many legitimate and competing demands on the marine environment that are only likely to increase. Given some of your comments so far, I cannot resist asking, in the context of the current high-profile debate around growth, what your thoughts are on whether year-on-year increases in the exploitation of marine resources can be sustainable in the context of our environmental commitments.

Professor Austen: I am so glad you asked that question, because I have not really talked about other effective conservation measures. I think that the growth agenda can go quite firmly hand in hand with a nature positive agenda, and Gemma was saying the same thing earlier. We can build offshore renewable farms that are nature positive and have nature features. One thing I have begun to learn is that if we look on land, many of the terrestrial systems that we want to protect are quite artificial. They have arrived there through controlled grazing, or through controlled whatever.

We know that if we put structures in the marine environment, we get different biodiversity, we get growth in biodiversity and, depending on the structures, we can get strange biodiversity. We lose some of the footprint of the original biodiversity, for sure, but particularly thinking through the ecosystem services lens, we can get something that can be quite positive. I am with the idea that we can do nature-positive growth, but we just need to think about what we want from that nature and from the growth.

It goes back to what the previous speakers said about how we need an updated policy statement or some idea of what we want from the marine environment. To repeat, that will mean some courageous decisions about what are the industries and the sectors that we need going forward. It will mean looking ahead and saying that we might not need them right now, but we might need them in 20 or 25 years' time, and taking that long-term vision about what is required from our marine environment and how to plan for it now.

I do not even think it is just marine spatial prioritisation. It is about building in positive nature in everything we do in the marine environment from now, whether it be marine protected areas or outside of marine protected areas. We need to think about the vision that we want and where we want to get that growth, but also where we want the nature growth and the low-carbon and zero-carbon areas. I am a bit more positive about that.

Professor Koldewey: All industries are not the same and all economic growth is not the same. Some of the opportunities are anchored in local communities, and perhaps that has not been discussed enough today. Coming from a small coastal community, coastal communities are the poorest communities in the UK. Looking at how there is sustainable blue natural capital development—blue economy is a jargony term that lends itself beautifully to green/blue wash—there are great opportunities. The important part of that is the communities being part of those decisions and the decision making and understanding what is happening in their waters.

That leads to building those opportunities. We have heard examples from Lyme Bay, Arran, where there are hand-in-hand opportunities for coastal regeneration and replenishment of marine-based activities, hand in hand with nature-based approaches led by communities, including fishers. That is where we need to learn from. There are plenty of global examples of how we go about that.

Q105 **Chris Hinchliff:** It would be really welcome if you could write to the Committee setting out some of those community-led examples.

To move on to specifics around management, thinking about the different industries that use the marine environment and marine resources, how effective do you feel the current cross-sector approaches to management of the marine environment are?

Professor Austen: It was articulated quite well previously that there is a bit of a mismatch of who is doing what where, who is overseeing what where and who is deciding what will go where. It brought back to my mind some discussions that I have had often with people about why we do not have a cross-departmental marine Minister who could look across the landscape at the different places and be the perspective of decisions that are made in DESNZ, in public health or in the health Department concerning the marine environment and how those work. I have seen it in Singapore. They have an environment and human health Minister, and I thought it was an amazing thing to do to have somebody who goes across those Departments.

The proliferation of legislation and policy, and different licensing and people doing things at different paces makes it very difficult for anybody who is trying to operate in that environment to work out what they can do and what they cannot do. It slows the pace of development and impedes the pace of thinking about what we can do that is a good thing, rather than just, "How on earth do we get this wind farm in the water?" or "Where are we going to land our fish next?" I feel that it is difficult out there for those who are operating.

Q106 **Chris *Hinchliff:*** Professor Koldewey, I welcome your comments on that, but specifically given some of the comments just made about communities, management of environmentally protected areas can often conflict with commercial activities on which local communities rely. Are

there any particularly effective methods that you would like to make the Committee aware of around securing buy-in from local communities in the development specifically of MPAs?

Professor Koldewey: Social science came up earlier, but the local communities and the resource users are usually the knowledge holders, too. I think we have often ignored local ecological knowledge and not factored that in. We have perhaps looked at more university-based science as the gold standard science, when if anyone has spent any time talking to anybody who fishes or is passionate about the ocean, they can tell you all the spots because they are there all day, every day, 365 days a year. It is different for a scientist who visits a couple of times a year—a different sort of data. We need to merge those two together to really understand and look at how we co-develop solutions.

There are a number of tools. There is one that I know the Marine Conservation Society has used very effectively called the community voices method, and it is a way of getting over committee meetings where some people will speak and some people will not, which does not represent all the opinions and voices in the community. Overall, it is about how we listen and learn and are inclusive of different perspectives, and reach consensus about what is possible and what is not. Any fisherman or fisherwoman will be looking to have fish in the environment for the long term. It does not make any sense otherwise.

A lot of the complexities around regulation and change—climate change, regulatory change—in an inherently uncertain business makes for a very difficult operating environment. We need to be thoughtful and sensitive to that. We need to listen and look at how they are part of the decision-making process, not just consulted, tick box, move on, and then somebody else decides and they have to change their entire lifestyle as part of that.

Professor Austen: I really reinforce that interdisciplinary approach of people who get the deep science and the ecology and those who have the local knowledge. We have used it in the marine pioneer that introduced natural capital thinking into the coastal waters. One of the sites was north Devon, where we produced a natural capital plan in connection, in combination and co-designed with the local community. We do it within the UNESCO Biosphere Partnership. There are quite a lot of those community groups, and organisations such as the MMO are increasingly plugged in and aware of it. It is just that they do not necessarily have the resources to fully engage in the strongly participatory way that is required.

Q107 **Chris Hinchliff:** Thank you very much. You have quite strongly pre-empted my next question, and possibly covered it to some extent, really. It was all about how the Government can ensure that all industries that use marine resources are environmentally sustainable in the long term and how they can work together to come to that sustainable situation.

You have just talked about some interesting case studies of how that is being delivered in particular locations. You have mentioned that resourcing is a challenge in that. How can the Government make more use of those practices? What more can we recommend to the Government to do?

Professor Austen: It comes back to your earlier question about workforce. If you are going to work with communities, it is quite time-consuming. You need people with the right expertise to talk to people, to elicit information and understanding, and to get people's trust, their buy-in and their enthusiasm, particularly in the local community setting. That also has to be juxtaposed with the people who are trying to get large-scale implementation and large-scale decision making going. You need quite good negotiating skills to be able to bring those together. I have certainly seen it in Natural England on the land side of things. We tend to be quite under-resourced in bringing community groups together in the marine sector, from my experience.

Professor Koldewey: I will add two points. One is on transparency. The ocean is the biggest common resource, and yet a lot of the things that go on are not transparent. Technology and tools that are emerging, satellite surveillance and other remote sensing techniques are helping us see what is going on and how to look at managing that. That is particularly important in the UK overseas territories, which tend to be small island populations with large ocean bodies. Understanding what is happening in their waters and how to manage and enforce illegal activity is particularly significant.

The other thing is the connectivity, which we have touched on indirectly. Biodiversity loss and climate change are inherently interlinked but tend to operate in different policy frameworks and different Committees. The impact has again come up of sewage pollution and other pollutants coming into our ocean environment. Land, sea, land, river, freshwater, estuarine is all completely interconnected. You could have the best managed marine protected area and there are regular sewage outfalls, and there is nothing you can do about that. It is important to think about not just the complexity of the regulatory agencies but how these issues connect, because they are fundamentally interlinked.

Professor Austen: I will add the farming sector to that. It is not just sewage that comes down; it is sediment and nutrients—excess nutrient loading as well.

Q108 **Chris Hinchliff:** I have a final question to pursue that a little further, because we have talked at a quite broad, high level there. Do you have any specific recommendations for how the Government can integrate that community-led approach with our current policy setting for managing the marine environment space?

Professor Austen: People are trying to do that in the marine planning context. There is almost over-consultation. There is quite a lot of "please

will you respond to a consultation?" It is about finding the time and resource, and being able to get engagement face to face takes resource and time. The biggest thing is lack of resource.

Potentially also—and I would say this—is a lack of training and of being able to look at that bigger picture. It is being able to talk to somebody from one end of a coastal community whose stake in the marine environment is that they go swimming every day or they go fishing, to another one whose stake in the marine environment is that they are trying to work out where their cabling will come ashore and how they will get the energy that they are producing a long way offshore into the land, and thinking about those different sectors of communities and those different stakeholders. That requires a lot of skill. I have certainly seen a lot of that in government. Hats off to some of the people I see, but you probably need an awful lot more of them.

Professor Koldewey: I will reinforce that it is absolutely critical, right from the outset, to run consultations well with the appropriate expertise, which usually comes from the social science sector. There are very well-established approaches, but many people working in government or who are doing those consultations might have backgrounds, as I do, in biology or fish. That is an important skillset, but you have to work alongside those with the expertise to know how to not only talk to communities, but listen to communities, and make them feel part of the decision making. While that is resource-intensive up front, we are still dealing with the consequences and negative perception of marine protection in the UK because of poor consultation processes over a decade ago.

That has lived really long in the minds of people who did not feel part of it, did not understand it, felt that decisions were made outside of their control and are having to live with the consequences. Front-loading that investment gives you a much better chance of people feeling they have co-developed and co-created, and that leads to a much more sustainable long-term approach. There are successful examples in Wales, in the south-west and elsewhere, and examples in Scotland have been mentioned. There are some good diverse cases here, as well as internationally. We are talking to colleagues in the Philippines who are super proud of their marine protected areas that are led by communities, and who find it bewildering how we have ended up in a slightly messy situation here.

Professor Austen: There is an issue of empowerment. We talk about community engagement or stakeholder engagement. We have a seabed that is owned by the Crown Estate, who lease it for a revenue. We have a Government who manage the activities in that area, and who do it in a piecemeal way. It is quite difficult for anybody to feel very empowered, involved or engaged in a system that is as complex as that.

I look at what goes on on land and in national nature reserves. It is a combination of people who want to do the right thing, maybe the NGOs,

and farmers who want to get a different revenue stream, but the good news is that they can buy the land and decide what they will do with it and do it within a government remit. In the marine environment, it is hard for anybody to get the grip of the system of how you would make that marine protection—that marine environmental improvement—work within the constraint that nobody is fully empowered to engage in doing something positive.

Q109 **Barry Gardiner:** I loved that last analogy that you used about farming and soil structure, and what you said about the whole sedimentary ecosystem. Has any work been done on trying to calculate the natural capital value of the sedimentary system that you were talking about? In your earlier remarks, you said it was about a metre where a heck of a lot of things are going on. It is not just about carbon sequestration, although that obviously has a value as well, but it is supportive of the whole of the rest of the oceanic biodiversity. If that could be put into a figure—valorised, or whatever the word is—has that work been done? Do we have that data?

Professor Austen: It has for blue carbon. It is astonishingly difficult to do it for all of the ecosystem services, but we do try. We have got to the point where monetising these services, with the uncertainties that are involved, starts to feel a little bit ridiculous. On the other hand, slightly tongue in cheek, I think that some of what we do with GDP is also slightly ridiculous. If we do it there, why do not we do it here? We can do that back of an envelope: this is what we think, if we add this all up—we can do it. Most scientists are very nervous and not really very comfortable about doing that. Most social ecologists, social economists, eco-economists and socioecologists—anyway, the interdisciplinary ones among us are not really very comfortable about trying to do that monetisation because it has such huge uncertainties on it, not least of which is understanding exactly the quantified, "Just how much function do you need to get this much ecosystem service?" Those are the scientific uncertainties we still have.

Q110 **Barry Gardiner:** You talked about the Crown Estate, and they are trying to balance these very complex choices. On the one side, there are clear economic metrics, and on the other side, you were telling us that there are very uncertain biological metrics, but they have huge monetary implications. It is very difficult to quantify them. If you were the Crown Estate, you would be weighing up something that has a clear metric on one side with something that does not have a clear metric on the other. How would you go about doing that?

Professor Austen: You can do it, but there are a lot of uncertainties, and they probably would struggle to find a bona fide economist who would be terrifically happy to do it. Some of this is in the realms of: scientists can say that this stuff is really important, and these things happen. We can quantify them to a certain extent, but we have already signed up to the GBIF and zero carbon, and we have not done that on the

basis of, "Here is the monetary reason why we should do it." We just think that it is important enough.

Q111 **Barry Gardiner:** What we have not signed up for is what protection means. We signed up to protecting 30%, but as we heard from the earlier panel, what that means in practice is not clear. It is not clear exactly what level of protection is being put in place.

I want to talk to you about baselines. We have all heard the analogy about cleaning the car. My mum would pay me half a crown—I am sorry, it is that old—to clean the car and I would leave a patch at the front that was covered in dirt to show her what a great job I had done.

It is very difficult to do that in the marine environment. Fifteen years ago, Callum Roberts and his team did some analysis by looking at the data from back in 1892 and showing that for our input power in terms of the fishing capacity that we now had, we were getting 17 times fewer fish out. What is the difficulty with baselines? How do we need to overcome that difficulty in our enforcement and operation of spatial planning?

Professor Austen: One of the difficulties in baselines is that they shift. We would probably need to go back to pre-industrial revolution to know what went on. Unfortunately, we did not have a whole bunch of Victorians who went around counting and identifying everything in the marine environment in the same way as they have on land. The terrestrial baselines have not shifted as much, or at least we have more of an idea. We have more understanding than we have in marine. There is a real problem. I know I look at the marine environment and I have a different baseline from someone else.

I would almost flip it on the other side and say we have climate change, so we do not know what some of the outcomes will be. I will give you an example. I live on the Tamar estuary. About 20 years ago there was upstream thinking where South West Water paid farmers not to put as much fertiliser on their land so that it was cheaper for them to abstract water without having to chemically process it to remove nitrates.

Twenty years later, there is a seagrass bed intertidally in front of my house. For a long time, it was a dark green mass of nuisance algae. I went out about seven years ago to have a look at something—my mooring, I think—and realised that this had been transformed and there was quite a lot of seagrass coming. We have had PhD students looking at it. We do not normally have so much seagrass in the intertidal. We would not expect the species that is in the intertidal to be in the intertidal. It is predominantly a subtidal species, but it is in the intertidal. It is very dense. It looks like a cricket pitch or a football pitch; it is really dense. We are all going, "What is this doing here. How did it get here?"

That is another shifting baseline. We could say that is a really good thing, seagrass. What is not to like about seagrass? We just do not know. I do not know what the ecosystem services are on it. There will be more and

more of those changes, and it will be really difficult to predict what will happen.

In Lyme Bay—we have talked about that—there has been an increase in biodiversity. There is an increase in hard bottom creating shells and shellfish, which none of us would have expected because they were not there in our lifetimes. They probably were there previously. Yes, it will be a problem, particularly to the industry sectors, to say "This is what we are expecting", because in many cases we do not quite know what we are expecting. But we usually see an increase in biodiversity.

In the seagrass bed, we are not seeing so far an increase in biodiversity in the sediment. We are seeing an increase in biomass and visitation of seabirds and wildfowl. We do not have any scientists who do birdwatching looking at what is happening on the seagrass. I can tell you anecdotally, because I have lived there a long time, that there are a lot more seabirds, and they seem to be quite diverse and are very different from the ones that were there when I first lived there. That is not quite scientific evidence. It is me as an expert saying that something has changed and it is different and it looks good, but I am not sure we know what the outcomes will be.

Barry Gardiner: There is a lack of good quality data.

Professor Austen: Yes.

Q112 **Barry Gardiner:** If we are thinking about our management of the seabed today, how likely is it, because of that lack of good quality data, that we could be facilitating damage to the ecosystem because we do not have the data to demonstrate it?

Professor Koldewey: The lack of data is a very good excuse. Scientists always look for more data. It is hard to be put on the spot because you can never say that data are perfect, and they change, and then there are observations, but we use that as excuse far too often to say we cannot make decisions. I work and have always worked in really data-poor situations, and the protection of Chagos started in a very data-poor situation. It is still very data-poor proportionally, but it is much better. We were still able, by consensus and the precautionary principle, to make good decisions. There is a lot to be learned from many other places that we can apply. It is not always exactly the same, but we need to get over ourselves a bit, and move on and say "We do know this."

We know that almost everywhere, trawling is highly destructive and is very bad for biodiversity. How it happens in marine protected areas is beyond me. The same for dredging—we know it is damaging. There are lots of papers. It is a subsidised fishery. In a biodiversity conservation context, it makes absolutely no sense at all, and that is backed up by science.

Q113 **Barry Gardiner:** Why has the MMO not yet proceeded to stage 3 and 4?

Professor Koldewey: I do not know, but that is the global view on trawling. We start with what we know in science, and then we get to a site-specific place, and we say, "But we do not know exactly that, right here in this place" and that just holds everything up. We need to be better at saying, "It may be a gap and it may not be perfect, but let's make a decision and move, and then fill those knowledge gaps as we go".

Professor Austen: That is where I was going to. We do not know quite where the outcome is, but we know that if we reduce or remove the pressures something will change, and it will not be for the worse. We are both committed that it will not be for the worse if you remove pressures. We do know what the pressures are. We know that climate change is a pressure; we know that we have too much carbon going into the environment; and we know that trawl or dredge fishing is a pressure.

Q114 **Barry Gardiner:** If we turn to the Indian overseas territories and the Chagos biome—the marine biome—we know that there will be pressure on fisheries in that area, because the enforcement that we have already has shown that there is encroachment by fishing.

Professor Koldewey: There is illegal fishing, and it has definitely decreased shark populations and others.

Q115 **Barry Gardiner:** Indeed. Under the putative agreement, who will pay for the enforcement of that in the future to ensure that those pressures do not increase?

Professor Koldewey: As a scientist, I do not have the answer to that question. How many crowns did you earn in your car washing? All protected areas need some degree of enforcement as part of the management plan. These large-scale remote ones are particularly tricky. With somewhere such as Chagos, all the science has shown that the decisions to protect it fully at the time were the right decisions—we basically filled in the blanks and said, yes, it really is globally significant and it is vital to protect it—but pressures change. We know that fuel subsidies and changing fishing in India have affected the poaching. We know the reasons and who poaches and why they poach, and we need to look at what deterrents and mechanisms we need to put in place for that.

That might be bilateral agreements, as the UK has been doing with Sri Lanka and is trying to do with India, and so it would become a new Government to look at how you manage that. We have a lot of data to say, "This is where the pressure is, and this is how you need to fix it." The choice then is how you do that. We have a whole suite of new technology that can support enforcement, but it does not solve it. We have the legislation challenges to then prosecute. All these large-scale protected areas are in their infancy and each one is different, and they have different characteristics. There is a global community working together to learn from that. It is the same for Pitcairn and Ascension.

Q116 **Barry Gardiner:** Let me ask this question to get us a bit more specific. It is my final question, I promise. With the Indian overseas territories marine biome, how confident or how concerned is the scientific community that the level of enforcement under Mauritian sovereignty will be able to combat the pressures of illegal fishing in that area?

Professor Koldewey: Three things. The first is that we have shared the research in the right way to support that, so the Mauritian Government can go in knowing what pressures they face, from the science that we have done. The second thing is looking at options for nature-based financing. It is complicated there but it is possible. There is a report, which I am happy to share, that we have done at ZSL to set out options that would produce the finance.

The third thing is strategies for enforcement. There is a suite of options and tools out there. The Mauritian Government are connected with the providers of those tools, and then really it is for them. It is not my decision, but they are equipped to make those decisions and to be aware of how much that costs and different approaches. Obviously, negotiations may happen on how that works. The previous announcement talked about an intent to work together for the UK and Mauritius, and that would be certainly a positive thing.

Just handing over the keys, as it were, would be extremely challenging for an area that is 640,000 square kilometres of ocean, and where we know that in covid, when the enforcement could not be done, poaching went up 19 times. It is an opportunity for poachers to come in, but there are also pluses and minuses because of the bilateral relations with different governments and how they can be used to address some of the fishing pressure—we know exactly where that comes from and why.

Chair: Thank you. It is worth saying that both this Committee and the Foreign Affairs Committee are very conscious of this and have already had discussions with Government on this matter. It is not something that we are blind to at all.

Q117 **Olivia Blake:** As the marine environment changes, how can the UK ensure that it is providing protection to species that may be displaced or migrate to different areas than they would ordinarily live in—for example, if they migrate north to waters that become warmer?

Professor Koldewey: Things are already moving, obviously. Entire fisheries have moved and entire species are moving. One specific recommendation is for the UK to ratify the High Seas Treaty, because those species pretty immediately go out into the high seas. Until we have a mechanism for protection of those species in what is over half of the surface of the ocean, and a lot more in 3D, we are always going to struggle with 30by30 and it will not be fully representative, either.

We need to link up the science with the practice. Talking to colleagues at ZSL who work on cetaceans around the UK, there are a lot of small

porpoises and dolphins that are moving. That will start to lead into encounters with fisheries that have not encountered them before. There are opportunities to be ready for that, to work on bycatch mitigation that is happening in current communities, and then also looking at the connectivity in corridors and where the threats are to those species.

For example, we know corridors where sea turtles move and where cetaceans move. There are examples in the US where the movement of cetaceans has put them smack into a shipping lane. Then there had to be a discussion with industry about how you shift that shipping lane to stop hitting whales, which is not good for anybody, and particularly not the whales. There are those examples of future planning but with specific recommendations.

How do communities that are dependent on marine resource that is changing dramatically—living in a highly uncertain Cornish tourism weather situation, and so on—plan for an uncertain future? We know that it is becoming more unpredictable. How do you deal with that? What does that mean for people who depend on the ocean? What does it mean for biodiversity? It might also mean thinking creatively about protected areas that move and protected areas that protect specific species at life stages, which is quite a familiar concept for migratory birds. We know that we have some amazing protected areas in the UK for species that are traveling globally. We need to think about that more in the ocean.

Professor Austen: We have some science that is quite good at predicting and projecting. It is not solid, but we can think about where the climate refugia are that might be better places to think about as protected areas now, if we are designating now, or being prepared to adapt. I have mentioned particularly the project MSPACE, which is part of the Sustainable Management of Marine Resources Programme, led out of Plymouth Marine Laboratory. They have some very complicated modelling that looks all around UK waters at where pressures will be in the future. We can make better use of that science. JNCC and others are using some of those models.

Q118 **Olivia Blake:** Are there any specific mechanisms that you think would be helpful to ensure that flexibility and adaptability?

Professor Austen: I am not enough of a governance expert to know how we build in byelaws, or things that would allow for temporal closures to say, "At this point we need to be prepared and willing to put in temporal closures or to change the boundaries of MPAs, because what was fit for purpose five years ago is now no longer fit for purpose for species that we might think are important now, particularly migratory species."

Professor Koldewey: Monitoring came up earlier as being critical. If we are unable to effectively and consistently monitor our protected areas over time, those changes will be harder to detect, or they will be dependent on a PhD student who happened to do their project there.

What we need is the reliability of knowing, through changes in governance and policy, that we have standard monitoring sentinel sites, or whatever else, which are resourced so that we know and can anticipate change and be ready for it. There is a lot of predictive modelling and a lot of science out there that can be used to inform decision making.

Q119 **Olivia Blake:** This is a strange question. How will you make sure that species are not wrongly deemed as invasive because they are moving? How do you maintain protection if they are new to someone's environment, and they are eating something that you are concerned about protecting? How do you keep up with nature to make sure that we are protecting the right thing in that situation?

Professor Austen: That is a lot about just adapting to climate change. We have gone beyond being able to entirely mitigate; we will now have to adapt. That means we will have to start thinking differently about a species that we previously have said was invasive, and start accepting that it is now naturalised. The seagrass that I have is a slight example of that—wrong seagrass, wrong place, but what is not to like?

Professor Koldewey: It is important to know that nature can recover. We are in London-on-sea, and if we take a minute to look out the window, we see something that was biologically dead in the 1950s and it now has multiple species, including seahorses and seals, swimming in it. The tools that we have at the moment are things such as protected areas, and that is why we are encouraging more highly protected areas that allow for us to build some resilience.

Chagos is fully protected, enormous and very far from everywhere. In 2015 and 2016, the global bleaching event, we lost 60% of the corals. They died. Last year in the fourth global bleaching event, we lost 23% of the corals. They died. That is why the climate change and biodiversity agendas are interlinked. What else do you do there except please deliver the Paris agreement?

What we can do is to get rid of invasive rats off islands, because we have learned through science that that will help the coral reef. We can take short-term actions, but we have to use the tools we have available. That is where running the science alongside the practice, but not being held up by that, is so important.

Q120 **Olivia Blake:** A final question, because I am aware of time. Do you think that the information that allows policymakers and regulators to make decisions is the right information and of adequate quality? Do you think the guidance that is produced provides sufficient protection for the species that migrate?

Professor Koldewey: Sorry; can you ask that question again?

Olivia Blake: Do you think that policymakers and regulators are getting the right information to be able to make good quality decisions about species that migrate?

Professor Koldewey: I would probably ask it the other way around—whether the policymakers are getting the right information for science. We have a bit of a blockage in that the currency of science is peer-reviewed scientific papers, which can be dull to read and intensive to keep up with. Even if you work in a narrow field with publications all the time, it is really hard to keep on top of the literature. The question is how scientists can work more closely in this interdisciplinary way to ask, "What information do you need and how do you need it? What is the right way to present the information?"

The data or the science is often there, but it is perhaps not available in the right format. We need to think more about providing the right science and consolidating science and also keeping it scientific. It is not a lobbying tool; it is a balanced, "This is what we know, good and bad, one position and another, and this is where there is certainty and uncertainty" to inform policy. I am very happy to take briefs on what is the most useful for you.

Professor Austen: It is quite an interesting question, because it makes me think about whether there is enough transparency about the information that is used and built within government bodies that make decisions, and where the challenge is going on. As academics, we are challenged by peer review for all of our papers. I have been in organisations that have had external challenge to review whether we are delivering in the best way. I wonder whether there is a role for a bit more constructive challenge from that science information.

Q121 **Olivia Blake:** I have a scientific background, and my personal view is that Government quite often do not realise that science is sometimes a continuing debate. They will get one paper and say, "That is the one", but science is an iterative process.

Professor Austen: Whether it is through collaboration, which is probably the optimum way, or whether it is through structured challenge, I am not quite sure. It would ideally be collaboration so that people are continuously informed—or, as I say, potentially through constructive challenge.

Chair: Thank you very much, Professor Austen and Professor Koldewey, for the evidence that we have heard today. That brings this sitting to a close.